



UNIVERSITY OF
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Mendoza College of Business

**Discussion: “A Century of Market Reversals:
Resurrecting Volatility”**

by Bogousslavsky, LeBaron and Pontiff

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Daily stock return autocorrelation

- It is an important aspect of market efficiency
 - Kendall (1953) and Fama (1965)
- Discount rate does not usually vary at daily frequency
 - No joint-hypothesis problem of Fama (1970)
- More statistical power even in a shorter sample
 - This paper pushes the envelope further by using intraday data and a century long sample

Drivers of daily return autocorrelation

- Micro-structure noise (+ / -)
 - Bid-ask bounce (-): Roll (1984), Kaul and Nimalendran (1990)...
 - Stale quote (+): Fisher (1966), Scholes and Williams (1977), Atchison et al. (1987), Lo and MacKinlay (1990)...

- Rational compensation for liquidity provision (-)
 - Campell, Grossman, and Wang (1993), Conrad, Hameed, and Niden (1994), Avramov, Chordia and Goyal (2006), Nagel (2012)....
 - This paper

- Behavioral forces (+ / -)
 - Overreaction (-): Shiller (1984), Black (1986), Stiglitz (1989), Summers and Summers (1989), Subrahmanyam (2005)...
 - Slow diffusion (+): Brennan et al. (1993), Badrinath et al. (1995), Chordia and Swaminathan (2000)...

Daily return autocorrelation over time

Individual stocks

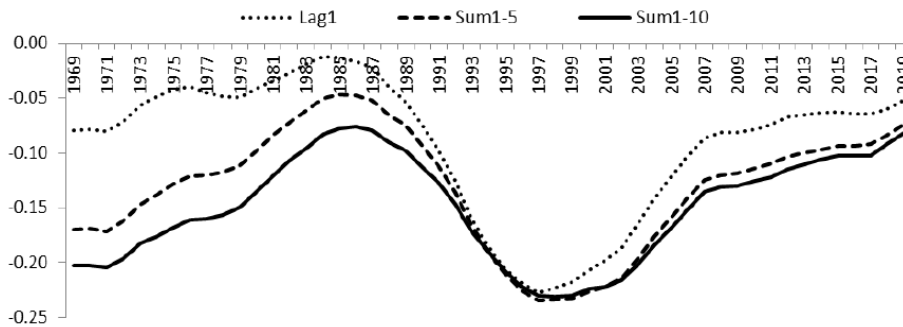


Figure 1 from Lewellen (2022), 10-year rolling window, 1960-2019, US

Stock market indices

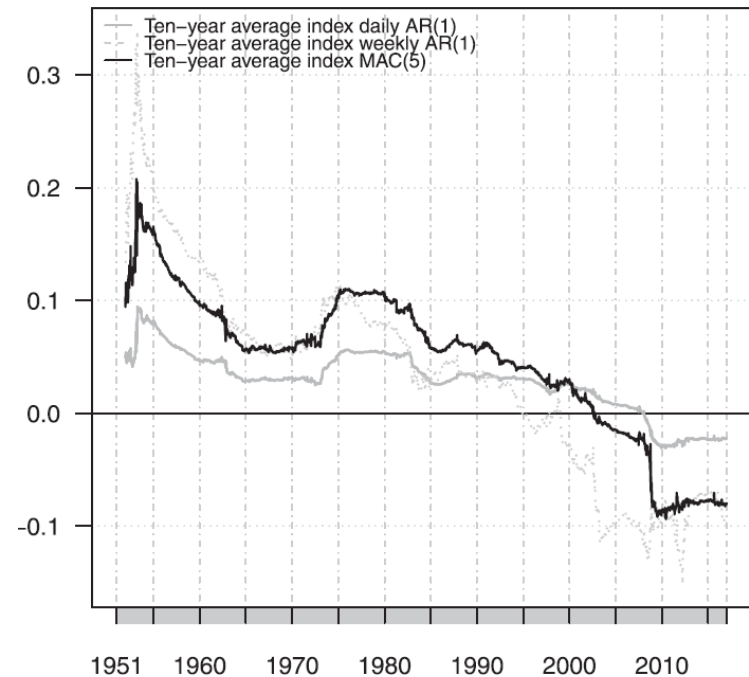


Figure 1 from Baltussen, van Bakkum and Da (2019), 10-year rolling window, 1951-2016, averaged across 20 major market indices covering 15 countries

