

Empirical Asset Pricing

You have 2 hours to complete the exam. The exam is open-book. Good luck!

1. Cederburg and O'Doherty have a paper in the April 2106 issue of the Journal of Finance by the title "Does it pay to bet against beta?". The abstract reads:

Prior studies find that a strategy that buys high-beta stocks and sells low-beta stocks has a significantly negative unconditional capital asset pricing model (CAPM) alpha, such that it appears to pay to "bet against beta." We show, however, that the conditional beta for the high-minus-low beta portfolio covaries negatively with the equity premium and positively with market volatility. As a result, the unconditional alpha is a downward-biased estimate of the true alpha. We model the conditional market risk for beta-sorted portfolios using instrumental variables methods and find that the conditional CAPM resolves the beta anomaly.

- (a) Briefly describe how you would build a trading strategy that 'bets against beta'.
 - (b) Elaborating on the claims in the abstract, explain in formulas why the fact that the beta of the high-minus-low beta portfolio varies with the market risk premium can account for the negative unconditional alpha of this portfolio
 - (c) Where the abstract talks about instrumental variables, you can read 'conditioning variables'. Explain in formulas how the use of conditioning information can eliminate the bias in the unconditional alpha
 - (d) How would you use conditioning variables in an empirical specification to estimate a conditional alpha?
 - (e) Specify the timing of the conditional variables with respect to the risk factors in your empirical specification
 - (f) Propose another methodology to test whether the time variation in beta can explain the betting-against-beta anomaly. Speak about the advantages and drawbacks of this alternative approach.
2. This question pushes you to reflect about market efficiency, risk, and risk bearing in the market. You are asked to think creatively and make use of your broader finance knowledge.

Lucca and Moench in a 2015 Journal of Finance paper talk about the Pre-FOMC Announcement Drift. Here is their abstract:

We document large average excess returns on U.S. equities in anticipation of monetary policy decisions made at scheduled meetings of the Federal Open Market Committee (FOMC) in the past few decades. These pre-FOMC returns have increased over time and account for sizable fractions of total annual realized stock returns. While other major international equity indices experienced similar pre-FOMC returns, we find no such effect in U.S. Treasury securities and money market futures. Other major U.S. macroeconomic news announcements also do not give rise to preannouncement excess equity returns. We

discuss challenges in explaining these returns with standard asset pricing theory.

Here are more details. Members of the FOMC—the Federal Reserve’s monetary policy-making body—regularly convene at scheduled meetings to make monetary policy decisions. These FOMC meetings have taken place eight times per year since the early 1980s, and were scheduled much more frequently before then. Since 1994 the decisions of scheduled meetings have been announced to the public within a few minutes of 2:15 pm Eastern Time (ET). Prior to 1994 monetary policy decisions were not announced, and investors had to infer policy actions through the size and type of open market operations (OMOs) in the days following each meeting.

We show that, since 1994, the S&P500 index (SPX henceforth) has on average increased 49 basis points in the 24 hours before scheduled FOMC announcements. These returns do not revert in subsequent trading days and are orders of magnitude larger than those outside the 24-hour pre-FOMC window. As a result, about 80% of annual realized excess stock returns since 1994 are accounted for by the pre-FOMC announcement drift. The statistical significance of the pre-FOMC return is very high: a simple trading strategy of holding the index only in the 24 hours leading up to an FOMC announcement would have yielded an annualized Sharpe ratio of 1.1 or higher. On the day of the announcement, the returns from the time of the announcement to the close are practically zero.

- (a) One possible explanation is that pre-FOMC returns reflect a premium required by equity investors for bearing nondiversifiable risk. FOMC decisions provide information about interest rates and the economic outlook, and therefore systematic risk is likely high on FOMC announcement days. Discuss how this explanation would account for the drift and discuss its plausibility.
- (b) As an alternative explanation, a reallocation of market risk across investors may result in a higher premium even in the absence of higher systematic risk in the pre-FOMC window. In the paper, the authors discuss a model by Duffie (2010) that features time-varying market participation due to slow-moving capital that can generate price drifts ahead of scheduled announcements. Discuss how this explanation would account for the drift and discuss its plausibility.
- (c) Another possible explanation for the pre-FOMC drift is that returns were not expected by investors, and thus are not compensation for risk, but instead were the result of unexpectedly good news. Monetary policy news has arguably been positive on average over the sample period as the federal funds rate has trended down since the early 1980s, reaching historically low levels at the end of the sample. Discuss how this explanation would account for the drift and discuss its plausibility.
- (d) Provide any other plausible explanation for the drift that you can think of and explain how it can account for the drift.