Revealing shorts:
An examination of large short position disclosures*

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ABSTRACT

As a policy response to the recent financial crisis, France, Spain and the United Kingdom now require the disclosure of large short positions in equities listed there. We characterize these disclosures, focusing on stock prices and shorting activity before, during and after the disclosure of a new large short position. A short position disclosure has little immediate effect on returns. However, when the short position is associated with a rights issue, there is a sharp price decline beginning about 10 trading days after the disclosure. In fact, cumulative abnormal returns over the 20 days following a short position disclosure are -18.66%. Outside of rights issues, we find that short position disclosures have little effect on share prices. Across the board, we 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. Follow-on shorting is more likely when the initial discloser has greater assets under management or is located near other short sellers. These findings shed light on information transmission, and they should also be of interest to regulators, short sellers and other investors.

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1. Introduction

Since the financial crisis reached its peak in September 2008, short sellers have found themselves under close scrutiny. Most academic research argues that short sellers improve market efficiency and generally stabilize share prices by identifying and then leaning against overvalued stocks.[1] In contrast, policymakers, journalists, company executives and even a few academics worry that short sellers may employ abusive trading strategies, damage investor confidence and market quality and amplify price declines.[2] Regulators have responded with new rules that limit or discourage some short sales. For example beginning in September 2008, the US and most European countries temporarily banned short sales in financial stocks and instituted new requirements on borrowing shares.[3] In 2010, the US reinstituted a version of the uptick rule if a stock experiences a sharp decline during the day. More recently, shorting bans have returned to Europe in 2011, with the worsening of the European sovereign debt crisis.

Rather than banning and restricting short sales, an alternative policy response is increased disclosure. 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. The sunlight of disclosure could discourage abusive short selling if it exists. However, it is possible that short sale disclosures could do more harm than good. Disclosure could provide a coordination mechanism for short sellers or lead to undesirable short squeezes.

While the US is still evaluating short sale disclosure rules, Europe has already acted. The UK, France and Spain now require that short sellers publicly disclose large short positions in all stocks listed in those countries. Under the UK disclosure regime, for example, 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. In this paper, we analyze these disclosures. We focus on

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[1] See, for example, Dechow et al. (2001); Abreu and Brunnermeier (2002); Alexander and Peterson (2008); Boehmer, Jones and Zhang (2008); Boehmer and Wu (2009) 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 (2011); Boehmer, Jones and Zhang (2011); Battalio and Schultz (2011) and Beber and Pagano (2011), among others.

the effects of these disclosures on share prices and on the subsequent behavior of other short sellers and other market participants. The key database we employ is a collection of short selling disclosures. This database comprises 652 unique disclosed short sale positions for the UK, France and Spain. 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.

It is worth pointing out that this type of short selling data is fundamentally different from other types of short selling data. Data that has been examined in the past includes short interest, daily amounts of shorting, and 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 to show short positions at the individual short seller level. It is the first to show both opening and closing dates of individual short positions, and it is the first to show the identity of the short seller.

These data provide new insights into short sellers' strategies. For instance, we find that short positions are highly crowded into certain stocks, and we find that the average short position is open for 15 days. Although this second finding is in line with some previous estimates (e.g., Boehmer, Jones and Zhang (2008) and Geczy, Musto and Reed (2002)), this database comprises the only exact measures of individual short position opening and closing dates available in the literature.

Although the short sale disclosure regime described here raises a number of interesting questions, our approach is to first establish the basic facts about how the market responds to the disclosure of a short position. We find that in the full sample of disclosed stocks, abnormal returns are significantly negative around the period of disclosure. Specifically, we compare the return of each disclosed stock to the return of that stock's industry benchmark, and we find that the average daily return difference is −0.27% (equivalent to an annual return of −45%) from the day of the disclosure until the thirtieth day after the disclosure. Furthermore, we show that returns from a hypothetical trading strategy designed to capture this return pattern would likely be profitable, especially at the beginning of the period.

Since many of the disclosures are associated with rights issues, we attempt to isolate any incremental effects of short sale disclosures around the time of rights issues. We find that the magnitude of the return pattern is largest in the rights issue subsample. For example in the thirty-day period following the disclosure, the average return is −0.0059, which is equivalent to

an annual return of − 73%. Furthermore, in the sample without rights issues, there is no statistically significant effect. In other words, the return pattern in the overall sample is driven by the sample of stocks with rights issues.

Given the fact that the literature has found 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 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. To investigate the possibility of increased shorting activity in response to disclosed short positions, we look at a daily measure of short interest. We find that short interest does indeed increase by 0.93% of shares outstanding following the public disclosure and an increase is present in both rights issue stocks and non-rights issue stocks.

We further investigate a number of other aspects of short selling using our detailed databases. We find that the percentage of lenders actively lending increases for disclosed stocks after the public disclosure, that the number of open loans increases and that the concentration of open loans does not appear to change after the disclosure indicating that the follow-on is not dominated by either small positions or large positions. Finally, we find that the daily cost of borrowing shows a dramatic increase in the days immediately following the short sale disclosure. Taken together, these statistics outline a cohesive story: short sale disclosures lead to an increase in short interest, which drives an increase in the number of lenders and loans in the equity loan market, and this increase in borrowing drives borrowing costs up as in Kolasinski, Reed and Ringgenberg (2011).

One of the criteria that triggers the short disclosure rules is the presence of a rights issue. This type of corporate event is prevalent in our sample, and we conduct a set of experiments specifically focused on teasing out the effect of short sale disclosures above and beyond the previously documented effects of rights issues (e.g., Slovin, Sushka and Lai (2000)). We first look at abnormal returns during the rights issue, and we find that in the first few days after the rights issue announcement, returns of rights issue stocks with disclosures are indistinguishable from returns of rights issue stocks without disclosures. However, over longer intervals, there is a sharp difference between undisclosed and disclosed samples. Specifically, we show that in the 20-day interval after a rights issue announcement, stocks with disclosed short positions have -18.2% lower returns than non-disclosed short positions.

Of course, short sellers may be responding to the trading opportunity that arises because of the rights issue, so it is no surprise to find that unconditionally, disclosed rights issues have lower returns than undisclosed rights issues. To address this potential concern, we include variable intended to capture the apparent profitability of rights issue trading strategies. We find that even controlling for these rights issue deal characteristics, disclosed rights issues have significantly more negative returns than other rights issues. Specifically, we find that the average rights issue with a disclosed short position has a 16.57% lower return than the average rights issue without a disclosed short position between the announcement and completion of the rights issue deal. Moreover, this underperformance is linked to the number of follow-on disclosures subsequent to the initial disclosure of a large short position. The average rights issue with a disclosed short position in our sample has 4.44 such follow-on disclosures, with each being associated with an additional -2.75% CAR over the (0,20)-day event window following the announcement of a rights issue.

In our final set of experiments, we investigate the possibility of disclosures driving more disclosures. Regulators 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. We use a logit specification in which our independent variables characterize the probability of a disclosure. Using this approach, we find that the existence of a past disclosure is a strong predictor of a disclosure today. In other words, after controlling for a number of factors that are likely to drive disclosures, the presence of another disclosure significantly increases the probability of another disclosure.

Given the fact that disclosures drive more disclosures, it is natural to 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 sort 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 good reputation. We do in fact find that reputation is a significant driver of subsequent disclosures. A stock with a disclosure made in the last five trading days by a short seller with high assets under management (one standard deviation above the mean) is about twice as likely as an undisclosed firm (0.20% versus 0.10%) to experience a disclosure by another short seller on a given trading day.

Similarly, we test whether disclosures made by short sellers in geographically dense locations are more likely to be followed. Specifically, we find that disclosures made by short sellers in New York and London and short sellers with addresses that are close to other short sellers' addresses are more likely to be followed. We conclude short sellers with good reputations as well as short sellers in central locations are more likely to be followed by future short sellers.

