

## Short Selling and Earnings Management: A Controlled Experiment\*

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### Abstract

During 2005-2007, the SEC ordered a pilot program in which one-third of the Russell 3000 were arbitrarily chosen as pilot stocks and exempted from short-sale price tests. Pilot firms' discretionary accruals and likelihood of marginally beating earnings targets decrease during this period, and revert to pre-experiment levels when the program ends. After the program starts, pilot firms are more likely to be caught for fraud initiated before the program, and their stock returns better incorporate earnings information. These results indicate that short selling, or its prospect, works to curb earnings management, helps to detect fraud, and improves price efficiency.

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## Short Selling and Earnings Management: A Controlled Experiment

### I. Introduction

Previous research shows that short sellers can identify earnings manipulation and fraud before they are publicly revealed.<sup>1</sup> But this is for earnings manipulations that already have taken place. Might short selling also constrain firms' incentives to manipulate or misrepresent earnings in the first place? That is, does the *prospect* of short selling help improve the quality of firms' financial reporting?

In this paper we exploit a natural experiment that allows us to address this question. In July 2004, the Securities and Exchange Commission (SEC) adopted a new regulation governing short selling activities in the U.S. equity markets – Regulation SHO. Regulation SHO contained a Rule 202T pilot program in which every third stock ranked by trading volume within each exchange was drawn from the Russell 3000 index and designated as a pilot stock. From May 2, 2005 to August 6, 2007, pilot stocks were exempted from short-sale price tests, including the tick test for exchange-listed stocks and the bid test for Nasdaq National Market Stocks.<sup>2</sup>

The pilot program creates an ideal setting to examine the effect of short selling on corporate financial reporting decisions, for three reasons. First, the exemption from short-sale price tests decreased the cost of short selling in the pilot stocks relative to the non-pilot stocks (see the SEC's Office of Economic Analysis, 2007; Diether, Lee, and Werner, 2009). The pilot program thus eliminates the need to estimate short selling costs directly, a notoriously difficult task (see Lamont, 2012). Rather, we use the fact that the prospect of short selling increased in the pilot firms relative to the non-pilot firms, all else being equal. Second, the pilot program represents a truly exogenous shock to the cost of selling short in the affected firms. We can identify no evidence that the firms themselves lobbied for the pilot program, or that any individual firm could know it would be in the pilot group until the program was announced.

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<sup>1</sup> See Dechow, Sloan, and Sweeney (1996), Christophe, Ferri, and Angel (2004), Efendi, Kinney, and Swanson (2005), Desai, Krishnamurthy, and Venkataraman (2006), and Karpoff and Lou (2010).

<sup>2</sup> The pilot program was originally scheduled to commence on January 3, 2005 and end on December 31, 2005 (Securities Exchange Act Release No. 50104, July 28, 2004). However, the SEC postponed the commencement date to May 2, 2005 (Securities and Exchange Act Release No. 50747, November 29, 2004) and extended the end date to August 6, 2007 (Securities and Exchange Act Release No. 53684, April 20, 2006).

Third, the pilot program had specific beginning and ending dates, facilitating a difference-in-differences (hereafter, DiD) analysis of the impact of short selling costs on firms' financial reporting. The known ending date allows us to investigate whether the effects of the pilot program reversed when it ended – an important check on the internal validity of the DiD tests (e.g., see Roberts and Whited, 2012).

We begin by verifying that pilot firms represent a random draw from the Russell 3000 population. In the fiscal year before the pilot program, the pilot and non-pilot firms are similar in size, growth, corporate spending, profitability, leverage, and dividend payout. Although the two groups of firms also exhibit similar levels of discretionary accruals before the program, pilot firms significantly reduce their discretionary accruals once the program starts.<sup>3</sup> After the program ends, pilot firms' discretionary accruals revert to pre-program levels. The non-pilot firms, meanwhile, show no significant change in their discretionary accruals around the pilot program. Our point estimates indicate that performance-matched discretionary accruals, as a percentage of assets, are one percentage point lower for the pilot firms than for the non-pilot firms during the three-year pilot program compared to the three-year pre-pilot period. This corresponds to 7.4% of the standard deviation of discretionary accruals in our sample.

