Models of Price Volatility

# Price Volatility in Markets without Counterparty Risk

I develop an original model of price volatility. In this section, I model a market with no counterparty risk. There are two sets of agents: market-makers who post bid and ask prices, and liquidity traders who post market orders. Assume that order-flow (net market-buy or market-sell orders) in one period are i.i.d Normal with variance :

Market-makers adjust their next period price based on the current period’s observed order-flow:

Where: is a parameter for the market-makers sensitivity to order-flow.

The expression for the volatility in this case is:

# Price Volatility in Markets with Counterparty Risk

I modify the above model to include additional order-flow dynamics related to counterparty risk. Assume that when the current period’s order-flow is negative, there is additional sell-off of the risky asset in the next period due to (perceived) additional counterparty risk, and when the current period’s order flow is positive, there is additional buying of the risky asset in the next period due to (perceived) reduction in counterparty risk. The order-flow dynamics are now given by:

Where:

The expression for the price chance becomes:

Where I have used the fact on the 3rd line and that .