Global Liquidity, Risk Premiums and Growth Opportunities

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"Global Liquidity, Risk Premiums
and Growth Opportunities"

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"Simple Model"

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

"Change in value"

$\qquad$ = "order flow" + "announcements"

$\quad \lambda q_t$ = price effect of trading

$\quad \sigma \varepsilon_t$ = 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. λ 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. λ 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 β = OLS reg. coef.= $cov(r_{t-k,} r_t) / var(r_t, r_t)$

Trader takes position proportional to βr_{t-k}

Define "Sharpe ratio" = μ / σ

Then can show

$\quad [E\{\mu^2/\sigma^2\}]^{1/2} \sim= |cov(r_{t-k,} r_t)| / var(r_t, r_t) =: \pi_{tk}$

Paper's measure of illiquidity is

$\quad (2 \Sigma_{tk} \pi_{tk}) / (1 + 2 \Sigma k \pi_{tk})$

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 finace 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
  - Sugggests 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.