1 Definitions

1. Define the law of one price, and the no-arbitrage condition.
2. For the existence, unicity and characteristics of the pricing vector (or stochastic discount factor), what are the relations to the law of one price and the no-arbitrage condition?
3. Define a complete vs. incomplete market?
4. What is the joint efficient market hypothesis?
5. Briefly describe the Fama-French evidence on the size and value premia, and why it is a puzzle relative to the CAPM model.
6. Briefly describe what a factor model is.

2 Arrow-Debreu Securities

Suppose there are 3 possible states at $t = 1$, $\{s_1, s_2, s_3\}$. We assume portfolio formation.

Let the 3 existing securities be given by:

$$X = \begin{pmatrix} 1 \\ 2 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 2 \\ 2 \\ 2 \end{pmatrix}$$

1. Are there redundant securities?
2. Is the market complete?
3. let the price vector be given by
$$P = \begin{pmatrix} 10 \\ 2 \\ 2 \end{pmatrix}$$
is the law of one price satisfied? is the no arbitrage condition satisfied?
4. Now, let the price vector be:
$$P = \begin{pmatrix} 0.5 \\ 0.2 \\ 0.4 \end{pmatrix}$$
is the law of one price satisfied? is the no arbitrage condition satisfied? is there a pricing kernel in the asset space? (if yes, what is it) is it the only one? can you find a strictly positive pricing kernel?