This paper

- Focuses on daily market return autocorrelation and extends Campbell, Grossman and Wang (1993)
- Major Improvements
 - Use better volatility estimate using intraday data
 - Zoom into intraday return that is free from the impact of news
 - Separate expected vs. unexpected volume and volatility
- New findings
 - Diminished (albeit still negative) volume effect, mostly from expected volume
 - Strong negative volatility effect, mostly from expected volatility
 - Asymmetry: more reversal following negative return → collateral channel
 - Volatility-based liquidity factor is superior
- My comments are mostly about other interesting things to explore

Individual stock vs. Index

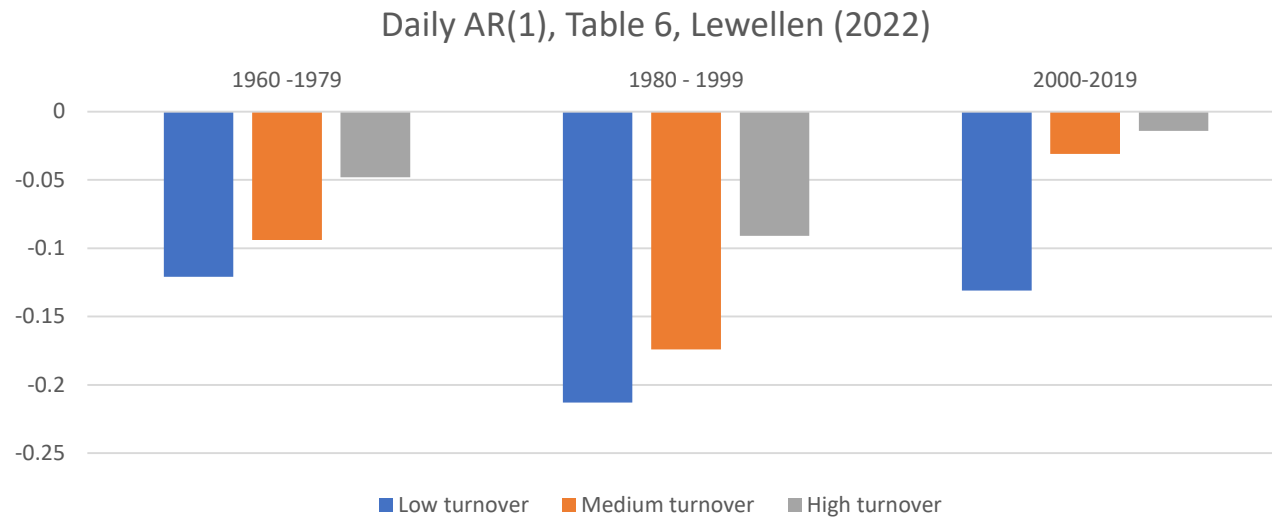
- Main test: $E_t[R_{t+1}] = \gamma Var_t[R_{t+1}] \frac{\bar{P}_t - P_t}{P_\theta}$
 - Should also hold at the individual stock level
 - Different market makers for different stocks
- Autocorrelation vs. cross-correlation

$$\begin{aligned} & Cov\left(\frac{R_{t+1}^A + R_{t+1}^B}{2}, \frac{R_t^A + R_t^B}{2}\right) \\ &= \frac{1}{4} [Cov(R_{t+1}^A, R_t^A) + Cov(R_{t+1}^B, R_t^B)] \\ &+ \frac{1}{4} [Cov(R_{t+1}^A, R_t^B) + Cov(R_{t+1}^B, R_t^A)] \end{aligned}$$

Slow information diffusion?

