Geographic Proximity in Short Selling*

Xiaolin Huo† , Xin Liu‡ and Vesa Pursiainen§

July 2021

Abstract

Geographic proximity is associated with significantly higher returns from short selling in the UK. Short trades by funds with offices near the target firm headquarters are followed by significantly larger negative abnormal returns. The effect of geographic proximity is stronger for stocks that are smaller, more volatile, and less actively covered be sellside analysts. Short trades are also correlated geographically, with geographically proximate institutions more likely to short the same stocks. Proximity matters less for large trades and for trades following more proximate funds' trades. Geographically closer short trades predict more negative earnings surprises. Covering of short positions by more geographically proximate funds is followed by more positive abnormal stock returns.

JEL classification: D82, G12, G14, G15, G23

Keywords: short selling, geography, information, investor performance, hedge funds

*We appreciate the helpful comments from Jerry Coakley, Claire Yurong Hong, Shiyang Huang, Marcin Kacperczyk, Jonathan Karpoff, Markus Leippold, Tse-Chun Lin, Ruichang Lu, Hanwen Sun, Thanos Verousis, Xianzhi Yuan, and Yiyuan Zhou, as well as the seminar participants at Renmin University of China and the conference participants at EFiC 2021 Conference in Banking and Corporate Finance 2021, China International Risk Forum 2021, and International Young Finance Scholars' Conference 2021. All errors are ours.

†Renmin University of China. E-mail: hxl7728@ruc.edu.cn

‡Renmin University of China. E-mail: xinl@ruc.edu.cn

§University of St. Gallen. E-mail: vesa.pursiainen@unisg.ch

1 Introduction

Geographic proximity can be associated with informational advantage. Nearby equity analysts tend to be more accurate than distant or foreign ones, while households, professional traders and mutual funds generate higher returns from local holdings relative to nonlocal holdings, suggesting that investors can exploit local knowledge.[1] While short sellers are typically considered some of the most sophisticated market participants, there is less direct evidence on the role of local information in short trades. Teo (2009) finds that Asia-focused hedge funds with an office in their investment region perform better than their non-present peers. But like most existing hedge fund studies, his study is based on fund-level returns, as the individual positions are usually not observable. For the same reason, studies of short sellers' information typically focus on the role of aggregate firm-level short interest in predicting firm new and stock returns.[2]

In this paper, we study the returns of institutional investors' short positions in the United Kingdom. We construct a comprehensive dataset of short positions using data from the WRDS European Short Data database. This allows us to study individual short positions directly and observe within-investor and within-firm differences. We match these data with institutional investor and fund data from Preqin and firm data from Compustat Global. For each short trade, we observe the office locations of the shorting investor (typically a hedge fund) and the firm's headquarter location. Hence, we can study the role of geography in much more detail than has been done in prior studies, given we can compare the same investor's short positions in more and less geographically proximate firms. Similarly, we can compare different investors in the same stock. Given London is home to the vast majority of European hedge funds and many of the shorted UK stocks, we perform our analysis for

[1] On equity analysts, see Malloy (2005) and Bae, Stulz, and Tan (2008). On households, see Ivković and Weisbenner (2005), on professional traders, Hau (2001), and on mutual funds, Coval and Moskowitz (1999, 2001).

[2] Two notable exceptions are von Beschwitz, Lunghi, and Schmidt (2021), who study transaction data from long-short equity hedge funds and find that hedge funds exhibit skill in both long and short positions, and Choi, Park, Pearson, and Sandy (2020), who find that short trades covered within very short time windows are profitable but those kept open longer are not.

both London-based stocks only as well as the full UK sample.

We calculate the cumulative abnormal stock returns around each short trade and find that short trades are followed by negative average abnormal stock returns. This suggests that short sellers possess valuable information. The negative abnormal returns persist for relatively long periods but are largest in the first approximately 20 days following the short trade and start levelling out after that. This finding is consistent with a large literature suggesting that aggregate short interest predicts stock returns (see, e.g., Desai, Ramesh, Thiagarajan, and Balachandran, 2002; Cohen, Diether, and Malloy, 2007; Rapach, Ringgenberg, and Zhou, 2016) and contrasts the findings of Chakrabarty, Moulton, and Trzcinka (2017), who find that the majority of short-term institutional (long) trades by mutual funds lose money. Our results are also consistent with those of Choi et al. (2020) and von Beschwitz et al. (2021) on hedge fund short trades in the US.

We find that the negative abnormal returns are significantly larger for investors that have an office near the firm headquarters. Plotting the short trade returns for different geographic distances between the investor and the firm, it is clearly visible that for stocks less than 5 km away from the investor office, the abnormal stock returns are substantially more negative in the days following the trade. Furthermore, the negative abnormal returns persist longer for very proximate short trades. Our regression analysis for London-based trades suggests that the cumulative abnormal returns for the first 20 trading days following a short trade are approximately 1.7 percentage point more negative for investors that have an office less than 2.5km away from the shorted firm's headquarters than for investors more than 5km away.

If the relationship between short returns and geographic distance is driven by information asymmetry, we might expect this effect to be larger for firms where the information asymmetry is likely to be larger. To explore this, we divide all firms in our sample into two groups based on (1) market capitalization, (2) stock volatility, and (3) the frequency of analyst estimate revisions. Intuitively, small and volatile stocks are likely to have more information asymmetry. The same is true of firms where analysts are less active in providing

information. Hence, we might expect to find a stronger relationship between geographic distance and short returns in these subsamples.

Our results are consistent with this prediction. The estimated effect of distance is significantly larger for small, volatile and less frequently covered stocks. For small stocks in the London sample, short trades where the investor is less than 2.5 km away from the target are followed by 3.5 percentage points more negative abnormal returns than trades where the distance is above 5 km. This difference is both economically large and statistically significant. The same estimate decreases to 0.7 percentage points and is not statistically significant in the subsample of large stocks. The patterns are similar when dividing the sample based on stock volatility or analyst revision frequency. These findings suggest that geographic distance is particularly important in information dissemination when the target firms are more opaque and there is generally less information available.

Having explored the information advantage in trading geographically proximate stocks, we then explore whether such information advantage transmits across institutions. To test this, we examine whether geographically close institutions exhibit similar trading patterns. We construct a trade-fund-pair-level sample and study to what extent short trades are likely to be followed by the same trades by other funds, and whether that likelihood is different depending on the distance between the two funds. We find that geographically proximate funds are significantly more likely to short the same stocks. This effect is strongest for institutions located within 0.5km from each and decreases as the distance between two funds increases. This is consistent with information being transmitted between geographically proximate investors.

Motivated by the information transmission across institutions, we examine the role of locations in follow-on trades where the same stock has been shorted by others in the preceding 20 days. For each short trade, we compute the total dollar short volume in the prior 20 days for the stock and divide our sample of short trades into low and high prior short volume trades. We also calculate the percentage of prior short volume by funds located near the

target headquarters. We find that in trades where there is little prior short volume, the short seller's own proximity to target is an important determinant of short returns. In contrast, for trades with higher preceding short volume, the location of the prior short sellers matters more than the current trader's location. This suggests that by following others' trades, short sellers can exploit other short sellers' proximity to the target firm.

Next, we examine the relationship between short trade returns and the size of the trade. We calculate the size of each short trade in GBP and find that there is a significant negative relationship between trade size and the abnormal stock return following the trade. This suggests that larger short trades are generally more profitable – possibly reflecting the fund's confidence in the trade. Furthermore, geographic proximity matters substantially more for smaller trades. This could mean that short sellers generally do large trades only when they are confident enough, and in the sample of larger trades, geography matters less since the fund in any case does them only when it has good-quality information.

To obtain more direct evidence of the information content in short trades by geographically proximate investors, we study company earnings surprises. We compute earnings surprises as the difference in EPS between two consecutive fiscal years, divided by stock price, and find that short sales by geographically close institutions are followed by significantly more negative earnings surprises, even when controlling for general short selling in the stock. This finding provides further evidence that geographic proximity is associated with an information advantage.

Finally, if new short trades (i.e., new or increased short positions) are followed by negative abnormal returns, we might expect the opposite for closing of short positions. A weakness of our data is that we cannot see the time when a short position is exited completely, as full exit takes the position to a level that does not require regulatory reporting. However, we can see trades that reduce short interest while still keeping the position above the reporting threshold. We calculate 20-day cumulative abnormal returns following all such trades and perform a regression analysis similar to our main short trade returns analysis. The results

mirror those on opening short positions. Covering of short positions by geographically proximate funds is followed by significantly more positive abnormal stock returns. In the London sample, covering of a short position by a fund less than 2.5 km away from the target firm is followed by 2.3 percentage points more positive abnormal stock returns than covering by a fund more than 5 km away. This difference is statistically significant and economically even larger than the difference when opening short positions. This finding is also consistent with geographic proximity being associated with an information advantage.

Our study makes several important contributions. First, we add to the literature on short interest as a predictor of stock returns and the nature of information that short sellers may have (e.g., Desai et al., 2002; Cohen et al., 2007; Rapach et al., 2016; Boehmer, Duong, and Huszár, 2018; von Beschwitz et al., 2021). Our findings suggest that geographic proximity plays an important role in short sellers' information acquisition.

We also contribute to the literature on the role of geography and distance in information dissemination in the financial markets (e.g., Malloy, 2005; Bae et al., 2008; Ivković and Weisbenner, 2005; Hau, 2001). Our study will provide the first evidence on the role of location in short selling and for hedge funds more generally. The closest existing study is that by Teo (2009), who finds that Asia-focused hedge funds with an office in their investment region perform better than their non-present peers. Our setting enables much more detailed analysis of hedge funds' short trades using micro-level differences in locations.

Our results should also be of interest to both regulators as well as practitioners as they have the potential to shed light to some of the channels through which short sellers obtain firm-specific information.