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)). 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 (2011) 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 around negative 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. In Goldstein and Geumbel (2008), aggressive short selling may depress a company's share price and distort the company's investment decision thereby harming its fundamental value. 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. Bear raids were widespread in the early 1900's in the United States, and some market observers and participants have worried recently that these strategies may be returning to the fore.[4]

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[5]. 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.

Empirical evidence of manipulative short sales is sparse outside of SEOs. Shkilko, Van Ness and Van Ness (2009) 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

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[4] 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; "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.

[5] 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.

suggest that short sellers may occasionally engage in predatory trading. Blocher, Engelberg and 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 yearend 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, notably the twice per month release of short interest information in the US Asquith, Pathak and Ritter (2005) find that short interest predicts returns only in the smallest 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. However, the relationship between high short interest and future returns is much weaker.

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 United States 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. Disclosure regimes in the UK, France and Spain

3.1. United Kingdom

Effective September 19, 2008, the UK Financial Services Authority (FSA) banned short selling in financial stocks and instituted a short position disclosure regime. On January 16, 2009, the FSA lifted the short sale ban on financial stocks, but kept and clarified the short position disclosure requirements.[6] The disclosure requirements apply to financial sector stocks as well as any stock in a rights issue period, and as of this writing, the disclosure regime is still in effect.

In the UK, 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 disclosures require the name of the person who has the position, the amount of the position and the company in relation to which it has the position.

3.2. 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,[7] but since short sales in those stocks were banned at the same time, there were virtually no disclosures of new short positions thereafter. 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 must be reported by the next day and are published on the AMF website. Additional thresholds are at 0.1% intervals (0.60% of shares outstanding, 0.70%, 0.80% and so on), and subsequent disclosures are required every time the position crosses one of these thresholds. A final disclosure is also required when the short position falls below the 0.50% threshold. The short position disclosure rules cover all issuers trading on Euronext Paris or Alternext Paris except firms for which the French market is

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[6] See 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".

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

not the principal trading market. Derivative positions must be included in calculating the discloser's net short position. Bona fide market-makers can apply in advance for an exemption from the short position disclosure requirements.[8]

3.3. 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 are now similar to those of France. The Spanish regulator Comisión Nacional del Mercado de Valores (CNMV) publishes individual short positions that are at least 0.50% of shares outstanding with additional thresholds at 0.1% intervals, just as in France. The main difference from the French regime is that those shorting Spanish stocks must report all positions of at least 0.20% of shares outstanding. The CNMV reports the aggregate amount of all short positions that are between 0.20% and 0.50% of shares outstanding but does not publish any details about the individual short positions in this size category.

4. Data

We employ two unfamiliar databases in this study. The first is a collection of short selling disclosures, and the second is data on the European securities lending market. We also obtain several measures of hedge fund reputation from 13F filings to the SEC. In what follows, we describe the sets of data used in this study in more detail.

4.1. Disclosure Data

We obtain a record of 652 unique disclosed short sale positions from 1,682 disclosure announcements from the beginning of the disclosure regime to June 30, 2011, for the three countries, the UK, France and Spain, in our sample.[9] The database has several pieces of information about each disclosure including the date of the disclosure, the name of the short

[8] 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.

[9] Specifically, the disclosure regimes for the UK, France and Spain begin on January 17, 2009, February 2, 2011 and June 10, 2010, respectively. A short selling ban was in place in the UK between September 18, 2008 and January 16, 2009. We restrict our analysis to exclude this period to avoid any confounding effects from the shorting ban.

seller, the name and ISIN of the instrument being sold short and the percentage of shares outstanding being sold short.[10] We obtain the UK portion of this database from Data Explorers, which collects 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.[11] 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.[12] Disclosure announcements for France and Spain are hand collected from the website of the regulatory body governing the disclosure regime.

Figure 1 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 2 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 two percent of shares outstanding until February 17, 2009. Two days later on February 19, 2009, Lansdowne Partners 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 1. During this period of disclosures, it is worth noting that total short interest in Old Mutual Plc increased to a high of 5.15% of shares outstanding, more than double the pre-disclosure level.

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[10] For 94% of the UK observations we also have the time at which the short sales are disclosed.

[11] We restrict the UK sample to firms listed on the London Stock Exchange to ensure data availability and to avoid double counting positions across the countries in our sample.

[12] 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.

These disclosures provide an unusually revealing view of individual short positions summarized in Table 1. Consistent with the clustering of disclosed short positions in Old Mutual Plc presented in Figure 2, the average number of positions per disclosed firm ranges from 2.18 in France to over 6 in the UK, the country with the longest disclosure regime. Additional disclosures are required each time the short position crosses a designated threshold. On average, each shorter-issuer pair appears 1.75 times in the UK sample and 5.95 times in Spain. The average disclosed short position ranges from 0.47% of shares outstanding in the UK with a disclosure threshold of 0.25% of shares outstanding to 0.86% of shares outstanding in France with a disclosure threshold of 0.50% of shares outstanding. Similarly, we see that the average holding period length of a short position exceeds 15 trading days in all three of our countries after excluding positions that are still open. This metric 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 made by Ignis Investment Services Limited in the stock of Cookson Group, PLC, which is 9.25% of shares outstanding.

Table 2 gives some indication of the largest short sellers in the UK, France and Spain. Trafalgar Asset Managers Limited and Millennium Partners, L.P. are the most prolific short position disclosers with positions in 37 and 20 UK issues, respectively. Sell-side firms also appear as frequent disclosers, with Barclays atop the list of frequent disclosers in French firms. There is also substantial variation in the average short position held by these short sellers ranging from 2.30% of shares outstanding to 0.29%, just above the regulatory threshold.

Figure 3 presents the disclosures by industry and reveals that financial firms dominate the UK data as the disclosure regime applies only to financial firms and firms undergoing rights offerings. In Spain and France, the disclosure regime is broader, and we have data from firms in a wider variety of industries. Figure 4 charts the percentage of firms disclosed by industry and country. Despite the prevalence of disclosure announcements in UK financial firms, less than 30 percent of UK financial firms have a disclosed short position over our sample period. A much

higher percentage of firms in Spain are disclosed indicative of the smaller exchanges in this country relative to the London and Paris exchanges.

Our subsequent analysis focuses primarily on the initial disclosed position in each firm for more precise identification. Thus for event studies, our sample is 142 initial disclosed positions with 46 of these disclosed positions occurring during a rights issue.

4.2. European Securities Lending Data

Securities lending data was generously provided by Data Explorers. Although it is not easily available, versions of this database have been used by a number of previous papers including Ringgenberg (2011); Saffi and Siggurdsen (2011) and Berkman and McKenzie (2011). The database contains information about short selling and short-selling constraints for stocks in the UK, France and Spain markets from January 1, 2008 through July 31, 2011. The data come from two main sources: the 'wholesale' data come from securities lenders, such as custodians, who lend stock to prime brokers, and 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 (2011)).

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 percentage of shares outstanding currently borrowed or on loan net of double counting.[13]

[13] For U.K. stocks, we also have access to data from CREST Co, the U.K.'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

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 a third measure 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. While this measure potential understates the size of long-short or short-only hedge funds, it has the benefit of being publicly available, and unlike other databases of hedge 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 and trading volume from Yahoo! Finance;[14] shares outstanding data are from Data Explorers; or DataStream where unavailable. Share turnover is equal to trading volume scaled by total shares outstanding.

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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.

[14] Returns are filtered to delete potentially erroneous values following Griffin, Kelly and Nardari (2009). 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%.

Country-level one-digit Industry Classification Benchmark (ICB) sector indices are obtained from DataStream.[15]

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. In addition to the announcement and completion dates of the rights issue[16], the data include two measures of rights issue quality. *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 73 rights issues we obtain, 46 have the disclosure of a short position occur within the window between the announcement and the completion date. The other 27 rights issues without disclosed short position comprise our sample of undisclosed rights issues.