Time series vs. Cross-section

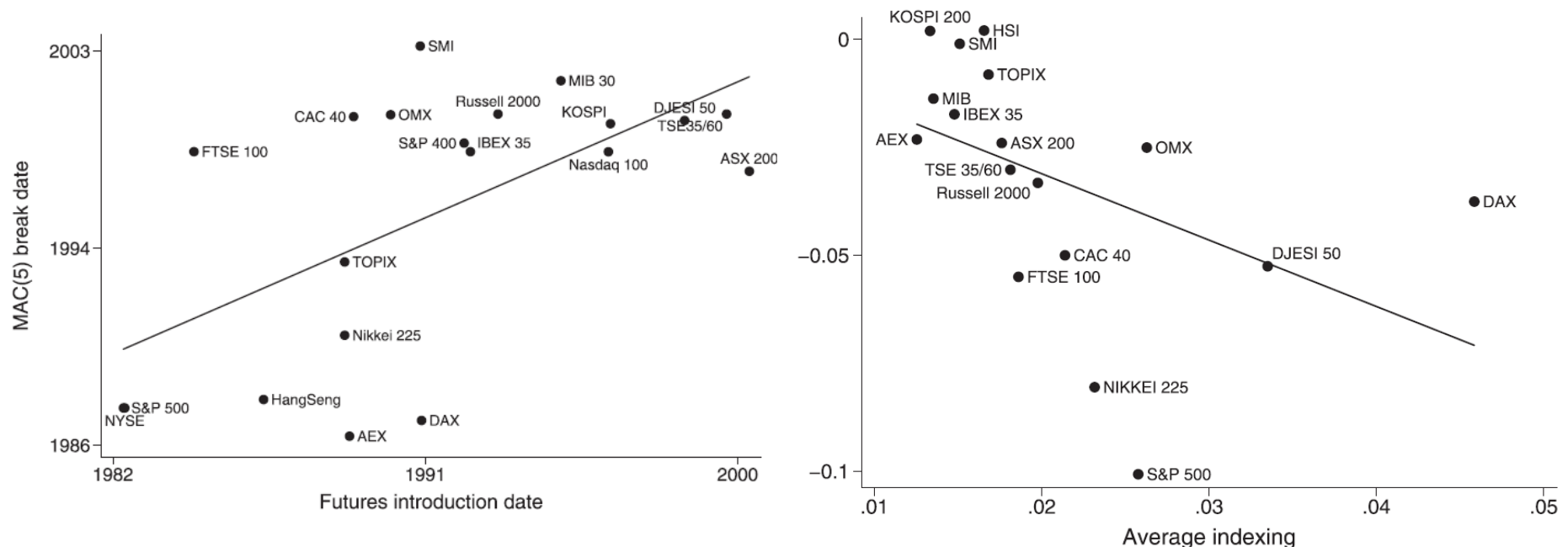
- Main test: $E_t[R_{t+1}] = \gamma Var_t[R_{t+1}] \frac{\bar{P}_t - P_t}{P_\theta}$
 - Can also be tested in the cross-section
 - Higher turnover \rightarrow more negative AR(1)



- Different sample? Different time period? Level vs. shock? Turnover vs. order imbalance?

Index arbitrage

- Index arbitrage generates correlated order flow at the index level
 - Propagates liquidity shocks from the index products (futures and ETFs) to the underlying index → negative AR(1)
 - Ben-David, Franzoni, and Moussawi (2018), Baltussen, van Bakkum and Da (2019)



Index arbitrage

➤ DJI

- Futures was introduced in Oct 1982
- E-mini futures was introduced in Sep 1997
- ETF (NYSE: DIA) was introduced in Jan 1998

➤ Additional tests

- Before vs. after futures introduction
- Incorporate a daily indexing measure in the time series regression
- Take advantage of the price-weight to isolate the impact from index arbitrage, as in Greenwood (2008)
 - United Health (UNH) has a weight of 8.52% in DJI but only 1.08% in S&P500
 - Goldman (GS) has a weight of 7.56% in DJI but only 0.34% in S&P500

Minor suggestions / questions

- pg 5, volatility estimates using intraday data are subject to market microstructure noise / illiquidity, see Bandi and Russell (2006) for potential solution
- pg 5, how is the volume on DJI calculated? Is there a price weight? Are the weekly and monthly measured computed using daily detrended volume, raw volume or log volume?
- pg 6, it is interesting that intraday vol is almost as large as daily vol, even after removing the effect of overnight news, possibly due to microstructure noise?
- pg 9, Table 4, it might be interesting to use overnight return today on the RHS. It affects collateral constraint but avoids the impact of bid-ask bounce (given the intraday gap).
- pg 9, “an unexpected, abrupt high-volume event such as a natural disaster will be afforded with less liquidity capital, than a pre-scheduled earnings announcement.” cool idea, implement it? Seasonality in trading volume (Hong and Yu, 2009)?
- pg 17, test for significant difference between PS factors and alternative implementations directly?

Summary

- Interesting and robust empirical results
- Clear contribution to the important debate on market efficiency
- My (somewhat orthogonal) suggestions:
 - Autocorrelation vs. cross-correlation
 - Cross-sectional tests
 - Role of index arbitrage