2 Literature review

2.1 Short interest, information, and stock returns

There is a large literature documenting that short interest predicts stock returns, both cross-sectionally and in aggregate. Desai et al. (2002) find that heavily shorted firms in the Nasdaq market experience significant negative abnormal returns. Cohen et al. (2007) isolate shifts in the supply and demand for shorting and find that an increase in shorting demand leads to negative abnormal returns of 2.98% in the following month. Rapach et al. (2016) argue that short interest is the strongest known predictor of aggregate stock returns. They conclude that short sellers are informed traders who are able to anticipate future aggregate cash flows and associated market returns.

Asquith, Pathak, and Ritter (2005) find that short-sale constrained stocks, measured using short interest and institutional ownership, underperform significantly on an equally weighted basis. Au, Doukas, and Onayev (2009) find a negative relation between short interest and returns among high idiosyncratic risk stocks and that short selling activity is mostly concentrated in low idiosyncratic risk stocks where it is less costly to arbitrage fundamental risk. Boehmer, Jones, and Zhang (2008) show evidence that there are differences in the level of information between different types of short sellers. Karpoff and Lou (2010) find evidence that short sellers anticipate the eventual discovery and severity of financial misconduct.

Christophe, Ferri, and Angel (2004) find that abnormal short selling is significantly linked to post-announcement stock returns. They take that as evidence of informed trading. Engelberg, Reed, and Ringgenberg (2012) dispute that interpretation. They find that the negative relation between short sales and future returns is significantly larger on company news release days and interpret that as evidence that a substantial portion of short sellers' trading advantage comes from their ability to analyze publicly available information. Similarly, Boehmer, Jones, Wu, and Zhang (2020) find that fundamental event days account for

over 24% of the overall underperformance of heavily shorted stocks. They also find evidence that short sellers use both public news and private information to anticipate news regarding earnings and analyst actions.

Boehmer et al. (2018) find that short covering trades also predict positive stock returns. Aitken, Frino, McCorry, and Swan (1998) study price reactions to short trades and find an immediate reaction to short trades within the first 15 minutes.

2.2 Geography, information, and home bias

Geographic proximity is often associated with informational advantage. Malloy (2005) shows evidence that geographically proximate sell-side equity analysts are more accurate than other analysts. Bae et al. (2008) show the same for analysts residing in the same vs. different country. Ivković and Weisbenner (2005) find that households generate higher returns from local holdings relative to nonlocal holdings, suggesting that local investors can exploit local knowledge.Hau (2001) finds similar home country advantage for professional traders trading German stocks. Chen, Gompers, Kovner, and Lerner (2010) find that venture capital firms based in locales that are venture capital centers outperform, but driven by investments that are not near the venture capital firms' office locations.Coval and Moskowitz (1999) and Coval and Moskowitz (2001) find that mutual funds exhibit home bias in their portfolios, and that they outperform in nearby investments.

Audretsch and Feldman (1996) study R&D activity and find evidence of the role of geography in information spillovers. Becker (2007) find evidence of geographic segmentation in US bank loan markets. Lin and Viswanathan (2016) show evidence of a home bias in marketplace loans. Choe, Kho, and Stulz (2005) find that domestic investors have an edge over foreign investors in trading domestic stocks, explained by prices moving against foreign investors before their trades.

3 Data and methodology

3.1 Short positions

To observe institutional investors' short positions, we use the WRDS European Short Data, encompassing all significant short positions reported by institutional investors under the EU236 Rule. The EU236 Rule is a regulation introduced by the European Securities and Markets Authority (ESMA) in the aftermath of the global financial crisis of 2008. Effective from November 2012, this EU-wide reporting regulation aims to improve the transparency of short selling activities conducted by institutional investors and to increase market stability through mandatory daily reporting by institutional investors. According to the regulation, significant net short positions in shares must be i) reported to the relevant competent authorities when they at least equal to 0.2% of company issued share capital and every 0.1% above that, and ii) disclosed to the public when they at least equal to 0.5% of company issued share capital and every 0.1% above that. The dataset covers 19 European markets.[3]

We focus on the short selling activities in UK. This is because i) the majority of the European short selling activity is on stocks listed on the London Stock Exchange, ii) most of the institutions covered in the dataset have a UK office, and iii) UK postcodes have one-to-one mapping to georaphic coordinates, enabling us to compute the precise distance between two addressses. Short sales in the UK market must be reported in a timely fashion. According to the Financial Conduct Authority, significant net short positions should be sent by 3.30 pm on the trading day after the day the position was reached.[4] Hence, we are able to identify daily short selling activity through changes in the reported net short positions.

If an institution has more than one short position record for a stock in a day, we keep the last record as the end-of-the day position. If a short position is recorded on a non-trading day, we adjust the record date to the ensuing trading day. For each institution and each

[3]The markets included in the data are Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Spain, Sweden, and UK.

[4]https://www.fca.org.uk/markets/short-selling/notification-and-disclosure-net-short-positions

stock on a reporting day, we compare the short position reported with that on the previous reporting day. If the short position increases, we record a short selling transaction at the end of this reporting day.

3.2 Fund and firm locations

We obtain institutional investors' office locations from Preqin. We include all European investment-related offices based on institution types and manager job titles.[5] The data include office addresses and zip codes. To get locations of the shorted stocks, we identify the location of each listed firm based on its headquarter location from Compustat Global.

Because each UK zip code uniquely identifies a specific geographic location (i.e., a building, instead of an area), we can get the precise coordinates of each office based on the zip code and use those to calculate the physical distance between two offices, as well as other geographic variables. We obtain coordinates for all UK zip codes from the National Statistics Postcode Lookup (NSPL).[6]

Panel A of Figure 1 shows the fund office and target firm headquarter locations for the full UK sample. We see that the vast majority of funds is located in London, while Manchester and Edinburgh also have some short sellers' offices. The target firms are more evenly spread across the country. Panel B shows the locations within central London. Short sellers are mostly concentrated in and around two areas of London, Mayfair and the City of London. Central London also includes the headquarters of a large number of shorted target firms in our sample.

[5]Many fund management firms have purely administrative offices which are not involved in the actual investment decisions.

[6]This is an open database that can be accessed online: https://opendata.camden.gov.uk/Maps/National-Statistics-Postcode-Lookup-UK-Coordinates/77ra-mbbn.

3.3 Stock returns and accounting data

We obtain all stock-level data, including stock returns and accounting variables, from Compustat Global, using stocks' International Securities Identification Number (ISIN) codes. We obtain Fama and French (1993) three factors and the Carhart (1997) momentum factor for the UK market from EUROFIDAI. We define daily abnormal return as the daily four-factor adjusted returns. More specifically, for daily returns from month t, we first run a regression using daily returns from month $t-6$ to month $t-1$. We compute daily four-factor adjusted returns in month t using the betas from this regression, together with the daily four factors from month t.

4 Returns on short trades

4.1 Overview of the sample

To examine the role of geographic proximity on the returns from short selling, we construct a sample of all short trades in UK-based companies. For each short selling transaction, we define the record date or the ensuing trading day as the event day ($t = 0$), and track the stock's subsequent cumulative abnormal return (CAR) over the next 20-trading-day window. Daily abnormal return is computed as the four-factor-adjusted return using betas estimated from the past six months. For each trade, we calculate the geographic distance between the short seller and the target firm. Figure 2 shows the distribution of this distance.

Table 1 shows summary statistics for both the London sample and the UK sample. The average 20-day abnormal stock return for the the short trades in the London (UK) sample is negative 0.39% (0.13%). This suggests that the average short trade is "profitable" in that it generates a positive abnormal return for the short seller. The standard deviation of the abnormal returns for the London (UK) sample is 9.80% (9.56%), which means that there is substantial variation among the profitability of short trades. The average distance between

the short seller and the target firm headquarters for the London (UK) sample is 3.24km (104.70km), while the median is 2.81km (29.34km). In the London (UK) sample, 43.5% (20.0%) of the short trades are within a distance of less than 2.5km (1.55 miles) and 42.1% (19.3%) are within 2.5km - 5km.

4.2 Returns analysis

We begin our analysis of short trade returns by plotting the average CAR by geographic distance, shown in Figure 3. Both the London sample and the UK sample suggest that, even though the firms being shorted have a negative subsequent stock performance on average, this varies substantially depending on geographic proximity. The returns for geographically proximate short trades are clearly more negative. For example, in the London sample, the cumulative abnormal return in the next 20 days following a short trade from a institution with distance closer than 2.5km to the firm is about -1%, while this number is only about -0.25% for short trades by institutions with distance between 2.5km and 5km. For institutions further than 5km from the firms they short, the subsequent abnormal stock returns are slightly positive on average. This suggests that the average short trades are profitable only for investors shorting nearby stocks. These patterns are similar within the UK sample as well. The magnitude of negative returns following a short trade monotonically decreases with geographic distance.

To further test these relationships, we conduct the following regression:

$$\begin{aligned} CAR[1,20]_{i,f,t} = \alpha_{i,f,t} + \beta_1 \cdot \textit{Distance below 2.5km}_{i,f} + \beta_2 \cdot \textit{Distance 2.5 - 5km}_{i,f} + \\ \gamma \cdot Controls_{i,t} + \sigma_i + \phi_f + \delta_t + \varepsilon_{i,f,t}. \end{aligned} \tag{1}$$

The dependent variable is the cumulative abnormal return for stock i from day 1 to day 20, where day 0 is the day when the institution f shorts the stock. We define *Distance below 2.5km* as a dummy variable that equals one if the distance between the short-selling

institution is within 2.5km from the headquarter of the firm, and zero otherwise. *Distance 2.5 - 5km* is defined in a similar fashion. We include the following control variables: (1) *ln(Market cap)*, the natural logarithm of the market capitalization; (2) *Market-to-book ratio*, the ratio of market value of equity to book value of equity; (3) *Past return (t-1)*, the return from the previous month; (4) *Past return (t-12, t-2)*, the return from the past 12 months, excluding the most recent month; (5) *Asset growth*, the annual growth rate of total assets; (6) *Volatility*, the standard deviation of daily stock returns in the previous month (in percentage). Depending on the specification, we include stock, fund, and time fixed effects to control for any stock- or fund-specific factors as well as market timing.

