Exam Asset Pricing 4.1

Vrije Universiteit Amsterdam

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Question 1: The Basics

Financial markets bring together the supply of and demand for capital. As such, it provides an intermediary function between borrowers and lenders. Banks effectively serve the same purpose.

a. Discuss the advantages and disadvantages (at least 1 advantage and 1 disadvantage) of financial markets relative to banks as intermediaries (6 points).

Consider the following article from Bloomberg (30 august 2016):

by Ben Steverman
bsteverman

August 31, 2016 – 12:00 PM CEST

The idea of an index fund seemed a bit of a joke at first. Indiscriminately buying hundreds of stocks, then accepting whatever return the market provided?

Aside from being impractical to build in the infancy of computers, an index fund was an insult to investors who prided themselves on picking the best stocks out of thousands. It sounded pretty cool to economics professors and a few of their financial geek students. Almost everyone else "thought we were crazy," Oldrich Vasicek, a mathematician who worked on one of the first index products, once recalled in an interview[1].

"They said, 'You want to buy all the dogs. ... You just want to buy whatever garbage happens to be traded?'"

Exactly.

b. Explain the abovementioned success of index funds from the point of view of portfolio theory, as well as the critique mentioned in the article (5 points).

One of the assumptions underlying the Capital Asset Pricing Model (CAPM) is mean-variance utility. In its simplest form, mean-variance utility is given by

$$U(W) = aW - \frac{b}{2}V[W]$$

In which U represents utility; W is wealth, V[W] is the variance of wealth, and b is risk aversion. Fama and MacBeth (1973) empirically verify the CAPM. They do this by estimating the following equation:

$$\tilde{R}_{it} = \tilde{\gamma}_{0t} + \tilde{\gamma}_{1t}\beta_i + \tilde{\gamma}_{2t}\beta_i^2 + \tilde{\gamma}_{3t}s_i + \tilde{\eta}_{it}.$$

In which R is the asset's return; β is the asset's market beta, s is the volatility of idiosyncratic risk, and η is the residual. The γ's are the coefficients to be estimated, and can be interpreted as the price of risk.

c. Explain the relation between risk aversion b from the utility function and the γ's from the Fama-MacBeth equation (6 points).

<PLEASE TURN OVER FOR QUESTION 2>

Question 2: Four Factor Model

The table below is taken from Fama and French (1992), and show the average returns of 100 double-sorted portfolios on size (ME or market equity) and book-to-market.

	Book-to-Market Portfolios										
	All	Low	2	3	4	5	6	7	8	9	High
All	1.23	0.64	0.98	1.06	1.17	1.24	1.26	1.39	1.40	1.50	1.63
Small-ME	1.47	0.70	1.14	1.20	1.43	1.56	1.51	1.70	1.71	1.82	1.92
ME-2	1.22	0.43	1.05	0.96	1.19	1.33	1.19	1.58	1.28	1.43	1.79
ME-3	1.22	0.56	0.88	1.23	0.95	1.36	1.30	1.30	1.40	1.54	1.60
ME-4	1.19	0.39	0.72	1.06	1.36	1.13	1.21	1.34	1.59	1.51	1.47
ME-5	1.24	0.88	0.65	1.08	1.47	1.13	1.43	1.44	1.26	1.52	1.49
ME-6	1.15	0.70	0.98	1.14	1.23	0.94	1.27	1.19	1.19	1.24	1.50
ME-7	1.07	0.95	1.00	0.99	0.83	0.99	1.13	0.99	1.16	1.10	1.47
ME-8	1.08	0.66	1.13	0.91	0.95	0.99	1.01	1.15	1.05	1.29	1 55
ME-9	0.95	0.44	0.89	0.92	1.00	1.05	0.93	0.82	1.11	1.04	1.22
Large-ME	0.89	0.93	0.88	0.84	0.71	0.79	0.83	0.81	0.96	0.97	1.18

a. Explain why this table represents a rejection of the CAPM (5 points).

The table from Fama and French (1992) shows that the value premium (the difference between the Low book-to-market portfolio and the High book-to-market portfolio) decreases with market equity. More recent research shows that the value premium has now completely disappeared for large cap stocks.

b. What does the disappearance of the value premium for large cap stocks imply for the "risk versus characteristics" debate concerning value? (6 points).

