Empirical Asset Pricing

You have 1.5 hours to complete the exam. The exam is open-book. Good luck!

1. In a recent Journal of Finance article, Linnainmaa (2013) argues that the CRSP Survivorship-bias-free mutual fund database is affected by "Reverse Survivorship Bias". We will proceed in steps to understand this concept.

   (a) Define the concept of survivorship bias. Describe how survivorship bias can distort the inference that is drawn from a data set reporting, for example, hedge fund returns.

   (b) Define the concept of backfill bias and provide an example of a data set that is affected by backfill bias. How does this bias distort the inference about peformance? How would you correct for backfill bias?

   (c) If you had the power to design a dataset, how would you construct it to avoid that it leads to a survivorship bias?

   (d) Let us now come to "Reverse Survivorship Bias". Let us focus on a data set reporting returns of mutual funds. Assume that mutual funds are closed down (and stop reporting to the data set) after bad performance. These funds are kept in the data set, even after they die. So, the standard survivorship bias is not present here. The bad peformance of these funds can be due to either low managerial skill (negative alpha) or to negative idiosyncratic shocks. Suppose that, using this data set, you want to infer managerial skill. In order to do that, for each fund, you run time-series regressions of fund returns on a set of factors f_t (The identity of the factors is not important in this case. You can assume that you are using the 'right' asset pricing model)

   $$R_{i,t}^e = \alpha_i + \beta_i f_t + \varepsilon_{i,t}$$

   You use the estimated alpha $\hat{\alpha}_i$ to make inferences about the manager's skill. "Reverse survivorship bias" has to do with the fact that your inference of α_i is biased *downward*. Can you provide an intuitive explanation for why $\hat{\alpha}_i$ is biased downward in the presence of a selection rule such that funds with low returns stop operating? [Hint: If a fund dies, it must have had a series of bad return realizations. These can be due to either a low α_i or a low ε_i]

   (e) How is the sample mean of estimated alphas (for both live and dead funds) affected by "Reverse Survivorship Bias"?

2. In a forthcoming article in the Journal of Finance, Mancini, Ranaldo, and Wrampelmeyer study the liquidity of foreign exchange (FX) markets. They focus on the exchange rate of nine different currencies against the US dollar (USD). Using intraday data on FX transactions, they construct a daily liquidity series for each currency. The liquidity measure accounts for price impact and the bid-ask spread. The construction details are not relevant here. They end up with a daily time-series of liquidity for each of the nine currencies.

(a) Suggest a way to construct an aggregate liquidity measure for the FX market starting from the these nine time-series of currency liquidity.

(b) Here's the aggregate liquidity series constructed by these authors for the FX market. Comment on the behavior of this series
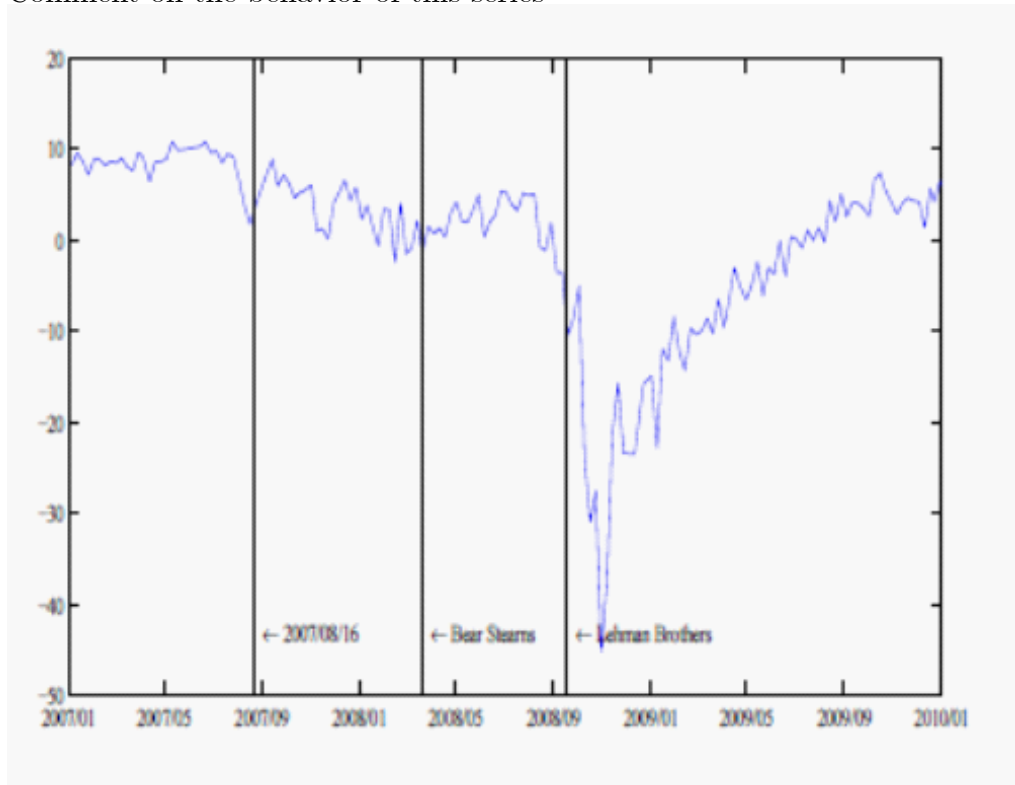
(c) They use FX liquidity to explain the returns on carry trade strategies. A carry trade strategy borrows in low-interest rate currencies (e.g. the Japanese Yen or the Swiss Franc) and invests in high-interest rate currencies (e.g. the Australian or the New Zealand Dollars). On average, carry trade strategies are profitable. The profitability of a carry trade is a violation of the uncovered interest rate parity (UIP), which states that the difference in interest rates should be compensated by the loss from the devaluation of the high yielding currency. In this sense, carry trade profitability is an anomaly for the FX market. The authors argue that this profitability is the result of liquidity risk. How would you test if liquidity risk explains the profitability of carry trade returns for each of the nine currencies against the USD? Be formal in your answer. In particular, specify what statistical test you would execute.

(d) The authors find that a liquidity risk factor, along with a FX market risk factor, explain the carry trade returns on these currencies. Suggest an economic interpretation for the finding that liquidity risk explains carry trade returns.