We also examine the pilot program's effect on two alternative measures of earnings management. First, we find that the likelihood of beating the analyst consensus forecast by up to one cent is 1.8 percentage points lower for the pilot firms than the non-pilot firms during the pilot program. This represents 11.1% of the unconditional likelihood of meeting or just beating analysts' forecast in our sample. Similarly, the likelihood of meeting or just beating the firm's quarterly EPS in the same quarter of the prior year is 0.8 percentage points lower for the pilot firms, representing 14.2% of the unconditional likelihood. Second, we find that the likelihood of being classified as a misstating firm, based on the F-score of Dechow et al. (2011), is significantly lower for the pilot firms during the pilot

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<sup>3</sup> Following the literature (e.g., Kothari, Leone, and Wasley, 2005), we measure discretionary accruals as the difference between actual accruals and a benchmark estimated within each industry-year. Details are provided in Section III.C.

period. Combined with our results regarding discretionary accruals, these results indicate that pilot firms decrease their earnings management during the pilot program.

We consider several alternative interpretations for the patterns we observe in discretionary accruals. One possibility is that pilot firms' discretionary accruals reflect changes in their growth, investment, or equity issuance, as Grullon, Michenaud, and Weston (2014) document a significant reduction in financially constrained pilot firms' investment and equity issuance during the pilot program. We consider several controls for firm growth and investment, both in the construction of our discretionary accruals measures and as controls in the multivariate tests. None of these controls has a material effect on our main findings. We also find that the pilot firms' investment levels do not follow a pattern that would explain the changes in their discretionary accruals during and after the pilot program. Regarding the possible impact of equity issuance, we find that pilot firms' discretionary accruals pattern is similar among firms that do not seek to issue equity as for the overall sample. These results indicate that the effect of the pilot program on discretionary accruals is unlikely to be explained by changes in pilot firms' growth, investment, or equity issuance surrounding the program.

Another possible explanation is that managers of the pilot firms decreased their earnings management because of a general increase in investors' attention paid to these firms. Using three measures of market attention, however, we do not find that pilot firms were subject to greater attention during the pilot program. In multivariate DiD tests, the market attention measures are not significantly related to discretionary accruals, nor do they affect our main finding in discretionary accruals.

The most plausible interpretation of our results is that the pilot program reduced the cost of short selling sufficiently among the pilot firms to increase potential short sellers' monitoring activities, and that the increased monitoring induced a decrease in these firms' earnings management.<sup>4</sup> We conduct three additional tests to further probe this interpretation. First, we find that, among the pilot firms during the pilot program, short selling is positively related to discretionary accruals. Second, we find that short

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<sup>4</sup> Throughout this paper, we use "potential short sellers" or "short sellers" to refer both to investors who may take new short positions and investors with existing short positions.

interest increases in months in which firms are later revealed to have engaged in financial misrepresentation during our sample period. And third, we find that, among firms that had previously initiated financial fraud, pilot firms are more likely to get caught than control firms after the pilot period started. We also find that the unconditional likelihood that pilot firms are caught for financial fraud converges monotonically toward that for non-pilot firms as we sequentially include frauds initiated after the pilot program begins. This result is consistent with both an increase in the pilot firms' conditional likelihood of being caught for any financial frauds they commit, and our finding that pilot firms endogenously adjust by decreasing their earnings manipulations after the pilot program begins.

Finally, we examine the implications of the pilot program for price efficiency through its effect on firms' reporting practices. We show that the pilot firms' coefficients of current returns on future earnings increase. Among firms announcing particularly negative earnings surprises, the well-documented post-earnings announcement drift disappears for pilot firms during the pilot period, while it remains significant for non-pilot firms. These results indicate that the reduction in pilot firms' earnings management during the pilot program corresponds to an increase in the efficiency of their stock prices as their stock returns better incorporate earnings information.

These findings make four contributions to the literature. First, they show that an increase in the prospect of short selling has real effects on firms' financial reporting. This demonstrates one avenue through which trading in secondary financial markets affects firms' decisions.<sup>5</sup> Second, our results highlight one important avenue through which short selling improves price discovery and makes prices more efficient. Previous research emphasizes how short selling facilitates the flow of private information into prices (e.g., Miller, 1977; Harrison and Kreps, 1978; Chang, Cheng, and Yu, 2007; Boehmer and Wu 2013). Our findings indicate that the prospect of short selling also improves price efficiency by decreasing managers' tendency to manage earnings. Third, our findings identify a new determinant of

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<sup>5</sup> See Bond, Edmans, and Goldstein (2012) for a survey of research on the real effects of financial markets. For example, Karpoff and Rice (1989) and Fang, Noe, and Tice (2009) examine the effect of stock liquidity on firm performance; Fang, Tian, and Tice (2014) examine the effect of liquidity on innovation; and Grullon, Michenaud, and Weston (2014) examine the effect of short selling constraints on investment and equity issuance.

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