Revealing shorts:
An examination of large short position disclosures*

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ABSTRACT

Between 2008 and 2012, European Union countries enacted rules requiring the disclosure of large short positions. This is a novel approach to short-sale regulation, and we analyze the effect of the regime change and the effect of the disclosures themselves. We find a reduction in short interest and a reduction in bid-ask spreads as the disclosure regime is implemented over five distinct event dates in a sample of 12 countries. We find no negative abnormal returns immediately after disclosure, but over longer intervals we find significantly negative returns. Similarly, we find no increase in short interest in the days immediately after a particular disclosure, although the total level of short interest falls when the disclosure regime is introduced. Taken together, these results suggest disclosures are not being used to coordinate manipulative attacks, but instead large short sellers are simply well-informed. Finally, we find that a disclosure today makes it more likely that there will be another disclosure within a month in the same stock by a different short seller. This follow-on shorting is more likely when the initial discloser is large, and when follow-on disclosers are geographically close to the initial discloser. Similar regulations are currently under consideration by the US Securities and Exchange Commission and other regulators, and our findings suggest that there are no serious unintended negative consequences associated with short-sale disclosure regulations.

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1. Introduction

Although most academic research argues that short sellers improve market efficiency and stabilize share prices, policymakers, journalists, and company executives worry that short sellers may employ abusive trading strategies and damage investor confidence.[1,2] In response, regulators have historically enacted rules that limit or discourage certain short sales.[3]

In contrast, disclosure has recently emerged as an alternative policy response. For example, US exchanges are now required to report daily the amount of shorting activity in each stock. The hope of regulators is that the sunlight of disclosure discourages abusive short selling. However, theory suggests that short sale disclosures could do more harm than good. One possible negative consequence of such regulation is that disclosure could provide a coordination mechanism for manipulative short sellers.[4]

While the US has focused on the release of aggregated data on short sales, Europe has taken the lead in requiring the immediate public disclosure of large short positions. The UK and Spain started requiring short sale disclosures in 2008. France started requiring disclosures in 2011, and all 27 European Union countries began requiring disclosures in November 2012. Under the current pan-European disclosure regime, for example, any short seller with a short position exceeding 0.5% of the shares outstanding in certain stocks must publicly disclose the size of the short position by the next business day.

We analyze the overall effect of these European disclosure regimes and specific effects of the individual disclosures on returns, shorting activity, and share lending activity. Overall, our results indicate that large short sellers take positions based on long-lived private information. Furthermore, there is no evidence that these disclosures provide a coordination device for predatory short selling, and more generally, we find no deleterious unintended consequences

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[1] See, for example, Dechow, Hutton, Meulbroek and Sloan (2001); Abreu and Brunnermeier (2002); Alexander and Peterson (2008); Boehmer, Jones and Zhang (2008); Boehmer and Wu (2013) and Diether, Lee and Werner (2009).

[2] For examples see "There's a Better Way to Prevent 'Bear Raids'" by R. Pozen and Y. Bar-Yam, *The Wall Street Journal*, 18 November 2008; "Anatomy of the Morgan Stanley Panic" by S. Pulliam et al., *The Wall Street Journal*, 24 November 2008; as well as Gerard and Nanda (1993), Brunnermeier and Pedersen (2005) and Goldstein and Guembel (2008).

[3] Recent bans and restrictions are analyzed in Kolasinski, Reed and Thornock (2013); Boehmer, Jones and Zhang (2013); Battalio and Schultz (2011) and Beber and Pagano (2013), among others.

[4] See Brunnermeier and Oehmke (2013) for a model where short sellers can force a vulnerable financial institution to liquidate assets at fire-sale prices. They argue that since their model has multiple equilibria, public disclosure may facilitate coordination by predatory short sellers.

associated with the short disclosure regime. For example, we find no evidence of "piling on" after a disclosure, either in terms of abnormal returns or short interest.

The disclosures studied here are novel and are distinct from previous types of publicly available short sale data. Our database comprises 3,647 unique disclosed short sale positions in 771 different firms across 12 European countries. Each disclosure includes the date of the disclosure, the name of the short seller, the name of the instrument being sold short and the size of the short position. Data that have been examined in the past include short interest, market-wide shorting volume, equity loan, and settlement information (e.g., Asquith, Pathak and Ritter (2005); Boehmer, Jones and Zhang (2008) and Geczy, Musto and Reed (2002)). The database used here is the first publicly available database to show short positions at the individual short seller level. It is also the first to show the evolution of individual short positions over time, and it is the first to include the identity of the short seller.

There are several main results. First, we consider the overall market-wide effects of changes in the disclosure regime. Statistical identification of these effects is enhanced by the staggered introduction of the disclosure rules on five distinct event dates in our sample of 12 countries. By measuring the difference between pre- and post-disclosure periods in this broad sample of stocks, we show that the disclosure regime has a significantly negative effect on short interest, with a measured decrease of 1.88% of shares outstanding in stocks subject to the regime. We also find a significant reduction in the bid-ask spread of 0.41% in affected stocks, suggesting the disclosure regime may reduce market participants' concerns about adverse selection. Overall, we find the regime has some intuitive causal effects: it reduces short interest and improves liquidity.

When we look at periods surrounding disclosures for individual stocks, we find rich trading and share price behavior. Just before the disclosure, we find significant increases in shorting activity, which probably reflects the trading and share borrowing activity of the eventual discloser. When we look immediately after disclosure, we find no change in overall shorting activity. Similarly, there is little evidence of an immediate share price reaction to the disclosure; the three-day cumulative abnormal return is an insignificant -0.41%. Post-disclosure abnormal returns are more negative at longer horizons. For example, the cumulative 90-day abnormal return after a disclosure is a statistically significant -5.23%. Furthermore, there are no return

reversals or other evidence of manipulative shorting activity. The evidence is consistent with the idea that large short sellers are simply well-informed.

Initially, the UK disclosure regime applied to financial stocks and stocks undergoing rights issues. It is important to look at rights issues separately because rights issue announcements, in themselves, may affect returns and because rights issues may generate different incentives for short sellers. For example. Henry and Koski (2010) find that short sellers may push prices below fundamental values in US seasoned equity offerings, suggesting there may be a different role for short sellers around rights issues. However, we find no evidence that short sale disclosures are driving down share prices of firms with rights issues. We find, for example, that the presence of a short position disclosure is not related to stock returns during the rights issue. Post-rights issue stock price behavior also points away from manipulation. If short sellers are temporarily driving share prices below fundamental value, we should see a share price reversal once the rights issue is complete. We do not see any evidence of a share price bounce-back; in the 60 days following completion of a rights issue with a short position disclosure, the mean CAR is an insignificant −0.27%. Thus, it does not appear that short sale disclosures push stock prices down during rights issues.

Beyond return effects, it is important to look at other trading statistics to understand whether disclosure drives abusive behavior. In particular, it is important to examine short-market related behavior around disclosure. We find an increase in short interest before disclosure as short sale disclosers build positions. Similarly, we find increases in the number of active lenders and the number of open loans. It is interesting to note that this short activity does not change significantly on or after the date of the disclosure; instead, the significant changes come only before the disclosure. This finding is consistent with the idea that information is driving the short activity, not disclosure.

Given that the previous literature suggests short sellers' trades are profitable (e.g., Asquith, Pathak and Ritter (2005); Boehmer, Jones and Zhang (2008) and Boehmer, Huszar and Jordan (2010)) and given the longer-window return finding described above, it is natural to expect market participants to respond to disclosures by shorting disclosed stocks after the public disclosure is made. However, if disclosures drive more disclosures, there would be cause for concern. Regulators have worried that disclosures of short positions could act as a coordination device enabling manipulative short sellers to act together.

To investigate this possibility, we use a logit specification to characterize the probability of a disclosure. Using this approach, we find that the existence of a recent disclosure is a strong predictor of a disclosure today. In other words, after controlling for a number of other factors that are likely to drive disclosures, the presence of a short position disclosure significantly increases the probability of another disclosure.

Given the fact that disclosures are clustered in this way, we consider how various characteristics of a disclosure can affect the probability of future disclosures. Specifically, we investigate the reputation of disclosing short sellers. Intuitively, if subsequent short sellers are responding to the presence of a disclosed short position (and not just fundamental information about the firm), then we would expect the response to be stronger if the disclosing short seller has a reputation as an informed trader. We do in fact find that reputation is a significant driver of the probability of subsequent disclosures. A stock with a disclosure made in the past thirty days by a short seller with high assets under management is significantly more likely to have a disclosure by another short seller on a given day.

To further understand the link between disclosures and short selling, we also examine the geography of short sellers. Disclosures made by short sellers in New York and London are more likely to be followed, and short sellers with addresses that are close to other short sellers' addresses are more likely to be followed. In fact, follow-on short sellers tend to be located closer to the initial short seller than other short sellers. These clustered short sellers could be communicating with each other directly, or they could independently obtain correlated signals. Regardless of the exact channel, the combination of public disclosure and geographical proximity seems to matter.

On its face, the finding that disclosures cluster in this way appears inconsistent with the other main findings because it suggests that disclosure, not information, is driving short sales. However, it is important to note that we can only measure clustering once the disclosure regime is in place. There is no way of measuring whether the clustering of short positions has changed because of the disclosure regime. Furthermore, we find that overall short interest does not increase following a disclosure. In fact, there is little change in any of our share lending metrics following a disclosure. Thus, the most likely explanation for clustered disclosure is that short sellers receive correlated private signals about equity value and act on this information at about

the same time. Overall, there do not appear to be any deleterious unintended consequences associated with the European disclosure regimes.

The remainder of this paper proceeds as follows. Section 2 discusses related literature, and Section 3 discusses the disclosure regime details for each of the three jurisdictions. Section 4 describes the databases and the construction of our variables. Section 5 presents our analyses and findings, and Section 6 concludes.

2. Related literature

There are strong theoretical reasons to expect short sellers to contribute to the informativeness of prices. Diamond and Verrecchia (1987) argue that short sellers are more likely to be informed because they do not have use of the sale proceeds, though they may use short sales to hedge other risks. Miller (1977), Harrison and Kreps (1978) and Duffie, Garleanu and Pedersen (2002) show that prices can be above fundamental values when short selling is constrained. Empirical evidence almost uniformly finds that overpricing is reduced when short selling constraints are relaxed (e.g., Danielsen and Sorescu (2001); Jones and Lamont (2002); Cohen, Diether and Malloy (2007)). Similarly, Saffi and Sigurdsson (2011) find that stocks with tighter short-sale constraints have lower price efficiency.

Short sellers anticipate future returns. For example, Boehmer, Jones and Zhang (2008) find that heavily shorted stocks underperform lightly shorted stocks over the following month, and Diether, Lee and Werner (2009) find that short sellers are contrarian, though Blau, Van Ness, Van Ness and Wood (2010) find some intraday evidence of momentum trading by short sellers. Christophe, Ferri and Angel (2004) and Boehmer, Jones and Zhang (2013) find that daily flows of short sales are concentrated prior to disappointing earnings announcements, analyst forecast revisions and analyst downgrades, which suggests short sellers have access to private information about fundamentals, while Engelberg, Reed and Ringgenberg (2010) find that short sellers trade profitably around news releases.

Several theoretical papers explore the possibility that short sellers might drive share prices below fundamental value, which could account for at least some of the relationship between short sales and future returns. One particularly relevant model is Brunnermeier and Oehmke (2013), in which short sellers can force a vulnerable financial institution to liquidate assets at fire-sale prices. The paper argues that public disclosure could facilitate coordination by

predatory short sellers. Similarly, Goldstein and Guembel (2008), suggest aggressive short selling may depress a company's share price and distort the company's investment decision, thereby harming its fundamental value, giving an incentive to short sellers to manipulate prices. Brunnermeier and Pedersen (2005), Carlin, Lobo and Viswanathan (2007) and Attari, Mello and Ruckes (2005) model predatory trading involving sellers (including short sellers) profitably exploiting investors that have a need to exit long positions or undercapitalized arbitrageurs. This type of trading would lead to return reversals. Allen and Gale (1992) and Aggarwal and Wu (2006) present theoretical and empirical evidence of "pump-and-dump" manipulation. A similar "bear raid" strategy could be used on the short side. Some market observers and participants have worried recently that these strategies may have worsened stock market volatility during the most recent financial crisis.[5]

Manipulative short selling is a particular concern around secondary equity offerings (SEOs). For example, Safieddine and Wilhelm (1996) and Corwin (2003) investigate rule changes in the US designed to curtail manipulative short selling around SEOs.[6] Particularly relevant for this paper is Henry and Koski (2010), who examine daily US short selling data around SEO pricing dates. In SEOs that are not part of a shelf registration and thus take longer to execute, they find that more short selling prior to the issue date is associated with larger issue discounts and the price moves are later reversed, consistent with manipulative short selling. Suzuki (2010) studies Japanese SEOs, where no such shorting restrictions exist. Kim and Masulis (2011) study trading behavior around the SEO issue date and find that underwriter market-making activity explains the heavily negative returns after the SEO.[7]

Empirical evidence of manipulative short sales is sparse outside of SEOs. Shkilko, Van Ness and Van Ness (2012) examine stocks that experience large negative intraday price moves followed by a reversal before the end of the day. They find aggressive short sales during the price decline period (though long sellers are even more aggressive than short sellers), and they suggest that short sellers may occasionally engage in predatory trading. Blocher, Engelberg and

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[5] For example, see "There's a Better Way to Prevent 'Bear Raids'" by R. Pozen and Y. Bar-Yam, *The Wall Street Journal*, 18 November 2008; "One way to stop bear raids" by G. Soros, *The Wall Street Journal*, 23 March 2009; and "Blame the bear raids" by T. Brennan, CNBC, 20 March 2008.

[6] SEC Rule 10b-21, adopted in 1988, and its replacement Rule 105, adopted in April 1997 as part of Regulation M, limit short sales and subsequent securities purchases around an SEO.

[7] In a related set of results on Initial Public Offerings (IPOs), Edwards and Hanley (2010) find that short sales are not as important to IPO pricing as suggested by the literature.

Reed (2009) find increased levels of short selling in the last hour of the last trading day of the year for stocks that have large short interest. The short selling is accompanied by poor returns and subsequent reversals at the beginning of the year, consistent with year-end manipulation by fund managers holding short positions.

Beyond the short position disclosures that we study here, there are other public releases of information about short sales. Aitken, Frino, McCorry and Swan (1988) examine real time disclosures of short sales in Australia and finds that short sales have a large, immediate negative price impact. Other studies focus primarily on the monthly release of short interest information in the US. Asquith, Pathak and Ritter (2005) find that short interest predicts returns only in small stocks and report that the effect is stronger in stocks with low institutional ownership. Desai, Ramesh, Thiagarajan and Balachandran (2002) find that high short interest predicts negative returns in Nasdaq stocks, and Boehmer, Huszar and Jordan (2010) find that low short interest predicts high future returns. Finally, Senchack and Starks (1993) find negative short term reactions to short interest announcements, especially for non-optioned stocks with unexpectedly large increases in short interest.

Long position disclosure rules have been in place longer and have been well studied. For example, Brav, Jiang, Partnoy and Thomas (2008) examine Schedule 13D filings in the US by activist hedge funds that disclose ownership stakes of at least 5%. They find average returns of around 2% associated with the disclosure, with an additional upward drift of about 2% over the next month, but they argue that these are associated with shareholder value creation rather than stock picking ability.

Examples of papers that study UK rights issues include Levis (1995); Slovin, Sushka and Lai (2000) and Ho (2005). Levis (1995) mainly studies young firms that return to the market following an IPO. Ho (2005) finds that there is little long-term equity underperformance following rights issues, while Slovin, Sushka and Lai (2000) find a rights announcement effect of -3.09%. Eckbo and Masulis (1992) develop theory that implies rights issues should have no effect on share price, since existing shareholders receive the rights. They study a small sample of US rights issues and find insignificantly negative stock price announcement effects.

