

Decision Models & Analytics

Portfolio Optimization

Suppose we are providing investment advice to Ms. Liu, who has some savings to invest. She has identified five stocks that she would be interested in investing in:

- Apple Inc. (AAPL)
- Amazon.com, Inc. (AMZN)
- Walt Disney Co. (DIS)
- Whole Foods Market, Inc. (WFM)
- Wal-Mart Stores, Inc. (WMT)

Ms. Liu is stumped by the question of how to allocate her investment among these five stocks. She would like to maximize the annual return and to minimize the risk. To help Ms. Liu, we collected data from Yahoo Finance on the daily prices of the five stocks over a ten-year period, from 10/17/2005 to 10/15/2015. See the table below and the data file.

Date	AAPL	WFM	WMT	AMZN	DIS
10/15/2015	111.80	33.64	59.33	562.36	107.89
10/14/2015	110.21	32.92	60.03	544.83	105.73
10/13/2015	111.79	33.24	66.73	548.90	106.59
10/12/2015	111.60	33.65	66.93	550.19	106.35
10/9/2015	112.09	34.24	66.69	539.80	105.56
10/8/2015	109.50	34.15	66.88	533.16	104.61
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10/25/2005	7.49	32.30	37.16	46.17	20.74
10/24/2005	7.59	32.27	37.83	46.93	20.55
10/21/2005	7.44	31.24	37.43	45.95	20.27
10/20/2005	7.50	30.86	37.34	45.01	20.25
10/19/2005	7.34	30.97	37.65	45.86	20.67
10/18/2005	6.97	29.94	36.95	44.65	20.63
10/17/2005	7.14	29.79	37.04	45.02	20.72

How would you help Ms. Liu choose her portfolio allocation?