The results, shown in Table 2, are consistent with Figure 3. The post-short-selling abnormal stock return is more negative when the distance between the firm and the institution is lower. Panel A shows this result using dummies indicating distances below 2.5 km and between 2.5 and 5 km, relative to trades with higher distances. Panel B shows the same analysis but including the natural logarithm of the distance as a continuous variable. In both panels, the effect between distance and post-short-selling performance is stronger within the London sample.

To further explore the relationship between short returns and distance, we divide our London sample into quintile groups based on the distance between the short seller and the target firm. In Panel A of Figure 4, we first plot the average CAR from each quintile. The average CAR monotonically increases with distance, consistent with our earlier results showing that nearby short trades are more profitable.

In Panel B, we perform a regression analysis including the same controls as in Table 2 with distance quintile dummies and plot the estimated coefficients. We exclude the dummy indicating quintile 5, so the estimated coefficients are relative to the most distant quintile. The pattern looks very similar to Panel A, showing that the monotonic relation between distance and CAR is robust to including the full set of control variables.

4.3 Stock characteristics and short returns

If the relationship between short returns and geographic distance is driven by information asymmetry, we might expect this effect to be larger for firms where the information asymmtery is likely to be larger. To explore this, we divide all firms in our sample into two groups based on: (1) market capitalization, (2) stock volatility, and (3) the frequency of analyst estimate revisions. Intuitively, small and volatile stocks are more like to have information asymmetry. The same is true for firms where analysts are less active in providing information. Hence, we might expect to find a stronger relationship between geographic distance and short returns in these subsamples. To test this, we repeat the main regression analysis shown in Table 2 using these subsamples.

The results are shown in Table 3. Consistent with our prediction, the estimated effect of distance is significantly larger for small, volatile and less frequently covered stocks. For small stocks in the London sample, short trades where the institution is less than 2.5 km away from the target are followed by 3.5 percentage points more negative abnormal returns than trades where the distance is above 5 km. This difference is both economically large and statistically significant. The same estimate decreases to 0.7 percentage points and is not statistically significant in the subsample of large stocks. The patterns are similar when dividing the sample based on stock volatility or analyst revision frequency. These findings suggest that geographic distance is particularly important in information dissemination when the target firms are more opaque and there is generally less information available.

5 Additional analysis

5.1 Correlated short selling and stock returns

The analysis above studies whether institutions have information advantage in trading geographically close firms. In this section, we explore whether information advantage transmits

across institutions. To test this, we examine whether geographically close institutions exhibit similar trading patterns.

For every short selling on a stock conducted by an institution in our sample, we track all short sales from all other institutions reported in the next 20 trading days. We pair this institution with each of the institutions with short selling in this window, and define a dummy variable, *Same trade*, that equals one if the other institution in the pair also shorts the same stock. Since each institutions can have multiple office locations, we compute the minimum distance between two institutions' office locations as the proxy for geographic proximity between two institutions. Since many institutions are located very close to each other, we define an additional *Distance below 0.5km* dummy variable that equals one if the distance between two institutions is within 0.5km. Similarly, *Distance 0.5 - 2.5km* is a dummy variable that equals one if the distance between two institutions is within (0.5km,2.5km], and zero otherwise. The 0.5km and 2.5km cutoffs roughly represents the 25th and 50th percentiles from the distribution of institutions' geographic proximity among each other. We then perform a regression analysis of *Same trade* on the distance dummies, together with stock controls and various fixed effects.

We report the results in Table 4. Geographic proximity is associated with significantly higher likelihood of getting into the same short trades. This result is robust to including fund-stock-pair fixed effects for both funds in the fund-pair, as well as year-month fixed effects to control for market timing. In the London sample, the likelihood of the same trade is nearly 20% higher for institutions located within 0.5km from each other than if the distance is more than 2.5km.

A natural extension based on these results is to examine whether stock returns following short trades depend on previous short selling records. Therefore, for each short trade, we compute the total GBP short volume in the prior 20 days for the stock, and divide our samples into Low vs. High based on its median value. To explore the geographic proximity in the past trading records, we define *Volume below 2.5km* as the percentage of prior dollar

short volume from institutions located within 2.5km from the firm headquarters. We re-run our baseline analysis in both low and high prior short trade subsamples.

The results, shown in Table 5, include two patterns. First, in addtion to the relation between geographic proximity and the subsequent stock return, previous short selling intensity from geographically close institutions, as proxied by *Volume below 2.5km*, also significantly and negatively predicts the subsequent stock return of a short trade. Second, the relation between geographic proximity and the subsequent stock return following a short trade is conditional on previous short selling intensity from closed by institutions. When the prior GBP short volume from closed by institution is low, geographically close institutions' short trades (i.e., first movers) significantly and negatively predicts the subsequent stock return. However, when the prior GBP short volume from closed by institutions is high, geographic proximity does not have an effect on the subsequent stock return following a short trade (i.e., the followers do not exhibit informational advantage). Overall, these two asymmetric patterns suggest that (1) first movers' short profits mainly depend on their geographic proximity; (2) followers' short profits mainly depend on the geographic proxmity of the trader that they follow.

5.2 Trade size and stock returns

In this section, we examine the relationship between short trade returns and the size of the trade. We calculate trade size in GBP and add it to our baseline return regression. We also further divide our samples into large and small trades based on the median value.

The results are shown in Table 6. In addition to the relation between geographic proximity and the subsequent stock return, there is a significant negative relationship between trade size and the abnormal stock return following the trade. This suggests that larger short trades are generally more profitable – possibly reflecting the short seller's confidence in the trade. Furthermore, the subsample analysis shows that geographic proximity matters substantially more for smaller trades. This could mean that short sellers generally do large trades only

when they are confident enough, and in the sample of larger trades geography matters less since short sellers in any case does them only when it has good-quality information.

5.3 Earnings surprises and short selling

To study the relationship between distance and information more directly, we examine whether short sales by close-by institutions are better at predicting negative earnings announcements. We compute earnings surprises as the difference in EPS between two consecutive fiscal years, divided by the stock price. We define *Short (Distance below 2.5km)* as a dummy variable that equals one if the stock has been shorted by any institutions within 2.5km radius of its headquarter in the 30-trading day window before the earnings announcement. To control for the aggregate short selling from the market, we also define *Short* as a dummy variable that equals one if the stock has been shorted in the 30-trading day window before the earnings announcement. We run panel regressions of earnings surprises on these two dummy variables, together with other stock controls, stock, and time fixed effects, and report the results in Table 7.

Table 7 suggests that short sales from closed by institutions right before earnings announcements indeed negatively predict earnings outcomes. For example, column (2) of Table 7 reports a coefficient of -0.010 (t-value=-2.50) on *Short (Distance below 2.5km)*. For reference, the average earnings surprise in the London sample is about -0.005. Therefore, closed by institutions' short selling is associated with doubled negative earnings surprise relative to the mean. Similar results are also obtained in the UK sample.

In the Internet Appendix, we provide some robustness results based on different event windows. We examine short sales from a 15-day window and a 60-day window before earnings announcements, and find results consistent with what we have reported in Table 7. These results further confirm the information channel of geographically-linked short selling, and show that our results are robust across different specificaitons.

5.4 Returns following covering of short positions

If new short trades (i.e., new or increased short positions) are followed by negative abnormal returns, we might expect the opposite for closing of short positions. A weakness of our data is that we cannot see the time when a short position is exited completely, as full exit takes the position to a level that does not require regulatory reporting. However, we can see trades that reduce short interest while still keeping the position above the reporting threshold. We calculate 20-day cumulative abnormal returns following all such trades and perform a regression analysis similar to our main short trade returns analysis.

The results, shown in Table 8, mirror those on opening short positions. Covering of short positions by geographically proximate funds is followed by significantly more positive abnormal stock returns. In the London sample, covering of a short position by a fund less than 2.5 km away from the target firm is followed by 2.3 percentage points more positive abnormal stock returns than covering by a fund more than 5 km away. This difference is statistically significant and economically even larger than the diffence when opening short positions. This finding is also consistent with geographic proximity being associated with an information advantage.

6 Conclusion

We find evidence of geography playing an important role in short selling. Geographic proximity between the fund and the target stock is associated with significantly more negative abnormal stock returns following a short trade – translating into higher returns for the short seller. Correspondingly, covering of short positions by geographically more proximate funds is associated with more positive subsequent abnormal stock returns. These results suggest that hedge funds are generally better at shorting close-by stocks, which in turn implies that geographic proximity may provide an important information advantage. As one might expect, geographic proximity appears more important when the shorted stocks are more

opaque.

Our findings on the clustering of short trades between funds located near each other suggests that information is also disseminated between different funds. This suggests that the proximity to both target firms as well as to other short seller funds can be an important determinant of success for a short seller.

References

Aitken, Michael J., Alex Frino, Michael S. McCorry, and Peter L. Swan, 1998, Short sales are almost instantaneously bad news: Evidence from the Australian Stock Exchange, *Journal of Finance* 53, 2205–2223.

Asquith, Paul, Parag A. Pathak, and Jay R. Ritter, 2005, Short interest, institutional ownership, and stock returns, *Journal of Financial Economics* 78, 243–276.

Au, Andrea S., John A. Doukas, and Zhan Onayev, 2009, Daily short interest, idiosyncratic risk, and stock returns, *Journal of Financial Markets* 12, 290–316.

Audretsch, David B., and Maryann P. Feldman, 1996, R&D spillovers and the geography of innovation and production, *American Economic Review* 86, 630–640.