Finally, our work is also related to the literature on institutional herding. For example, Sias (2004) finds that institutions follow each other's trades at quarterly horizons, and Puckett and Yan (2011) show herding at weekly frequencies.

3. European disclosure regimes

The short position disclosure requirements that we study were adopted at different times in various countries and differ in some details, but the requirements are broadly similar. In particular, there is always a minimum position size threshold calculated as a fraction of shares outstanding, additional disclosures are required if the short position changes substantially or shrinks below the threshold, and disclosure of the position and the identity of the short seller must occur within one business day after the threshold is reached. In addition, short sellers must include positions in equity derivatives on a delta-adjusted basis, including options and total-return swaps, but do not require the inclusion of short positions in bonds or credit-default swaps.

3.1. Pan-European disclosure requirements

A uniform short position disclosure regime came into force throughout the entire European Union on November 1, 2012. Under this regime, net short positions must be privately reported to the relevant national regulator if they are at least 0.2% of shares outstanding, and short positions must be publicly disclosed if they are least 0.5% of shares outstanding. Subsequent disclosures are required in 0.1% increments. For example additional private disclosures are required if the short position crosses 0.3% or 0.4% of shares outstanding, and additional public disclosures are required if the short position crosses 0.6%, 0.7%. Disclosures must be made the day after a threshold is crossed, and the disclosure requires the name of the entity that has the position, the amount of the position and the name of the company in which it has the position. There are exceptions for market-makers and for stocks where the primary listing venue is outside the EU.

In the four years prior to the start of the pan-European regime, the United Kingdom, France, and Spain each instituted some form of short position disclosure at the national level. There is some variation across these three jurisdictions in the stocks covered, and the next section details the relevant features of each of these national disclosure regimes. All of the disclosure regimes are summarized in Figure 1.

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3.2. United Kingdom

The UK Financial Services Authority (FSA) was the first to institute a short position disclosure regime, requiring disclosures starting on June 20, 2008 in stocks undergoing rights issues. On September 19, 2008, the FSA banned short selling in financial stocks and expanded the disclosure regime to include financial stocks. About four months later, on January 16, 2009, the FSA lifted the short sale ban on financial stocks, but kept and clarified the short position disclosure requirements for financial sector stocks as well as any stock in a rights issue period.[8] The UK disclosure requirements were expanded to all stocks when the pan-European regime came into effect in November 2012.

In the UK prior to November 2012, any short seller with a short position exceeding 0.25% of the shares outstanding is required to publicly disclose the size of the short position, and subsequent disclosure is required if a short position changes by 0.1% of shares outstanding or more. The disclosures are required by 3:30 PM on the business day following the first day on which the position reaches, exceeds or falls below the disclosure thresholds. The UK national regime never required private disclosure only to the regulator: short positions of less than 0.25% of shares outstanding did not require any disclosure.

3.3. France

In September 2008, the French securities regulator Autorité des Marchés Financiers (AMF) issued temporary rules mandating the disclosure of short positions in French financial stocks.[9] However, since short sales in those stocks were banned at the same time, there were virtually no disclosures of new short positions during that period. On February 1, 2011, the ban on shorting financial stocks was allowed to lapse, and a permanent disclosure regime came into effect for all French stocks. Short positions of at least 0.50% of shares outstanding were required to be reported by the next day and are published on the AMF website. Short positions below this threshold did not require any form of disclosure. Additional thresholds are at 0.1% intervals (0.60% of shares outstanding, 0.70%, 0.80% and so on), and subsequent disclosures were

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[8] See FSA press release FSA/PN/057/2008 dated 13 Jun 2008, the FSA's policy statement "Temporary short selling measures," January 2009, http://www.fsa.gov.UK/pubs/policy/ps09_01.pdf and "FSA confirms extension of short selling disclosure regime," release FSA/PN/009/200, January 14, 2009, "http://www.fsa.gov.UK/pages/Library/Communication/PR/2009/009.shtml".

[9] AMF News Release dated September 19, 2008.

required every time the position crossed one of these thresholds. A final disclosure was also required when the short position falls below the 0.50% threshold. The short position disclosure rules covered all issuers trading on Euronext Paris or Alternext Paris, except firms for which the French market is not the principal trading market. Derivative positions were included in calculating the discloser's net short position. Bona fide market-makers could apply in advance for an exemption from the short position disclosure requirements.[10] The French disclosure regime is superseded by the EU regime in November 2012.

3.4. Spain

Spain also adopted short position disclosure rules for 20 financial stocks in September 2008. As of June 10, 2010, changes were made to the thresholds, and the disclosure regime was expanded to all Spanish stocks. The disclosure rules thereafter were similar to those of France. The Spanish regulator Comisión Nacional del Mercado de Valores (CNMV) published individual short positions of at least 0.50% of shares outstanding with additional thresholds at 0.1% intervals, just as in France. During the period before November 2012, the main difference from the French regime is that those shorting Spanish stocks had to report to the regulator all positions of at least 0.20% of shares outstanding. The CNMV reported the aggregate amount of all short positions that were between 0.20% and 0.50% of shares outstanding, but did not publish any details about the individual short positions in this size category. As with the UK and France, the Spanish disclosure regime was superseded by the EU regime in November 2012.

4. Data

We employ several databases in this study, some novel and some familiar. The key database is a collection of short selling disclosures. We also use a database on the European securities lending market, and we obtain several measures of hedge fund reputation from 13F filings to the SEC. In what follows, we describe the datasets used in this study in more detail.

4.1. Disclosure Data

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[10] Additional details on the French disclosure requirements can be found in AMF Implementing Instruction 2010-08 of November 9, 2010, available at http://www.amf-france.org/documents/general/9738_1.pdf.

We obtain a record of over 23,000 disclosures of 3,647 distinct short positions in 771 firms. The sample of disclosures begins on January 17, 2009, February 2, 2011, and June 10, 2010 for the UK, France, and Spain, respectively, and disclosures start on November 1, 2012 for the nine other countries in our sample (Austria, Belgium, Finland, Germany, Ireland, Italy, the Netherlands, Portugal, and Sweden).[11] The sample extends through December 31, 2013.[12] The database has several pieces of information about each disclosure, including the date of the disclosure, the name of the short seller, the name and ISIN of the instrument being sold short and the percentage of shares outstanding being sold short.[13] We obtain the initial UK portion of this database from Data Explorers, which collected the disclosure information from publicly available news sources. We have hand checked a small sub-sample (2% of the announcements) of the database against the London Stock Exchange's regulatory news database, and we find no discrepancies. We also validate the UK disclosures by checking that the disclosed short position is below the number of shares borrowed in the UK's CREST database.[14] Disclosure announcements for all other countries are hand collected from the website of the regulatory body governing the disclosure regime.

Figure 2 presents an example of a UK disclosure announcement retrieved from the Bloomberg newswire. In this example, Millennium Partners, L.P. disclosed a short position of 0.16% shares outstanding in Old Mutual, PLC, (LSEX Ticker: OML) on March 24, 2009, the day after the threshold of 0.25% was crossed from above. This disclosure closes out the position held by Millennium Partners, L.P., for the purpose of our study, and such final disclosures make it possible to describe the life cycle of a disclosed short position. Figure 3 plots the closing price of Old Mutual, PLC, against short positions held in the security for the first three months of the UK disclosure regime. Short interest in this security stays relatively stable around 2% of shares outstanding until February 17, 2009. Two days later on February 19, 2009, Lansdowne Partners

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[11] These countries consist of MSCI EAFE members for which a disclosure regime was enacted, a short position was disclosed over our sample period, and data on the disclosed firm are available from both Datastream and Data Explorers.

[12] As discussed above, short selling bans are instituted at various times in many European countries (see also Beber and Pagano, 2012). We exclude all disclosures that occur while a shorting ban is in effect in order to avoid any confounding effects from the ban.

[13] For many but not all of the disclosures, we also have the exact time at which the short sales are disclosed.

[14] In three cases, the disclosed short position exceeds the percentage of shares that are being lent out as reported by CREST. In the case in which this discrepancy is the greatest, the disclosed short position is 0.85% of shares outstanding and CREST only reports that 0.50% of shares are being lent out. Because there is the possibility of using swap contracts to fulfill short sale requirements in the UK and because CREST data report settled transactions as opposed to initiated short positions, we consider these observations valid.

Limited discloses a short position in Old Mutual, PLC, of 0.39% of shares outstanding. The following day Diamond Master Fund, Ltd., discloses a short position of 0.32% of shares outstanding. Together, these two short positions comprise 26.4% of the total aggregate short interest in Old Mutual, PLC, as reported by CREST. On March 10, 2009, Millennium Partners, L.P., discloses a position of 0.26% of shares outstanding. This disclosure marks the origination of the position that is closed by the announcement in Figure 2. During this period of disclosures, it is worth noting that total short interest in Old Mutual, PLC, increases to a high of 5.15% of shares outstanding, more than double the pre-disclosure level.

These disclosures provide an unusually revealing view of individual short positions, and some summary statistics by country are given in Table 1. The UK accounts for a little more than half of the sample, with 7,265 disclosures of 1,953 distinct short positions relating to 399 different firms. From those last two numbers, we discern that the average UK stock in the disclosure sample is subject to 4.89 distinct short positions over the sample period. The corresponding number for the whole sample is quite similar at 4.73 disclosed positions per stock. Consistent with the clustering of disclosed short positions in Old Mutual, PLC, presented in Figure 3, there are an average of 2.78 follow-on disclosures by others within 20 trading days of the first disclosure by a short seller. Additional disclosures are required each time the short position crosses a designated threshold. On average, each shorter-issuer pair appears 6.42 times in the overall sample. The average disclosed short position in the sample is 0.95% of shares outstanding.

Similarly, we see that the average holding period of a disclosable short position is 51 trading days after excluding positions that are still open at the end of our sample. On average, the short position builds up and reaches its maximum 16 trading days after the first disclosure. This average holding period roughly aligns with prior findings on the holding period for short positions. Boehmer, Jones and Zhang (2008) estimate that the average short position is 37 days, and Geczy, Musto and Reed (2002) find that the median equity loan length is 3 days. However, unlike the prior literature that estimates holding periods, our measure of holding period length is directly reported and subject to regulatory scrutiny. Table 1 also shows that some of the individual short positions are surprisingly large. The largest single disclosure is a short position taken by Two Sigma Investments, LLC in the stock of Pernod-Ricard, which is 14% of shares outstanding.

As a first glimpse into the follow-on behavior of other short sellers, Table 1 presents summary statistics on the average number of disclosed short positions originated by other short sellers over the (0,20)-day window following a disclosure. Follow-on activity is particularly prevalent in the UK, where on average there are 3.57 follow-on short position disclosures per stock. Many of these follow-on positions cross the disclosure threshold within the first few days following a disclosure. For example, in the UK the average disclosed position has one follow-on disclosure after 3.17 trading days and another follow-on after 4.44 trading days. Moreover, multiple short sellers can cross the disclosure threshold on the same day. In the UK, for example, this occurs 39% of the time.

Table 3 lists the most prolific short position disclosers in our sample. Most are hedge funds and asset managers rather than large sell-side firms. At the top of the list are Marshall Wace (a London-based hedge fund) and Blackrock (a multinational asset management firm based in New York), each with about 350 disclosures. Marshall Wace is involved in 10 of our 12 sample countries and discloses short positions at various times in 85 different firms. Among these top short sellers, the average disclosed short position ranges from 1.02% of shares outstanding for Lansdowne Partners down to 0.40% of shares outstanding for Davidson Kempner.[15]

Table 2 presents the disclosures by industry and reveals that financial firms account for about 17% of the disclosures overall, and as high as 38% in Italy. This is unsurprising, since European banks and financial firms have faced well-publicized problems during the sample period. However, recall that the disclosure regime in the UK and Spain initially focuses on financial firms, so that could account for some of finance's overrepresentation in the sample. In addition, banks and other financial firms in Italy have faced well-publicized capital concerns during the 2012-2013 period.

Table 3 Panel B details the percentage of firms in a given industry and country that experience a short position disclosure. Despite the prevalence of disclosure announcements in UK financial firms, only 6.16% of UK financial firms have a disclosed short position over our sample period. A much higher percentage of firms in Spain have a disclosed short position. For

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[15] Average disclosed short positions can be close to the original, lower UK regulatory threshold of 0.25% if a short seller focuses on UK stocks and is active during the earlier part of the sample.

example, more than 29% of Spanish industrials are the subject of a short position disclosure during our sample period.

While we analyze each short position disclosure, we focus greater attention on the first disclosed short position in each firm for more precise identification. Thus, for many of our analyses, the sample consists of 771 initial disclosed positions.

4.2. European Securities Lending Data

Securities lending data were generously provided by Data Explorers, now a division of Markit. Versions of this database have been used by a number of previous papers, including Ringgenberg (2011), Saffi and Siggurdsen (2011) and Berkman and McKenzie (2012). The database contains information about short selling and short-selling constraints for stocks in European markets from January 1, 2008 through December 31, 2013. The data come from two main sources: the "wholesale" data come from securities lenders, such as custodians, who lend stock to prime brokers; the "retail" data come from borrowers, such as hedge funds, who borrow stock from prime brokers. According to Data Explorers, their "wholesale" data cover at least 80% of the equity loan transactions in the market. Data Explorers is a firm whose main product is aggregate securities lending data, which they sell to individual market participants who themselves cannot see market rates for securities loans because of the significant opacity of the market (e.g., Kolasinski, Reed and Ringgenberg (2013)).

The key short activity variables that we employ in the paper are as follows. *Daily Cost of Borrowing Score* is a variable describing the borrowing cost as reported by securities lenders. The variable is a rank variable with fixed, but unreported, bin cutoffs where rank one indicates the lowest loan fees and rank ten indicates the highest loan fee. *Concentration of Open Loans* is the Herfindahl index of loans, where zero indicates small loans across many lenders and one indicates one loan at one lender. *Percent of Lenders Active* is the number of lenders with available inventory currently making loans divided by the total number of lenders with available inventory. *Scaled Number of Open Loans* is the number of open loans in the database divided by shares outstanding (in millions), and *Short Interest* is the number of shares outstanding currently borrowed or on loan net of double counting scaled by the total number of shares outstanding.[16]

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[16] For UK stocks, we also have access to data from CREST Co, the UK's electronic settlement system. The advantage of the CREST data is that it is a market-wide clearing system, as opposed to Data Explorers, which bases

These variables are measured as of the settlement day, which is three days after the trade day in our sample. We adjust the variables by three days to eliminate this settlement lag and reflect data in trade time. In other words, short interest and loan variables at time t reflect positions as of trading day t, though they will not appear in short interest or loan market databases until date t + 3. Sometimes it is important to ensure that short interest is an element in the public information set. When this is necessary (in Table 12 and as a criterion for our matching algorithm, for example), we do not adjust for the three-day settlement lag. For clarity, we label this variable *Short Interest at Settlement.*

4.3. Measures of Hedge Fund Reputation

In addition to the variables described above, we add a number of variables for each discloser of a short position. First, we collect the geographic location of each of the short sellers from 13F filings available on EDGAR. For firms not subject to this regulation, we supplement the EDGAR filings by hand collecting the location of the firm through web search. Using these data, we construct two measures of centrality to other disclosers. *MoneyCtr* is a dummy variable equal to one if the discloser is headquartered in New York or London and equal to zero otherwise. *Centrality* is a percentile rank based on the average pairwise distance between short sellers in our sample. Thus, a centrality measure of 0.01 would be the short seller furthest on average from other short sellers, while a centrality measure of 0.99 would be the short seller closest on average to other short sellers. We are able to find geographic location information for 98.6% of the disclosed positions in our sample and 97.7% of the short sellers in our sample.