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 squared differences between the disclosed firm and the control firm at the disclosure date of three match criteria: percentile short interest, percentile market capitalization and percentile share turnover. Percentiles are calculated each trading day and for each country. Table 3 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 three match criteria. At the date of initial disclosure, the average disclosed stock has short interest of 4.84% of shares outstanding and slightly more than one open loan per million shares outstanding. Disclosed firms have a significantly higher percentage of lenders active than the control group, 50.75% versus 45.05%. Disclosed firms are also significantly more costly to borrow than their counterparts.

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[15] Results are qualitatively similar using three-digit Industry Classification Benchmark (ICB) sector indices; however, these indices are often sparse with fewer than 5 firms in a given sector portfolio. Results using this alternative set of benchmarks are available from the authors upon request.

[16] 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.

5. Results

5.1. Stock Returns Around Short Sale Disclosure

There are a number of interesting aspects of short sale disclosure, but one of the primary 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 4, we see that the abnormal returns are significantly 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, and we find that the cumulative difference is negative for many of the windows around the day of disclosure. For example, the cumulative abnormal return from the day of the disclosure until the thirtieth day after the disclosure is -0.0830%, and it is statistically significant. Furthermore, the return is large economically; the -0.0027% average daily return is equivalent to an annual return of −45%.[17]

Figure 5 sheds a bit more light on this finding. 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 one-digit Industry Classification Benchmark (ICB) index.[18] Each position is held for thirty trading days. Panel A shows the distribution of monthly returns from this strategy is negatively skewed and the mean and median of the distribution are both negative. Similarly, Panel B shows that the trading strategy has a negative return in most months with much of negative return coming in the beginning of the sample. 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.

It is interesting to note that returns are also negative in the period immediately preceding the disclosure. Specifically, for the full sample, the window from three days to one day before the disclosure has a negative and statistically significant return; the -0.0107 average daily return over this period is large relative to the returns measured over the later periods. This negative

[17] -0.4483=((1+-0.0027)^220)- 1

[18] 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.

return before disclosure indicates that the disclosure itself is likely only part of the explanation for the negative returns.

Of course, there are a number of possible factors that may also be driving the downward return around the time of the short sale disclosure, and it is important to try to understand the relative impact of those factors on the overall return. To this end, we split short sale disclosures into two main groups: those with rights issue announcements and those without. In the sample of rights issues, we can pinpoint the one important corporate event that is likely to affect returns. In subsequent experiments, we will attempt to isolate any incremental effects of short sale disclosures around the time of these corporate events. On the other hand, for the sample without rights issues, there is no obvious single reason for observed return patterns, which allows us to more directly examine the average effect of short sale disclosures on returns.

In Panel B, we see that the magnitude of the return pattern is largest in the rights issue subsample. For example, in the thirty-day period following the disclosure, the average return is -0.0059, which is equivalent to an annual return of -73%. Furthermore, in the sample without rights issues, there is no statistically significant effect. In other words, the return pattern in the overall sample is driven by the sample of stocks with rights issues.

5.2. 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 (2009)). Furthermore, the results above show that 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 experimental setup, we conduct a difference in difference analysis. The first difference is between disclosed stocks and matched sample 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, percentile market capitalization and percentile share turnover. The second difference is between

the measured statistic over the event window. For example, adjusted Short Interest in the full sample is on average 1.09% higher on day 10 than on day 0 for disclosed firms.

We start by looking at a daily measure of short interest from our data provider. In Table 5 we find that short interest does indeed increase significantly following the public disclosure; in the overall sample, short interest increases by 0.0093. This increase is strongest among rights issue stocks, but there is a statistically significant effect among non-rights issue stocks. Unlike the return results above, the increase in short interest happens strictly after the public disclosure.

We next turn to the percentage of lenders actively lending a particular stock, or *Percent of Lenders Active*, and we do see an increase in lending activity for disclosed stocks in all three samples. Turning to the number of open loans, or *Scaled Number of Open Loans*, we see that the number of loans is increasing in the full sample, and the overall result is driven by the rights issue subsample. *Concentration of Open Loans* does not appear to increase after the disclosure, indicating that the follow-on 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 a dramatic increase in the days immediately following the short sale disclosure. Specifically, we see a statistically significant increase of 0.2871 in the full sample in the first two days after the disclosure.[19] This increase is concentrated among the rights issue disclosures; there is no effect in the non-rights-issue sample.

Taken together, a clear picture emerges. Short sale disclosures are followed by an increase in short interest with an increase in the number of lenders and loans in the equity loan market, and this increase in borrowing drives borrowing costs up.

5.3. Results for rights issues

As noted earlier, we have identified 46 rights issues in UK, French and Spanish stocks where a short position disclosure occurs during a rights issue. There are also 27 rights issues subject to the disclosure requirements where there is no short position disclosure during the rights issue. Of these 73 rights issues, 71 are in the UK and 2 are in Spain. Additional summary statistics on the rights issues can be found in Table 6. On average, firms undergoing rights issues are slightly larger in terms of market capitalization than the rest of the firms in our sample, but

[19] Since the bin cutoffs are not reported by Data Explorers, it is difficult to interpret the economic magnitude of this finding.

this difference is fairly modest, with the median rights issue firm at the 57th percentile of the distribution of market caps across all sample firms. 82.2% of the rights issues are successfully completed. The mean rights issue in our sample is 31.7% of the (pre-rights offering) shares outstanding, though the distribution is somewhat skewed as the median rights issue is only 18.8% of shares outstanding. The exercise price on the rights is always at a discount to the pre-announcement share price. The average discount of 43.4% is fairly substantial, with the discount ranging from 33.4% to 58.0% for the two middle quartiles.

We first look at abnormal returns during the rights issue. 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 20) or upon completion. 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 10 business days. Rights issues typically remain open for a longer period. In our sample, the interval from announcement to completion averages 26.74 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 7.

Not much happens to the stock in the first week following the announcement of a rights issue. Specification 1 in Panel A shows that the cumulative abnormal return (CAR) over the (0,5)-day interval is -3.12% for rights issues where there is no short position disclosure and -3.12% + 2.96% = -0.16% for rights issues where a large short position is disclosed in this time interval. These CARs are statistically indistinguishable from zero and from each other.

Things get more interesting over the next three weeks, documented in Panel B. As before, Specification 1 shows that the CAR over the (0,20)-day interval is insignificantly different from zero for the rights issues where there is no short position disclosure. In contrast, there is a sharp downward share price move if a large short position is disclosed in this interval, with a 20-day CAR of -4.61% - 18.20% = -22.81%, significant at the 1% level. The more large short sellers there are, the bigger the share price drop. Specification 2 shows that each additional disclosing short seller beyond the first one is associated with an additional -2.75% CAR over this month-long period, and this incremental effect is strongly statistically significant. For rights issues with at least one associated short position disclosure, there is significant herding, with

4.44 disclosing short sellers on average in the (0,20)-day window. Panel C shows that there is not much change in the average share price from day 20 to completion of the rights issue.

Next, we look at the publicly available details of the rights issues to see if large short sellers are targeting particular types of firms. 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. 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 disclosers. Each additional large short seller continues to be associated with an incremental -2.24% cumulative abnormal return during the first month of the rights issue.

Next we compare overall shorting activity and equity loan activity in rights issues with a short position disclosure versus those rights issues without a short position disclosure. The goal is to determine whether a disclosure is associated with the amount of overall shorting demand, or whether a disclosure just conveys information about the concentration or composition of shorting demand, as opposed to the total amount of shorting demand. To separate these effects, we match each rights issue to a non-rights issue stock that is similar along the three dimensions of share turnover, market capitalization and short interest. Then we compare disclosed rights issues 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 6 demonstrates the result graphically.[20] 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, we see a doubling of excess short interest for roughly two weeks after the disclosure and then a return to normal levels. For stocks without disclosures, there is no obvious pattern.

