Mean-Variance Portfolio Optimization using Markowitz's Theory

Desired Portfolio Return 0.15 ← Constraint in Solver

Stock Returns

ATT	GMC	USX	TBILL
0.111	0.223	0.122	0.05
0.114	0.46	5.00E-03	0.05
0.323	-0.09	0.111	0.05
1.00E-03	-0.107	0.054	0.05
-0.209	0.12	0.169	0.05
0.223	0.309	-0.035	0.05
0.26	0.411	0.133	0.05
0.21	0.05	0.732	0.05
0.144	0.1	0.021	0.05
0.412	0.445	0.131	0.05
-0.013	0.123	6.00E-03	0.05
0.553	0.55	0.908	0.05
Mean Returns 0.17742	0.216167	0.19625	0.05

Portfolio Allocation

ATT	0.136
GMC	0.392
USX	0.120
TBIL	0.352
Total	1

Values to be changed by Solver

Constraint in Solver

Covariance Matrix

	ATT	GMC	USX	TBILL	
ATT	0.041227	0.023	0.030563	3.5E-35	
GMC	0.022661	0.048	0.015001	-2.5E-34	
USX	0.030563	0.015	0.090806	-1.4E-34	
TBIL	3.5E-35	-2E-34	-1.4E-34	5.3E-35	Porfolio Variance
Variances	0.002471	0.009	0.00249	-3.2E-35	0.01425	← Value to be minimized

INSTRUCTIONS

Set your desired portfolio return

Start the Excel Solver and

    i)   Minimize the Portfolio Variance

    ii)   Change "By changing variable cells" to the range of cells containing the Portfolio Allocation

    iii)   Set the constraints (the total portfolio allocation must add up to one, and the portfolio return should be the desired value)

    iv)   Click Solve. You should now find that you Portfolio Allocation has changed.

NOTE: You may need to enable Solver through the File > Options > Add-Ins > Manage menu

Mean Variance Portfolio Optimization With Excel

Craig W. Holden

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