We construct two additional measures of short seller reputation from total assets under management subject to 13F filings from EDGAR. *AUM* is the natural logarithm of the discloser's most recently reported assets under management subject to 13F filings. *PositionSize* is the dollar value of the disclosed short position divided by assets under management subject to 13F filings multiplied by 10. While *AUM* potentially understates the size of long-short or short-only hedge funds, it has the benefit of being publicly available; unlike other databases of hedge

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its aggregates on the voluntary reporting of borrowers and lenders. Within our sample, the average ratio of shares reported borrowed/loaned by Data Explorers to shares reported borrowed/loaned by CREST is 73.79%. Moreover, short interest from Data Explorers is highly correlated with short interest from CREST, with a correlation coefficient of 0.7261.

fund characteristics, disclosure is not discretionary. We are able to find performance variables for 74.9% of the disclosed positions in our sample and 75.1% of the short sellers in our sample.

4.4. Additional Data and Match Criteria

We also employ the following securities-level data. Daily stock returns, trading volume, shares outstanding, and bid-ask spread are from Datastream.[17] *Share Turnover* is equal to trading volume scaled by total shares outstanding. Country-level one-digit Industry Classification Benchmark (ICB) sector indices are obtained from Datastream.[18]

Our analysis investigates disclosed short positions in stocks undergoing rights issues separately from disclosed short positions in stocks without rights issues, in an effort to disentangle the effects of the announcement of a known corporate event and the disclosure announcement of a short position. We obtain a list of rights issues occurring during our sample period in our sample countries from Data Explorers and Thomson Reuters SDC Platinum. In addition to the announcement and completion dates of the rights issue, the data include two measures of rights issue quality.[19] *Ratio of Rights to Total Shares* is equal to the number of rights shares divided by total shares outstanding at the announcement date. *Discount to Share Price* is the difference in price between the share price and the rights price at announcement scaled by share price. Of the 1,158 rights issues we obtain, 108 have the disclosure of a short position occurring within the window between the announcement and the completion date. The other rights issues without a disclosed short position comprise our sample of undisclosed rights issues, with 799 rights issues occurring before the disclosure regime and 251 occurring during the disclosure regime period.

For subsequent analysis, we match each disclosed firm to a control firm that did not undergo a rights issue and did not have a disclosed short position over our sample period. We select a control firm in the same country as the disclosed firm by minimizing the sum of the

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[17] Returns are filtered to delete potentially erroneous values following Griffin, Kelly and Nardari (2010). Specifically, we delete single-day returns in excess of 200%. We also delete two-day returns in which either of the single-day returns is in excess of 100% and the two-day cumulative return is less than 20%.

[18] Results are qualitatively similar using three-digit Industry Classification Benchmark (ICB) sector indices; however, these indices are often sparse with fewer than five firms in a given sector portfolio.

[19] For rights issues for which we cannot identify the announcement date, we define the announcement date as the filing date. In the sample of rights issues for which we have both the announcement date and the filing date, these two dates coincide in 85% of the sample. For uncompleted rights issues or other rights issues with missing completion dates, we define the completion date to be 180 days after the announcement date of the rights issue.

squared differences between the disclosed firm and the control firm as of the disclosure date for four match criteria: percentile *Short Interest at Settlement*,[20] percentile *Market Capitalization*, percentile *Share Turnover* and percentile *Change in Short Interest at Settlement* over the past month (22 trading days). Percentiles are calculated each trading day and for each country.

Table 4 presents summary statistics for the match criteria and short activity measures for both the disclosed group and the control group. We find no significant differences in mean between the two groups for any of our four match criteria. At the date of initial disclosure, the average disclosed stock has short interest of 3.65% of shares outstanding, roughly 1.4 percentage points more than the control group.[21] The average disclosed stock also has slightly less than one open loan per million shares outstanding. Disclosed firms have a significantly higher percentage of lenders active than the control group, 47.49% versus 40.32%.

5. Results

5.1. Effects of the disclosure regime

We begin by considering the overall effects of changes in the disclosure regime. For example, in assessing this new policy, regulators should know whether a short position disclosure regime increases, decreases, or has no impact on overall shorting activity. Changes in overall shorting behavior could also help us understand whether short-sellers are choosing to advertise or mask their shorting activity by choosing to hold positions that are respectively above or below the disclosure threshold.

To investigate the overall effects of the change in policy, we want to examine short interest and other measures before and after the implementation of a short position disclosure regime. The challenge is to rule out other contemporaneous influences. To this end, we take advantage of the breadth of our dataset and the staggered introduction of the disclosure regime by combining multiple event dates and multiple countries into one experimental design, similar in spirit to Table III of Beber and Pagano (2013). In particular, we use five distinct event dates corresponding to the implementation dates of disclosure rules in our sample of 12 countries. Thus, we can measure the difference between pre- and post-disclosure measures on a broad sample of stocks. The disclosure regime dates are provided in Figure 1.

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[20] Using short interest at settlement versus short interest in trade time assures that our match criteria are in the information set at the disclosure date.

[21] Short interest here is measured in trade time, adjusted for the three-day settlement lag.

The results of a standard diff-in-diff regression analysis can be found in Table 5. For the purposes of this analysis, we use the three months before the event as the pre-period and the three months after the event as the post-period. Panel A shows that in the full sample, the disclosure regime has a significantly negative effect on short interest (based on Data Explorers share lending data). The point estimate is -1.88% of shares outstanding for the differential effect on firms subject to the disclosure regime. Furthermore, Panels B, C and D indicate that the effect is significant among high short interest stocks, small stocks, and on high short interest, small stocks. These results are consistent with the idea that the disclosure regime deters some short sellers, and furthermore, the result is especially strong among those stocks that are most likely to trigger a disclosure. In particular, stocks that are both high in short interest and small in market-cap show a reduction of 7.08% of shares outstanding. Overall, these results suggest that the disclosure regime reduces short interest, and it reduces short interest most in those stocks that are most likely to be subject to disclosures.

We also investigate changes in loan concentration around the disclosure regime, and we find that concentration increases. In particular, in the full sample, concentration increases by 0.0291. This full sample result is generally consistent with the reduction in short interest discussed above; as short sellers borrow fewer shares, they may borrow shares from fewer lenders, as suggested by Kolasinski, Reed and Riggenberg (2013). However, this result is not very consistent; we find that there are both increases and decreases in concentration among different sub samples.

To investigate changes in liquidity associated with the disclosure policy, we measure changes in the bid-ask spread. When we estimate the diff-in-diff specification, we find a statistically significant reduction in the bid-ask spread of 41 basis points, which indicates an increase in liquidity. The reduction in the bid-ask spread is also significant among small, high-short-interest stocks. This finding is consistent with liquidity providers being less concerned about adverse selection because of the beneficial effects of the disclosure regime.

To summarize, the imposition of the disclosure regime reduces the overall amount of shorting and it increases liquidity. Although a large body of research shows that shorting is positively associated with liquidity, the results here are consistent with the idea of disclosure having two intuitive effects: First, disclosure dissuades some short sellers from taking large positions. Second, disclosure reduces liquidity providers' concerns about adverse selection.

5.2. Stock Returns Around Short Sale Disclosure

To investigate the possibility of abusive behavior, one of the essential facts to establish is how the market responds to the disclosure of a short position. As a first pass, we examine a relatively simple setting: the abnormal returns around the first disclosure of a short position in a particular stock.

Examining the full sample of disclosed stocks in Table 6, we see that the abnormal returns are flat to negative around the period of disclosure. Specifically, we compare the return of each disclosed stock to the return of that stock's one-digit Industry Classification Benchmark (ICB) index. Using a calendar-time portfolio approach, we find that the cumulative difference is only negative in the longer windows around the day of disclosure. For example, there is no significant immediate stock price response to the disclosure; the cumulative abnormal return from the day of the disclosure through the second day after the disclosure is an insignificant −0.41%. However, there is a stronger downward trend for longer windows; cumulative abnormal returns from the day of disclosure until the tenth day after the disclosure average −1.24%, which is significant at the 5% level. Similarly, returns to the 90th day after disclosure are −5.23%, which is again significant at the 5% level.

Figure 4 displays these results graphically. In the full sample, we see that cumulative abnormal returns have only a gradual decrease after the disclosure, and in the rights issue subsample, there is no decrease until well after the disclosure. These returns then remain relatively stable with no obvious reversal until up to 90 days following the disclosure. In summary, stock prices show no effect in the days immediately after disclosure, but over time, a gradual decrease can be measured in the full sample.

Figure 5 sheds a bit more light on the negative returns post-disclosure. In this figure, we present results from a hypothetical trading strategy that buys each stock on the day it is initially disclosed and short sells that stock's benchmark portfolio as a hedge. Each position is held for 30 trading days. In Panel A, the stock's one-digit Industry Classification Benchmark (ICB) index is used as the hedge portfolio.[22] Panel A shows that the trading strategy has a negative return in most months, with much of negative return coming in the beginning of the sample. In un-

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[22] Since this strategy captures the abnormal returns of disclosed stocks, a strategy that short-sold disclosed stocks would have a return that is -1 times the returns presented here.

tabulated calculations, we find that the average return to this hypothetical portfolio is significantly negative. Recognizing that the relationship between short interest and returns has been documented in previous literature (e.g., Asquith, Pathak and Ritter (2005)), we control for short interest by using the corresponding short interest decile portfolio return as the hedge portfolio in Panel B. The results are similar for this short-interest based benchmark. Overall, Figure 5 shows that it would likely be profitable to short sell stocks with disclosed short positions, especially at the beginning of the period.

Recognizing that there are potentially multiple types of disclosures for a given short position, we partition disclosures into types. It is interesting to note that the results are largely consistent across types. Table 7 reports industry-adjusted returns following various types of short position disclosures.[23] Increases in short positions (which we call upticks), decreases in short positions (referred to as downticks), and moving below the disclosure threshold ("close-outs") are not associated with significant returns. Neither is the first short position disclosure by a particular short seller in a given stock. The two-day announcement abnormal return is only -0.15%, which is statistically indistinguishable from zero. Thus, there is no evidence that follow-on disclosures by other short sellers are associated with negative returns. We also partition into groups based on the size of the short position as a fraction of shares outstanding. Again, we find that returns are insignificant for both relatively large and relatively small disclosed short positions. Table 7 shows that short positions at or above the median position size have statistically insignificant average CARs of 0.33% in the (0,1)-day window, compared to a statistically insignificant -0.06% for smaller short positions.

Since we know the identity of the short seller, we can also investigate whether discloser attributes are associated with differences in stock returns. For instance, an intuitive interpretation of Diamond and Verrecchia (1987) would suggest that disclosures made by more informed short sellers would lead to larger stock price reactions. We investigate this idea by measuring whether disclosures have a greater stock price effect if they come from disclosers with greater assets under management (AUM). Indications of a stronger negative signal should also

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[23] It is worth noting that some disclosures in the database are unnecessary. For example, we find 29 disclosures (all of which are in the non-rights issue subsample)- where there is no change in the position. These disclosures suggest that some short sellers perceive a benefit from disclosure, an idea developed in Fishman and Hagerty (1989). Although we do not include these non-mandatory disclosures in our sample, we find that there is a negative price reaction around these events. The average daily abnormal return is -0.38% (two-day announcement cumulative abnormal return of -0.77%) with a standard error of 0. 22% and is statistically significant at the 10% level.

affect the share price response to a disclosure. For example, the share price response might be stronger if the short position is a bigger fraction of the overall manager's portfolio. To investigate this, we regress event window stock returns on these and other discloser characteristics. We include as regressors *AUM* and *PositionSize*, which is the ratio of the size of the short position disclosed to the firm's *AUM*. The results are in Table 8.

Surprisingly, there is only weak support for these cross-sectional hypotheses. In particular, only *PositionSize* is significantly correlated with the cross section of abnormal returns, and only when abnormal returns are measured over the (0,2)-day window. Surprisingly, the effect is opposite of what one would expect: we find larger positions are associated with positive announcement returns. Overall, we conclude that share price responses to disclosures are not reliably related to these discloser characteristics.

5.3. Results for Rights Issues

Recall that in the UK, the initial disclosure regime applies to financial stocks and to stocks undergoing rights issues. There are two reasons to look at rights issues separately. First, the announcement of a rights issue could affect the share price, and it is important to take this corporate news into account in measuring the incremental effect of a short position disclosure. Second, short sellers could have different incentives during a rights issue, so the disclosure rules could have a different effect in that environment. For instance, in a rights issue short sellers might benefit more from coordination, as they might be able to drive share prices below the rights exercise price or otherwise force the rights issue to fail. Thus, it is important to examine returns and trading during rights issues to see if this concern is justified. We have identified 108 rights issues in European stocks where a short position disclosure occurs during a rights issue. There are also 251 rights issues subject to the disclosure requirements where there is no short position disclosure during the rights issue, and we also have a control sample of 799 rights issues that are not subject to the disclosure regime. Of the 359 rights issues subject to the disclosure regime, 158 are in the UK.[24]

Additional summary statistics on the rights issues can be found in Table 9. On average, firms undergoing rights issues are slightly larger in terms of market capitalization than the rest of

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[24] Additionally, there are ten rights issues in UK financial firms that occur during the 2008-2009 short selling ban. Due to the small sample size and the unusual macroeconomic events in this interval, we do not attempt to analyze these events.

the firms in our sample, but this difference is fairly modest, with the median rights issue firm at the 51st percentile of the distribution of market caps across all sample firms. Of the rights issues we examine, 94.9% are successfully completed. The mean rights issue in our sample is 24.6% of the (pre-rights offering) shares outstanding, though the distribution is somewhat skewed because the median rights issue is only 17.6% of shares outstanding. The average discount of 40.7% is fairly substantial, with the discount ranging from 28.2% to 52.5% for the two middle quartiles.

We start by examining the return pattern around disclosure announcements for stocks with rights issues. What effect should a short position disclosure have on stock returns during a rights issue? There are reasons to expect little effect. Some shareholders may not wish to exercise their rights, for example. When the stock goes ex-rights, these shareholders can sell their rights on the open market. Before this date, however, they might hedge the price risk associated with the value of the right by shorting the underlying shares. If these types of short positions are hedges rather than directional views on the company's fundamentals, we might expect returns to be unaffected by short position disclosures around the rights issue, since the disclosures are not conveying negative information to the market.[25]

Second, after the ex-rights day, there may also be some relative-value trading between the rights and the shares, which could lead to disclosed short positions in the shares. Again, if market participants are aware that this type of trading is likely and does not reflect fundamentals, a short position disclosure during this time period would be less likely to move the share price.

In Table 6 Panel B, we see that, consistent with our hypothesis, there are no statistically significant abnormal returns in any window following a disclosure. For example, in the 10-day period following the disclosure, the cumulative abnormal return is -0.99% (t = -0.5).[26] Although there is nothing suspicious in the post-disclosure return data, we need to do more to measure the incremental return effect of a short position disclosure. As a first step in this direction, we measure returns from the rights issue announcement date instead of from the short position disclosure date. Returns are calculated beginning on the announcement day of the rights issue and ending one week later (post-announcement day 5), one month later (post-announcement day

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[25] During the sample period, most issuers prohibit underwriters from taking a short position (or an economic equivalent) in the shares or rights in order to limit any downward price pressure from underwriter hedging. Investment banks often syndicate the risk to subunderwriters, including other banks, institutional shareholders, and hedge funds. Subunderwriters are also usually prohibited from taking a short position in the underlying shares or rights.

[26] Note that, due to the calendar-time portfolio approach used to measure abnormal returns, the full sample returns need not be exactly equal to the weighted average of returns for the two subsamples.