In his guest lecture, Dennis Karstanje (Robeco) distinguished between momentum from underreaction and momentum from overreaction. We also know that the results in the momentum study by Jegadeesh and Titman (1993) are mainly driven by the past *winners*, and the results in the mean-reversion study by DeBondt and Thaler (1985) are mainly driven by the past *losers*.

c. What can we conclude from the results of Jegadeesh and Titman and DeBondt and Thaler regarding the overreaction versus underreaction distinction? (6 points).

<PLEASE TURN OVER FOR QUESTION 3>

Question 3: Market Frictions

Shleifer and Vishny (1997) argue that real-world arbitrage is not riskless and not without costs; there are limits to arbitrage. They introduce the notion of 'performance based arbitrage'. Related to this, DeLong, Shleifer, Summer and Waldman (1991) show that noise traders might not lose money, based on the 'create space effect'.

a. Explain the relation between 'performance based arbitrage' and the 'create space effect' (5 points).

An important market friction is (lack of) liquidity. At the same time, liquidity is not a very sharply defined concept, but we know that there is a time-dimension as well as a price-impact dimension. Now assume that you run a large mutual fund, and want to make a large transaction.

b. Explain how there is a trade-off between the time and the price-impact dimension of liquidity for the mutual fund (6 points).

Brunnermeier and Pedersen (2009) study the interaction between funding liquidity and market liquidity.

c. Explain how and why the relation between funding liquidity and market liquidity is nonlinear (6 points).

<PLEASE TURN OVER FOR QUESTION 4>

Question 4: Behavioral Finance

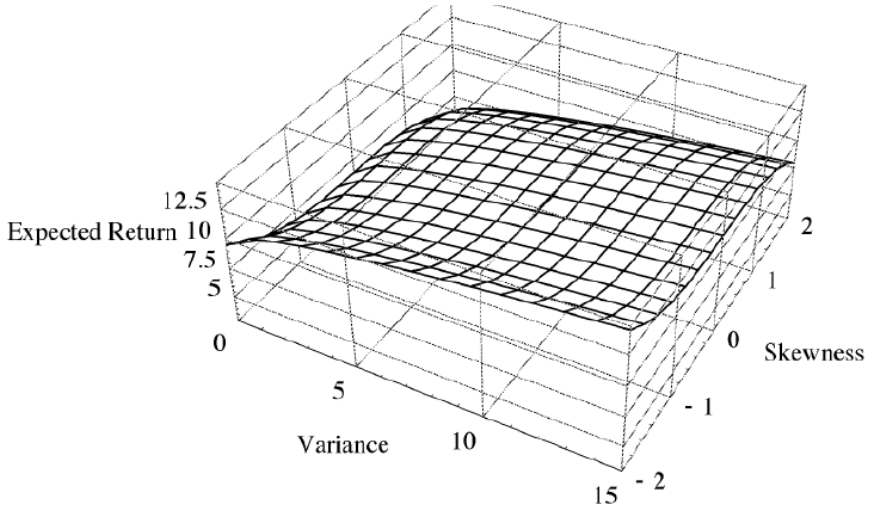
Baker and Wurgler (2006) study whether certain stocks are more affected by sentiment than others, without applying the infamous Fama-MacBeth methodology.

a. Explain which steps you need to make to find out whether market sentiment is a priced factor in the cross section of stock returns using Fama-MacBeth (6 points).

From prospect theory we know that people tend to overestimate very small probabilities and underestimate very large probabilities. We call this probability transformation. Now consider a stock with a highly positive skewness.

b. Based on probability transformation, explain whether you expect the stock to be overpriced, underpriced, or correctly priced (6 points).

Harvey and Siddique (2002) show that there is a relationship between skewness and expected returns, which they illustrate using the following graph



c. Explain why expected return is *higher* for *lower* levels of skewness (5 points).

<PLEASE TURN OVER FOR QUESTION 5>

Question 5: Disagreement

The following table is taken from Diether, Malloy, and Scherbina (2002), who study the effect of disagreement on the cross-section of stock returns. The table shows estimation results of the four factor model on 5 disagreement portfolios.

