

Empirical Asset Pricing
Problem Set 7
due 12 hours before the class

I've uploaded OptionMetrics data on VIX option prices (VIXoptions.csv) and standardized implied volatilities (VIXoptionsStd.csv). The two files have different structure in that the first one provides actual number days to maturity of any given option and the second one uses a standardized set of maturity times, so it interpolates between the neighboring actual dates. You will need only VIX forward prices from the second file. Match these forward prices with the respective options in the first file. You'd have to undo the aforementioned interpolation.

Problems

1. Construct implied volatilities using the Black (1976) model of options on futures (here we have forwards).
2. What's an average smile? How does the smile look when short-term VIX is high/low and the long-term VIX is high/low (consider all combinations)?
3. Could you conjecture a model of VIX that would be able to capture the facts?
4. What should a model of SPX be to deliver your preferred model of VIX?