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journal homepage: [www.elsevier.com/locate/bar](http://www.elsevier.com/locate/bar)Short selling and stock returns: Evidence from the UK<sup>☆</sup>Azhar Mohamad<sup>a,\*</sup>, Aziz Jaafar<sup>b</sup>, Lynn Hodgkinson<sup>b</sup>, Jo Wells<sup>b</sup><sup>a</sup> Department of Finance, Kulliyah of Economics and Management Sciences, International Islamic University Malaysia, 53100 Kuala Lumpur, Malaysia<sup>b</sup> Bangor Business School, Bangor University, Gwynedd LL57 2DG, UK

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## ABSTRACT

The practice of shorting stocks was put forward as one of the causes of the recent financial crisis whereas Shiller (2003), for example, considers shorting an essential element of an efficient market. Shorting involves selling borrowed stocks and subsequently closing the position by purchasing and returning the stock to the lender. A profit will be realised if the stock's price decreases. Shorting enables investors who do not own a perceived overvalued stock to sell. Using a high-frequency UK dataset for the period between September 2003 and April 2010, our findings suggest shorting indicates evidence of overvalued stocks as significantly negative abnormal stock returns appear to follow an increase in shorting. These results do not hold, however, for shorting which occurs around the ex-dividend date. We further find that these results hold during the recent financial crisis.

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## 1. Introduction

A fundamental question for investors, researchers and policymakers is whether short selling leads to predictable changes in stock prices. An increase in the short interest in a stock is often viewed as a signal that the stock price is going to fall, since market participants may believe that short sellers possess significant private information. In general, a short sale is costlier to execute than a long sale. To short, sellers first have to locate stocks they want to short and they then have to pay the borrowing costs. As a result of this constraint, Diamond and Verrecchia (1987) predict that only investors who have strong expectations of a considerable price decline will choose to short, hence large increases in short interest should be followed by negative abnormal returns. This price adjustment to short sellers' information may be far from instantaneous (Boehmer, Jones, & Zhang, 2008). It can be regarded as consistent with a limit-to-arbitrage setting characterised by rational arbitrageurs who are unable to borrow without incurring costs and short a sufficient quantity of stock to force rapid price adjustment. Shiller (2003), for example, considers shorting an essential element of an efficient market.

Our study is motivated by Diamond and Verrecchia's (1987) rational expectation framework which argues that short sellers are not liquidity driven traders, instead they are sophisticated traders with private information. That is, when short sellers short the stocks they expect the stock price to drop, hence large increases in short interest are regarded as bad news. Thus, the main aim of this paper is to provide empirical evidence of Diamond and Verrecchia's (1987) prediction. In particular, this paper examines whether firms that experience large increases in short interest subsequently experience negative abnormal returns. Here, we define large increases in short interest as the top one percentile of changes in short interest.

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We also carefully separate the sample into dividend arbitrage shorts and those involving pure bets on price falls, i.e., valuation shorts in order to assess the informational content of both types of short position. Previous UK studies of short interest utilised weekly data, we, however, focus on short-term abnormal returns, and thus utilise daily short interest data. To our knowledge, no previous study has examined the informational content of large daily increases in short interest in the UK stock market. This non-occurrence may be due to several reasons. The lack of suitable data might have previously restricted research in this area. Monthly short interest data have been publicly available in the US, for example, since the 1980s, whereas stock-lending data in the UK (a proxy for short interest) has only been available since September 2003. Furthermore, the necessity of using stock-lending data as a proxy for short interest in the UK market may have deterred prior research in this area.