Bae, Kee-Hong, René M. Stulz, and Hongping Tan, 2008, Do local analysts know more? a cross-country study of the performance of local analysts and foreign analysts, *Journal of Financial Economics* 88, 581–606.

Becker, Bo, 2007, Geographical segmentation of US capital markets, *Journal of Financial Economics* 85, 151–178.

Boehmer, Ekkehart, Truong X. Duong, and Zsuzsa R. Huszár, 2018, Short covering trades, *Journal of Financial and Quantitative Analysis* 53, 723–748.

Boehmer, Ekkehart, Charles M Jones, Juan (Julie) Wu, and Xiaoyan Zhang, 2020, What do short sellers know?, *Review of Finance* Forthcoming.

Boehmer, Ekkehart, Charles M Jones, and Xiaoyan Zhang, 2008, Which shorts are informed?, *Journal of Finance* 63, 491–527.

Carhart, Mark M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57–82.

Chakrabarty, Bidisha, Pamela C. Moulton, and Charles Trzcinka, 2017, The performance of short-term institutional trades, *Journal of Financial and Quantitative Analysis* 52, 1403–1428.

Chen, Henry, Paul Gompers, Anna Kovner, and Josh Lerner, 2010, Buy local? the geography of venture capital, *Journal of Urban Economics* 67, 90–102.

Choe, Hyuk, Bong-Chan Kho, and René M. Stulz, 2005, Do domestic investors have an edge? the trading experience of foreign investors in korea, *Review of Financial Studies* 18, 795–829.

Choi, Jaewon, Ji Min Park, Neil D. Pearson, and Shastri Sandy, 2020, Profitability of hedge fund short sales: Evidence from opening and closing transactions, Working paper.

Christophe, Stephen E., Michael G. Ferri, and James J. Angel, 2004, Short-selling prior to earnings announcements, *Journal of Finance* 59, 1845–1875.

Cohen, Lauren, Karl B. Diether, and Christopher J. Malloy, 2007, Supply and demand shifts in the shorting market, *Journal of Finance* 62, 2061–2096.

Coval, Joshua D., and Tobias J. Moskowitz, 1999, Home bias at home: Local equity preference in domestic portfolios, *Journal of Finance* 54, 2045–2073.

Coval, Joshua D., and Tobias J. Moskowitz, 2001, The geography of investment: Informed trading and asset prices, *Journal of Political Economy* 109, 811–841.

Desai, Hemang, K. Ramesh, S. Ramu Thiagarajan, and Bala V. Balachandran, 2002, An investigation of the informational role of short interest in the Nasdaq market, *Journal of Finance* 57, 2263–2287.

Engelberg, Joseph E., Adam V. Reed, and Matthew C. Ringgenberg, 2012, How are shorts informed?: Short sellers, news, and information processing, *Journal of Financial Economics* 105, 260–278.

Fama, Eugene F., and Kenneth R. French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.

Hau, Harald, 2001, Location matters: An examination of trading profits, *Journal of Finance* 56, 1959–1983.

Ivković, Zoran, and Scott Weisbenner, 2005, Local does as local is: Information content of the geography of individual investors' common stock investments, *Journal of Finance* 60, 267–306.

Karpoff, Jonathan M., and Xiaoxia Lou, 2010, Short sellers and financial misconduct, *Journal of Finance* 65, 1879–1913.

Lin, Mingfeng, and Siva Viswanathan, 2016, Home bias in online investments: An empirical study of an online crowdfunding market, *Management Science* 62, 1225–1531.

Malloy, Christopher J., 2005, The geography of equity analysis, *Journal of Finance* 60, 719–755.

Rapach, David E., Matthew C. Ringgenberg, and Guofu Zhou, 2016, Short interest and aggregate stock returns, *Journal of Financial Economics* 121, 46–65.

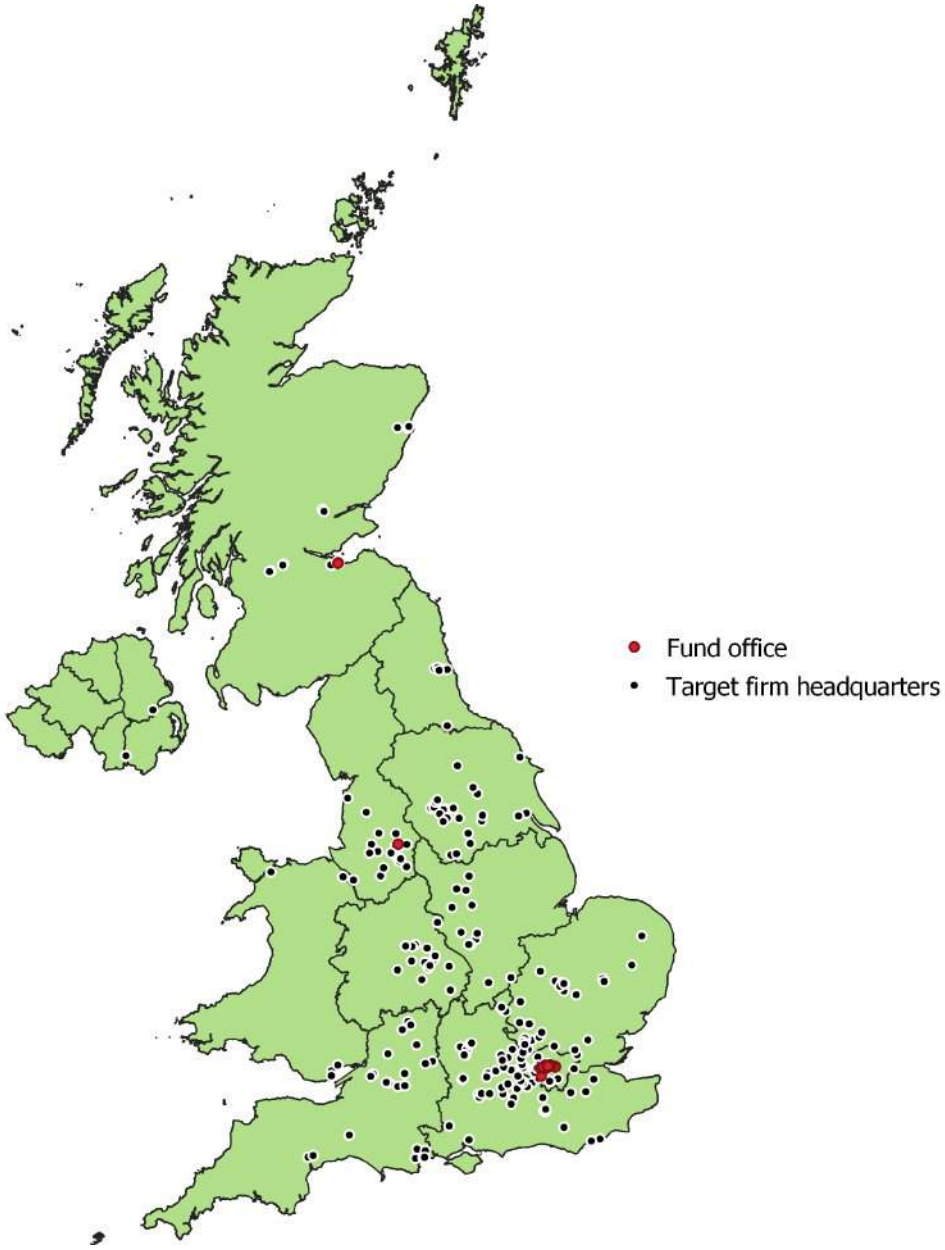
Teo, Melvyn, 2009, The geography of hedge funds, *Review of Financial Studies* 22, 3531–3561.

von Beschwitz, Bastian, Sandro Lunghi, and Daniel Schmidt, 2021, Fundamental arbitrage under the microscope: Evidence from detailed hedge fund transaction data, *Review of Asset Pricing Studies* Forthcoming.

Figure 1: Short seller and target firm locations

This figure shows the locations of short seller fund offices and target firm headquarters. Panel A shows the full UK sample. Panel B shows central London only.

Panel A. United Kingdom

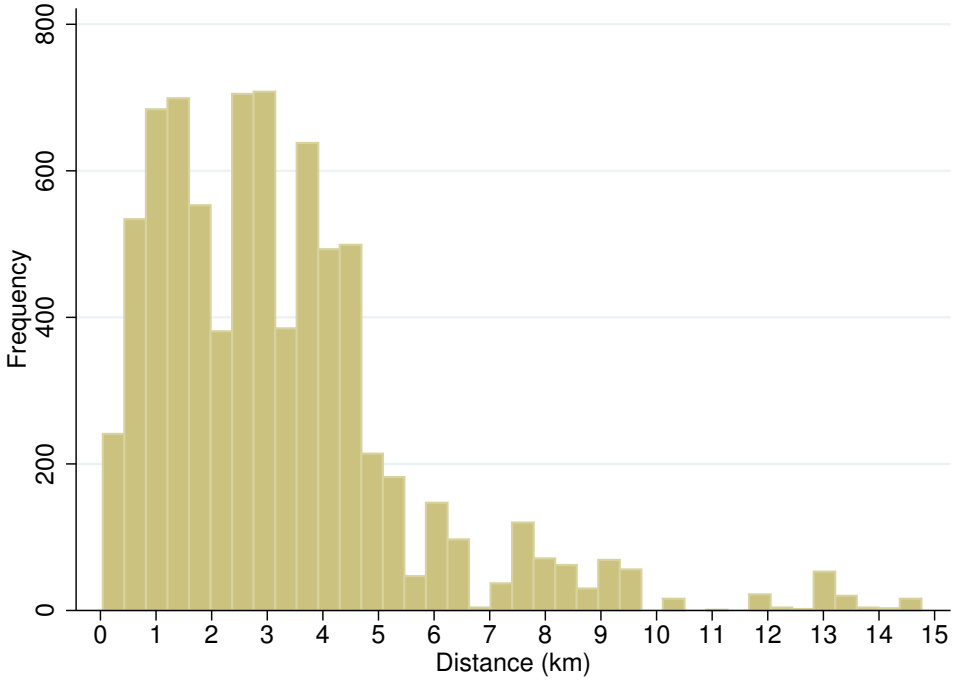


Panel B. Central London

Figure 2: The distribution of distance

This figure shows the distribution of the distance between the fund and the shorted target firm headquarters. Panel A shows the all short trades involving London-based funds and companies. Panel B shows the all short trades involving UK-based funds and companies.