[20] To eliminate the possibility of differing periods between rights issue announcements and disclosures, we graph only the disclosures that occur on the second day after the rights issue announcement. This criterion captures 58.7% of the sample of rights issues with short sale disclosures.

The differences-in-differences are in Table 8. Again, for the first couple of days after the rights announcement, there is little difference in shorting activity between the disclosed and non-disclosed rights issues. By day five, however, there is a significant divergence between rights issues with short position disclosures versus rights issues without. Averaged over the (0,5)-day interval after the rights issue announcement, short interest is greater by 3.14% of shares outstanding for firms with a short position disclosure, and this difference is significant at the 1% level. Short interest remains higher over the (0,10)-day interval, but relative to firms without a short position disclosure, shorting activity in disclosed firms drops off over the following 10 days. In the week following the rights announcement, disclosed firms see an increase in the number of equity loans open, in the number of active share lenders and in the cost to borrow the shares. Again, it takes at least 10 days after the rights issue announcement, but eventually the divergence in shorting and lending activity disappears between rights issues with a short position disclosure and rights issues without. The results indicate that a short position disclosure is in fact associated with more shorting, not just more concentrated shorting.

The results on returns during rights issues are quite puzzling. On first glance, shorts appear to be well informed and able to identify the overvalued equity issuers. Short sellers are in possession of and trade on this negative fundamental news. Moreover the stronger the negative signal, the more likely it is to be received by multiple short sellers. In these overvalued stocks identified by short sellers, the negative news then becomes public several days later.

But why don't these large negative returns appear in the first five days after the rights issue announcement? Rights issues and other equity issues are typically strong negative signals. One would expect a similar reaction here, and share prices should fall immediately on the rights issue announcement.

An alternative possibility is that short sellers are actually driving down the share price. There is some evidence that this effect occurs in other contexts. For instance, Henry and Koski (2010) find that short sellers create downward price pressure in the US during secondary equity offerings despite the existence of certain restrictions on shorting then. Also, Mitchell, Pulvino and Stafford (2004) find price pressure around mergers due to short selling by merger arbitrage traders. In the next section, we look at short sales by disclosers and others to see if their behavior can account for the strongly negative returns that we measure.

5.4. 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 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." 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 characteristics of these previous disclosers, such as their assets under management (AUM) and their location. In addition to country fixed effects, unreported control variables include the level of short interest, 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 will emerge from these size and location variables, but if there is a relationship, we would expect AUM might proxy for short seller signal quality. 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 something similar here. Such a correlation could be due to actual information sharing between the two short sellers or simply the acquisition of correlated signals.

The results are in Table 9. 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 more than doubles the probability of a disclosure on a given day from 0.10% to 0.28%. A disclosure in the earlier period ups the disclosure probability by an additional 0.04%. 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 0.29% 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 9. Follow-on short positions 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 2.61 so each increase of one standard deviation in AUM by a short position discloser is associated with an increase of 0.02% to 0.03% in the probability of a follow-on disclosure relative to the baseline probability of 0.10%. The results are similar in both rights and non-rights issue subsamples.

Next, we replace the AUM interaction variable 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 somewhat mixed in terms of statistical significance. However, the full-sample coefficient estimates in Specification 3 of Panel A are quite similar in magnitude for both the {t-1, t-5} lag and the {t-6, t-30} lag, and a short position discloser located in New York or London increases the probability of a follow-on disclosure by 0.03% to 0.04%.

Finally, we 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 4 of Table 9, 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 week or month. Recall that the centrality variable is defined as a quantile and thus is distributed approximately uniform on the unit interval. Thus, a unit standard deviation increase in centrality of 0.292 increases the probability of a follow-on disclosure by 0.29% * 0.292 = 0.08%.

Overall, our results indicate the possibility that the disclosure regime encourages herding by short sellers. However, it is important to emphasize that we cannot rule out the alternative explanation that multiple short sellers independently receive similar information or apply similar analysis, leading to approximately contemporaneous short positions. In future work, we hope to to distinguish between these two possible explanations by comparing the persistence of shorting activity under the disclosure regime to shorting activity when there is no disclosure.

6. Conclusion

In this paper, we provide the first analysis of a new post-crisis regulatory regime that mandates the disclosure of large short positions in French, Spanish and United Kingdom stocks. We characterize the disclosers, stock price behavior around the disclosure and equity lending market effects. We 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. Follow-on shorting is more likely when the initial discloser has greater assets under management or is located near other short sellers.

The most striking result is that when the short position is associated with a rights issue, there is a sharp price decline beginning about 10 trading days after the disclosure. In fact, cumulative abnormal returns over the 20 days following a short position disclosure are -18.66%, and returns are more negative when there are more large short sellers present. We cannot yet distinguish between information-based shorting and manipulative short sales; this identification is currently a topic for future work. But abusive shorting during secondary equity offerings has long been a concern of regulators, and Regulation M in the US limits shorting during an SEO. In fact, in a recent release (DP09/1), the UK FSA asked 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?" While the FSA recently concluded (in FS09/4) that it would not ban shorting (including shorting by underwriters) during equity issuances, it is not clear that it was aware of these sharp stock price declines during recent rights issues. It may be

time for the UK FSA to take another look at shorting during rights issues and to ask itself why the US SEC has come to a different conclusion about shorting during equity offerings.

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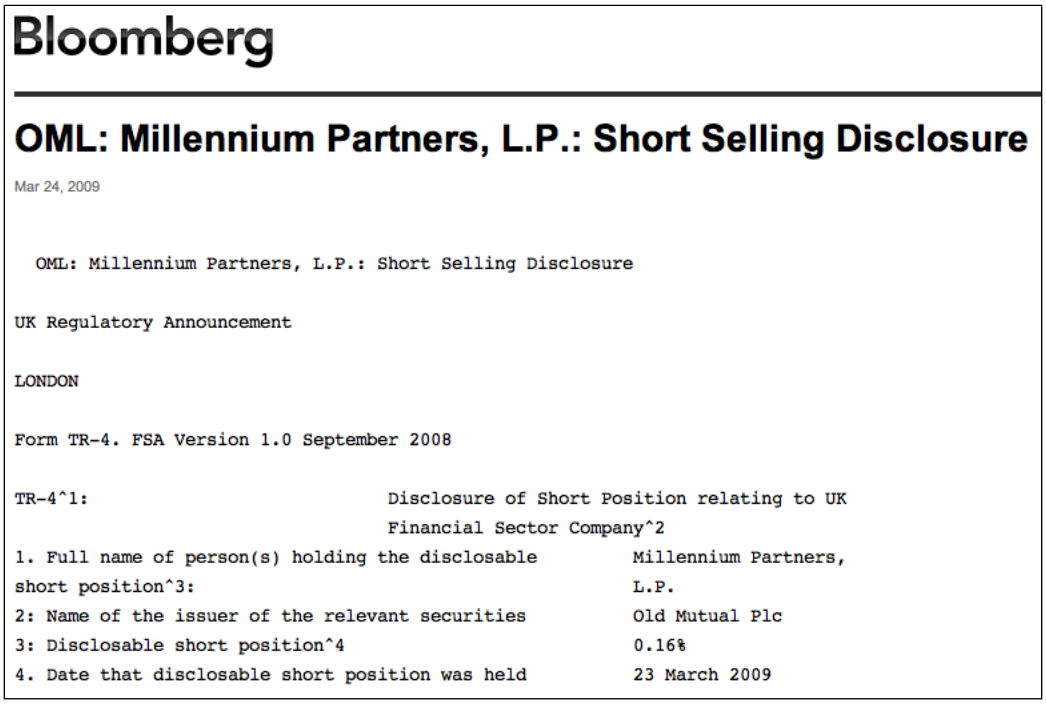
Figure I: Sample Disclosure

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 II: 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.