The empirical results show that for the overall period of 2003–2010, when short-selling data are separated into valuation short and dividend arbitrage short subsamples, large increases in valuation shorts have greater informational value than large increases in dividend arbitrage shorts. Valuation shorts yield significant negative cumulative abnormal returns of 0.28% and 1.48% for the first two days and 15 days post-publication of short interest, respectively. This finding is generally consistent with Senchack and Starks (1993), Boehmer et al. (2008) and Diether, Lee, and Werner (2009) for US datasets. Given that valuation short sellers are shorting into a bullish market rather than pursuing a bearish trend, it is plausible that the short sellers are acting on private information. As a robustness test, we examine the informational content of short interest in the periods before and after September 2008 in order to assess the impact of the financial crisis. We also consider abnormal returns before and after the September 2008–January 2009 short-selling ban. We find no significant difference in the mean abnormal returns of valuation shorts between the sub-periods, suggesting a consistent informational content of short interest throughout the period of the data sample. For dividend arbitrage shorts however, there are differences in mean abnormal returns between the sub-periods in certain event windows.

We contribute to the growing short-selling literature in several ways. First, to our knowledge the use of high-frequency data to examine the effect of large increases in short interest on stock returns in the UK stock market as a direct test of Diamond and Verrecchia's (1987) 'Private Information Hypothesis' has not been considered before. Indeed, there are a limited number of studies on short selling in the UK. The only prior UK study on short selling by Au, Doukas, and Onayev (2009) uses a low frequency of weekly horizon data. The main methodological advantages of a daily dataset include the ability to control for contaminating events and to employ an event-study methodology for a more detailed investigation of the informational content of short interest (Thomas, 2006). Previous studies on changes or increases in short interest and subsequent stock returns (e.g. Choie & Hwang, 1994; Senchack & Starks, 1993) concentrate on the US market, where the unavailability of daily data until more recently dictated the use of monthly changes in short interest as a predictor of future stock returns. For US studies, Boehmer et al. (2008) and Diether et al. (2009) are among the first authors to use high-frequency daily and tick data, respectively, to investigate the informational content of short interest. Boehmer et al. (2008) use proprietary daily short-selling order flow data, whereas Diether et al. (2009) use tick data on all short sales executed in the US in 2005. Second, the previous UK study on the level of short interest (Au et al., 2009) uses stock-lending data as a proxy, but does not separate the sample into stock-lending data associated with dividend arbitrage (dividend arbitrage shorts) and those involving pure bets on price falls (valuation shorts). The separation of dividend arbitrage shorts and valuation shorts in the current study allows us to compare the informational content of both types of short position. Third, this paper also considers whether large increases in short interest convey the same information during different states of the economy. Finally, the event-study methodology used in the current paper enables us to examine the market reaction to the disclosure of large increases in short interest.

The remainder of this paper is organised as follows. In the next section, we provide a brief description of the UK short selling and stock-lending mechanism. We review the related literature on the informational content of short interest in Section 3. Section 4 describes our data and research methodology. Section 5 reports our results and finally Section 6 offers some concluding remarks.

## 2. The mechanism for short selling in the UK

The short-selling mechanism in the UK is very different from that in the US. Unlike in the US, a short sale trade in the UK is not specifically marked as such; therefore it is not possible to differentiate between a short sale and a long sale in transaction data. One result of this limitation is that there are no tick rules in the UK market. Tick rules allow relatively unrestricted short selling in a flat or advancing market, but prevent short selling at successively lower prices and hence help to mitigate the risk of short selling accelerating a downward move in share prices. An up-tick (or plus tick) rule provides that the last sale must have been at a higher price than the sale preceding it before a share can be short sold. A zero-plus tick rule provides that if the last transaction price is unchanged but higher than the preceding different sale then the stock can be shorted. In the US, short sales are not permitted on minus ticks or zero-minus ticks. The lack of such rules in the UK may enable short interest in a stock to build up relatively quickly, and the returns following such large increases in (relatively unconstrained) short interest are of particular interest from a research and policy perspective.

The most common reason to borrow stocks is to cover a short sale, with the short seller borrowing the stock to deliver to the buyer on settlement. Some transactions captured in the stock-lending data may reflect other motives. Given that under English Common Law a stock borrowing transaction involves absolute transfer of title (sale) against the undertaking to return equivalent securities in the future, the borrower obtains other rights that might provide a rationale for the stock borrowing

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