Panel A. London sample



Panel B. UK sample

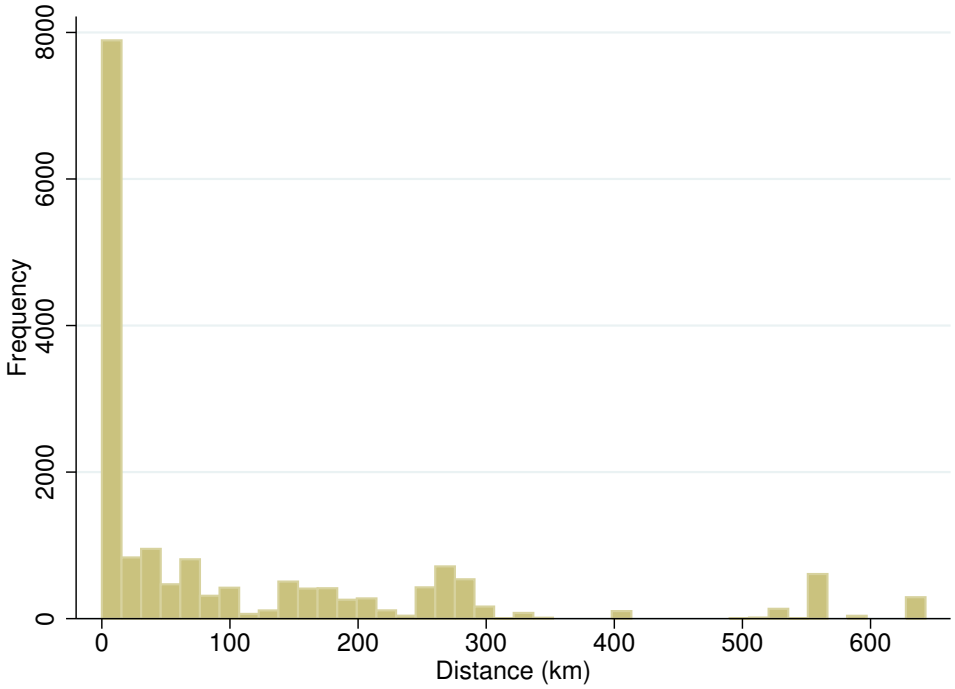
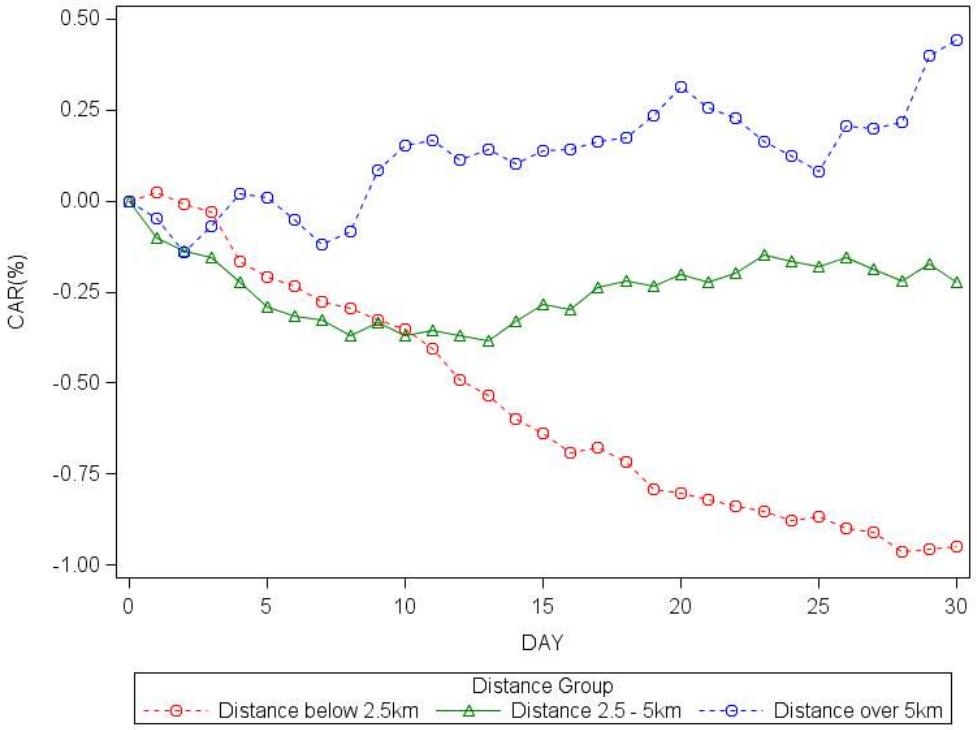


Figure 3: Cumulative abnormal return of stocks following short trades

This figure shows the average cumulative abnormal stock return following a short trade. Panel A (B) includes all short trades in London-based (UK-based) companies.

Panel A: London sample



Panel B: UK sample

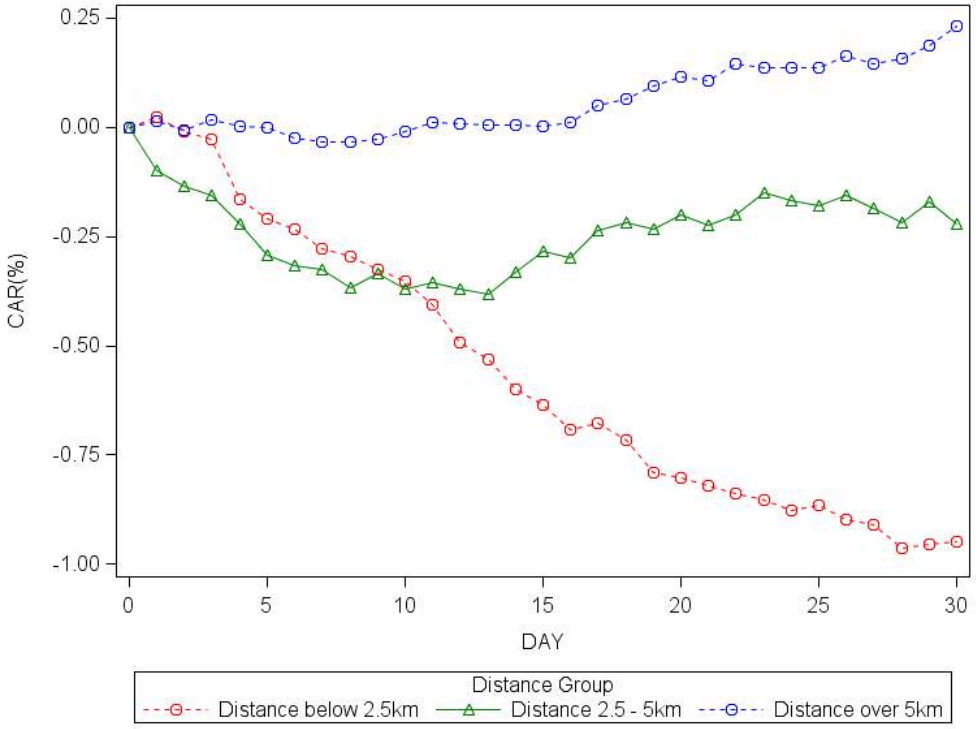
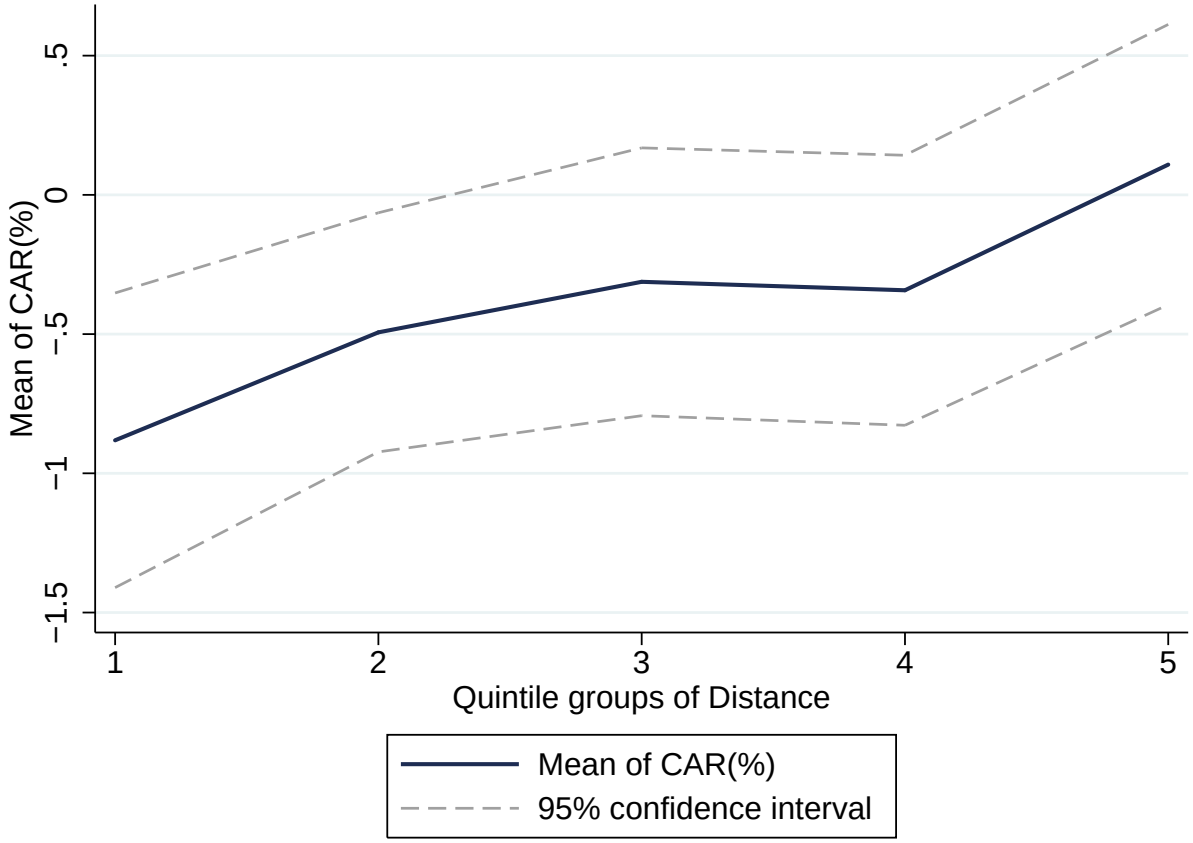