20) or upon completion.[27]   Prior to February 10, 2009, UK rights issues had to remain open for at least 21 calendar days; UK FSA Policy Statement 09/2 reduced this minimum to ten business days.   Rights issues typically remain open for a slightly longer period.   In our sample, the interval from announcement to completion averages 30.4 trading days.   Abnormal returns are computed relative to the stock's one-digit Industry Classification Benchmark (ICB) sector index, and we use cross-sectional regressions to characterize the cross-sectional variation in the abnormal returns.   The results are summarized in Table 10.[28]

Short position disclosures are not associated with bigger share price declines during the rights issue, consistent with our hedging explanation.   For example, Specification 1 in Panel A shows that the cumulative abnormal return (CAR) over the (0,5)-day interval is -7.23% for rights issues where there is no short position disclosure and -7.23% + 1.27% = -5.96% for rights issues where a large short position is disclosed in this time interval.   These CARs are statistically indistinguishable from each other.   The statistical conclusions are the same over longer horizons, which are reported in Panels B and C.   Specification 2 shows that the number of disclosers doesn't matter, either.   The incremental return effect of each additional disclosing short seller beyond the first one is very close to (and statistically indistinguishable from) zero.   We also control for the publicly available details of the rights issues to see if this is masking a disclosure effect.   We include as regressors the size of the rights issue relative to the number of existing shares, as well as the rights issue discount to the pre-announcement share price.   Our priors were that the larger the equity issue relative to the shares already outstanding, the bigger should be the negative share price reaction.   Larger discounts to the pre-announcement share price might be interpreted as a negative signal about the expected share price post-announcement.

Panel B Specification 3 has the results for the 20-day returns, and Panel C Specification 3 has the results from announcement to completion of the rights issue.   The size of the rights issue is not significant, but bigger rights issue discounts are reliably associated with more negative stock returns.   Adding these two variables does not change the main result on the number of

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[27] We calculate stock returns in the usual way. On the ex-rights day, returns are adjusted to include the value of the rights (now trading separately), and after the ex-rights day, returns are calculated on the shares alone, excluding the value of the rights.

[28] Our focus here is on the announcement date for rights issues, and in later results, we focus on the completion date of the rights issue. However, there is a third date between the two, the date on which trading goes from including the right to excluding the right. While this date may play a key role for the implementation of any trading strategy, we fail to find a significant difference in cumulative abnormal returns between disclosed and undisclosed rights issues over the (0,5)-day, (0,20)-day or (0,Completion) intervals.

disclosers. There continues to be virtually no association between the number of short position disclosers and returns during the rights issue, consistent with our hedging interpretation.

We also investigate whether short position disclosures are associated with a rights issue's failure to complete. Table 9 notes that 95% of announced rights issues are completed. For rights issues that occur during the disclosure regime but are without a short position disclosure, 96% complete. Similarly, if there is at least one disclosure, completion is also extremely likely, at 92%, and the two completion percentages are statistically indistinguishable (p = 0.1545). Thus, there is no evidence that the presence of a short position disclosure decreases the likelihood of completion.

We can also assess whether the disclosure regime itself has an impact on returns around rights issues, as we have a sample of 799 rights issues that take place when there was no short position disclosure regime. This sample includes: 14 UK rights issues from January 10, 2008 to June 26, 2008, 76 French rights issues from January 10, 2008 to September 28, 2010,; 29 Spanish rights issues from April 10, 2008 to April 14, 2010, and 680 rights issues in other European countries from January 9, 2008 to October 31, 2012. Table 11 Panel B shows that the average 20-day CAR for these earlier rights issues is -3.41%, which is statistically indistinguishable from the average CAR of -3.51% for rights issues undertaken in the disclosure regime. The results are similar for 5-day CARs and for returns measured from announcement to completion. That is, rights issues are generally associated with temporary negative stock returns, whether or not there is a disclosure regime. On average, the presence of the short position disclosure requirement does not affect stock returns during the rights offering.

Overall, there is no evidence that short sellers are pushing share prices down during a rights issue. To confirm this, we look at what happens after the rights issue is completed. If short sellers are temporarily manipulating the price downward during the rights issue, we would expect a reversal once the rights expire. Table 11 Panel A has 5-day, 20-day, and 60-day returns after the rights issue is completed. There is no statistical evidence of a reversal in rights issues, either with or without a short position disclosure. All of the post-completion abnormal returns are statistically indistinguishable from zero. Thus, the post-completion evidence provides no evidence of abusive shorting activity.

5.4. Shorting Activity Around Disclosure

One of the overarching results in the short selling literature is that short sellers' trades are profitable (e.g., Asquith, Pathak and Ritter (2005); Boehmer, Jones and Zhang (2008) and Boehmer, Huszar and Jordan (2010)). Furthermore, the results above show that longer-run returns are negative following disclosures of short positions. So it stands to reason that market participants may respond to disclosures by shorting disclosed stocks after the public disclosure is made. In this section we look at a number of measures of shorting activity to gauge the magnitude of this potential follow-on behavior.

In our empirical setup, we conduct a difference-in-difference analysis. The first difference is between disclosed stocks and a matched sample of control stocks without disclosures. Specifically, we match every disclosed stock to a control firm in the same country as the disclosed firm by minimizing the sum of the squared differences in percentile *Short Interest at Settlement*,[29] percentile *Market Capitalization*, percentile *Share Turnover* and percentile *Change in Short Interest at Settlement* over the past month (22 trading days). The second difference is the change in the measured statistic over the given event window.

We start by looking at a daily measure of short interest from our data provider. *Short Interest* in disclosed stocks does increase significantly, but nearly all of the increase is before the public disclosure. This can be seen graphically in Figure 6 or in tabular form in Table 12. Compared to the matched sample of firms without disclosures, short interest increases by 0.22% of shares outstanding during the period from three days to one day before the announcement (Table 12 Panel A). This pre-disclosure short position increase is strongest among rights issue stocks; Table 12 Panel B shows that, compared to the matched sample of undisclosed stocks, short interest in rights issue stocks with a disclosure rises by 0.88% of shares outstanding over this three-day interval. Figure 6 shows that short interest gradually falls over the next 30 trading days in both the disclosure and matched control group, and Table 12 shows that the short interest declines are statistically indistinguishable over the 10-day and 20-day intervals.

Interestingly, Table 12 Panels B and C show that short interest reverts very differently in rights issue vs. non-rights issue stocks. Rights issues see a sharp short interest reversal following a short position disclosure, while there is no such reversal in non-rights issues. To be precise,

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[29] Using short interest at settlement versus short interest in trade time assures that our match criteria are in the information set at the disclosure date.

short interest in disclosed rights issues falls by a fairly dramatic and statistically significant 1.61% of shares outstanding over the 20 trading days following a disclosure. The corresponding number for the non-rights issue subsample is a statistically insignificant 0.09% rise in short interest. This suggests that large short sellers in rights issues are following fairly short-horizon trading strategies that are likely associated with the rights issue itself.

We next turn to the percentage of lenders actively lending a particular stock, or *Percent of Lenders Active*, and again we see an increase in lending activity for disclosed stocks during the three days leading up to a disclosure. Turning to the number of open loans, or *Scaled Number of Open Loans*, we see that the number of loans is also increasing during the pre-disclosure period. *Concentration of Open Loans* does not appear to change either before or after the disclosure, indicating that shorting is not dominated by small positions or large positions; the distribution of position size remains constant despite the overall increase in number of positions. Finally, the *Daily Cost of Borrowing Score* shows little change around the disclosure, suggesting that short sellers take large positions in stocks where there is ample lendable supply.

Taken together, a clear picture emerges. Just before the disclosure, short interest increases, as does the number of lenders and loans in the equity loan market, but this increase in borrowing does not affect share borrowing costs. The build-up of the soon-to-be-disclosed position is probably the main source of the increase in short interest, as the increase in short interest is modest compared to the size of the average disclosed short position, which is 0.95% of shares outstanding as reported in Table 1.

Next we compare shorting market activity in rights issues with a short position disclosure versus those rights issues without a short position disclosure. The goal is to determine whether, and to what extent, disclosure is associated with differences in shorting activity. To separate these effects, we match each rights issue to a non-rights issue stock that is similar along the dimensions of share turnover, market capitalization, level of *Short Interest at Settlement* and change in *Short Interest at Settlement*. Then we compare disclosed rights issue shorting activity (versus activity in the matched control firms) to non-disclosed rights issues (versus their matched non-rights issue control firms) during various windows after the rights issue announcement.

Figure 7 demonstrates the result graphically.[30] In this relatively closely matched setting, we see a dramatic difference in short interest between disclosed stocks and undisclosed stocks. In the stocks with disclosures, abnormal short interest is much higher at the time of disclosure. Interestingly, abnormal short interest remains fairly constant for about two weeks after the short position disclosure, followed by a sharp return to normal levels. For stocks without short position disclosures, there is no obvious increase in short interest relative to control stocks. Results are similar whether we benchmark disclosed rights issues against undisclosed rights issues during the regime period or rights issues occurring during the pre-regime period.

Formal statistical tests using differences-in-differences are in Table 13. From one day before to one day after the rights issue announcement, short interest in disclosed stocks rises by 1.65% of shares outstanding compared to stocks without a disclosure, and this is strongly statistically significant. Compared to rights issue stocks without a disclosure, rights-issue stocks with a disclosure experience little change in short interest during the (0,5)-day interval post-announcement, matching the graphical evidence from Figure 7. The bump in short interest is completely reversed by the tenth day after the announcement of the rights issue. The increase in overall short interest is much larger than the size of the disclosed short, indicating that a rights issue with a large short position disclosure is associated with more shorting overall, not just more shorting by the initial discloser.

While we find no evidence that short sellers are inappropriately driving down the share price, there is some evidence that this effect occurs in other contexts. For instance, Mitchell, Pulvino and Stafford (2004) find price pressure around mergers due to short selling by merger arbitrage traders, and Henry and Koski (2010) find that short sellers create downward price pressure in the US during secondary equity offerings (SEO's) despite the existence of certain restrictions on shorting then.

While rights offerings and SEO's both raise equity capital, the two procedures contain different incentives to short sell, and this could explain the lack of price pressure in rights offerings. To be specific, in SEO's the underwriters typically price the new shares at a slight discount to the closing share price on the pricing date. By driving down the price, a short seller in an SEO can cause the issuer to sell new shares at a lower price, thereby reducing the overall

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[30] To eliminate the possibility of differing periods between rights issue announcements and disclosures, we consider disclosures that occur in the (0,1)-day event window around the rights issue announcement. This criterion captures 53.7% of the sample of rights issues with short sale disclosures.

value of the firm and leading to profits on the short sale. This is a classic example of a Goldstein and Guembel (2008) strategic complementarity associated with short sales. More mechanically, an SEO short seller can drive down the price and then cover with shares issued in the SEO, with no upward price impact on the covering transaction. For this reason, the US SEC Rule 105 sharply limits short selling around SEOs.

Rights offerings do not have the same strategic complementarity. The exercise price is fixed, so short sellers cannot easily force the issuer to take an action that reduces firm value.[31] There might be relative-value trading strategies involving the share and the transferable right, but these would have no overall effect on firm value, nor would such relative-value trading strategies provide a useful signal to the market about firm value. Given these institutional differences, it makes sense that short selling in rights issues is associated with less price pressure than shorting in SEO's. Nevertheless, in the next section, we look at the time-series of short sales by disclosers and others to see if there is any remaining cause for concern.

5.5. Follow-on Behavior

Some practitioners have worried that disclosures of short positions could be a coordination device among short sellers, with a disclosure inducing other short-sellers to pile on. When commenters were asked by the UK FSA (DP09/1, Q15) whether they agreed with the FSA's analysis that the benefits of public disclosure of significant short positions outweigh the costs, "a smaller, but significant, group actively disagreed with us…" (FSA FS09/4, paragraph 3.9)

> "Those who did not agree with us all raised similar concerns. Namely, the risk of 'herding' behaviour when the identities of big-name short sellers are revealed, forced disclosure of companies' intellectual property (i.e. the information they have garnered that led them to take the position), the risk of short 'squeezes' by competitors, compliance costs and, as a result of all of these factors, deterring short selling and damaging market quality." (paragraph 3.10)

The FSA responded (also in paragraph 3.10) that "we have not seen any evidence of these phenomena occurring."

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[31] If the rights offering is not underwritten, it is conceivable that short sellers could drive prices down below the rights exercise price, in which case the rights might not be exercised. This could be quite damaging to the issuer. For this reason, rights offerings are typically underwritten, and if not, exercise prices are typically set quite low to ensure that such a trading strategy is not appealing, and the new equity capital is successfully raised.

To provide direct empirical evidence on some of these issues, we use a logit specification to characterize the persistence of short position disclosures. Our specification has an observation for each stock-day, and the dependent variable is equal to one if there is an initial short position disclosure by a short seller in a given stock on a given date and zero otherwise. The explanatory variables of interest are lagged indicator variables indicating recent short position disclosures, often interacted with characteristics of these previous disclosers, such as their assets under management (AUM), the size of their disclosed short position, and their location. In addition to country fixed effects, unreported control variables include the level of *Short Interest at Settlement*, the stock's log trading volume in shares and its log market capitalization on date *t-1*, along with abnormal stock returns on dates *t-1*, *t-2,* and *t-3* relative to the industry return (using the one-digit ICB sector index).

What do we expect to find? It is possible that nothing emerges from these size and location variables, but if there is a relationship, we would expect *AUM* and *PositionSize* might proxy for the quality of the short selling signal. The better the signal, the more likely other short sellers would take a similar position. Other literature, such as Huberman (2001), indicates that proximity is associated with similar investor positions, and we might expect something similar here. Such a correlation could be due to actual information sharing between the two short sellers, either privately or through the disclosure process, but follow-on shorting might simply reflect the unrelated acquisition of correlated signals by multiple asset managers.

The results are in Table 14. Panel A deals with the full sample, including stocks with and without rights issues underway. Panel B has the subsample of rights issues, and the complement is in Panel C.

Specification 1 includes only lagged disclosure dummies and is designed to simply measure whether there is time-series persistence and clustering of large short positions for a given stock. There are two lags: an indicator variable equal to one if there is a disclosure in the previous week (*t-1* to *t-5*) and an indicator if a short position disclosure occurs at lags -6 through -30, inclusive. Both lagged indicator variables are significant in the full sample and in both subsamples. In the full sample, for example, a disclosure in the previous week in the same stock triples the probability of a disclosure on a given day from the baseline probability of 0.08% to 0.24%. A disclosure in the earlier period increases the disclosure probability by an additional 0.20%. Comparing the rights issue subsample in Panel B with the non-rights issue sample in

Panel C, large short positions are more prevalent in rights issues (the baseline probability is 0.30% versus 0.07% for the non-rights issue sample), but the magnitude of the (log odds ratio) persistence is similar.

We then add *AUM* for the prior discloser interacted with the prior disclosure dummies; this estimation is Specification 2 in Table 14. Follow-on short positions a week to a month later are significantly more likely when the previous discloser is large, and this increase in the predicted probability of follow-on disclosure holds for both the rights issue and non-rights issue subsamples. The cross-sectional standard deviation in assets under management is 2.77, so each increase of one standard deviation in *AUM* by a short position discloser is associated with an increase of 0.0008% to 0.0036% in the probability of a follow-on disclosure relative to the baseline probability of 0.08%. The results are similar in both rights and non-rights issue subsamples. In contrast, there is no statistical link between the initial discloser's position size (Specification 3) and follow-on shorting.

5.6. Geography and Follow-ons

It is possible that the likelihood of follow-on shorting is related to the physical location of the short sellers. To begin to look into this, we replace the *AUM* interaction variable in Table 14 with an interacted indicator variable that is equal to one if the lagged discloser is headquartered in New York or London. Here the evidence is fairly weak. The full-sample coefficient estimate in Specification 4 of Panel A is marginally statistically significant for the {t-6, t-30} lag but is economically small: a short position discloser located in New York or London increases the probability of a follow-on disclosure by only 0.01% over the baseline probability of 0.08%.

