

University of California, Los Angeles  
Department of Statistics

Statistics C183/C283

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Project 5

Please answer the following questions assuming the single index model holds:

- a. Assume the single index model holds. Use only the stocks with positive betas in your data. Choose a value of  $R_f$  and find the optimal portfolio (point of tangency) using the optimization procedure as discussed in handout #12: [http://www.stat.ucla.edu/~nchristo/statistics\\_c183\\_c283/statc183c283\\_tangent.pdf](http://www.stat.ucla.edu/~nchristo/statistics_c183_c283/statc183c283_tangent.pdf) . The approach here is based on  $\mathbf{Z} = \Sigma^{-1}\mathbf{R}$ .
- b. Adjusting the betas:  
Adjust the betas using Blume's and Vasicek's techniques. For the Blume technique use the two periods: 01-Jan-2015 to 01-Jan-2020 and 01-Jan-2020 to 31-Mar-2023. For the Vasicek technique use only the period 01-Jan-2014 to 01-Jan-2019.

Note:

For the Blume technique our goal is to adjust the betas in 01-Jan-2020 to 31-Mar-2023 to be better forecasts for the betas in period 01-Apr-2023 to 01-Apr-2027.

For the Vasicek technique our goal is to adjust the betas in 01-Jan-2015 to 01-Jan-2020 to be better forecasts for the betas in period 01-Jan-2020 to 31-Mar-2023.

- c. Compute PRESS only for the Vasicek technique. (You can compute the PRESS only for the Vasicek technique because you have the actual betas in the period 01-Jan-2020 to 31-Mar-2023.)