Global Liquidity, Risk Premiums and Growth Opportunities

Albert S. “Pete” Kyle
University of Maryland

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“Global Liquidity, Risk Premiums and Growth Opportunities”

By Gianni De Nicolo and Iryna Ivaschenko

Discussion by Albert S. “Pete” Kyle

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“Simple Model”

\[ V_t = V_{t-1} + \lambda q_t + \sigma \varepsilon_t \]

“Change in value”

= “order flow” + “announcements”

\[ \lambda q_t = \text{price effect of trading} \]
\[ \sigma \varepsilon_t = \text{effect of public announcements} \]

\[ P_t = V_t + c_t q_t \]

“Price” = “Value” + “bid-ask bounce”
Or Not So Simple

• Rational, Risk Neutral “Market Makers”
  – Implies order flow effect has martingale property
  – Implies announcement effect has martingale property
  – Simplification to assume past order flow and announcements do not affect current price fluctuations

• Competition (zero profits) among Market Makers
  – Implies bid-ask bounce effect is zero
Market Efficiency

• Rational, Risk Neutral, Competitive Market Makers
  – Implies order flow and announcement effect follow martingale, i.e. no serial correlation at any lag
  – Implies bid-ask bounce effect is zero
  – So prices follow martingale, i.e. “market efficiency”

• Rational, Risk Neutral, Imperfectly Competitively Market Makers
  – Implies “Roll model” where bid-ask bounce shows up as first order negative serial correlation
  – Implies serial correlation at other lags is zero

• Irrational or risk averse market makers
  – Allows serial correlation at lags other than one
  – Also would allow correlations between price changes and order flow at other lags (hard to measure with price data alone)
Types of Market Inefficiencies

• Bid-ask Bounce (measured by Roll)
  – Implies first-order negative serial correlation

• Stale Prices (measured by Lesmond)
  – Probably related to positive autocorrelation
  – Not captured by simple model but probably in data

• Too Much Depth (i.e. $\lambda$ too small)
  – Suggests too little volatility and momentum
    • Momentum = positive autocorrelation at many lags
    • “Overconfident” market makers?
    • Autocorrelated order flow?

• Too Little Depth (i.e. $\lambda$ too large)
  – Suggest excess volatility and mean reversion
    • Mean reversion = negative autocorrelation at many lags
    • “Undercapitalized” market makers
This Paper’s Liquidity Measure

• Tries to capture all four inefficiencies in one statistic
  – More general than “Roll” measure
  – More general than “Lesmond” measure
  – More general than variance ratio tests

• Roll, Lesmond, and variance ratio tests can capture stale prices and bid-ask bounce.
  – Variance ratio test also capture momentum and mean reversion.
My “Derivation” of Paper’s Liquidity Measure

Consider simple trading strategy using \( r_{t-k} \) to forecast \( r_t \)

Let \( \beta = \text{OLS reg. coef.} = \frac{\text{cov}(r_{t-k}, r_t)}{\text{var}(r_t, r_t)} \)

Trader takes position proportional to \( \beta r_{t-k} \)

Define “Sharpe ratio” = \( \frac{\mu}{\sigma} \)

Then can show

\[ [\mathbb{E}\{\mu^2/\sigma^2\}]^{1/2} \approx \frac{|\text{cov}(r_{t-k}, r_t)|}{\text{var}(r_t, r_t)} =: \pi_{tk} \]

Paper’s measure of illiquidity is

\[ (2 \sum_{tk} \pi_{tk}) / (1 + 2 \sum_k \pi_{tk}) \]

Sum of profits over \( t,k \) scaled to lie between zero and one
Summary: Paper’s Illiquidity Measure …

- Captures autocorrelations of univariate price series at various lags
- Does not capture univariate volatility
- Does not capture cross-sectional correlations in returns across assets
In Financial Markets …

• “Means” (including autocorrelations) are much harder to measure than variances and covariances (cross-sectionally)
  – This is especially true if data frequency is high.

• So this paper is trying to do something the finance literature believes to be difficult.
Alternative Approach Based on Kyle and Xiong (JF, 2001)

- Model based on “wealth effects” which generate “limits to arbitrage”
- When wealth is low, markets are inefficient.
- When wealth is high, markets are more efficient.
- Traders have log-utility, so base trading on sharpe ratios.
Implications of Kyle and Xiong

• Limited wealth (implying market inefficiency) shows up as
  – High volatility in returns
  – High cross-sectional correlation in returns

• Model is continuous-time so (in principle)
  – Volatility and cross-sectional correlation easy to measure accurately with limited history but frequent observations
  – Mean (i.e., autocorrelation) harder to measure since shows up over longer time periods.
Empirical Results

• Secular increase in liquidity
  – May be due to increased trading volume diminishing bid-ask bounce and price staleness, not excess volatility and mean reversion.

• Correlation of term spreads and credit spreads with illiquidity
  – Suggests Kyle and Xiong’s wealth constrained investors bet on term and credit spreads, i.e., consistent with LTCM crisis widening such spreads.

• Low PE ratios correlated with illiquidity
  – Suggests Kyle and Xiong’s wealth constrained investors are long equity exposure.
Conclusion

• Paper develops measure of market inefficiency based on autocorrelations
  – Combined in ad hoc but intuitive manner into a simple statistic.
• Should be complementary to measures of inefficiency based on volatility and cross-sectional covariances
• Empirical results consistent with models based on wealth effects.