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Recent trends in trading activity and market quality ☆

Tarun Chordia [a,1], Richard Roll [a,2], Avanidhar Subrahmanyam [b,*]

[a] Goizueta Business School, Emory University, Atlanta, GA 30322, USA
[b] Anderson School, UCLA, Los Angeles, CA 90095-1481, USA

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ABSTRACT

We explore the sharp uptrend in recent trading activity and accompanying changes in market efficiency. Higher turnover has been associated with more frequent smaller trades, which have progressively formed a larger fraction of trading volume over time. Evidence indicates that secular decreases in trading costs have influenced the turnover trend. Turnover has increased the most for stocks with the greatest level of institutional holdings, suggesting professional investing as a key contributor to the turnover trend. Variance ratio tests suggest that more institutional trading has increased information-based trading. Intraday volatility has decreased and prices conform more closely to random walk in recent years. The sensitivity of turnover to past returns has increased and cross-sectional predictability of returns has decreased significantly, revealing a more widespread use of quantitative trading strategies that allow for more efficient securities prices.

1. Introduction

Intense trading activity is a conspicuous aspect of financial markets. For example, the New York Stock Exchange (NYSE) Web site reports that the share turnover rate on the NYSE in 2008 is well in excess of 100%, corresponding to a volume in excess of 800 billion shares. The investing public paid several billion dollars for these transactions. In his American Finance Association presidential address, French (2008) suggests that the cost of price discovery via trading was about $99 billion in 2006.[3]

Trading activity in equities is not only at high levels, but also has increased dramatically over the past few years.[4] The value-weighted average monthly share

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* Corresponding author. Tel.: +1 310 825 5355; fax: +1 310 206 5455.
E-mail addresses: Tarun_Chordia@bus.emory.edu (T. Chordia), Rroll@anderson.ucla.edu (R. Roll), asubrahm@anderson.ucla.edu (A. Subrahmanyam).
[1] Tel.: +1 404 727 1620; fax: +1 404 727 5238.
[2] Tel.: +1 310 825 6118; fax: +1 310 206 8404.

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[3] French (2008) includes trading commissions as well as the fees charged by mutual funds and hedge funds in his cost measure, and documents that U.S. investors spent an average of 0.67% of the aggregate value of the market each year over the period 1980–2006 in searching for superior returns.

[4] Apart from the NYSE, a dramatic increase in trading volume is evident in a number of markets, including Nasdaq, the London Stock Exchange, and the Tokyo Stock Exchange, among others. See World

turnover (on the NYSE) increased from about 5% to about 26% from the beginning of 1993 to the end of 2008, and the average daily number of transactions increased about ninetyfold during that same period.[5] The aim of this paper is to empirically explore this strong upswing and accompanying changes in market efficiency. Although examining an unusual pattern in trading and accompanying shifts in market efficiency measures are worthwhile pursuits in themselves, our study attains further significance because recent research has found that increases in trading activity are associated with decreases in the cost of equity capital.[6]

There have been previous time-series studies of volume, many of which have focused on the contemporaneous links between volume and other variables such as returns and volatility. For example, a number of empirical papers have documented a positive correlation between volume and absolute price changes (see Karpoff, 1987; Schwert, 1989; Gallant, Rossi, and Tauchen, 1992). Other papers report calendar regularities in volume. Amihud and Mendelson (1987, 1991) find that volume is higher at the market's open, while Foster and Viswanathan (1990) demonstrate a U-shaped intraday volume pattern and also find that trading volume is lower on Mondays. Lakonishok and Maberly (1990) observe that volume from institutions is smaller but individual investor volume is larger at the beginning of the week. In another stream of research, Campbell, Grossman, and Wang (1993) and Llorente, Michaely, Saar, and Wang (2002) analyze the dynamic relation between returns and volume levels.