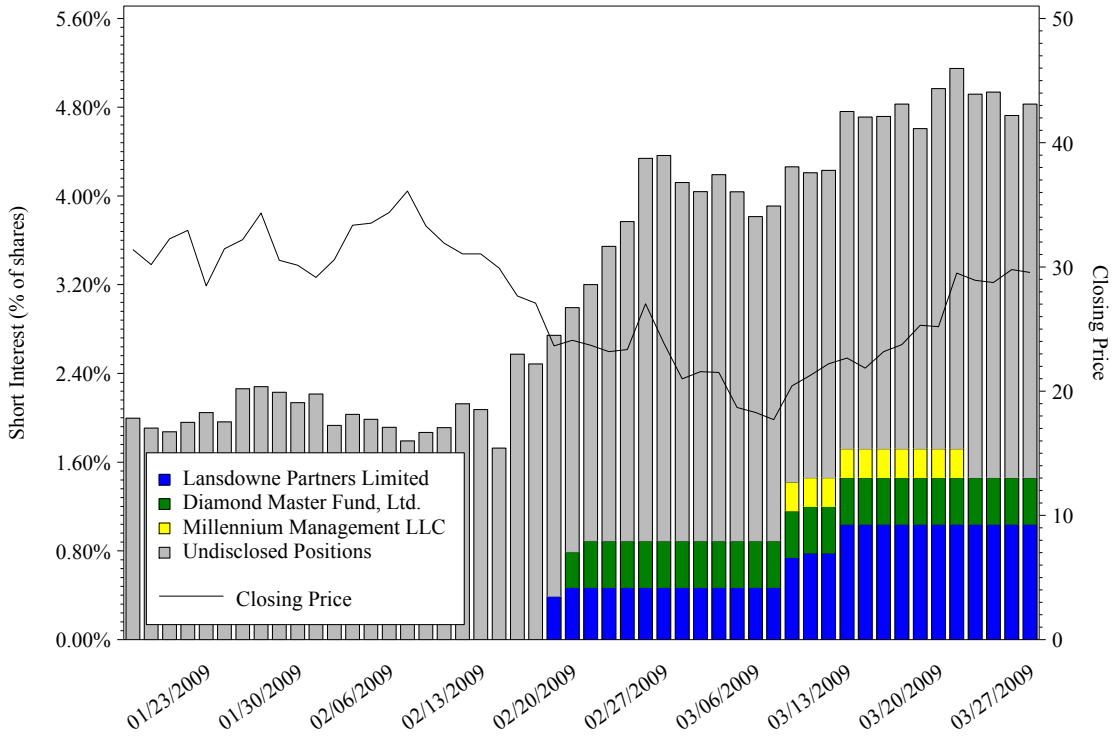
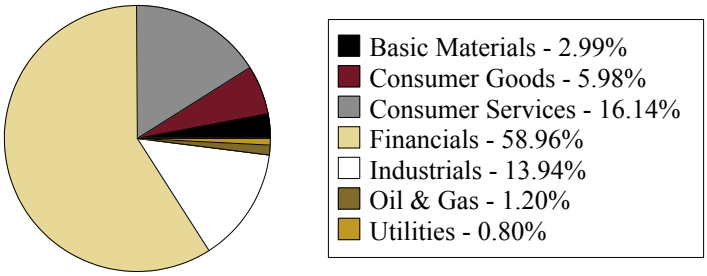


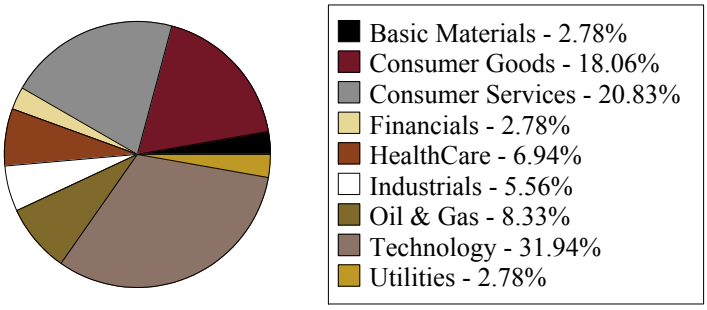
Figure III: Disclosures by Industry

This figure 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.

United Kingdom



France



Spain

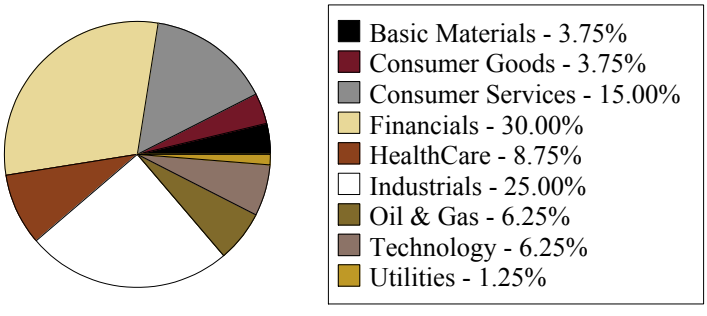


Figure IV: Percentage of Firms Disclosed

This figure 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.

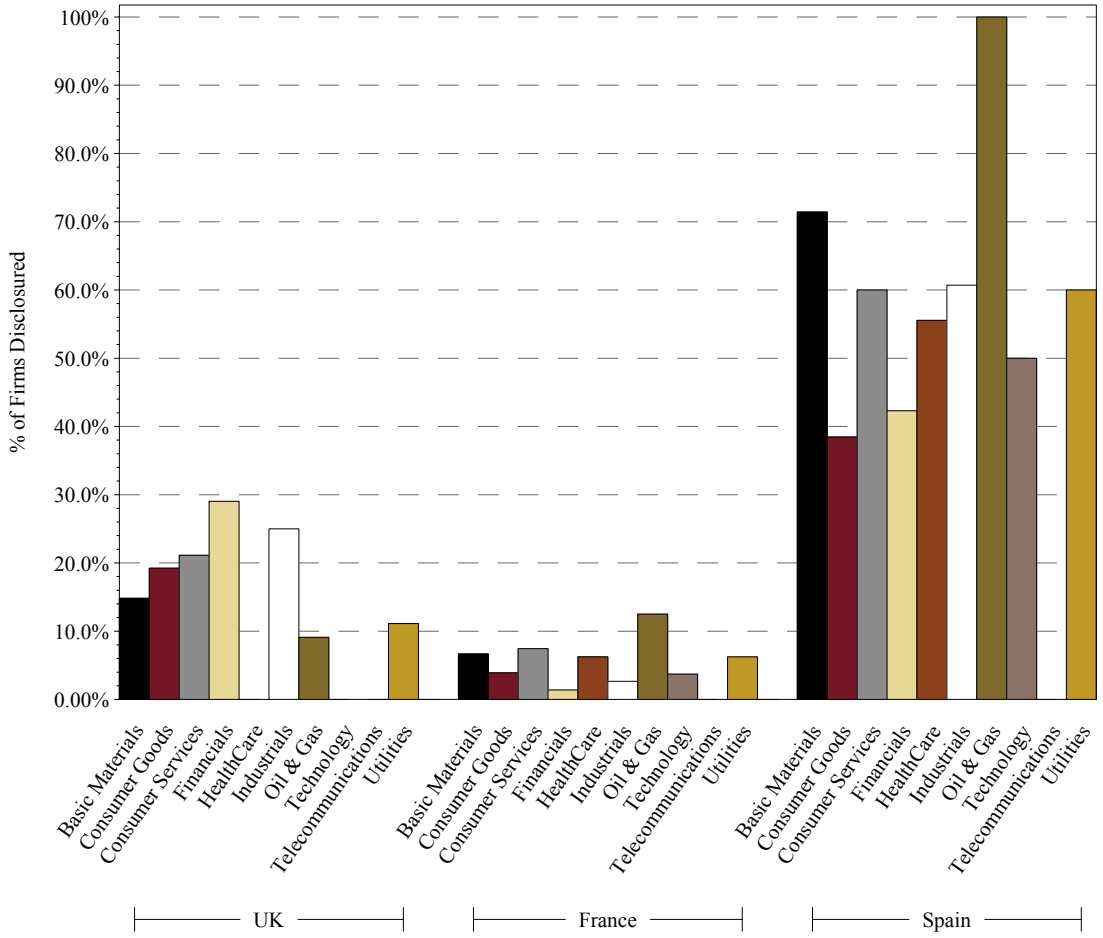
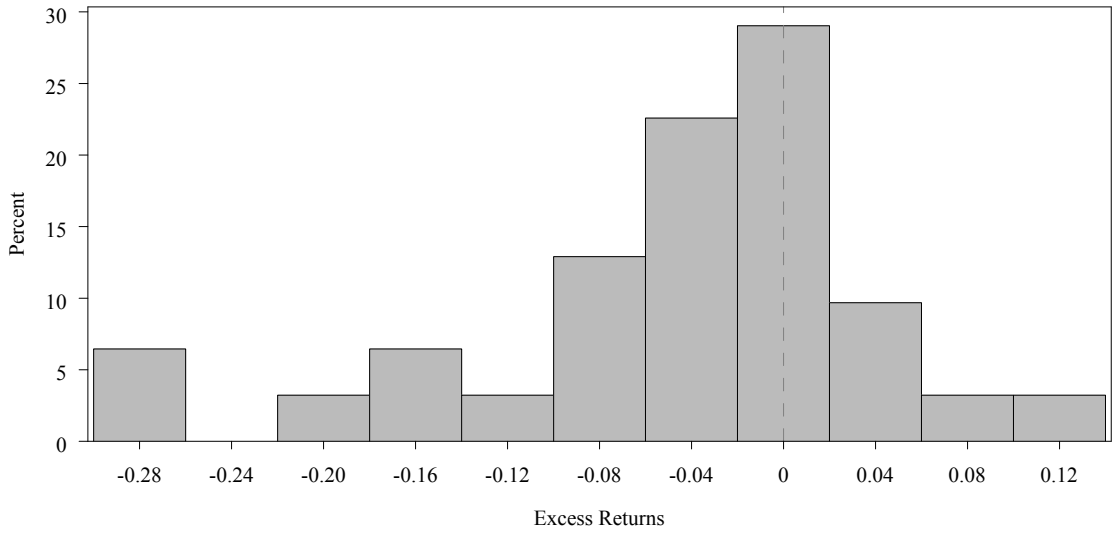


