

**The Validity of Price Informativeness Proxies:**

**Evidence from A Regulatory Experiment**

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## **The Validity of Price Informativeness Proxies:**

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#### **Extended Abstract**

Stock return synchronicity, usually measured as transformed  $R^2$  from the market model, is now a widely-used proxy for stock price informativeness (Bin et al. 2014). Yet it remains hotly contested whether synchronicity reflects informativeness or noise. Roll (1988) and a growing literature (e.g. Morck et al. 2000; Durnev et al. 2003; Hutton et al. 2009) suggest that lower synchronicity reflects higher informativeness because individual stock returns should exhibit lower co-movement with market returns when stock prices reflect more firm-specific information. On the other hand, Dasgupta et al. (2010) show both theoretically and empirically that a rapid incorporation of information into the stock prices should reduce idiosyncratic return volatility and raise synchronicity, suggesting that synchronicity is *positively* related with informativeness. Some recent papers (e.g. Chan and Chan 2014; Kelly 2014) find support for Dasgupta et al.'s (2010) hypothesis.

Prior literature on the relation between synchronicity and informativeness is plagued by serious endogenous concerns. One important concern is omitted variables. Hutton et al. (2009), for instance, use earnings quality as a measure of stock information inefficiency and show that poorer earnings quality is associated with higher synchronicity. However, both earnings opacity and synchronicity may be

driven by some omitted (and perhaps unobservable) factors. Using a similar sample but different model design compared to Hutton et al. (2009), Rajgopal and Venkatachalam (2011) find that earnings quality is positively related with synchronicity, which contradicts the evidence in Hutton et al. (2009). Other than the omitted variable problem, the accuracy of proxies for informativeness is another thorny issue, as informativeness is not directly observed. Kelly (2014) tests the statistical relation between probability of informed trading (PIN) and synchronicity based on the assumption that PIN proxies for informativeness. Duarte and Young (2009) argue that PIN may merely proxy for illiquidity rather than informativeness. If true, this weakens Kelly (2014)'s conclusion drawn from the relation between PIN and synchronicity.

A good way to test the link between synchronicity and informativeness, and more broadly, the validity of a proxy for stock price informativeness, is to find settings where informativeness is known or predicted to change exogenously, and see whether and how a given proxy reflects the exogenous change in informativeness. The Securities and Exchange Commission (SEC)'s Regulation SHO pilot program constitutes an ideal setting in which to examine this issue. We believe that this program is a quasi-natural experiment that induces exogenous changes to informativeness. In one part of this program, the SEC ranked stocks in the Russell 3000 index by trading volume within each exchange and designated every third one as "pilot stocks". From May 2, 2005 to August 6, 2007, these randomly-selected stocks were exempted from short-selling price tests. This regulatory change significantly

reduced the short-selling constraints of the pilot stocks compared to the non-pilot stocks (SEC 2007; Diether et al. 2009). The program ended one month early on July 6, 2007, when the SEC eliminated short-selling price tests for *all* exchange listed stocks including the non-pilot stocks. It is well documented that lessening of short-selling constraints increases price informativeness, by improving the information environment and external monitoring (e.g. Diamond and Verrechia 1987; Chang et al. 2007; Saffi and Sigurdsson, 2011; Boehmer and Wu 2013; Massa et al. 2015). Relaxing short-sales constraints therefore could improve the information environment and hence price informativeness. Since firms cannot self-select into or out of the Regulation SHO program, the regulatory changes provide exogenous shocks to the information environment which enable us to examine how commonly-used proxies for price informativeness, such as synchronicity, change surrounding the regulatory events, using a difference-in-differences (DD) analysis in a regression framework (Angrist and Pischke 2015; Fang et al. 2016).

We compute the following proxies for price informativeness: stock price synchronicity, probability of informed trading, bid-ask spread, extent of price delay, levels of illiquidity and liquidity risk, number of zero return days, and the extent to which stock price moves like a random walk. The changes in these proxies around the two regulatory events are computed, and a DD analysis is conducted for pilot stocks and non-pilot stocks. If a given proxy indeed measures stock price informativeness, it should increase by more for the pilot stocks relative to non-pilot stocks when the short-selling constraint is removed. Furthermore, the

difference in a given proxy between the pilot stocks and non-pilot stocks should vanish after the SEC ended the Regulation SHO program. Testing whether the effect of the pilot program on a given proxy reverses when the program ends represents an important check on the internal validity of the DD test (Fang et al. 2016).

As a second method of comparing the validity of price informativeness proxies, we use the methodology of Chan et al. (2016) and compute the correlations between the different proxies, based on the idea that if different proxies represent the same underlying construct, they should be correlated. To exploit the exogenous shock to firms' information and trading environments surrounding the SHO pilot program, the correlations are separately computed for the two regulatory events.

We have obtained preliminary results for stock price synchronicity. The results indicate that relative to non-pilot stocks, the pilot stocks saw a significant increase in synchronicity when their short-selling price tests were lifted. After Regulation SHO eliminated the short-selling price tests for all firms, the difference in synchronicity disappeared. The evidence supports a positive, rather than negative, association between synchronicity and informativeness. Ongoing work is being undertaken for the other proxies.

The main contribution of this paper lies in exploiting a regulatory experiment to shed light on the comparative validity of proxies for stock price informativeness, and, in doing so, contribute to the continuing debate in this regard. Our paper has important implications for future studies that rely on proxies for informativeness. Our paper also suggests that it may be necessary to rethink and reexamine some empirical

findings and conclusions from a vast prior literature that regards synchronicity as an inverse proxy for informativeness (e.g. Piotroski and Roulstone 2004; Chan and Hameed 2006). Based on our preliminary evidence that synchronicity positively reflects informativeness, we should interpret the findings of Piotroski and Roulstone (2004) and Chan and Hameed (2006) as indicating that more analyst coverage increases stock information efficiency by producing firm-specific information. A more definitive conclusion would be possible after completing the same analysis for the other proxies.

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