Figure 4: CAR by distance quintile

Panel A shows the average cumulative abnormal stock return following a short trade by distance quintile for the London sample. Panel B shows coefficients for the same distance quintile dummies from a regression of CAR including the same controls as in Table 2. These include *ln(Market cap)*, the natural logarithm of the market capitalization, *Market-to-book ratio*, the ratio of market value of equity to book value of equity, *Past return (t-1)*, the return from the previous month, *Past return (t-12, t-2)*, the return from the past 12 months, excluding the most recent month, *Asset growth*, the annual growth rate of total assets, and *Volatility*, the standard deviation of daily stock returns in the previous month, as well as stock, fund, and time fixed effects to control for any stock- or fund-specific factors as well as market timing.

Panel A: Average CAR by distance quintile



Panel B: Regression coefficients for distance quintiles

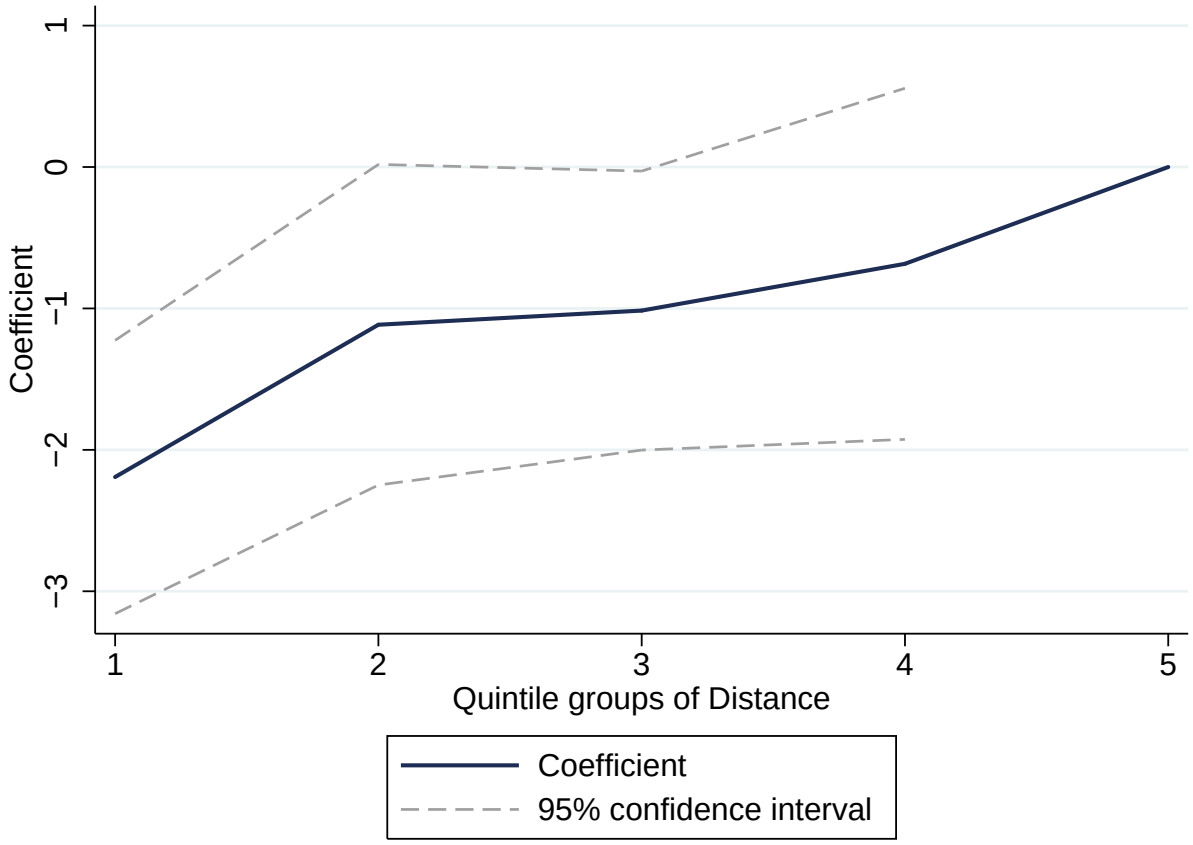


Table 1
Summary statistics

The table shows the summary statistics for the London sample (Panel A) and UK sample (Panel B). *CAR[1,20]* is the cumulative abnormal stock return in the trading days 1 to 20 relative to the trade. *Distance* is the geographic distance between the nearest investor office and the shorted firm headquarters, measured in km. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating this distance range. *Market cap* is the market capitalization of the target firm. *Market-to-book ratio* is the ratio of market value of equity to book value of equity. *Past return (t-1)* is the return from the previous month. *Past return (t-12, t-2)* is the return from the past 12 months, excluding the most recent month. *Asset growth* is the annual growth rate of total assets. *Volatility* is the standard deviation of daily stock returns in the previous month.

Panel A: London sample

	Mean	Std	p10	p50	p90
Trade return					
CAR [1,20](%)	-0.388	9.795	-11.550	-0.070	10.737
Geography					
Distance (km)	3.240	2.323	0.866	2.806	6.073
Distance below 2.5km	0.435	0.496	0.000	0.000	1.000
Distance 2.5 - 5km	0.421	0.494	0.000	0.000	1.000
Short trade					
Volume below 2.5km	0.434	0.440	0.000	0.271	1.000
Prior short volume (GBP bn)	0.016	0.019	0.001	0.008	0.050
Trade size (GBP bn)	0.003	0.004	0.000	0.002	0.010
ln(Trade size)	14.171	1.393	12.188	14.229	16.075
Stock characteristics					
Market cap (GBP bn)	2.788	2.260	0.346	2.142	6.738
ln(Market cap)	21.309	1.043	19.663	21.485	22.631
Market-to-book	2.725	2.641	0.575	1.863	5.331
Past return (t-1)	-0.024	0.104	-0.173	-0.016	0.108
Past return (t-12,t-2)	-0.108	0.300	-0.534	-0.121	0.289
Asset growth	0.096	0.199	-0.098	0.039	0.348
Volatility	2.430	1.033	1.332	2.118	4.182
Analyst revision	2.650	1.081	1.125	2.571	4.400
N	7,797				

Panel B: UK sample

	Mean	Std	p10	p50	p90
Trade return					
CAR [1,20](%)	-0.129	9.557	-11.118	0.027	10.831
Geography					
Distance (km)	104.704	150.884	1.290	29.336	277.583
Distance below 2.5km	0.199	0.399	0.000	0.000	1.000
Distance 2.5 - 5km	0.193	0.394	0.000	0.000	1.000
Short trade					
Volume below 2.5km	0.201	0.369	0.000	0.000	1.000
Prior short volume (GBP bn)	0.015	0.018	0.001	0.008	0.041
Trade size (GBP bn)	0.003	0.004	0.000	0.001	0.008
ln(Trade size)	14.111	1.353	12.168	14.137	15.922
Stock characteristics					
Market cap (GBP bn)	2.446	2.065	0.364	1.676	5.827
ln(Market cap)	21.204	0.979	19.713	21.239	22.486
Market-to-book	3.251	3.125	0.759	2.176	7.294
Past return (t-1)	-0.022	0.104	-0.166	-0.015	0.110
Past return (t-12,t-2)	-0.085	0.299	-0.475	-0.105	0.333
Asset growth	0.109	0.201	-0.090	0.054	0.382
Volatility	2.348	0.956	1.354	2.075	3.826
Analyst revision	2.450	1.058	1.053	2.300	4.000
N	17,019				

Table 2
Stock return following short trades

The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a short trade. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating this distance range. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: Distance dummies

	London				UK			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Distance below 2.5km	-1.117	-1.108***	-1.604***	-1.693***	-0.917**	-1.088**	-1.080**	-1.022**
	(0.781)	(0.412)	(0.478)	(0.471)	(0.463)	(0.463)	(0.422)	(0.440)
Distance 2.5 - 5km	-0.516	-0.191	-0.453	-0.612	-0.316	-0.183	-0.211	-0.188
	(0.632)	(0.379)	(0.438)	(0.471)	(0.327)	(0.409)	(0.484)	(0.536)
ln(Market cap)		-3.409***	-3.110***	-3.153***		-2.721***	-2.431***	-2.150***
		(0.550)	(0.593)	(0.726)		(0.427)	(0.450)	(0.521)
Market-to-book		0.383*	0.412*	0.324*		0.281***	0.211**	0.142*
		(0.194)	(0.218)	(0.176)		(0.088)	(0.093)	(0.082)
Past return (t-1)		2.026	1.604	0.378		-0.385	-0.924	-1.359
		(2.002)	(1.859)	(2.036)		(1.544)	(1.441)	(1.410)
Past return (t-12,t-2)		-5.425***	-5.307***	-5.407***		-4.585***	-4.452***	-4.375***
		(0.918)	(0.936)	(1.010)		(0.625)	(0.628)	(0.629)
Asset growth		1.482	2.023	1.566		-0.197	-0.173	-0.498
		(1.661)	(1.734)	(1.463)		(0.688)	(0.707)	(0.789)
Volatility		-0.143	-0.287	-0.400		0.065	0.053	0.072
		(0.336)	(0.322)	(0.410)		(0.245)	(0.251)	(0.265)
Stock FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Fund FE	No	No	Yes	Yes	No	No	Yes	Yes
Year-month FE	No	No	No	Yes	No	No	No	Yes
N	7,797	7,467	7,451	7,451	17,019	16,059	16,046	16,046
R^2	0.002	0.122	0.146	0.198	0.001	0.111	0.129	0.164