We also examine whether a follow-on disclosure is more likely when the initial disclosing short seller is closer to other short sellers. The results are in Specification 5 of Table 14, and they indicate that a short position disclosure by a centrally located short seller is significantly more likely to result in a follow-on disclosure within the next month. Recall that the centrality variable is defined as a quantile, so moving from one tail of the centrality distribution to the other increases the probability of a follow-on disclosure by 0.05%.

To further investigate the connection to physical location, we examine the distance between pairs of short position disclosers in the same stock. We identify the principal location of each discloser using web searches and fund databases. When we compare the physical

distance between an initial discloser and a follow-on short seller, we find evidence that the follow-on discloser tends to be located significantly closer to the original discloser.[32] The results are in Table 15. For example, we find that in the full sample follow-on disclosers between 6 and 30 days after the initial disclosure are 1,848 miles away from the initial discloser, while the unconditional average distance between a pair of disclosers is 2,094 miles. The difference in these average distances is statistically significant. Similarly, 34.82% of follow-on disclosers between 6 and 30 days after the initial disclosure are within 100 miles of the initial discloser, whereas only 26.73% of discloser pairs are within 100 miles of one another unconditionally. The distance differences are similar for the rights issue and non-rights issue subsamples (Panels B and C, respectively). Clearly, large short position disclosure sequences are characterized by significant geographical clustering.

Overall, our results suggest that there is herding in disclosure by short sellers. However, it is important to emphasize that we cannot rule out the natural explanation that multiple short sellers independently receive similar information due to their geography or apply similar analyses, leading to approximately contemporaneous short positions. Furthermore, because we do not observe individual short positions before the disclosure regime is in place, these results cannot discern whether clustering in large short positions has changed because of the disclosure regime.

6. Conclusion

Disclosure has become an important tool in short sales regulation. For example, after the UK, France and Spain promulgated rules forcing short sellers to disclose their positions starting in 2008, 27 European Union countries have adopted a similar disclosure regime. These rules require short sellers to disclose their positions as well as details, such as their identity, that have never been required before. This new kind of regulation raises some unique concerns among regulators and market participants alike. For example: Does disclosure lead to stock price declines? Or, perhaps more worryingly, does disclosure provide a means for short sellers to coordinate their actions? These questions are likely at the forefront of regulatory discussions as

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[32] One potential concern is that disclosures may cluster within fund families thus biasing our results. To address this concern, we require that a pair of funds is located more than 0 miles apart. We repeat this analysis after excluding 100 out of 238,822 pairs where the distance was close to zero (less than 0.01 miles). None of the excluded pairs appeared to belong to the same fund family. Results are quantitatively similar with or without these excluded pairs.

the US Securities and Exchange Commission responds to Section 417 of the Dodd-Frank Act, which requires a study of "the feasibility, benefits, and costs of requiring reporting publicly, in real time short sale positions of publicly listed securities." For example, in May 2011, the US Securities and Exchange Commission asked for input on a wide variety of potential short sale disclosure rules (release No. 34-64383) ranging from immediate disclosure of all short sales to the disclosure of large short positions.

In this paper, we provide the first analysis of the regulatory regime that mandates the disclosure of large short positions in European stocks. We identify the effect of the change in the disclosure regime by making use of the staggered introduction of the disclosure rules across our sample of 12 countries. Overall, we find that the disclosure regime reduces short interest and improves liquidity.

Next, we characterize the disclosers and the disclosures, stock price behavior around the disclosure, and equity lending market effects. Our results indicate that in many respects disclosures have little impact on trading and share prices. First of all, we find no abnormal return immediately following disclosed short positions. Furthermore, we find little evidence that the level of short interest increases in response to disclosure. Among stocks with rights issues, we find that disclosed rights issues have virtually the same returns as their non-disclosed counterparts. Furthermore, we see no evidence of manipulative short selling because there are no price reversals in either the overall sample or in the subsample of rights issues.

We do find significant follow-on shorting activity: a large short position disclosure makes it much more likely that there will be another disclosure within a month in the same stock by a different short seller. Furthermore, follow-on shorting is more likely when the initial discloser has greater assets under management or is located near other short sellers. However, there is no increase in short interest after the first disclosure. While these two results seem at odds, one possible explanation is that at the time of the first disclosure, the follow-on already has a substantial but undisclosed short position, and thus it only takes a small increase in the follow-on short position to cross the disclosure threshold. Even if this follow-on behavior is caused by the disclosure regime, our results suggest that the new rules do not dramatically affect the behavior of share prices.

Our work also has implications for regulatory policy towards short selling around equity offerings. Abusive shorting during secondary equity offerings has long been a concern of

regulators. Regulation M in the US limits shorting during a secondary equity offering, for example. In a recent release (DP09/1), the UK FSA suggested that disclosure could serve as an alternative to shorting restrictions, asking commenters, "Do you agree that, subject to having a satisfactory disclosure regime, we should not ban short selling of the stocks of companies engaging in rights issues?" The FSA recently concluded (in FS09/4) that it would not ban shorting (including shorting by underwriters) during equity issuances. Overall, our evidence suggests that there are no economically meaningful negative consequences to the disclosure regime, implying that the UK's current policy is on the right track.

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Figure 1: Timeline of Disclosure Regimes

This figure presents the timeline of short selling disclosure regulation for the countries in our sample from June 2008 to December 2013. Aggregation indicates that disclosed positions above 0.25% and below the 0.50% threshold are aggregated and disclosed as a single anonymous position by the regulatory agency.
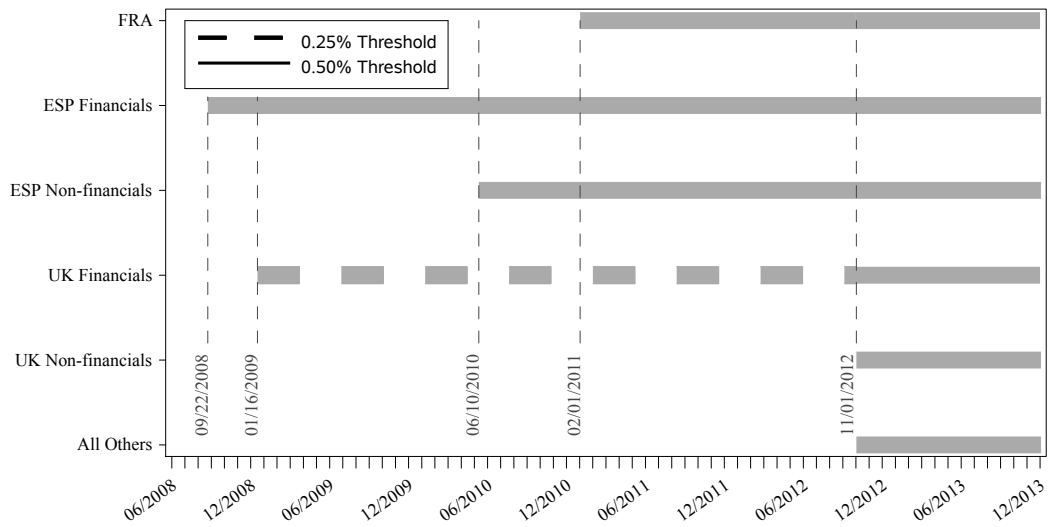
Figure 2: Sample Disclosure

This figure presents a sample disclosure of a short position in Old Mutual, PLC, (LSEX Ticker: OML) as it appears on the web-based newswire, Bloomberg. The web clip was retrieved September 22, 2011 from `http://www.bloomberg.com/apps/news?pid=21070001&sid=a49bgTzL0tt4`.

Bloomberg

OML: Millennium Partners, L.P.: Short Selling Disclosure

Mar 24, 2009

  OML: Millennium Partners, L.P.: Short Selling Disclosure

UK Regulatory Announcement

LONDON

Form TR-4. FSA Version 1.0 September 2008

TR-4^1:	Disclosure of Short Position relating to UK Financial Sector Company^2
1. Full name of person(s) holding the disclosable short position^3:	Millennium Partners, L.P.
2: Name of the issuer of the relevant securities	Old Mutual Plc
3: Disclosable short position^4	0.16%
4. Date that disclosable short position was held	23 March 2009

Figure 3: Example of Short Selling Disclosures

This figure presents price and short interest in Old Mutual, PLC, (LSEX Ticker: OML) during the UK disclosure regime for short positions. Stock price is from Yahoo! Finance. *Short Interest* is defined as the number of shares on loan divided by the total number of shares outstanding. *Undisclosed Short Interest* is defined as the aggregate short interest from the CREST database less the total short interest held by disclosed positions.
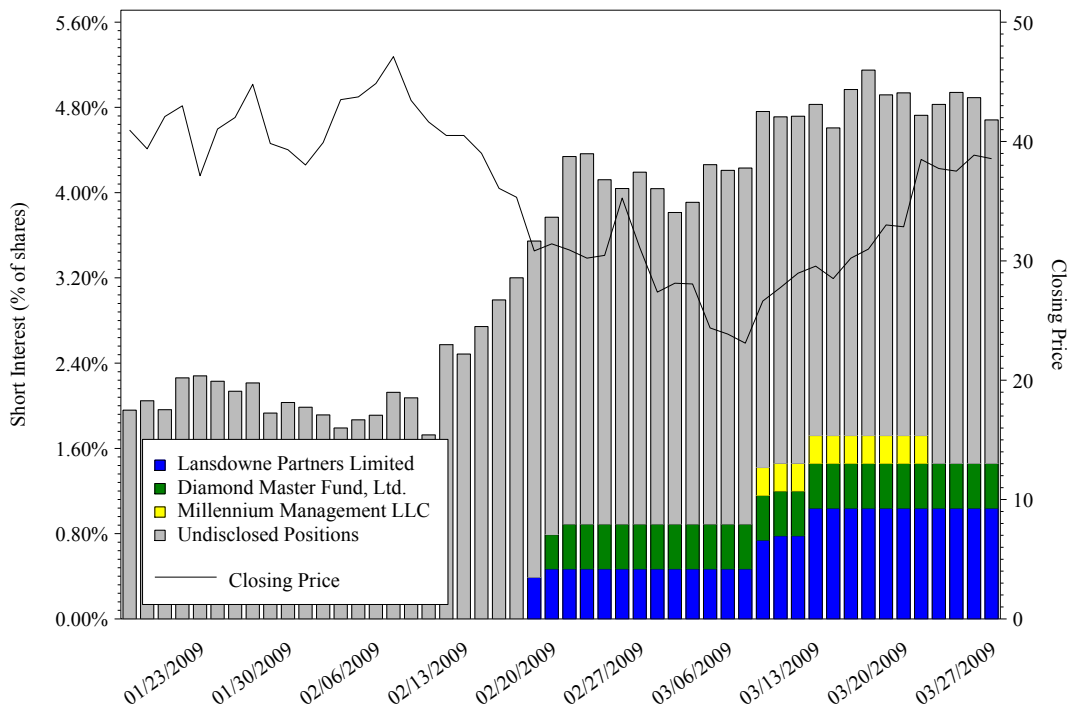
Figure 4: Portfolio Cumulative Abnormal Returns

This figure plots the cumulative abnormal returns generated by the trading strategy presented in Table 5. Specifically for each date in the event window, the equally-weighted portfolio is long the disclosed stock and short the stock's one-digit Industry Classification Benchmark (ICB) sector index. The event window is relative to the date of a stock's initial disclosure. *CAR* is the mean daily abnormal return multiplied by the length of the event window. Disclosed firms are as defined in the text.
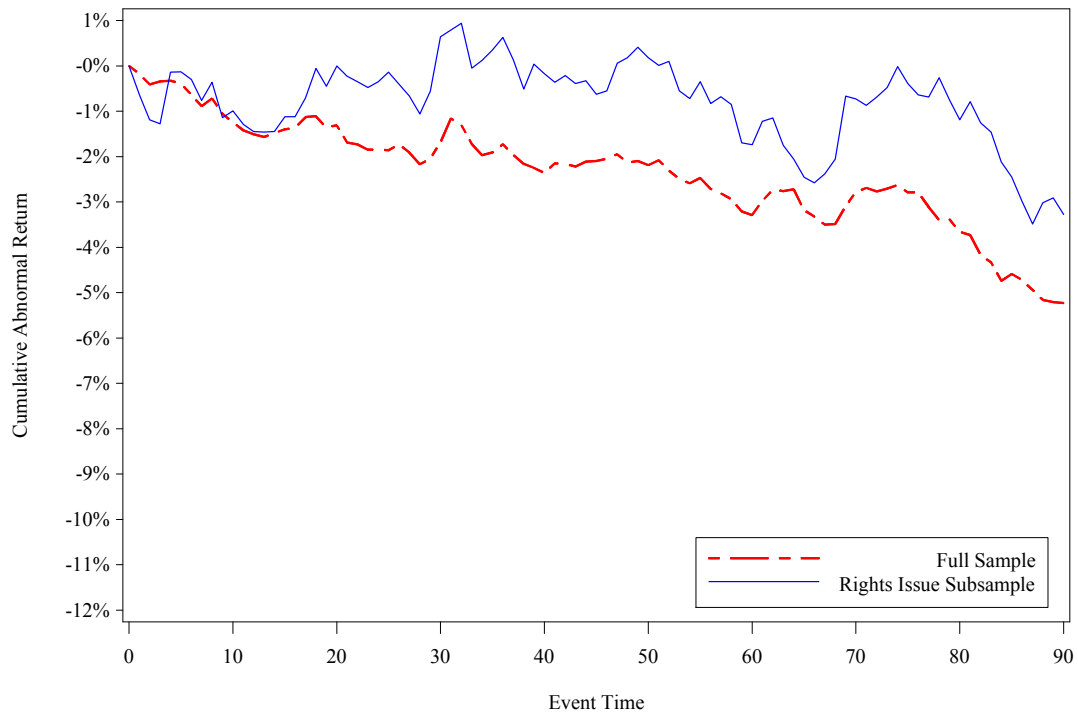
Figure 5: Monthly Returns Post-disclosure

This figure presents the monthly returns from a calendar-time portfolio holding disclosed stocks. For each date in the (0,30)-day window, the equally-weighted portfolio is long the disclosed stock and short the stock's benchmark portfolio. The event window is relative to the date of a stock's initial disclosure. In Panel A, this benchmark is the stock's one-digit Industry Classification Benchmark (ICB) sector index. In Panel B, this benchmark is the set of stocks listed on the same exchange and in the same decile of short interest as the disclosed stock on the date of initial disclosure. Disclosed firms are as defined in the text.

