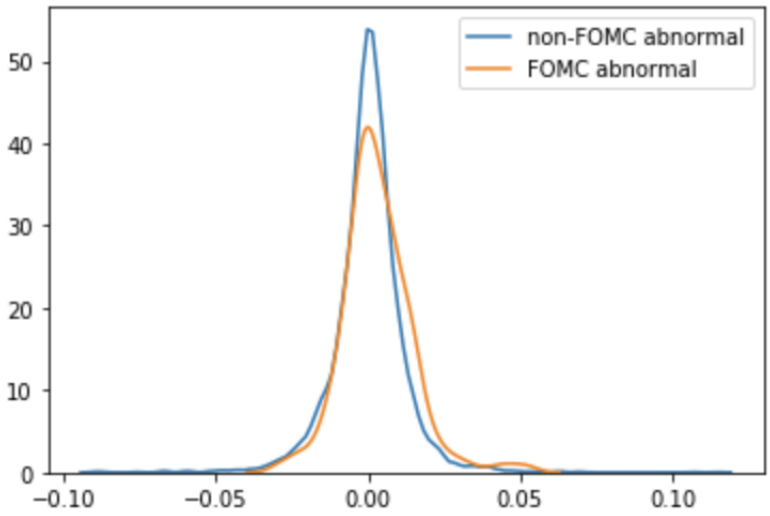
1.(a) False. The true parameter values of baseline model may change over time. If increasing the length of estimation window too much, the estimated baseline model may not be appropriate to estimate normal returns within the event window.

(b) Since event windows overlap across securities, the abnormal returns are more likely to be correlated contemporaneously or at lags. In this case, we can form a portfolio of the securities with the same event window. Then we can follow with the same testing procedure for individual securities from here on. Another method is to conduct an event study via (panel) regression.

2.(a)
(1) The event is the FOMC announcement. The event window is $T_1 = 0$ to $T_2 = 1$ (the day when the announcement is made).
(2) The reference model for normal returns is the constant-mean-return model.
(3) Null: return distribution (including mean and variance) unchanged on FOMC announcement dates.
(4) On each FOMC announcement day, we estimate the normal return using the average of past year daily SP500 returns, and compute the abnormal return as the difference between announcement day return and this normal return. Assume in the reference model, the abnormal returns are iid, and follow a distribution of $N(0, \sigma^2)$. Under the null hypothesis, this announcement day abnormal return will follow the same distribution as non-announcement day abnormal returns. When aggregated, announcement day abnormal returns' mean divided by their standard error will asymptotically follow $N(0, 1)$.
(5) Compare the z-score to the 95% critical value from $N(0, 1)$.

(b) The z-score is 3.3437, greater than 1.96. Therefore, we reject the null hypothesis under 95% confidence level.

(c)



(d) Since the announcement day abnormal returns are significantly positive, and announcement day abnormal returns approximately follow a normal distribution and center at a positive level, I would recommend long the SP500 ETF at the market close 1 day before the announcement day, and clear the position at the market close on the announcement day.

Practical issues: 1. Transaction costs (bid-ask spread) and other fees and taxes may reduce profit. 2. May not be able to exactly trade at market close, so need to trade maybe 10 minutes before the market close. Such time discrepancy is not tested. 3. If this FOMC effect is discovered by many people, the potential profits may be driven away.

(e) i. The FOMC return is not significant post 2016, since the z-score is -0.5970. In this case, we cannot reject the null hypothesis.

ii. Use US 10-year treasury yield (TNX) in this question. The FOMC does not seem to have a significant effect on TNX. From 1993 to 2016, the z-score is -0.1515, which is not significant. Post 2016, the z-score is -1.6126. The FOMC seems to be more significant after 2016 than before 2016. However, since after 2016, we only have 10 FOMC dates, which may not be sufficient to compute an accurate z-score.