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Abstract

We make an extensive empirical study of the market impact of large orders (metaorders) executed in the US equity market between 2007 and 2009. We show that the square root market impact formula, which is widely used in the industry and supported by previous published research, provides a good fit only across about two orders of magnitude in order size. A logarithmic functional form fits the data better, providing a good fit across almost five orders of magnitude. We introduce the concept of an "impact surface" to model the impact as a function of both the duration and the participation rate of the metaorder, finding again a logarithmic dependence. We show that during the execution the price trajectory deviates from the market impact, a clear indication of non-VWAP executions. Surprisingly, we find that sometimes the price starts reverting well before the end of the execution. Finally we show that, although on average the impact relaxes to approximately $2/3$ of the peak impact, the precise asymptotic value of the price depends on the participation rate and on the duration of the metaorder. We present evidence that this might be due to a herding phenomenon among metaorders.

Keywords: Market impact ▪ trading cost analysis ▪ large trade execution ▪ impact surface

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