Panel A: Monthly Returns in Calendar Time - Sector Benchmark
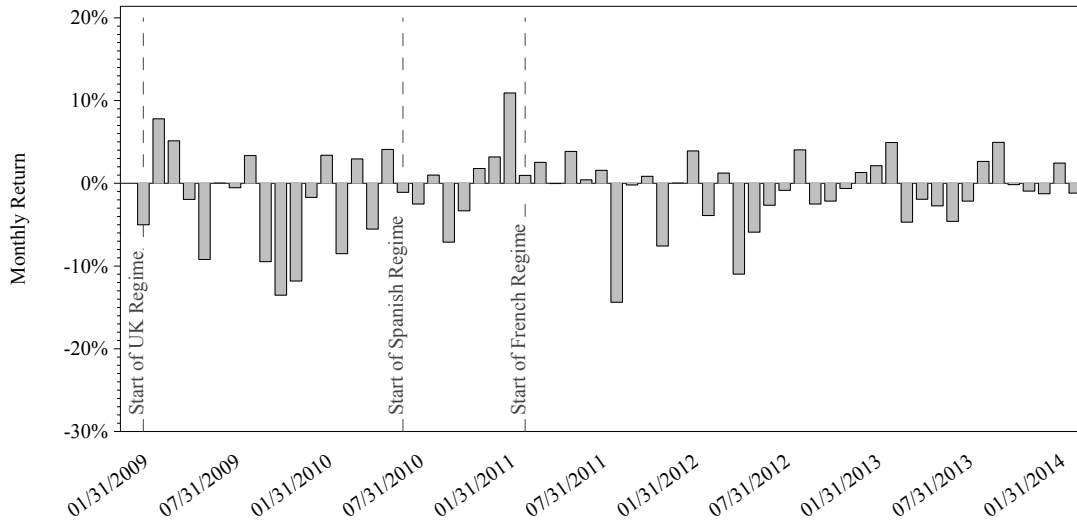
Panel B: Monthly Returns in Calendar Time - Short Interest Decile Benchmark
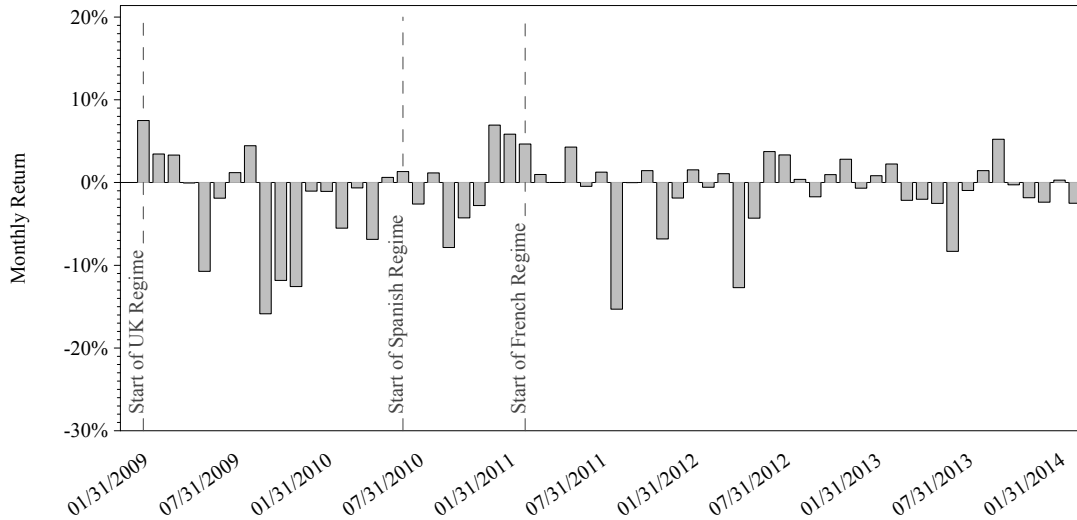
Figure 6: Short Interest Around Disclosure

This figure plots the average short interest around the first disclosed position in a stock relative to the matched counterpart over the event window. Each firm is matched on the disclosure date to a firm listed in the same country by minimizing the sum of the square differences of percentile *Share Turnover*, percentile *Market Capitalization*, percentile *Short Interest at Settlement* and percentile *Change in Short Interest at Settlement* over the previous month (22 trading days).
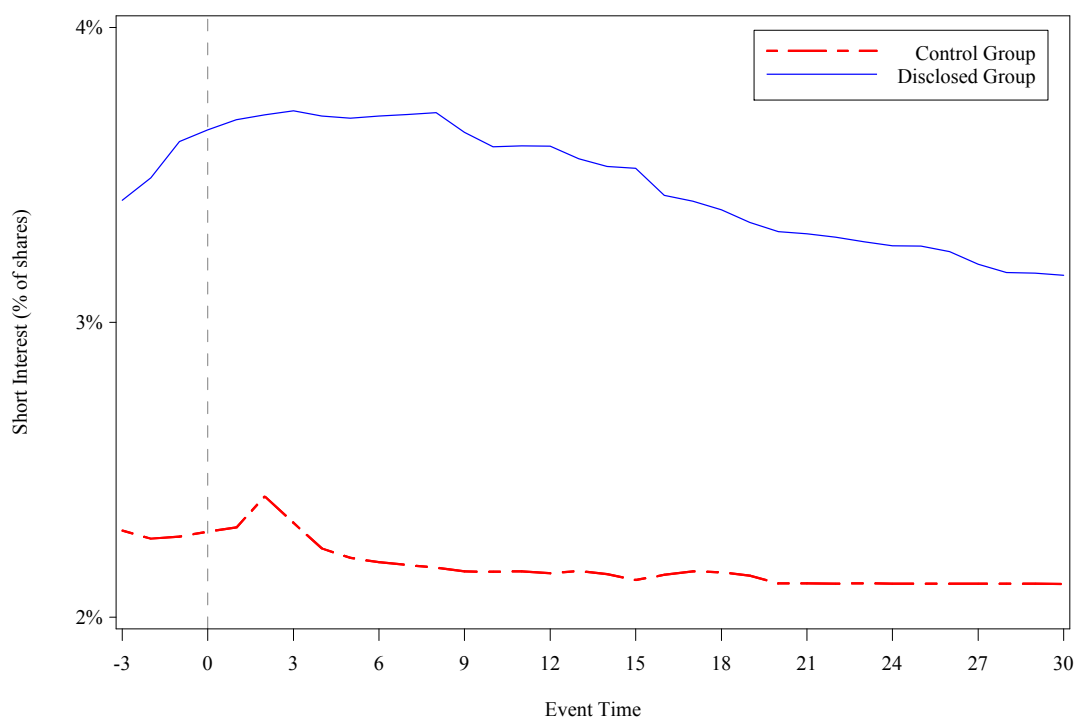
Figure 7: Short Interest Around Rights Issue Announcement

This figure plots the average short interest around a rights issue announcement relative to the matched counterpart over the event window. Each firm is matched to a control firm one trading month prior to the announcement of a rights issue by minimizing the sum of the square differences of percentile *Share Turnover*, percentile *Market Capitalization*, percentile *Short Interest at Settlement* and percentile *Change in Short Interest at Settlement* over the previous month (22 trading days). Disclosed rights issues are the subsample of stocks with a rights issue announcement and a disclosed short position within the (0,1)-day event window. Panel A benchmarks against undisclosed rights issues, which are the subsample of stocks with a rights issue announcement and no disclosed short position within the window between the announcement and completion of the rights issue. Panel B benchmarks against rights issues occurring before the disclosure regime took effect.

Panel A: Disclosed vs. Undisclosed Rights
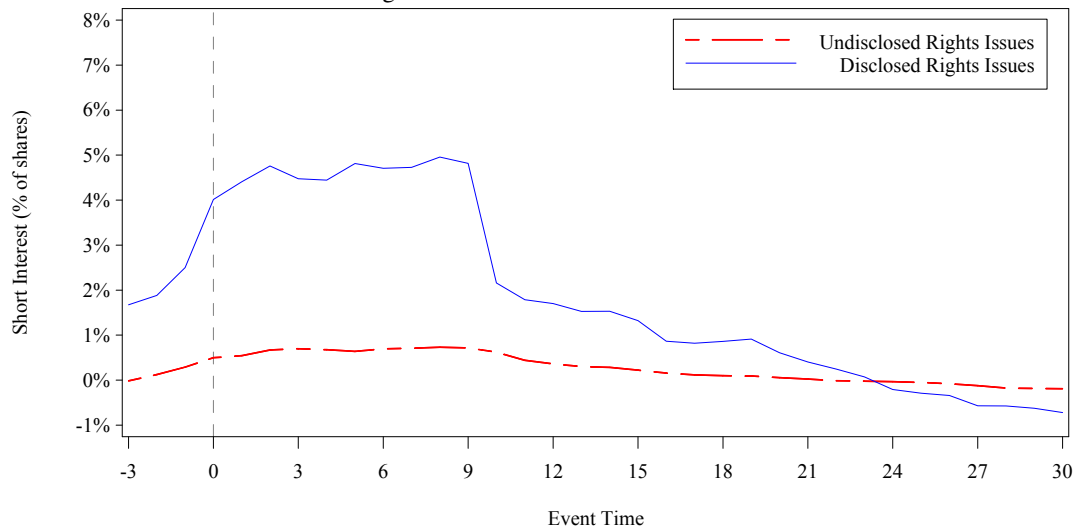
Panel B: Disclosed vs. Pre-Regime Rights
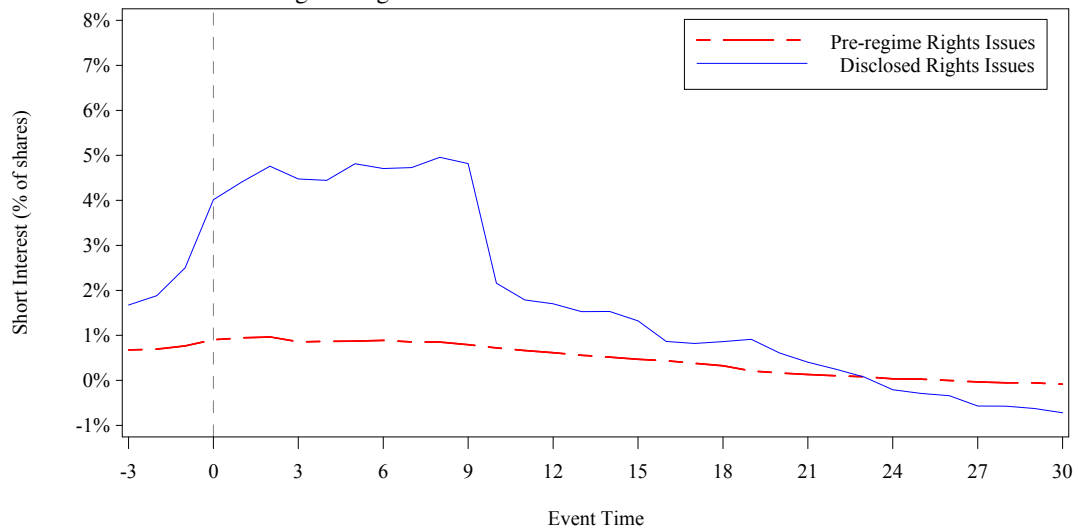
Table 1: Summary Statistics of Disclosures by Country

This table reports summary statistics concerning the number of disclosed short positions since the onset of the disclosure regime by country. The specifics of each country's disclosure regulations are discussed in the text. *Average Length of Holding Period*, *Average Length of Build-up Period* and *Average Length of Unwind Period* are calculated excluding positions that are still open (above the regulatory threshold). *Length of Build-up Period* is defined as the number of trading days between the initial disclosure of the short position and the maximum disclosed position. *Length of Unwind Period* is defined as the number of trading days between the maximum disclosed position and the closure of the short position. *# of Follow-on Disclosures* is the number of short positions originated over the (0,20)-day window following the first disclosure.

	All	AUT	BEL	FIN	FRA	GER	IRL	ITA	NED	POR	ESP	SWE	UK
# of Positions	3,647	23	57	152	618	126	6	159	159	14	167	213	1,953
# of Disclosed Firms	771	9	17	23	80	54	6	50	28	4	39	62	399
Average # of Positions Per Disclosed Firm	4.73	2.56	3.35	6.61	7.73	2.33	1.00	3.18	5.68	3.50	4.28	3.44	4.89
Ratio of Disclosed Firms to Total Firms	0.12	0.05	0.06	0.13	0.07	0.04	0.03	0.10	0.09	0.06	0.14	0.10	0.32
Average Disclosures Per Position	6.42	4.17	105.58	6.75	5.25	6.55	2.33	6.35	6.31	6.29	10.29	5.26	3.72
Percentage Initiations	21.24	23.96	0.95	14.81	19.03	15.27	42.86	15.76	15.84	15.91	9.71	19.02	25.48
Percentage Decreases in Short Interest	30.53	25.00	2.03	34.31	30.09	32.24	7.14	37.96	30.58	25.00	36.47	32.23	29.97
Percentage Increases in Short Interest	48.23	37.50	96.88	40.84	39.70	50.18	14.29	37.56	40.84	59.09	46.71	35.80	33.56
Average Length of Holding Period	51.00	59.92	119.38	75.56	42.87	28.79	39.80	59.27	40.78	–	172.92	48.52	41.03
Average Length of Build-up Period	16.09	18.85	81.00	18.66	14.30	7.37	4.40	13.04	12.25	–	91.47	12.42	9.64
Average Length of Unwind Period	34.91	41.08	38.38	56.90	28.57	21.42	35.40	46.23	28.53	–	81.45	36.09	31.39
Average Disclosed Short Position	0.95	0.88	1.15	1.06	0.91	1.21	0.50	0.98	1.05	0.74	1.07	0.91	0.91
Maximum Disclosed Short Position	14.00	3.41	4.96	3.76	14.00	4.20	1.18	4.26	6.27	1.44	5.03	5.82	12.17
Average # of Follow-on Disclosures	2.78	2.00	1.50	2.67	1.55	1.29	–	2.38	2.17	1.00	1.23	2.60	3.57
Average # of Trading Days to 1st Follow-on	3.56	3.00	12.25	2.33	4.73	4.00	–	1.13	3.92	8.00	4.85	2.33	3.17
Average # of Trading Days to 2nd Follow-on	4.87	12.00	1.00	2.14	7.17	9.00	–	6.50	2.71	–	6.00	1.33	4.44
Percentage of Dates with Multiple Originations	27.93	0.00	5.45	25.38	14.86	10.92	0.00	12.16	25.74	15.38	12.18	16.06	38.63

Table 2: Industry Composition of Disclosures

This table provides information on the industry composition of firms with a disclosed short position. Panel A presents the distribution of disclosed position by country and one-digit Industry Classification Benchmark (ICB) sector. A disclosed position is opened by the disclosure of a short position above the regulatory threshold and is closed by the disclosure of the same position below the regulatory threshold. Panel B reports the ratio of disclosed firms to total firms in our sample by country and one-digit Industry Classification Benchmark (ICB) sector. The specifics of each country's disclosure regulations are discussed in the text.

	All	AUT	BEL	FIN	FRA	GER	IRL	ITA	NED	POR	ESP	SWE	UK
Panel A: Disclosures by Industry													
Oil & Gas	6.62%	5.88%	–	4.35%	3.75%	2.00%	–	6.67%	11.11%	–	10.26%	3.77%	8.26%
Basic Materials	9.52%	–	23.53%	30.43%	3.75%	12.00%	–	–	7.41%	–	10.26%	9.43%	10.47%
Industrials	22.34%	29.41%	23.53%	30.43%	17.50%	24.00%	16.67%	8.89%	29.63%	–	23.08%	24.53%	23.42%
Consumer Goods	9.93%	17.65%	–	4.35%	13.75%	12.00%	16.67%	17.78%	7.41%	–	5.13%	20.75%	7.44%
Health Care	6.21%	11.76%	17.65%	4.35%	6.25%	10.00%	33.33%	6.67%	–	–	10.26%	7.55%	4.41%
Consumer Services	16.55%	–	5.88%	8.70%	23.75%	12.00%	16.67%	11.11%	3.70%	25.00%	17.95%	15.09%	19.01%
Telecommunications	2.62%	11.76%	11.76%	4.35%	1.25%	–	–	4.44%	7.41%	25.00%	–	3.77%	1.65%
Utilities	1.66%	5.88%	–	–	3.75%	2.00%	–	4.44%	–	25.00%	2.56%	–	0.83%
Financials	16.97%	17.65%	11.76%	4.35%	6.25%	10.00%	16.67%	37.78%	25.93%	25.00%	17.95%	9.43%	18.73%
Technology	7.59%	–	5.88%	8.70%	20.00%	16.00%	–	2.22%	7.41%	–	2.56%	5.66%	5.79%
Panel B: % of Firms Disclosed													
Oil & Gas	7.75%	25.00%	0.00%	100.00%	13.64%	0.33%	0.00%	37.50%	25.00%	0.00%	44.44%	6.90%	14.22%
Basic Materials	8.81%	0.00%	17.39%	43.75%	7.50%	2.05%	0.00%	0.00%	25.00%	0.00%	16.67%	10.87%	13.57%
Industrials	8.99%	20.00%	8.89%	15.22%	10.37%	1.71%	7.69%	4.82%	16.33%	0.00%	29.03%	11.61%	17.60%
Consumer Goods	7.46%	16.67%	0.00%	5.56%	9.91%	1.62%	7.14%	11.11%	8.70%	0.00%	10.00%	24.44%	14.59%
Health Care	6.45%	33.33%	13.04%	14.29%	8.62%	1.55%	50.00%	27.27%	0.00%	0.00%	36.36%	6.90%	9.94%
Consumer Services	10.54%	0.00%	5.26%	16.67%	17.27%	1.28%	10.00%	11.11%	4.35%	9.09%	33.33%	17.78%	21.50%
Telecommunications	10.50%	66.67%	100.00%	50.00%	8.33%	0.00%	–	20.00%	22.22%	50.00%	0.00%	33.33%	13.33%
Utilities	4.67%	33.33%	0.00%	0.00%	15.00%	0.90%	–	7.69%	0.00%	33.33%	6.25%	0.00%	6.00%
Financials	3.23%	9.09%	3.03%	5.00%	1.16%	0.36%	3.23%	4.82%	6.73%	8.33%	10.29%	4.31%	6.16%
Technology	5.41%	0.00%	4.76%	10.00%	13.01%	1.79%	0.00%	3.23%	6.90%	0.00%	25.00%	4.29%	8.54%

Table 3: Most Active Disclosers by Country

This table reports the twenty most active disclosers, as defined by the highest number of disclosed short positions. *Number of Short Positions* is the total number of short positions disclosed since the beginning of the disclosure regime. *Number of Disclosed Firms* is the number of unique firms in which the discloser has a disclosed short position. *Number of Countries* is the number of countries in which the discloser has a disclosed short position. *Average Short Position* is the average percent of shares outstanding shorted by a discloser in a particular position.

