FINC-585-3 -- PhD Finance Seminar
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Assignment 1

The objective of this assignment is for you to gain familiarity with basic properties of univariate equity-index return series and standard test statistics gauging the existence of return dependence or weak-form predictability. A few useful technical tricks are also touched on in the exercises.

1) Provide a sketch of a proof for the Hausman Principle, given on page 11.

2) Derive the asymptotic distribution for the VD statistic on page 12.

3) Do the exercise on page 13 (on the VR statistic with overlapping returns). Hint: If it seems tricky, you can check the literature, e.g., Lo & MacKinlay publications, for inspiration.

4) Hong, Linton and Zhang (2017, JFEc) (HLZ) provide a correction and extension to the Variance Ratio statistic explored by Lo & MacKinlay (no formal proofs needed below).

    a) Identify the changes in assumptions they introduce relative to Lo & MacKinlay.
    b) What are the advantages of their proposed new assumptions?
    c) State the limiting distribution result for the **univariate VR statistic** in their paper.

5) Apply the Spearman Correlation Test on page 4 of the notes to explore dependence for the daily S&P 500 index returns.

    a) First, do the test as suggested for January 1991-December 2006 period.
    b) Second, do the same test for the sample period 2007-2022.
    c) Repeat the above, but using the absolute returns in lieu of the returns.

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6) Implement the Lo & MacKinlay Variance Ratio test for the CRSP value-weighted and equal-weighted indices over their sample period, and for the periods 1991-2006 and 2007-2022. Try to assess significance according to the Lo & MacKinlay and HLZ robust limiting distributions.