Significance levels: * 0.1, ** 0.05, * 0.01.**

Panel B: Continuous distance

	London				UK			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln(Distance)	0.375	0.634**	0.941***	0.900***	0.086	0.653**	0.566**	0.450*
	(0.343)	(0.283)	(0.309)	(0.281)	(0.059)	(0.284)	(0.272)	(0.265)
ln(Market cap)		-3.426***	-3.112***	-3.151***		-2.729***	-2.434***	-2.149***
		(0.560)	(0.597)	(0.729)		(0.431)	(0.454)	(0.527)
Market-to-book		0.387**	0.424*	0.337*		0.282***	0.213**	0.144*
		(0.195)	(0.219)	(0.177)		(0.087)	(0.091)	(0.081)
Past return (t-1)		2.012	1.585	0.342		-0.388	-0.936	-1.385
		(2.006)	(1.856)	(2.027)		(1.546)	(1.445)	(1.417)
Past return (t-12,t-2)		-5.458***	-5.335***	-5.422***		-4.597***	-4.466***	-4.384***
		(0.924)	(0.943)	(1.011)		(0.629)	(0.632)	(0.631)
Asset growth		1.454	1.966	1.517		-0.209	-0.188	-0.513
		(1.659)	(1.736)	(1.470)		(0.688)	(0.709)	(0.791)
Volatility		-0.152	-0.295	-0.415		0.061	0.048	0.068
		(0.336)	(0.323)	(0.410)		(0.245)	(0.252)	(0.266)
Stock FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Fund FE	No	No	Yes	Yes	No	No	Yes	Yes
Year-month FE	No	No	No	Yes	No	No	No	Yes
N	7,797	7,467	7,451	7,451	17,019	16,059	16,046	16,046
R^2	0.001	0.121	0.146	0.197	0.000	0.111	0.129	0.164

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 3
Stock return following short trades – subsamples

The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a short trade. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating the distance range. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: London sample

	Market cap		Volatility		Analyst revision	
	(1) Large	(2) Small	(3) Low	(4) High	(5) High	(6) Low
Distance below 2.5km	-0.664	-3.501***	-0.557	-3.775***	-1.649	-3.143***
	(1.035)	(0.947)	(0.735)	(0.842)	(0.991)	(0.534)
Distance 2.5 - 5km	-0.536	-1.108	-0.247	-2.054***	-0.493	-2.132***
	(0.791)	(1.198)	(0.567)	(0.775)	(0.730)	(0.419)
ln(Market cap)	-5.195***	-2.404**	-1.920***	-3.362***	-4.291***	-3.684***
	(1.817)	(0.980)	(0.717)	(1.211)	(0.842)	(1.248)
Market-to-book	0.144	0.547**	-0.308**	0.205	0.094	0.854***
	(0.218)	(0.227)	(0.127)	(0.183)	(0.185)	(0.194)
Past return (t-1)	-3.643*	0.143	-3.016	0.687	-3.337*	4.718**
	(2.107)	(3.244)	(2.474)	(3.042)	(1.778)	(2.106)
Past return (t-12,t-2)	-7.473***	-5.072***	-5.175***	-4.371***	-7.823***	-4.107**
	(0.826)	(1.648)	(0.722)	(1.376)	(1.127)	(1.887)
Asset growth	-1.302	4.319*	1.256	2.080	2.007	4.435*
	(0.826)	(2.298)	(1.556)	(2.198)	(1.280)	(2.319)
Volatility	-0.813***	-0.779	-2.420***	-0.527	0.986	-0.901
	(0.262)	(0.642)	(0.842)	(0.867)	(0.871)	(0.608)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	3,648	3,790	3,732	3,706	3,847	3,589
R^2	0.237	0.263	0.212	0.296	0.254	0.291

Significance levels: * 0.1, ** 0.05, * 0.01.**

Panel B: UK sample

	Market cap		Volatility		Analyst revision	
	(1) Large	(2) Small	(3) Low	(4) High	(5) High	(6) Low
Distance below 2.5km	0.088	-2.649**	-0.077	-2.107**	-0.282	-2.518**
	(0.684)	(1.068)	(0.362)	(0.857)	(0.715)	(1.156)
Distance 2.5 - 5km	-0.242	-0.316	0.139	-0.609	0.499	-1.614
	(0.543)	(1.255)	(0.401)	(0.960)	(0.498)	(1.478)
ln(Market cap)	-3.003***	-0.848	-0.987	-2.494***	-1.947*	-2.019**
	(0.985)	(0.904)	(0.624)	(0.835)	(1.022)	(0.868)
Market-to-book	0.047	0.229*	-0.126	0.317***	0.069	0.259*
	(0.151)	(0.123)	(0.125)	(0.114)	(0.126)	(0.149)
Past return (t-1)	-0.201	-3.170*	-5.373***	-1.405	-4.467**	0.037
	(1.408)	(1.673)	(1.581)	(2.507)	(2.044)	(1.509)
Past return (t-12,t-2)	-6.096***	-3.634***	-4.554***	-4.148***	-5.278***	-4.074***
	(0.670)	(1.050)	(0.614)	(0.893)	(0.678)	(1.331)
Asset growth	-0.359	-0.244	-1.255	1.384	0.717	0.020
	(0.670)	(1.680)	(0.882)	(1.323)	(0.843)	(1.160)
Volatility	0.069	-0.246	-0.464	0.221	1.297***	-0.530
	(0.283)	(0.405)	(0.633)	(0.494)	(0.457)	(0.384)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	8,045	7,989	8,174	7,833	8,287	7,720
R^2	0.227	0.183	0.217	0.220	0.187	0.222

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 4
Geographic clustering in short trades

The dependent variable is *Same trade*, a dummy variable that equals one if the other fund in the fund pair also shorts the same stock within the next 20 trading days. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: Summary statistics – London

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.053	0.224	0.000	0.000	0.000
Geography					
Distance (km)	2.627	1.833	0.373	2.366	5.330
Distance below 0.5km	0.149	0.356	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.383	0.486	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.920	2.407	0.372	2.352	6.713
ln(Market cap)	21.355	1.036	19.735	21.579	22.627
Market-to-book	2.495	1.963	0.593	1.857	5.249
Past return (t-1)	-0.024	0.104	-0.173	-0.016	0.108
Past return (t-12,t-2)	-0.118	0.298	-0.532	-0.123	0.274
Asset growth	0.093	0.192	-0.098	0.039	0.348
Volatility	2.438	1.072	1.333	2.122	4.201
N	163,428				

Panel B: Summary statistics – UK

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.036	0.185	0.000	0.000	0.000
Geography					
Distance (km)	3.837	25.943	0.346	2.366	5.258
Distance below 0.5km	0.158	0.364	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.375	0.484	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.478	2.057	0.392	1.724	5.833
ln(Market cap)	21.230	0.962	19.786	21.268	22.487
Market-to-book	3.293	3.220	0.777	2.170	7.543
Past return (t-1)	-0.023	0.104	-0.167	-0.016	0.110
Past return (t-12,t-2)	-0.089	0.296	-0.476	-0.108	0.322
Asset growth	0.112	0.202	-0.078	0.056	0.382
Volatility	2.341	0.957	1.352	2.070	3.844
N	543,689				

Panel C: Geographic clustering in short trades

	London			UK		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance below 0.5km	0.011***	0.011***	0.011***	0.009***	0.009***	0.009***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Distance 0.5 - 2.5km	0.005**	0.005**	0.005**	0.004**	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Stock controls	No	Yes	Yes	No	Yes	Yes
Year-month FE	No	No	Yes	No	No	Yes
Fund 1-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund 2-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
N	161,685	155,227	155,227	538,548	509,668	509,668
R^2	0.464	0.461	0.463	0.389	0.385	0.386

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 5
Geographic clustering and stock return following short trades

The samples are divided into high and low volume based on the GBP volume of short trades in the preceding 20 days before the current trade. The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a short trade. *Volume below 2.5km* is the percentage of GBP volume in prior short trades in the preceding 20 days where the distance between the short seller and the target firm is less than 2.5km. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating the distance range. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