This paper examines the *trend* in trading activity and the impact of this trend on market efficiency measures. Trading costs have declined substantially and this decline has contributed significantly to the volume trends. For example, French (2008) and Chakravarty, Panchapagesan, and Wood (2005) argue that institutional commissions have declined over time, and it is well-known (e.g., Chordia, Roll, and Subrahmanyam, 2001) that bid-ask spreads have also decreased substantially. Further, the advent of technology has made it easier for institutions to execute automated algorithmic trading (Hendershott, Jones, and Menkveld, 2008) and online brokerage accounts have made trading easier for retail investors. With lower trading costs, the demand for trading activity has gone up, and with the advent of technology, it has become easier for exchanges to accommodate large trading volumes.

However, recognizing that trading frictions have decreased still leaves several unanswered research questions related to the turnover trend. For example, which types of investors have responded most to decreased frictions? One possibility is that online brokerages, lower trading costs, and the accompanying "illusion of control" (Barber and Odean, 2002) has intensified trading by retail investors. Another possibility is that institutional trading (induced perhaps by reduced commissions and spreads) accounts for much of the turnover trend.[7] A third possible factor is the advent of widespread algorithmic trading. Other determinants of trading activity, such as dispersion of opinion and implied volatility, might have increased and contributed to the trend. These possible influences are not mutually exclusive.

A related, and arguably more important, issue involves the economic consequences of the turnover trend. If the trend is largely due to uninformed investing, then the market may have become more volatile and less efficient at incorporating information. Alternatively, trading by more informed agents may well have led to greater information production and a more efficient market with reduced short-run fluctuations.

Motivated by the above observations, we address the following questions: (i) What microstructure patterns have accompanied the sharp increase in turnover? Is the increase due to changes in transaction frequency, or trade size, or both? (ii) Who, amongst institutions or individuals, is primarily responsible for the turnover trend? (iii) Is it possible to discern why trading by certain trader classes has increased? (iv) What have been the consequences of the shift in trading activity? Has information-based trading increased? Has market quality increased or decreased? Have there been changes in the cross-section of expected turnover and returns possibly due to the actions of hedge funds that trade on cross-sectional return predictability?

We examine these issues in several stages. First, we establish some basic empirical features of the recent turnover trend. In particular, we show that volume has increased substantially for both S&P 500 constituent larger stocks and non-S&P 500 smaller stocks, suggesting that neither indexation nor market capitalization are responsible for the increase in trading activity.[8] We also document that the turnover increase has principally resulted from smaller trades and a greater frequency of transactions. We then ask whether institutions or individuals are primarily responsible for the increase in turnover. We find that stocks with larger levels of institutional holdings experienced the greatest increases in turnover, indicating a possible causative role for institutions. In addition, changes in the breadth of ownership (as measured by the number of shareholders) are not associated with changes in turnover in the cross-section. Under the supposition that changes in ownership breadth primarily reflect changes in dispersed retail ownership (as opposed

(*footnote continued*)
Federation of Exchanges (http://www.world-exchanges.org/statistics/annual/equity-markets).

[5] In contrast to the trend from 1993 to 2008, turnover remained virtually unchanged at around 4.5% per month during the decade prior to 1993 (NYSE.com).

[6] See Datar, Naik, and Radcliffe (1998), Brennan, Chordia, and Subrahmanyam (1998), and Chordia, Subrahmanyam, and Anshuman (2001).

[7] Evidence indicates that assets in institutional as well as individual accounts have increased substantially over the sample period. For example, both mutual fund assets and the number of retail accounts grew fourfold from 1996 to 2001 (see Saxton, 2002). This observation makes it particularly intriguing to examine whether institutional or retail investing is primarily responsible for the turnover increase.

[8] French (2008) shows that the fraction of the U.S. domestic equity invested passively has increased steadily for all four groups of institutions (defined benefit plans, defined contribution plans, non-profits, and public funds) examined. For instance, non-profits start with 2.8% of their assets passively managed in 1986, which increased to 28.7% in 2006.