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Ultra-high-frequency lead–lag relationship and information arrival

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Abstract

To our knowledge, this paper is the first study on the effect of information arrival on the lead–lag relationship amongst related spot instruments. Based on a large data-set of ultra-high-frequency transaction prices time-stamped to the millisecond of the S&P500 index and its two most liquid tracking ETFs, we find that their lead–lag relationship is affected by the rate of information arrival whose proxy is the unexpected trading volume of these instruments. Specifically, when information arrives, the leadership of the leading instrument may strengthen or weaken depending on whether the leading or lagging instrument responds to that information. An increase in the unexpected volume of the leader strengthens its leadership whereas an increase in the unexpected volume of the lagger weakens this leadership. In addition to the strength of leadership, an increase in the unexpected volume in response to information arrival may also have opposite effects on the lead–lag correlation coefficient depending on whether that

volume increase belongs to the leader or the lagger. Finally, we find that sophisticated investors have a more significant effect on the lead–lag relationship than non-sophisticated ones.

Keywords:

High frequency | Lead–lag relationship | Lead–lag effect | Information arrival | Trading volume

Notes

[1] In addition to the 25% threshold, we have used alternative cut-off points (i.e. 5, 15, 35 and 45%) and still got the same results.