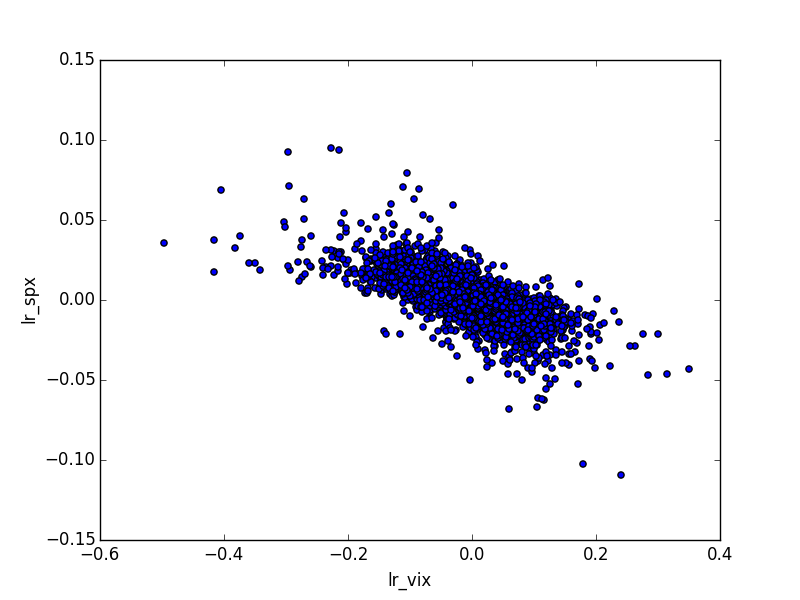
NBA 6450

Analysis package: anaconda (Python)

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2016

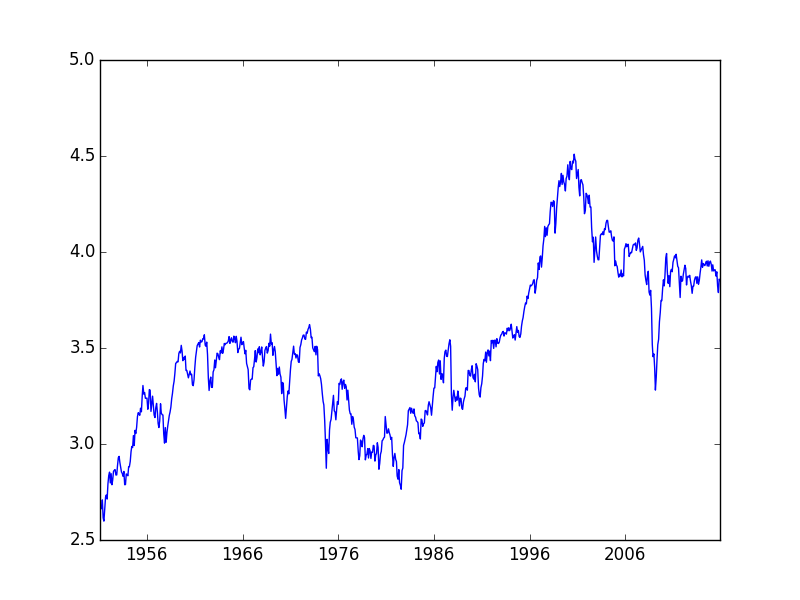
Problem 1



1. S&P500 std dev: 1.1359, VIX std dev: 6.2756, correlation: -0.7132
2. Slope: -0.1291, intercept: -0.0003. It is significant because P-value is 0.
3. Slope = correlation \* stddev(y)/stddev(x) -> beta = corr\*stddev(S&P500)/stddev(VIX)
4. S&P500 skew: 0.2400, VIX skew: -0.6745. No this is not in line with the market wisdom as seen from 1) the positive skew in S&P500 implies large declines in the stock market are less likely than large stock market rallies; 2) the negative skew in VIX implies large increases in volatility are less likely than large drops in volatility.
5. We see a negative correlation between aggregate stock return and volatility. As seen in the linear regression of S&P500 returns on VIX returns, there is a negative slope between the returns of S&P500 and VIX returns that is statistically significant. This implies an inverse relationship between VIX returns and S&P500 returns.

Problem 2

1. Log Price/Dividend Ratio



1. Correlation: 0.9000
2. Log P/D Ratio: Persistence: 0.9922, Half Life: 88.5343 months

Log CAPE Ratio: Persistence: 0.9960, Half Life: 173.5174 months

1. Based on the Dickey Fuller Test:

P-value for Log P/D Ratio: 0.2765

P-value for Log CAPE Ratio: 0.4835

Based on the P-values not < 0.05, it is not econometrically sound to use the P/D ratio or CAPE ratio in regressions.