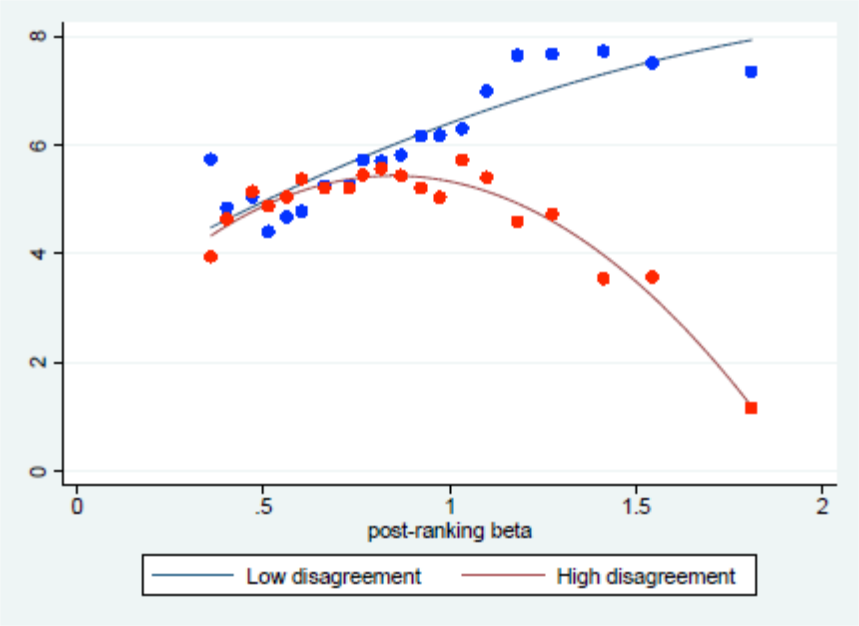
Portfolio	Alpha (%)	Factor Sensitivities				Adj. R^2 (%)
		$R_M - R_F$	SMB	HML	UMD	
$D1$ (low-dispersion)	0.13	1.06	0.32	0.26		88.42
	(0.88)	(39.78)	(3.17)	(2.83)		
	0.27	1.06	0.33	0.21	−0.13	89.18
	(2.14)	(43.33)	(4.17)	(2.50)	(−2.01)	
$D2$	0.03	1.06	0.40	0.22		92.64
	(0.30)	(44.13)	(5.76)	(2.95)		
	0.17	1.06	0.41	0.17	−0.12	93.35
	(1.57)	(56.96)	(7.98)	(2.44)	(−2.81)	
$D3$	−0.07	1.08	0.49	0.15		95.08
	(−0.82)	(42.71)	(6.59)	(2.91)		
	0.09	1.07	0.51	0.09	−0.14	95.94
	(1.26)	(52.92)	(9.46)	(1.98)	(−4.12)	
$D4$	−0.18	1.11	0.67	0.14		96.47
	(−2.56)	(52.79)	(12.74)	(3.31)		
	−0.03	1.10	0.68	0.08	−0.14	97.17
	(−0.40)	(63.19)	(19.12)	(2.00)	(−5.21)	
$D5$ (high-dispersion)	−0.58	1.15	0.88	0.13		93.74
	(−4.78)	(38.53)	(16.16)	(3.19)		
	−0.35	1.15	0.91	0.05	−0.20	94.92
	(−2.62)	(45.66)	(26.12)	(1.11)	(−5.18)	

a. Explain why the high dispersion portfolio D5 has a significantly negative alpha while the low dispersion portfolio D1 has a significantly positive alpha (5 points).

Beber and Pagano (2013) study the effect of short sale constraints on market quality. The find, overall, that short sale bans are bad for market quality.

b. Explain why the short sale ban had a larger effect on small cap stocks than on large cap stocks (6 points).

Hong and Sraer (2012) combine disagreement and short sale constraints. One of their main results is given by the following figure, which shows the relation between beta and expected returns for periods of high and low disagreement:



c. Explain why to this figure represents a possible explanation for the empirical failure of CAPM (6 points).

<PLEASE TURN OVER FOR QUESTION 6>

Question 6: Delegated Asset Management

Asset managers typically invest very large sums of money. As a result, it is hard for them to invest in small cap stocks, due to limited liquidity.

a. Explain why the asset management industry could be an explanation for the size anomaly (4 points).

Carhart (1997) finds that there is persistence in in raw returns of mutual funds, but that there is no persistence in performance (i.e., four-factor alpha).

b. Explain this paradoxical difference between persistence in raw returns and persistence in performance (5 points).

Berk (2005) argues that mutual funds should not have persistence in performance in an efficient market.

c. Explain which mechanism eliminates persistence in performance (6 points).

<END OF THE EXAM>