



Short sales, long sales, and the Lee–Ready trade classification algorithm revisited[☆]

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Abstract

Asquith et al. (2010) conclude that short sales are often misclassified by the Lee–Ready algorithm. The algorithm identifies most short sales as buyer-initiated, whereas the authors posit that short sales should be overwhelmingly seller-initiated. Using order data to identify true trade initiator, we document that short sales are, in fact, predominantly buyer-initiated and that the Lee–Ready algorithm correctly classifies most of them. Misclassification rates for short and long sales are near zero at the daily level. At the trade level, misclassification rates are 31% using contemporaneous quotes and trades and decline to 21% when quotes are lagged one second.

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1. Introduction

Research in securities markets relies on trade direction to arrive at inferences on a wide array of subjects, from transaction costs and trading behavior of various investor groups to market efficiency and optimal market structure. Because trading data from many sources, including the NYSE's Trade and Quote (TAQ) database, lack trade direction identifiers, it is impossible to directly determine from these data whether a trade was initiated by a buyer or by a seller. Thus the literature has developed methods that allow for indirect trade classification, commonly referred to as "trade classification algorithms." The ability of such algorithms to correctly identify the trade initiator directly affects the credibility of a large body of empirical research.

The most commonly used trade classification algorithm is that proposed by Lee and Ready (1991).¹ The Lee–Ready algorithm infers trade direction from the trade price position relative to the prevailing quotes and historical prices. Studies using data from the early 1990s find that the Lee–Ready algorithm correctly classifies about 85% of all trades (e.g., Finucane, 2000; Odders-White, 2000), but in recent years questions have arisen about the efficacy of the Lee–Ready algorithm given the significant changes in market structure since the early 1990s.

Most recently, Asquith et al. (2010) argue conceptually that short sales should be predominantly seller-initiated, yet they find that the Lee–Ready algorithm more often classifies short sales as buyer-initiated. The authors conclude that the algorithm is unreliable when used to classify short sales. Such a conclusion casts a shadow over many recent studies of short selling that use the Lee–Ready algorithm to sign trades. These studies find that short sellers provide liquidity when it is needed, help keep prices in check, and contribute to price discovery and market efficiency (e.g., Alexander and Peterson, 2008; Diether et al., 2009b; Bailey and Zheng, 2010; Boehmer and Wu, 2010; Comerton-Forde et al., 2011). These findings are important from a policymaking standpoint, particularly in light of the negative public image of short sellers and recent debates over bringing back short-sale restrictions.² Furthermore, even studies that do not focus on short selling would be compromised if short sales were systematically misclassified by the Lee–Ready algorithm, as short sales represent a significant portion of general trading activity (e.g., Diether et al., 2009a, report that short selling accounts for over 24% of the volume in NYSE stocks and for over 36% of the volume in NASDAQ stocks). Given the importance of understanding short and long sellers' actions for academic research and policymaking, it is imperative to assess the Lee–Ready algorithm's reliability in classifying trades.

In this paper, we use INET³ order data to examine whether the Lee–Ready algorithm correctly identifies the true trade initiator for short sales. We also examine the Lee–Ready algorithm's accuracy for long sales to see if the performance differs for short versus long sales.

¹Although a number of alternative algorithms have been developed (e.g., Ellis et al., 2000; Chakrabarty et al., 2007), the Lee–Ready algorithm remains the most frequently used.

²"There's a Better Way to Prevent 'Bear Raids'" by R. Pozen and Y. Bar-Yam, *The Wall Street Journal*, November 18, 2008; "Restore the Uptick Rule, Restore Confidence" by C. Schwab, *The Wall Street Journal*, December 9, 2008; "Four European Nations to Curtail Short Sales" by L. Story and S. Castle, *The New York Times*, August 11, 2011; "Studies Find Shorting Bans Come Up Short" by J. Armstrong, *Traders Magazine Online News*, October 4, 2011.

³Until 2005, when it was acquired by NASDAQ, INET was an independent Electronic Communications Network (ECN). In 2006, INET and NASDAQ were integrated, and INET became NASDAQ's primary trading platform (Hasbrouck and Saar, 2009).

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