Figure V: Monthly Returns Post-disclosure

This figure presents the histogram of monthly returns from a calendar-time portfolio holding disclosed stocks. Relative to the date of a stock's initial disclosure, the portfolio is long one share of the disclosed stock for each date in the (0,30)-day event window and short one share of the stock's one-digit Industry Classification Benchmark (ICB) sector index. Panel A presents the histogram of the monthly portfolio returns. Panel B presents the monthly portfolio returns in calendar time. Disclosed firms are as defined in the text.

Panel A: Histogram of Returns



Panel B: Monthly Returns in Calendar Time

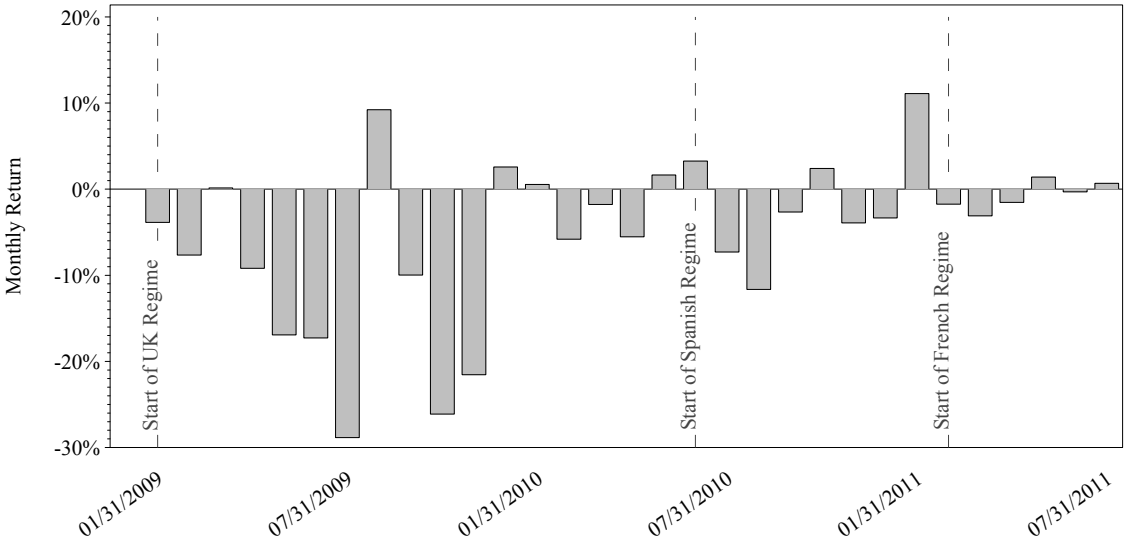


Figure VI: Short Interest Around Rights Issue Announcement

This figure plots the average short interest around a rights issue announcement relative to their matched counterpart over the event window. Firms are matched one trading month prior to the announcement of a rights issue by minimizing the sum of the square differences of share turnover, market capitalization and percentage shares demanded by short sellers. 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. Undisclosed rights issues 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.

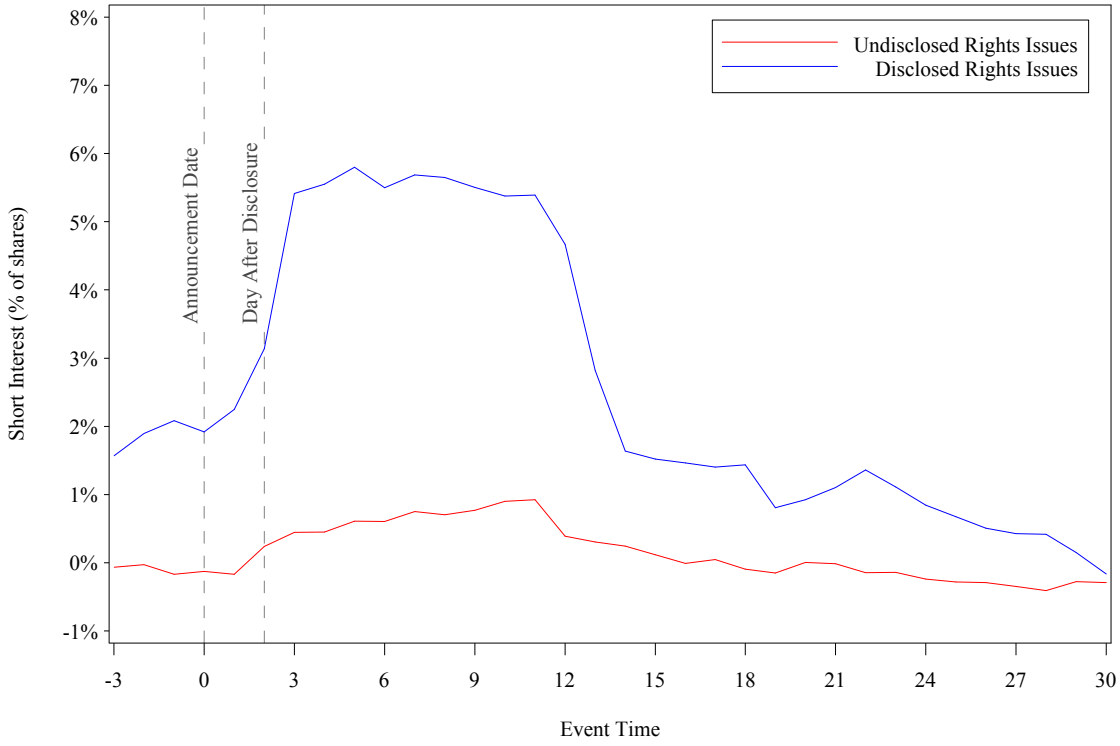


Table I: Summary Statistics of Disclosures by Country

This tables 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, build-up period and unwind period are calculated excluding positions that are still open (above the regulatory threshold). The build-up period is defined as the period between the initial disclosure of the short position and the maximum disclosed position. The unwind period is defined as the period between the maximum disclosed position and the closure of the short position.

