

# Does intraday technical analysis in the U.S. equity market have value? <sup>☆</sup>

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## Abstract

This paper investigates whether intraday technical analysis is profitable in the U.S. equity market. Surveys of market participants indicate that they place more emphasis on technical analysis (and less on fundamental analysis) the shorter the time horizon; however, the technical analysis literature to date has focused on long-term technical trading rules. We find, using two bootstrap methodologies, that none of the 7846 popular technical trading rules we test are profitable after data snooping bias is taken into account. There is no evidence that the market is inefficient over this time horizon.

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## 1. Introduction

The use of past price movements to predict future price movements (technical analysis) has been popular with the investment community for a considerable period of time. When the key word “technical analysis” is typed into the Internet search engine Google, 201,000,000 urls are located compared to only 71,300,000 urls for “fundamental analysis”.<sup>2</sup> Despite this widespread acceptance and adoption by practitioners, academics have traditionally treated technical analysis with disdain. It has been described by Malkiel (1981) as an “anathema to the academic world” due to its conflict with market efficiency, one of the central pillars of academic finance.

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<sup>2</sup> Both searches were conducted on September 22, 2005.

Surveys of market participants and journalists consistently find that these individuals place more emphasis on technical analysis (and less emphasis on fundamental analysis) the shorter the forecasting horizon (e.g., Carter and Van Auken, 1990; Allen and Taylor, 1992; Lui and Mole, 1998; Oberlechner, 2001). More specifically, respondents place approximately twice as much weight on technical analysis for intraday horizons as they do for one-year horizons.

Despite market participants ascribing the most value to short-term technical analysis, the academic literature has focused on testing the profitability of long-term technical trading rules.<sup>3</sup> Most studies find that technical analysis is not profitable once transaction costs are taken into account (e.g., Allen and Karjalainen, 1999; Bessembinder and Chan, 1998; Olson, 2004). However, Corrado and Lee (1992) and Lee, Chan, Faff, and Kalev (2003) point out that technical analysis may still have merit as a value-adding “overlay” strategy to assist investors such as fund managers in better timing the buying or selling of stocks as part of their normal trading activities. Under this scenario the stock trades would have occurred in the normal course of business so the transaction costs are already factored in.

This paper considers the value of equity market technical analysis on an intraday basis using 5-minute Standard and Poor’s Depository Receipts (SPDR) data. In doing so, several contributions are made. First, to the best of our knowledge, this is the first paper to consider the profitability of intraday equity market technical analysis. This is important because it is heavily used by practitioners over this time horizon, and recent papers by Kavajecz and Odders-White (2004) and Osler (2003) find evidence of order clustering that is consistent with the propositions of technical analysis. Given that the price pressure from order clustering is a short-term phenomenon, it seems reasonable to expect this to lend more support to intraday technical analysis than daily or monthly technical analysis. In addition, the short-term nature of intraday technical analysis also means that any profitability is extremely unlikely to be driven by time varying risk premia.<sup>4</sup>

Second, the use of actual transactions data for the Standard and Poor’s Depository Receipts (SPDRs), the exchange traded fund that replicates the S&P 500 index, by this paper has several advantages. Previous studies, such as Neely and Weller (2003) and Osler (2000), analyze the value of technical analysis on intraday foreign exchange market data, but the absence of foreign exchange market trade data necessitates that these papers estimate transaction prices based on bid and ask quotes.

In addition, the choice of SPDR data has several advantages over the index data that has been used by the majority of longer-term technical analysis papers. Indices are not tradable in their own right so any technical trading signals would therefore be unable to be implemented without purchasing each of the index components in the correct proportions. Moreover, as Day and Wang (2002) document, tests of technical trading rules on index data can be biased due to non-synchronous trading. Finally, technical analysts claim that technical analysis is most reliable on actively traded stocks (Morris, 1995). By the end of 1999 there was \$19.8 billion invested in SPDRs, and in 1998 the daily dollar volume was the highest of any stock (Elton et al., 2002). We purposely study the January 1, 2002 to December 31, 2003 period to give us an insight into any difference between trading rule performance in bull and bear markets.<sup>5</sup> The S&P 500 declined 21.2% in 2002 and increased by 21.9% in 2003.

Third, the choice of 7846 trading rule specifications from five rule families (Filter Rules, Moving Average Rules, Support and Resistance Rules, Channel Breakouts, and On Balance Volume Rules), which were widely publicized prior to the start of this study, allows a fair test of market efficiency. Miller (1990) points out that the development of financial theories alters behavior so testing models with data from before the models were developed is less than adequate.

Finally, unlike the previous intraday technical analysis literature (on the foreign exchange market), which does not conduct robust statistical tests of the significance of profits they document, we apply a suite of tests. These are the Brock, Lakonishok and LeBaron (1992) (hereafter BLL) approach of fitting null models to the data, generating random series and comparing the results from running the rules on the original series to those from running on the randomly generated bootstrapped series, and the so-called White’s Reality Check bootstrapping technique (Sullivan, Timmerman, and White (1999), hereafter STW) which adjusts for data snooping bias. To the best of our knowledge, this is the first paper to utilize both these techniques.

<sup>3</sup> These include tests of moving average rules that signal a buy (sell) when price moves above (below) a moving average of past prices (Brock et al., 1992), trading range break out rules that signal a buy (sell) when price moves above (below) local maxima (minima) (Brock et al., 1992), optimal combinations of moving average and trading range break out rules derived using genetic algorithms (Allen and Karjalainen, 1999), and chart patterns such as “head and shoulders” and “double top” formations (Lo et al., 2000).

<sup>4</sup> We thank an anonymous referee for pointing this out to us.

<sup>5</sup> We wish to thank an anonymous referee for highlighting the importance of this.

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