Discloser	Number of Short Positions	Number of Disclosed Firms	Number of Countries	Average Short Position
Marshall Wace LLP	351	85	10	0.60%
Blackrock Investment Management (UK) LTD	205	118	10	0.69%
Blackrock Institutional Trust Company	145	67	6	0.57%
TT International	122	45	10	0.56%
Highbridge Capital Management LLC	109	58	8	0.62%
AQR Capital Management LLC	104	52	7	0.68%
Oxford Asset Management LLP	89	54	8	0.70%
Egerton Capital Limited	88	28	7	0.72%
GLG Partners LP	88	40	7	0.60%
Odey Asset Management LLP	80	44	7	0.75%
AKO Capital LLP	79	37	5	0.97%
Lansdowne Partners Limited	74	42	7	1.02%
Henderson Alternative Investment Advisor Limited	72	31	1	0.61%
Magnetar Financial (UK) LLP	70	46	6	0.43%
DE Shaw & CO LP	66	27	9	0.65%
Trafalgar Asset Managers Limited	60	33	1	0.43%
Davidson Kempner	58	24	5	0.40%
CQS (UK) LLP	52	24	7	0.72%
BNP Paribas SA	50	23	8	0.57%
JP Morgan Asset Management (UK) LTD	48	33	8	0.63%

Table 4: Summary Statistics

This table reports summary statistics for the market and short activity variables for disclosed firms, their matched controls, and the full sample of firms. Each firm is matched on the disclosure date to a firm listed in the same country by minimizing the sum of the square differences of percentile *Daily Share Turnover*, percentile *Market Capitalization*, percentile *Short Interest at Settlement* and percentile *Change in Short Interest at Settlement* over the previous month (22 trading days). *Market Capitalization* is in millions of euros. *Daily Share Turnover* is the volume of shares traded divided by shares outstanding. Short activity measures are defined in the text. Data are provided by Data Explorers. For the test of the difference in means, *, **, and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively. Standard errors are clustered at the firm-level for this test and the difference is relative to the set of disclosed stocks.

	Disclosed Group		Control Group			Full Sample		
	Mean	Std Dev	Mean	Std Dev	Difference in Means	Mean	Std Dev	Difference in Means
Market Measures:								
Market Capitalization	308.9757	686.6350	460.3027	1172.2110	-151.3270^{**}	371.7156	154.3631	-62.7399^{**}
Daily Share Turnover	0.0046	0.0067	0.0033	0.0039	0.0013^{***}	0.0080	0.0235	-0.0035^{***}
Short Activity Measures:								
Short Interest	0.0365	0.0410	0.0229	0.0353	0.0137^{***}	0.0332	0.1182	0.0033^{*}
Percent of Lenders Active	0.4749	0.2005	0.4032	0.1846	0.0699^{***}	0.1291	0.2314	0.3457^{***}
Scaled Number of Open Loans	0.7345	0.9197	0.7584	1.0366	-0.0241	0.0004	0.0009	0.7342^{***}
Concentration of Loans	0.2889	0.2088	0.3196	0.2046	-0.0308^{**}	0.1359	0.2740	0.1530^{***}
Daily Cost of Borrowing Score	1.9875	1.4886	1.8967	1.3409	0.1009	2.7850	1.5126	-0.7975^{***}
Match Criteria:								
Percentile Market Capitalization	77.9110	16.7162	78.8497	16.3043	-0.9387			
Percentile Daily Share Turnover	72.9387	17.5891	71.2929	16.4612	1.6457			
Percentile Short Interest at Settlement	84.5123	14.0966	81.2316	13.4513	3.2807^{***}			
Percentile Δ Short Interest at Settlement	58.9325	40.3423	59.0230	39.5039	-0.0905			

Table 5: Impact of the Disclosure Regime on Market Measures

This table reports the estimates for the impact of a disclosure regime on measures of market quality. Observations are the averages of firm-day observations for the three month before and after the start of a given disclosure regime. A minimum of 45 valid observations is required to calculate the average. The treatment group for a given disclosure regime is the set of firms subject to the disclosure requirement. The control group is the set of firms during this period that are not subject to a change in the disclosure requirement. For a firm to be included in the sample for the start of a given disclosure regime, it must have a valid pre- and post-regime observation. Firms subject to a short selling ban are excluded. *Bid-Ask Spread* is the difference in the ask and the bid scaled by the ask. *Turnover* is the volume of shares traded divided by shares outstanding. Data are provided by Data Explorers. Short activity measures are defined in the text. Standard errors are clustered at the firm-level. Fixed effects are included to control for country, event date and industry. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

	Bid-Ask Spread	Turnover	Short Interest	Concentration	Daily Cost of Borrowing Score
Panel A: Full Sample					
Disclosure	-0.0041^{***}	-0.0006^{*}	-0.0188^{***}	0.0291^{***}	0.1116^{***}
Adjusted R^2	0.06	0.17	0.09	0.03	0.06
Panel B: High Short Interest Subsample					
Disclosure	0.0002	-0.0083^{***}	-0.0467^{***}	0.0231^{***}	0.1178^{***}
Adjusted R^2	0.07	0.34	0.26	0.03	0.09
Panel C: Small Size Subsample					
Disclosure	0.0008	0.0000	-0.0304^{***}	-0.0416^{***}	0.1145
Adjusted R^2	0.24	0.37	0.32	0.05	0.19
Panel D: High Short Interest $\times$ Small Size Subsample					
Disclosure	-0.0025^{***}	-0.0050^{**}	-0.0708^{***}	0.0537^{**}	0.1307
Adjusted R^2	0.25	0.54	0.51	0.08	0.10

Table 6: Abnormal Returns Around Disclosure - First Disclosed Position in Each Stock

This table reports the mean abnormal returns from a calendar-time portfolio holding disclosed stocks for the specified interval. For each date in the event window, the equally-weighted portfolio is long the disclosed stock and short the stock's one-digit Industry Classification Benchmark (ICB) sector index. The event window is relative to the date of a stock's initial disclosure. *CAR* is the mean daily abnormal return multiplied by the length of the event window. Disclosed firms are as defined in the text. Panel A has 686 disclosures, Panel B has 108 disclosures and Panel C has 578 disclosures. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

Event Window	CAR	Daily Abnormal Return	Std Err
Panel A: Full Sample			
(-30,-3)	-0.0180	-0.0006	0.0004
(-3,-1)	-0.0016	-0.0005	0.0014
(0,1)	-0.0018	-0.0009	0.0013
(0,2)	-0.0041	-0.0014	0.0012
(0,5)	-0.0039	-0.0007	0.0008
(0,10)	-0.0124^{**}	-0.0011^{**}	0.0006
(0,20)	-0.0131	-0.0006	0.0004
(0,30)	-0.0168	-0.0005	0.0004
(0,60)	-0.0329^{*}	-0.0005^{*}	0.0003
(0,90)	-0.0523^{**}	-0.0006^{**}	0.0003
Panel B: Rights Issue Subsample			
(-30,-3)	0.0129	0.0005	0.0007
(-3,-1)	-0.0149	-0.0050	0.0034
(0,1)	-0.0064	-0.0032	0.0035
(0,2)	-0.0119	-0.0040	0.0029
(0,5)	-0.0013	-0.0002	0.0025
(0,10)	-0.0099	-0.0009	0.0017
(0,20)	-0.0000	-0.0000	0.0012
(0,30)	0.0064	0.0002	0.0009
(0,60)	-0.0174	-0.0003	0.0007
(0,90)	-0.0328	-0.0004	0.0007
Panel C: Non-Rights Issue Subsample			
(-30,-3)	-0.0138	-0.0005	0.0005
(-3,-1)	0.0034	0.0011	0.0013
(0,1)	0.0005	0.0003	0.0011
(0,2)	0.0015	0.0005	0.0013
(0,5)	0.0002	0.0000	0.0008
(0,10)	-0.0051	-0.0005	0.0005
(0,20)	-0.0063	-0.0003	0.0005
(0,30)	-0.0117	-0.0004	0.0004
(0,60)	-0.0205	-0.0003	0.0003
(0,90)	-0.0346	-0.0004	0.0003

Table 7: Abnormal Returns Around Alternative Events

This table reports the mean abnormal returns from a calendar-time portfolio holding disclosed stocks. For each date in the (0,1)-day window, the equally-weighted portfolio is long the disclosed stock and short the stock's one-digit Industry Classification Benchmark (ICB) sector index. *CAR* is the mean daily abnormal return multiplied by the length of the event window. Disclosed firms are as defined in the text. *N* is the number of disclosures included in the portfolio. For *First Disclosed Position in Each Stock*, the event date is the date of the origination of the first disclosed position in a stock. *Size of Disclosed Position* is the percentage of shares outstanding held by the discloser and its median is calculated by country. For *First Disclosed Position by Each Fund-Stock Pair*, the event date is the date of the origination of any disclosed position by a fund in a stock. For *Close-Outs*, the event date is the date on which the position is reported to be below the regulatory threshold thus indicating a closure of that position. For *Upticks*, the event date is the date of an upward adjustment in the size of the disclosed position. For *Downticks*, the event date is the date of a downward adjustment in the size of the disclosed position. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

(0,1)-day Event Window	N	CAR	Daily Abnormal Return	Std Err
Panel A: Full Sample				
First Disclosed Position in Each Stock	686	−0.0018	−0.0009	0.0013
Below Median Size of Disclosed Position	336	−0.0006	−0.0003	0.0013
At or Above Median Size of Disclosed Position	350	0.0033	0.0016	0.0025
First Disclosed Position by Each Fund-Stock Pair	2,650	−0.0015	−0.0008	0.0007
Close-Outs	4,899	0.0006	0.0003	0.0005
Upticks	10,480	−0.0010	−0.0005	0.0003
Downticks	8,870	−0.0005	−0.0003	0.0004
Panel B: Rights Issue Subsample				
First Disclosed Position in Each Stock	108	−0.0064	−0.0032	0.0035
Below Median Size of Disclosed Position	70	−0.0006	−0.0003	0.0013
At or Above Median Size of Disclosed Position	38	0.0083	0.0041	0.0082
First Disclosed Position by Each Fund-Stock Pair	772	−0.0028	−0.0014	0.0014
Close-Outs	1,000	0.0007	0.0004	0.0012
Upticks	2,358	−0.0002	−0.0001	0.0006
Downticks	1,870	−0.0001	−0.0001	0.0007
Panel C: Non-Rights Issue Subsample				
First Disclosed Position in Each Stock	578	0.0005	0.0003	0.0011
Below Median Size of Disclosed Position	266	−0.0001	−0.0000	0.0012
At or Above Median Size of Disclosed Position	312	0.0030	0.0015	0.0021
First Disclosed Position by Each Fund-Stock Pair	1,878	0.0007	0.0003	0.0007
Close-Outs	3,899	0.0009	0.0005	0.0006
Upticks	8,122	−0.0012	−0.0006	0.0004
Downticks	7,000	−0.0005	−0.0003	0.0004

Table 8: Abnormal Returns and Discloser Reputation

This table reports the estimates from the regression of abnormal daily returns on variables related to the reputation of a discloser of a short position. Each row presents results from a separate set of regressions. The unit of observation is firm-day abnormal returns within the window around the first disclosed position in each stock. Abnormal daily returns are defined as the stock's daily return in excess of the stock's one-digit Industry Classification Benchmark (ICB) sector index. These returns are regressed on discloser-level fixed effects to obtain an estimate of the daily profits attributable to each discloser. Disclosed firms are as defined in the text. *AUM* is the natural logarithm of the discloser's most recently reported assets under management subject to 13F filings. *AUM above Median* is a binary variable equal to 1.0 if the discloser's *AUM* is above the median *AUM* calculated by country and equal to 0.0, otherwise. *PositionSize* is the ratio of the size of the short position disclosed and AUM multiplied by 10. *PositionSize above Median* is a binary variable equal to 1.0 if the discloser's *PositionSize* is above the median *PositionSize* calculated by country and equal to 0.0, otherwise. *MoneyCtr* is a binary variable equal to one if the discloser is headquartered in New York or London and equal to zero otherwise. *Centrality* is defined in the text. Country-level effects are fixed, and standard errors are clustered at the firm-level. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

	Full Sample		Rights Issue Subsample		Non-Rights Issue Subsample	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Panel A: (0,2) Event Window						
AUM	−0.0003	0.0002	−0.0011	0.0011	−0.0001	0.0003
AUM above Median	−0.0025	0.0016	−0.0027	0.0051	−0.0026	0.0017
PositionSize	0.0034**	0.0015	0.0018	0.0024	0.0038**	0.0019
PositionSize above Median	0.0007	0.0016	0.0049	0.0054	−0.0001	0.0016
MoneyCtr	0.0007	0.0017	−0.0062	0.0048	0.0020	0.0017
Centrality	0.0001*	0.0000	0.0001	0.0001	0.0001*	0.0001
Panel B: (0,10) Event Window						
AUM	0.0000	0.0001	−0.0002	0.0004	0.0000	0.0001
AUM above Median	−0.0002	0.0007	−0.0003	0.0020	−0.0003	0.0007
PositionSize	−0.0009	0.0008	0.0005	0.0010	−0.0009	0.0010
PositionSize above Median	0.0006	0.0007	0.0023	0.0022	0.0004	0.0006
MoneyCtr	−0.0001	0.0007	−0.0010	0.0020	0.0002	0.0007
Centrality	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Panel C: (0,30) Event Window						
AUM	−0.0001	0.0001	−0.0002	0.0002	−0.0000	0.0001
AUM above Median	−0.0002	0.0004	−0.0006	0.0012	−0.0001	0.0004
PositionSize	−0.0005	0.0007	−0.0005	0.0005	−0.0005	0.0009
PositionSize above Median	0.0004	0.0003	0.0011	0.0011	0.0002	0.0003
MoneyCtr	−0.0002	0.0004	−0.0017	0.0011	0.0000	0.0004
Centrality	0.0000	0.0000	−0.0000	0.0000	0.0000	0.0000

Table 9: Summary Statistics for Rights Issue Subsample

This table reports summary statistics for the subsample of firms undergoing rights issues. *Percentile Market Capitalization* is calculated each trading day and for each country. *Ratio of Rights to Total Shares* is the number of rights shares offered scaled by total shares outstanding. *Discount to Share Price* is the difference in price between the share price and the rights price at announcement scaled by share price.