	United Kingdom	France	Spain
Number of Positions	502	72	80
Number of Disclosed Firms	81	33	28
Average Number of Positions Per Disclosed Firm	6.20	2.18	2.86
Ratio of Disclosed Firms to Total Firms	0.21	0.04	0.41
Average Disclosures Per Position	1.75	4.54	5.95
Percentage Initiations	57.05	22.02	16.81
Percentage Decreases in Short Interest	22.50	39.76	34.66
Percentage Increases in Short Interest	18.41	38.23	48.11
Average Length of Holding Period	25.23	16.37	52.05
Average Length of Build-up Period	6.10	0.93	14.74
Average Length of Unwind Period	19.13	15.43	37.31
Average Disclosed Short Position	0.47	0.86	0.80
Maximum Disclosed Short Position	9.25	3.91	4.23

Table II: Most Active Disclosers by Country

This table reports the five most active disclosers, as defined by the highest number of disclosed short positions, by country. Number of short positions is the total number of short positions disclosed since the beginning of the disclosure regime. Average short position is the average percent of shares outstanding shorted by a discloser in a particular position.

Discloser	Number of Short Positions	Average Short Position
United Kingdom Disclosers		
Trafalgar Asset Managers Limited	37	0.43%
Millennium Partners, L.P.	20	0.38%
ABC Arbitrage SA	18	0.34%
Lansdowne Partners Limited	14	1.05%
Davidson Kempner International Ltd	13	0.39%
Guevoura Fund Limited	12	0.51%
Davidson Kempner European Partners	11	0.41%
Odey Asset Management LLP	10	0.36%
Highbridge Capital Management, LLC	9	0.29%
GLG Partners LP	8	0.38%
French Disclosers		
BNP Paribas Arbitrage SNC	4	0.89%
Barclays PLC	4	0.66%
Oceanic Hedge Fund	4	0.56%
JABCAP Multi Strategy Master Fund Limited	3	0.82%
AKO Master Fund Limited	2	2.30%
Samana Capital, L.P.	2	1.36%
Lansdowne UK Equity Fund Limited	2	1.11%
Egerton Capital Limited	2	1.02%
Pictet Asset Management SA	2	0.68%
AQR Capital Management, LLC	2	0.68%
Spanish Disclosers		
Amber Capital LP	6	1.25%
Morton Holdings, INC	6	1.13%
Egerton Capital Limited Partnership	4	0.77%
Discovery Capital Management, LLC	4	0.72%
Highbridge Capital Management, LLC	4	0.71%
Marshall Wace LLP	4	0.64%
Eminence Capital, LLC	3	0.77%
Conatus Capital Management LP	3	0.64%
TT International	3	0.62%
Wellington Management Company, LLP	2	1.34%

Table III: Summary Statistics for Disclosed and Control Groups

This tables reports summary statistics for the match criteria and short activity variables for disclosed firms and their matched control. Firms are 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 and percentile short interest. 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 5 percent, 1 percent and 0.1 percent levels respectively. Standard errors are clustered at the firm-level for this test.

	Disclosed Group		Control Group		
	Mean	Std Dev	Mean	Std Dev	Difference in Means
Match Criteria:					
Percentile Market Capitalization	57.3540	28.5185	61.2301	27.3032	−3.8761
Percentile Share Turnover	78.3717	21.3459	76.3451	20.4445	2.0265
Percentile Short Interest	73.2743	26.6268	70.9469	25.2423	2.3274
Short Activity Measures:					
Short Interest	0.0484	0.0393	0.0382	0.0307	0.0102
Percent of Lenders Active	0.5075	0.1647	0.4505	0.1668	0.0570*
Scaled Number of Open Loans	1.0896	2.2711	0.9786	1.4534	0.1110
Concentration of Loans	0.2515	0.1660	0.2776	0.1778	−0.0262
Daily Cost of Borrowing Score	2.1239	1.4087	1.7345	1.1021	0.3894*

Table IV: Abnormal Returns Around Disclosure

This table reports the mean daily abnormal returns from a calendar-time portfolio holding disclosed stocks. Relative to the date of a stock's initial disclosure, the portfolio is long one share of the disclosed stock for each date in the event window and short one share of 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. For the (0,2)-day window, Panel A has 246 observations, Panel B has 96 observations, and Panel C has 174 observations. *, **, and *** denote significance at the 5 percent, 1 percent, and 0.1 percent levels respectively.

Event Window	CAR	Abnormal Return	Std Err
Panel A: Full Sample			
(-30,-3)	−0.0104	−0.0004	0.0015
(-3,-1)	−0.0322	−0.0107**	0.0036
(0,2)	−0.0231	−0.0077**	0.0027
(0,5)	−0.0208	−0.0035*	0.0017
(0,10)	−0.0341	−0.0031**	0.0012
(0,20)	−0.0753	−0.0036***	0.0011
(0,30)	−0.0830	−0.0027***	0.0008
(0,60)	−0.0787	−0.0013*	0.0006
(0,90)	−0.0836	−0.0009	0.0005
Panel B: Rights Issue Subsample			
(-30,-3)	−0.0891	−0.0032	0.0024
(-3,-1)	−0.0688	−0.0229**	0.0080
(0,2)	−0.0355	−0.0118*	0.0053
(0,5)	−0.0286	−0.0048	0.0032
(0,10)	−0.0403	−0.0037	0.0021
(0,20)	−0.1866	−0.0089***	0.0024
(0,30)	−0.1834	−0.0059***	0.0017
(0,60)	−0.1522	−0.0025*	0.0010
(0,90)	−0.1294	−0.0014	0.0009
Panel C: Non-Rights Issue Subsample			
(-30,-3)	−0.0083	−0.0003	0.0021
(-3,-1)	−0.0145	−0.0048	0.0036
(0,2)	−0.0090	−0.0030	0.0027
(0,5)	−0.0054	−0.0009	0.0019
(0,10)	−0.0175	−0.0016	0.0014
(0,20)	−0.0242	−0.0012	0.0012
(0,30)	−0.0427	−0.0014	0.0009
(0,60)	−0.0515	−0.0008	0.0007
(0,90)	−0.0466	−0.0005	0.0006

Table V: Short Activity Around Disclosure

This tables reports the difference-in-difference estimator for stocks with a disclosed short position relative to their matched counterpart over the event window. Firms are 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 and percentile short interest. 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 5 percent, 1 percent and 0.1 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 Sample					
(-3,-1)	−0.0002	0.0182**	−0.0356	0.0038	0.0000
(0,2)	0.0093***	0.0359***	0.0662*	−0.0108	0.2871***
(0,5)	0.0096***	0.0416***	0.0795	−0.0108	0.3069***
(0,10)	0.0109***	0.0526***	0.0812	−0.0158	0.3366*
(0,20)	0.0009	0.0391*	0.0478	−0.0246	0.2178
Panel B: Rights Issue Subsample					
(-3,-1)	−0.0021	0.0219*	−0.0251	−0.0034	−0.0811
(0,2)	0.0193***	0.0555**	0.1211***	−0.0152	0.4595**
(0,5)	0.0168***	0.0653***	0.0953*	−0.0055	0.5135***
(0,10)	0.0195***	0.0745**	0.1200*	−0.0057	0.4324
(0,20)	−0.0114	0.0256	−0.1080	−0.0198	0.3243
Panel C: Non-Rights Issue Subsample					
(-3,-1)	0.0010	0.0161	−0.0417	0.0080	0.0469
(0,2)	0.0035*	0.0245***	0.0344	−0.0083	0.1875
(0,5)	0.0054*	0.0279**	0.0704	−0.0138	0.1875
(0,10)	0.0059	0.0399**	0.0588	−0.0217	0.2813
(0,20)	0.0080	0.0469**	0.1379	−0.0274	0.1563

