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2604697 Financial Markets, Institutions and Instruments
Homework #1
(Due: 16th (full-time) 21st (flexible) October 2023, 16.00 hrs.)

Q1. Response to each of the following comments in the context of EMH. *[3 points]*

1.1. If the capital market is efficient, it implies that market participants could use currently available information to accurately forecast future stock price changes.

The statement is not true. This is because forecast error can occur even though we have efficient capital market. Nonetheless, market will not systematically misprice (→ totally random) securities. In other words, on average, forecast error should be zero and this implies that the market unbiasedly gives prices to securities.

1.2. A good part of a company's future prospects are predictable. Given this fact, returns on stocks can't possibly follow a random walk. * random walk model

False, return on stocks can follow a random walk. This is because, in efficient market, predictable future prospects (not the same as predictable price) of a company are considered as today's information, which are already reflected in stock price. Thus, if price changes are random and unpredictable, then return on stocks can follow a random walk.

1.3. If the market is efficient and the current security price already fully reflects all available and relevant information, we should expect the current price of a security to be an unbiased estimator of its future price. E[error term] = 0 → unbiased estimator of future return

According to Martingale model, current stock price is an unbiased estimator of the future price if the current price fully reflects all information ($E[P_{i,t+1} | \phi_t) = P_{i,t}$ and $E[r_{i,t+1} | \phi_t] = 0$). However, this is unrealistic because it implies that the stock will have zero return on average but risky assets should generate positive return on average in long run (people are risk-averse).

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Q2. Investors expect the market rate of return in the coming year to be 12%. The T-bill rate is 4%. Heavy Metal Industries' stock has a beta of 0.5. The market value of its outstanding equity is $100 million. *[2 points]*

2.1. Using the CAPM, what is your best guess currently as to the expected rate of return on Heavy Metal Industries' stock? You believe that the stock is fairly priced.

CAPM : $E[r_i] = r_f + \beta_i (E(r_m) - r_f) = 4\% + 0.5(12\% - 4\%) = 8\%$.

From CAPM, expected rate of return on Heavy Metal Industries' stock should be 8%.

2.2. Suppose now that during the coming year, there are 2 major events occur. First, the market return actually turns out to be 10%. Second, the firm wins a major lawsuit with the settlement value of $5 million. Heavy Metal Industries' stock return during the coming year turns out to be 10%. What is your best guess as to the settlement the market previously expected Heavy Metal to receive from the lawsuit? The magnitude of the settlement is the only unexpected firm-specific event during the year.

- From $r_m = 10\%$ and CAPM, $E[r_i] = 4\% + 0.5(10\% - 4\%) = 7\%$.
- The actual stock return of 10% is 3% greater than estimated expected return calculated from CAPM (7%).
- The unexpected firm-specific surprise is 3%. Thus, the unexpected magnitude of settlement is 3% × $100 million (outstanding equity) = $3 million.

∴ The settlement that the market previously expected is 5 - 3 = $2 million.

Q1		
1.1	EMH does not imply that the current information could be used to forecast future price accurately.	
1	That is EMH does not imply the market has perfect foresight.	
	What EMH implies is that investors do not systematically misforecast future prices/returns.	
	That is average forecast errors is zero.	
1.2	Given this situation, future returns could still be random.	
1	If the market is efficient, the predictable parts of future prospects should already	
	been incorporated into the current price (i.e., the μ part of RW model).	
	The unpredictable part of future prospects (i.e., the ε part of RW model) will cause	
	future return to be random.	
1.3	I agree with this statement. Under this condition, only new future information will cause	
1	price to change. As the new information is random (i.e., equal chance of good and bad news),	
	the expected effect of new information is zero. This leads to the current price being	
	an unbiased estimator of future price.	

Q2							
		E[rM]	12%				
		rF	4%				
		Beta	0.5				
		MV[EQ]	100	mio			
2.1		E[r]	8.00%	from CAPM			
1							
2.2		rM	10%				
1		New E[r] (due to market-wide effect)			7.00%	from CAPM	
		Actual r	10%				
		Return due to firm-specific event			3.00%		
		This part of actual return is driven by the settlement.					
		As the firm is initially worth $100 mio, the surprising amount					
		of the settlement is			3	mio	
		The actual settlement is			5	mio	
		Hence, the prior expectation for the settlement was					
					2	mio	