Total Number of Rights Issues	1,158
Number of Pre-Regime Rights Issues	799
Number of Post-Regime Disclosed Rights Issues	108
Number of Post-Regime Undisclosed Rights Issues	251
Percentage of Rights Issues Completed	94.91
Average Trading Days to Completion	30.39
Percentile Market Capitalization	
Mean	52.77
Std Dev	27.43
5th Percentile	13.00
Lower Quartile	29.00
Median	51.00
Upper Quartile	78.00
95th Percentile	95.00
Discount to Share Price	
Mean	0.4072
Std Dev	0.1855
5th Percentile	0.1117
Lower Quartile	0.2822
Median	0.4000
Upper Quartile	0.5246
95th Percentile	0.7116
Ratio of Rights to Total Shares	
Mean	0.2459
Std Dev	0.2035
5th Percentile	0.0364
Lower Quartile	0.0985
Median	0.1756
Upper Quartile	0.3062
95th Percentile	0.7093

Table 10: Determinants of Rights Issue Cumulative Abnormal Returns

This table reports the model estimates for cumulative abnormal returns (CARs) around the announcement date of a rights issue. Abnormal returns are relative to the stock's one-digit Industry Classification Benchmark (ICB) sector index. *Disclosed* is a dummy variable equal to 1 if a short position in the stock was disclosed during the event window and 0 otherwise. *# of Follow-on Disclosures* is the number of short positions originated over the event window beyond the first disclosure. *Ratio of Rights to Total Shares* is the number of rights shares offered scaled by total shares outstanding. *Discount to Share Price* is the difference in price between the share price and the rights price at announcement scaled by share price. Effects are fixed at the country-level, and standard errors are clustered by firm. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

	Specification 1		Specification 2		Specification 3	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Panel A: (0,5) CAR						
Intercept	−0.0723*	0.0412	−0.0721*	0.0413	−0.0518	0.0520
Disclosed	0.0127	0.0250	0.0071	0.0276	0.0099	0.0295
# of Follow-on Disclosures			0.0032	0.0052	0.0039	0.0053
Ratio of Rights to Total Shares					0.0632	0.0514
Discount to Share Price					−0.0818**	0.0402
Panel B: (0,20) CAR						
Intercept	−0.0537	0.0437	−0.0526	0.0437	−0.0154	0.0545
Disclosed	−0.0369	0.0299	−0.0632*	0.0354	−0.0295	0.0334
# of Follow-on Disclosures			0.0073	0.0059	0.0050	0.0057
Ratio of Rights to Total Shares					0.0310	0.0505
Discount to Share Price					−0.1291**	0.0629
Panel C: (0, Completion) CAR						
Intercept	0.0986	0.0683	0.0991	0.0684	0.0412	0.0968
Disclosed	−0.0593	0.0400	−0.0697	0.0480	−0.0087	0.0467
# of Follow-on Disclosures			0.0022	0.0055	0.0014	0.0054
Ratio of Rights to Total Shares					0.0728	0.0746
Discount to Share Price					−0.0953	0.0943

Table 11: Alternative Rights Issue Cumulative Abnormal Returns

This table reports the mean cumulative abnormal returns (CARs). Abnormal returns are relative to the stock's one-digit Industry Classification Benchmark (ICB) sector index. Panel A tabulates CARs around the completion date of a rights issue during the disclosure regime period. *Disclosed* is the set of rights issues in which a short position in the stock was disclosed between the announcement date and the completion date of the rights issue. Similarly, *Undisclosed* is the set of rights issues in which a short position in the stock was not disclosed between the announcement date and the completion date of the rights issue. Panel B tabulates the difference in CARs around the announcement date of a rights issue before and after the disclosure regime. Effects are fixed at the country-level, and standard errors are clustered by firm. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

Panel A: Disclosed vs. Undisclosed Rights Issue CARs around Completion

| | Disclosed | | Undisclosed | | |
	Mean	Std Err	Mean	Std Err	Difference in Means
(Completion, 5) CAR	0.0254	0.0303	0.0189	0.0291	0.0065
(Completion, 20) CAR	0.0156	0.0537	−0.0170	0.0517	0.0326
(Completion, 60) CAR	−0.0027	0.0570	−0.0383	0.0480	0.0357

Panel B: Pre-regime vs. Post-regime Rights Issue CARs

| | Pre-regime | | Post-regime | | |
	Mean	Std Err	Mean	Std Err	Difference in Means
(0, 5) CAR	−0.0581**	0.0181	−0.0552***	0.0115	−0.0029
(0, 20) CAR	−0.0341	0.0220	−0.0351**	0.0155	−0.0010
(0, Completion) CAR	0.0529	0.0392	0.0022	0.0318	0.0508*

Table 12: Changes in Short Activity Around Disclosure

This table reports the difference-in-difference estimate for stocks with a disclosed short position relative to their matched counterparts over the event window. Each firm is matched on the disclosure date to a firm listed in the same country by minimizing the sum of the square differences of percentile *Share Turnover*, percentile *Market Capitalization*, percentile *Short Interest at Settlement* and percentile *Change in Short Interest at Settlement* over the previous month (22 trading days). Short activity measures are defined in the text. Data are provided by Data Explorers. Standard errors are clustered at the firm-level. *, **, and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

Window	Short Interest	Percent of Lenders Active	Scaled Number of Open Loans	Concentration of Loans	Daily Cost of Borrowing Score
Panel A: Full Subsample					
(-3,-1)	0.0022***	0.0088**	0.0283***	−0.0017	0.0251
(-1,0)	0.0002	0.0009	−0.0036	0.0018	−0.0157
(-1,1)	0.0004	−0.0004	−0.0012	0.0016	−0.0110
(0,2)	−0.0007	−0.0020	−0.0024	0.0004	0.0079
(0,5)	0.0012**	0.0050	0.0336***	−0.0034	0.0110
(0,10)	0.0008	0.0092*	0.0429***	−0.0052	0.0569
(0,20)	−0.0017	0.0156**	0.0470***	−0.0085	0.0079
Panel B: Rights Issue Subsample					
(-3,-1)	0.0088***	0.0170*	0.0522***	0.0015	0.1485
(-1,0)	0.0007	0.0036	−0.0053	−0.0046	0.0396
(-1,1)	0.0006	−0.0019	−0.0140	−0.0074	0.0500
(0,2)	−0.0028	−0.0084	−0.0532*	0.0053	−0.0200
(0,5)	0.0009	0.0050	0.0166	−0.0024	−0.0400
(0,10)	−0.0085***	0.0023	−0.0175	0.0038	0.1200
(0,20)	−0.0161***	−0.0091	−0.0509	−0.0074	−0.1500
Panel C: Non-Rights Issue Subsample					
(-3,-1)	0.0010**	0.0072*	0.0239***	−0.0023	0.0019
(-1,0)	0.0001	0.0004	−0.0032	0.0030	−0.0262
(-1,1)	0.0003	−0.0001	0.0011	0.0032	−0.0224
(0,2)	−0.0004	−0.0008	0.0069	−0.0005	0.0131
(0,5)	0.0013**	0.0050	0.0367***	−0.0036	0.0206
(0,10)	0.0024***	0.0105*	0.0539***	−0.0068	0.0450
(0,20)	0.0009	0.0201***	0.0649***	−0.0087	0.0375

Table 13: Changes in Short Activity Around Rights Issue Announcement

This table reports the difference-in-difference-in-difference (DDD) estimate for stocks with a rights issue announcement and a disclosed short position relative to their undisclosed counterparts over the event window. Each firm is matched to a control firm one trading month prior to the announcement of a rights issue by minimizing the sum of the square differences of percentile *Share Turnover*, percentile *Market Capitalization*, percentile *Short Interest at Settlement* and percentile *Change in Short Interest at Settlement* over the previous month (22 trading days). Disclosed rights issues are the subsample of stocks with a rights issue announcement and a disclosed short position within the (0,1)-day event window. Panel A benchmarks against undisclosed rights issues, which are the subsample of stocks with a rights issue announcement and no disclosed short position within the window between the announcement and completion of the rights issue. Panel B benchmarks against rights issues occurring before the disclosure regime took effect. Short activity measures are defined in the text. Data are provided by Data Explorers. Standard errors are clustered at the firm-level. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

Window	Short Interest	Percent of Lenders Active	Scaled Number of Open Loans	Concentration of Open Loans	Daily Cost of Borrowing Score
Panel A: Disclosed vs. Undisclosed Rights					
(-3,-1)	0.0052**	−0.0032	0.0047	−0.0217	0.1275
(-1,0)	0.0130***	0.0141	0.0598**	−0.0282	0.3873***
(-1,1)	0.0165***	0.0302*	0.0731***	−0.0538**	0.2930*
(0,2)	0.0058**	0.0117	0.0154	−0.0376	−0.0727
(0,5)	0.0066*	0.0014	0.0393	−0.0047	−0.2128
(0,10)	−0.0198***	0.0026	−0.1994**	−0.0017	−0.2994
(0,20)	−0.0290***	0.0698**	−0.2123***	0.0108	−0.2847
Panel B: Disclosed vs. Pre-Regime Rights					
(-3,-1)	0.0074***	0.0194	0.0449	−0.0115	0.0562
(-1,0)	0.0138***	0.0366***	0.0666***	−0.0116	0.4010***
(-1,1)	0.0172***	0.0397***	0.0802***	−0.0296	0.2885*
(0,2)	0.0068***	−0.0036	0.0281*	−0.0312*	−0.2971*
(0,5)	0.0083**	−0.0146	0.0709**	−0.0102	−0.6013***
(0,10)	−0.0167**	−0.0170	−0.1570**	−0.0026	−0.4998**
(0,20)	−0.0267***	0.0368	−0.2062***	0.0078	−0.3630

Table 14: Likelihood of the Disclosure of a Short Position

This table reports the marginal effects for a logit model of the disclosure of a short position. The sample includes stock-day observations for all firms in our sample and the two subsamples defined in the text. The dependent variable is a binary variable equal to one if a short position in the stock was disclosed on day t and equal to zero otherwise. *Disclosure*$_{\{t-i,t-i-k\}}$ is a binary variable equal to one if a short position in the stock was disclosed on day $t-i$ to day $t-i-k$ and equal to zero otherwise. *AUM* is the natural logarithm of the discloser's most recently reported assets under management subject to 13F filings. *PositionSize* is the ratio of the size of the short position disclosed and AUM multiplied by 10. *MoneyCtr* is a binary variable equal to one if the discloser is headquartered in New York or London and equal to zero otherwise. *Centrality* is a percentile rank based on the average pairwise distance between short sellers in our sample. Thus, a centrality measure of 0.01 indicates the short seller furthest on average from other short sellers, while a centrality measure of 0.99 indicates the short seller closest on average to other short sellers. Country-level effects are fixed, and standard errors are clustered at the firm level. Additional controls (unreported) include *Short Interest at Settlement* on day $t-1$, log trading volume on day $t-1$, log market capitalization on day $t-1$ and return in excess of the stock's one-digit Industry Classification Benchmark (ICB) sector index on days $t-1$, $t-2$ and $t-3$. *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Panel A: Full Sample					
(Baseline Probability = 0.0844)					
Disclosed$_{\{t-1,t-5\}}$	0.1664***	0.1587***	0.1663***	0.1529***	0.1473***
Disclosed$_{\{t-6,t-30\}}$	0.2008***	0.1735***	0.2011***	0.1901***	0.1740***
Disclosed$_{\{t-1,t-5\}} \times$ AUM		0.0003			
Disclosed$_{\{t-6,t-30\}} \times$ AUM		0.0013***			
Disclosed$_{\{t-1,t-5\}} \times$ PositionSize			0.0433		
Disclosed$_{\{t-6,t-30\}} \times$ PositionSize			−0.1868		
Disclosed$_{\{t-1,t-5\}} \times$ MoneyCtr				0.0175	
Disclosed$_{\{t-6,t-30\}} \times$ MoneyCtr				0.0143**	
Disclosed$_{\{t-1,t-5\}} \times$ Centrality					0.0320
Disclosed$_{\{t-6,t-30\}} \times$ Centrality					0.0494***

Table 14: Likelihood of the Disclosure of a Short Position (cont.)

	(1)	(2)	(3)	(4)	(5)
Panel B: Rights Issue Subsample					
(Baseline Probability = 0.2981)					
$\text{Disclosed}_{\{t-1,t-5\}}$	0.5739***	0.5698**	0.5748***	0.4927***	0.4363***
$\text{Disclosed}_{\{t-6,t-30\}}$	0.4483***	0.2900***	0.4490***	0.4404***	0.2969***
$\text{Disclosed}_{\{t-1,t-5\}} \times$ AUM		−0.0001			
$\text{Disclosed}_{\{t-6,t-30\}} \times$ AUM		0.0075***			
$\text{Disclosed}_{\{t-1,t-5\}} \times$ PositionSize			−0.7856		
$\text{Disclosed}_{\{t-6,t-30\}} \times$ PositionSize			−0.2776		
$\text{Disclosed}_{\{t-1,t-5\}} \times$ MoneyCtr				0.1047*	
$\text{Disclosed}_{\{t-6,t-30\}} \times$ MoneyCtr				0.0069	
$\text{Disclosed}_{\{t-1,t-5\}} \times$ Centrality					0.2243*
$\text{Disclosed}_{\{t-6,t-30\}} \times$ Centrality					0.2437***
Panel C: Non-Rights Issue Subsample					
(Baseline Probability = 0.0688)					
$\text{Disclosed}_{\{t-1,t-5\}}$	0.1278***	0.1205***	0.1274***	0.1241***	0.1261***
$\text{Disclosed}_{\{t-6,t-30\}}$	0.1738***	0.1566***	0.1741***	0.1650***	0.1562***
$\text{Disclosed}_{\{t-1,t-5\}} \times$ AUM		0.0003			
$\text{Disclosed}_{\{t-6,t-30\}} \times$ AUM		0.0009**			
$\text{Disclosed}_{\{t-1,t-5\}} \times$ PositionSize			0.1137		
$\text{Disclosed}_{\{t-6,t-30\}} \times$ PositionSize			−0.1777		
$\text{Disclosed}_{\{t-1,t-5\}} \times$ MoneyCtr				0.0043	
$\text{Disclosed}_{\{t-6,t-30\}} \times$ MoneyCtr				0.0120*	
$\text{Disclosed}_{\{t-1,t-5\}} \times$ Centrality					0.0009
$\text{Disclosed}_{\{t-6,t-30\}} \times$ Centrality					0.0336**

Table 15: Distance between the Disclosers in the Same Stock

This table reports summary statistics on the distance between disclosers of a follow-on position and the discloser of a position in the same stock between day $t-i$ and day $t-i-k$. Statistics on the distance between all discloser pairs in our sample are reported for comparison. *Percentage within 100 miles* is the percentage of disclosers of a follow-on position that are within 100 miles of the discloser of a position in the same stock over the prior window. For the test of the difference in means, *, ** and *** denote significance at the 10 percent, 5 percent and 1 percent levels, respectively.

	Mean Distance	Difference in Means	Percentage within 100 miles	Difference in Means
All Pairs	2094.10		26.73	
Panel A: Full Sample				
Days $(t-1, t-5)$	1906.80	-187.30***	29.80	3.06***
Days $(t-6, t-30)$	1847.70	-246.40***	34.82	8.08***
Panel B: Rights Issue Subsample				
Days $(t-1, t-5)$	1912.50	-181.60***	26.10	-0.63
Days $(t-6, t-30)$	1775.80	-318.30***	35.88	9.15***
Panel C: Non-Rights Issue Subsample				
Days $(t-1, t-5)$	1859.70	-234.40***	35.24	8.50***
Days $(t-6, t-30)$	1915.10	-179.00***	33.13	6.40***