Table VI: Summary Statistics for Rights Issue Subsample

This tables 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	73.00
Number of Rights Issues in UK	71.00
Number of Rights Issues in France	0.00
Number of Rights Issues in Spain	2.00
Percentage of Rights Issues Completed	82.19
Average Trading Days to Completion	26.74
Percentile Market Capitalization	
Mean	55.45
Std Dev	28.57
5^{th} Percentile	9.00
Lower Quartile	33.00
Median	57.50
Upper Quartile	80.00
95^{th} Percentile	96.00
Discount to Share Price	
Mean	0.4336
Std Dev	0.3279
5^{th} Percentile	0.0149
Lower Quartile	0.3344
Median	0.4926
Upper Quartile	0.5796
95^{th} Percentile	0.7902
Ratio of Rights to Total Shares	
Mean	0.3172
Std Dev	0.4707
5^{th} Percentile	0.0766
Lower Quartile	0.1227
Median	0.1883
Upper Quartile	0.3038
95^{th} Percentile	0.7943

Table VII: 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 5 percent, 1 percent, and 0.1 percent levels respectively.

	Specification 1		Specification 2		Specification 3	
	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Panel A: (0,5) CAR						
Intercept	−0.0312	0.0189	−0.0312	0.0190	−0.0546	0.0333
Disclosed	0.0296	0.0378	0.0166	0.0403	0.0202	0.0468
# of Follow-on Disclosures			0.0077	0.0132	0.0066	0.0133
Ratio of Rights to Total Shares					0.0023	0.0205
Discount to Share Price					0.0412	0.0486
Panel B: (0,20) CAR						
Intercept	−0.0461	0.0366	−0.0461	0.0368	−0.0117	0.0683
Disclosed	−0.1820**	0.0559	−0.0597	0.0576	0.0262	0.0658
# of Follow-on Disclosures			−0.0275**	0.0081	−0.0224**	0.0076
Ratio of Rights to Total Shares					−0.0261	0.0649
Discount to Share Price					−0.2705*	0.1056
Panel C: (0, Completion) CAR						
Intercept	−0.0582	0.0639	−0.0582	0.0644	−0.1120	0.0956
Disclosed	−0.1657*	0.0741	−0.0692	0.0763	−0.0305	0.0702
# of Follow-on Disclosures			−0.0173*	0.0078	−0.0188*	0.0094
Ratio of Rights to Total Shares					−0.1023	0.0529
Discount to Share Price					0.0880	0.2267

Table VIII: Short Activity Around Rights Issue Announcement

This tables reports the difference-in-difference-in-difference (DDD) estimator for stocks with a rights issue announcement and a disclosed short position relative to their undisclosed counterparts over the event window. Firms are 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 and percentile short interest. 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. Undisclosed rights issues 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. 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 5 percent, 1 percent and 0.1 percent levels respectively.

Window	Short Interest	Percent of Lenders Active	Scaled Number of Open Loans	Concentration of Open Loans	Daily Cost of Borrowing Score
(-3,-1)	0.0062	0.0113	0.0455^{*}	-0.0151	-0.1810
(0,2)	0.0086	0.0445	0.0945^{*}	0.0065	0.3143
(0,5)	0.0314^{**}	0.0850^{*}	0.2517^{***}	-0.0669	0.7714^{*}
(0,10)	0.0243^{*}	0.1194^{**}	0.2484^{***}	0.0138	0.9143^{*}
(0,20)	-0.0100	0.1156^{*}	-0.1020	-0.0826	0.6333

Table IX: Likelihood of the Disclosure of a Short Position

This table reports the parameter estimates 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. $\text{Disclosure}_{\{t-i,t-i-k\}}$ 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. Money Center 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. Additional controls (unreported) include short interest on day $t-1$, trading volume on day $t-1$, 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 5 percent, 1 percent and 0.1 percent levels respectively.

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect
Panel A: Full Sample								
(Baseline Probability = 0.0010)								
$\text{Disclosed}_{\{t-1,t-5\}}$	1.492^{***}	0.0018	0.630^{***}	0.0008	1.261^{***}	0.0016	0.818^{***}	0.0010
$\text{Disclosed}_{\{t-6,t-30\}}$	0.363^{***}	0.0004	-0.022	-0.0000	0.162	0.0002	-0.017	-0.0000
$\text{Disclosed}_{\{t-1,t-5\}} \times$ AUM			0.071^{***}	0.0001				
$\text{Disclosed}_{\{t-6,t-30\}} \times$ AUM			0.082^{***}	0.0001				
$\text{Disclosed}_{\{t-1,t-5\}} \times$ MoneyCtr					0.279	0.0003		
$\text{Disclosed}_{\{t-6,t-30\}} \times$ MoneyCtr					0.297^{*}	0.0004		
$\text{Disclosed}_{\{t-1,t-5\}} \times$ Centrality							1.569^{***}	0.0019
$\text{Disclosed}_{\{t-6,t-30\}} \times$ Centrality							2.364^{***}	0.0029

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

	Specification 1		Specification 2		Specification 3		Specification 4	
	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect	Estimate	Marginal Effect
Panel B: Rights Issue Subsample (Baseline Probability = 0.0029)								
$\text{Disclosed}_{\{t-1,t-5\}}$	1.338^{***}	0.0051	0.476^{**}	0.0018	1.048^{***}	0.0040	0.652^{***}	0.0024
$\text{Disclosed}_{\{t-6,t-30\}}$	0.309^{***}	0.0012	-0.183^{**}	−0.0007	0.393^{**}	0.0015	-0.217^{**}	−0.0008
$\text{Disclosed}_{\{t-1,t-5\}} \times$ AUM			0.080^{***}	0.0003				
$\text{Disclosed}_{\{t-6,t-30\}} \times$ AUM			0.082^{***}	0.0003				
$\text{Disclosed}_{\{t-1,t-5\}} \times$ MoneyCtr					0.382	0.0014		
$\text{Disclosed}_{\{t-6,t-30\}} \times$ MoneyCtr					−0.101	−0.0004		
$\text{Disclosed}_{\{t-1,t-5\}} \times$ Centrality							1.794^{***}	0.0067
$\text{Disclosed}_{\{t-6,t-30\}} \times$ Centrality							2.403^{***}	0.0089
Panel C: Non-Rights Issue Subsample (Baseline Probability = 0.0007)								
$\text{Disclosed}_{\{t-1,t-5\}}$	1.412^{***}	0.0012	0.721^{***}	0.0006	1.323^{***}	0.0011	0.948^{***}	0.0008
$\text{Disclosed}_{\{t-6,t-30\}}$	0.382^{***}	0.0003	0.100	0.0001	0.011	0.0000	0.090	0.0001
$\text{Disclosed}_{\{t-1,t-5\}} \times$ AUM			0.053^{**}	0.0000				
$\text{Disclosed}_{\{t-6,t-30\}} \times$ AUM			0.071^{***}	0.0001				
$\text{Disclosed}_{\{t-1,t-5\}} \times$ MoneyCtr					0.068	0.0001		
$\text{Disclosed}_{\{t-6,t-30\}} \times$ MoneyCtr					0.581^{***}	0.0005		
$\text{Disclosed}_{\{t-1,t-5\}} \times$ Centrality							1.054	0.0009
$\text{Disclosed}_{\{t-6,t-30\}} \times$ Centrality							2.205^{***}	0.0019