**Lecture 7**

**Example 1**

Assume that the market is in equilibrium.

1. Describe and draw the CML, if you know:

= 0,04, = 0,10 a = 0,09

1. Consider three securities and create SML. Thus add the concrete security to the SML, if you know:

, ,

**Example 2**

In the following table we have three securities, market portfolio and risk-free asset. Create SML and add the securities to the SML. After calculate the betas.

|  |  |  |  |
| --- | --- | --- | --- |
|   | **ri** | **correlation i a M** | **sigma i** |
| **S1** | 15,5 | 0,9 | 20 |
| **S2** | 9,2 | 0,8 | 9 |
| **S3** | 11,2 | 0,5 | 15 |
| **MP** | 12 | 1 | 12 |
| **rf** | 5 | 0 | 0 |

**Example 3**

Make estimation for betas and expected returns of each security. Then calculate the optimal portfolio, if short sell is allowed. What will be the return of the portfolio and the risk. After that decide how much of the whole risk is the systematic and unsystematic risk. The risk free asset is 3 % p. a.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Day | A | B | C | D | E | Market Index |
| 1 | 570 | 98,4 | 669,1 | 53,9 | 103,5 | 333,4 |
| 2 | 569,0 | 98,2 | 715 | 53,8 | 103 | 338,9 |
| 3 | 563,8 | 96,6 | 725 | 53,2 | 101,9 | 346,8 |
| 4 | 575,3 | 96,5 | 716 | 53,9 | 100 | 347,8 |
| 5 | 595,1 | 97 | 725 | 55,6 | 101,6 | 350,9 |
| 6 | 602,8 | 98,4 | 727,5 | 57 | 101,2 | 348,1 |
| 7 | 601,8 | 99 | 716,6 | 54,7 | 102 | 349,4 |
| 8 | 601,3 | 105,4 | 721,5 | 55,6 | 101,6 | 354,2 |
| 9 | 614,8 | 116,9 | 718,6 | 55,9 | 101,7 | 361,1 |
| 10 | 628,1 | 119,6 | 717,8 | 56,5 | 100,5 | 372,7 |
| 11 | 629 | 113,2 | 729,5 | 56,4 | 103,4 | 371,6 |
| 12 | 618,6 | 109,5 | 702,6 | 54,9 | 102,3 | 395,9 |
| 13 | 638 | 105 | 750,8 | 55 | 102,8 | 397,6 |
| 14 | 656 | 104,9 | 789,7 | 56,6 | 99,8 | 406,1 |
| 15 | 662 | 105,3 | 799,1 | 56,9 | 101,4 | 400,7 |
| 16 | 669,4 | 105,7 | 805 | 56 | 100,9 | 396,6 |
| 17 | 700,7 | 108,5 | 870 | 56,7 | 95,3 | 398,2 |
| 18 | 709 | 110,3 | 937,6 | 57 | 65,7 | 400,9 |
| 19 | 713 | 112,6 | 948,8 | 56,8 | 99,4 | 399,1 |
| 20 | 708 | 113,9 | 951,5 | 56,5 | 99,2 | 401,1 |