	London (low vs. high volume)			UK (low vs. high volume)		
	(1) All	(2) Low	(3) High	(4) All	(5) Low	(6) High
Volume below 2.5km	-1.211**	-0.735	-2.325***	-1.279**	-0.966	-2.588***
	(0.602)	(0.931)	(0.638)	(0.618)	(0.943)	(0.640)
Distance below 2.5km	-1.670***	-2.982***	-0.031	-0.767	-1.976**	0.474
	(0.531)	(0.889)	(0.778)	(0.508)	(0.827)	(0.624)
Distance 2.5 - 5km	-0.803*	-1.466**	-0.213	-0.240	-0.441	-0.054
	(0.448)	(0.664)	(0.573)	(0.486)	(0.973)	(0.465)
ln(Market cap)	-3.346***	-2.043	-5.353***	-1.903***	-1.880**	-1.133
	(1.103)	(1.378)	(1.878)	(0.684)	(0.836)	(1.085)
Market-to-book	0.460**	0.614***	0.360	0.209*	0.401***	-0.505*
	(0.178)	(0.191)	(0.460)	(0.108)	(0.132)	(0.299)
Past return (t-1)	-0.135	2.236	-5.229**	-1.125	0.100	-2.673*
	(2.182)	(3.828)	(2.449)	(1.566)	(2.334)	(1.357)
Past return (t-12,t-2)	-6.397***	-5.720***	-8.806***	-4.331***	-4.376***	-4.726***
	(1.162)	(2.040)	(1.331)	(0.728)	(0.980)	(1.180)
Asset growth	2.190	5.158*	-2.426	-0.635	0.282	-2.262**
	(1.775)	(2.606)	(1.828)	(0.999)	(1.800)	(0.964)
Volatility	-0.563	-0.800	-0.587*	0.128	-0.159	0.473
	(0.427)	(0.703)	(0.331)	(0.266)	(0.375)	(0.308)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	6,197	3,115	3,050	13,170	6,588	6,533
R^2	0.221	0.272	0.325	0.185	0.207	0.265

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 6
Trade size and stock return following short trades

The samples are divided into high and low based on the GBP amount of each short trade. The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a short trade. *ln(Trade size)* is the natural logarithm of the GBP amount of the trade. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating the distance range. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

	London (large vs. small trades)			UK (large vs. small trades)		
	(1) All	(2) Small	(3) Large	(4) All	(5) Small	(6) Large
ln(Trade size)	-0.209**			-0.117*		
	(0.083)			(0.061)		
Distance below 2.5km	-1.676***	-2.760***	-1.272	-1.012**	-1.979***	-0.558
	(0.465)	(0.676)	(0.846)	(0.434)	(0.697)	(0.565)
Distance 2.5 - 5km	-0.586	-1.544**	-0.441	-0.173	-0.761	-0.026
	(0.466)	(0.657)	(0.733)	(0.530)	(0.961)	(0.482)
ln(Market cap)	-3.064***	-2.167*	-4.366***	-2.093***	-1.792**	-2.325***
	(0.728)	(1.191)	(0.925)	(0.508)	(0.802)	(0.596)
Market-to-book	0.327*	0.484**	-0.030	0.144*	0.221**	-0.057
	(0.179)	(0.192)	(0.161)	(0.082)	(0.110)	(0.123)
Past return (t-1)	0.467	-0.520	-0.185	-1.299	-2.287	-1.407
	(2.039)	(2.314)	(1.726)	(1.405)	(1.839)	(1.379)
Past return (t-12,t-2)	-5.312***	-4.500***	-6.441***	-4.300***	-3.838***	-5.001***
	(1.020)	(1.645)	(0.826)	(0.642)	(1.021)	(0.660)
Asset growth	1.614	4.327*	-1.196	-0.497	0.403	-1.276*
	(1.471)	(2.213)	(1.422)	(0.790)	(1.565)	(0.717)
Volatility	-0.448	-1.239**	0.579	0.053	-0.383	0.779***
	(0.409)	(0.592)	(0.375)	(0.267)	(0.407)	(0.230)
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7,451	3,776	3,638	16,046	8,067	7,897
R^2	0.198	0.245	0.239	0.164	0.192	0.202

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 7
Earnings surprises and short selling

The sample includes all earnings announcement events where we can calculate the *SUE* measures, and where stock has been shorted by the institutions in our sample. Panel A shows summary statistics for the sample. In Panel B, the dependent variable is *SUE*, defined as the difference in EPS between two concecutive fiscal years, divided by stock price. *Short (Distance below 2.5km)* is a dummy variable that equals one if the stock has been shorted by any institutions within 2.5km radius of its headquarter in the 30-trading day window before the earnings announcement. *Short* is a dummy variable that equals one if the stock has been shorted in the 30-trading day window before the earnings announcement. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: London sample summary statistics

	Mean	Std	p10	p50	p90
Earnings surprises					
SUE	-0.005	0.038	-0.054	0.003	0.031
Geography and short					
Short (Distance below 2.5km)	0.123	0.328	0.000	0.000	1.000
Short	0.212	0.409	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.804	3.428	0.183	1.267	8.763
ln(Market cap)	20.944	1.394	19.027	20.960	22.894
Market-to-book	3.087	3.369	0.550	1.853	6.822
Past return (t-1)	0.012	0.082	-0.106	0.015	0.119
Past return (t-12,t-2)	0.039	0.321	-0.383	0.024	0.487
Asset growth	0.100	0.202	-0.098	0.049	0.356
Volatility	2.134	0.811	1.220	1.954	3.452
N	1,197				

Panel B: UK sample summary statistics

	Mean	Std	p10	p50	p90
Earnings surprises					
SUE	-0.004	0.035	-0.042	0.004	0.025
Geography and short					
Short (Distance below 2.5km)	0.050	0.217	0.000	0.000	0.000
Short	0.189	0.392	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.163	2.986	0.133	0.898	6.204
ln(Market cap)	20.644	1.367	18.705	20.616	22.548
Market-to-book	3.717	3.833	0.707	2.352	8.645
Past return (t-1)	0.011	0.081	-0.102	0.012	0.121
Past return (t-12,t-2)	0.061	0.320	-0.350	0.041	0.502
Asset growth	0.102	0.198	-0.092	0.053	0.359
Volatility	2.132	0.808	1.260	1.930	3.447
N	2,965				

Panel C: Earnings surprises and short selling

	London		UK	
	(1)	(2)	(3)	(4)
Short (Distance below 2.5km)	-0.013***	-0.010**	-0.009**	-0.010***
	(0.005)	(0.004)	(0.004)	(0.003)
Short	0.003	0.006	-0.004	0.002
	(0.004)	(0.004)	(0.002)	(0.002)
ln(Market cap)		0.013***		0.009***
		(0.004)		(0.003)
Market-to-book		-0.000		-0.001
		(0.000)		(0.000)
Past return (t-1)		-0.012		-0.000
		(0.023)		(0.015)
Past return (t-12,t-2)		0.031***		0.025***
		(0.006)		(0.004)
Asset growth		-0.003		-0.004
		(0.009)		(0.005)
Volatility		-0.017***		-0.016***
		(0.003)		(0.002)
Year-month FE	Yes	Yes	Yes	Yes
Stock FE	Yes	Yes	Yes	Yes
N	1,007	983	2,542	2,474
R^2	0.270	0.426	0.221	0.355

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table 8
Returns following covering of short positions

The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a reduction of a short position. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* is a similar dummy indicating the distance range. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A : London sample summary statistics

	Mean	Std	p10	p50	p90
Trade return					
CAR [1,20](%)	-0.473	9.749	-10.849	-0.334	10.565
Geography					
Distance (km)	3.324	2.351	0.881	2.856	6.140
Distance below 2.5km	0.416	0.493	0.000	0.000	1.000
Distance 2.5 - 5km	0.432	0.495	0.000	0.000	1.000
ln(Distance)	0.976	0.680	-0.127	1.049	1.815
Stock characteristics					
Market cap (GBP bn)	2.794	2.292	0.332	2.114	6.786
ln(Market cap)	21.294	1.066	19.619	21.472	22.638
Market-to-book	2.671	2.629	0.586	1.784	5.303
Past return (t-1)	-0.006	0.103	-0.151	-0.003	0.134
Past return (t-12,t-2)	-0.107	0.312	-0.536	-0.120	0.317
Asset growth	0.093	0.200	-0.099	0.038	0.365
Volatility	2.443	1.037	1.348	2.129	4.180
N	6,776				

Panel B : UK sample summary statistics

	Mean	Std	p10	p50	p90
Trade return					
CAR [1,20](%)	-0.015	9.241	-10.361	0.068	10.560
Geography					
Distance (km)	103.542	149.647	1.366	29.740	277.404
Distance below 2.5km	0.188	0.391	0.000	0.000	1.000
Distance 2.5 - 5km	0.195	0.396	0.000	0.000	1.000
ln(Distance)	3.083	2.089	0.312	3.392	5.625
Stock characteristics					
Market cap (GBP bn)	2.423	2.081	0.352	1.632	5.820
ln(Market cap)	21.180	0.996	19.679	21.213	22.485
Market-to-book	3.203	3.064	0.751	2.139	7.294
Past return (t-1)	-0.004	0.100	-0.142	-0.000	0.128
Past return (t-12,t-2)	-0.081	0.312	-0.492	-0.100	0.353
Asset growth	0.105	0.199	-0.096	0.048	0.368
Volatility	2.373	0.982	1.353	2.092	3.913
N	15,032				

Panel C : Regression

	London		UK	
	(1)	(2)	(3)	(4)
Distance below 2.5km	2.334***		1.945***	
	(0.577)		(0.651)	
Distance 2.5 - 5km	1.879***		1.341**	
	(0.606)		(0.648)	
ln(Distance)		-0.575*		-0.709**
		(0.337)		(0.298)
ln(Market cap)	-3.403***	-3.410***	-2.496***	-2.490***
	(0.500)	(0.505)	(0.353)	(0.356)
Market-to-book	-0.012	-0.033	-0.038	-0.042
	(0.212)	(0.204)	(0.109)	(0.106)
Past return (t-1)	-3.046**	-2.968*	-4.470***	-4.454***
	(1.516)	(1.532)	(0.808)	(0.810)
Past return (t-12,t-2)	-5.300***	-5.304***	-3.782***	-3.779***
	(0.842)	(0.835)	(0.357)	(0.354)
Asset growth	0.407	0.466	-0.123	-0.120
	(1.061)	(1.066)	(0.713)	(0.729)
Volatility	-0.223	-0.201	0.152	0.163
	(0.333)	(0.327)	(0.190)	(0.189)
Stock FE	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes
N	6,497	6,497	14,161	14,161
R^2	0.194	0.193	0.157	0.157

Significance levels: * 0.1, ** 0.05, * 0.01.**

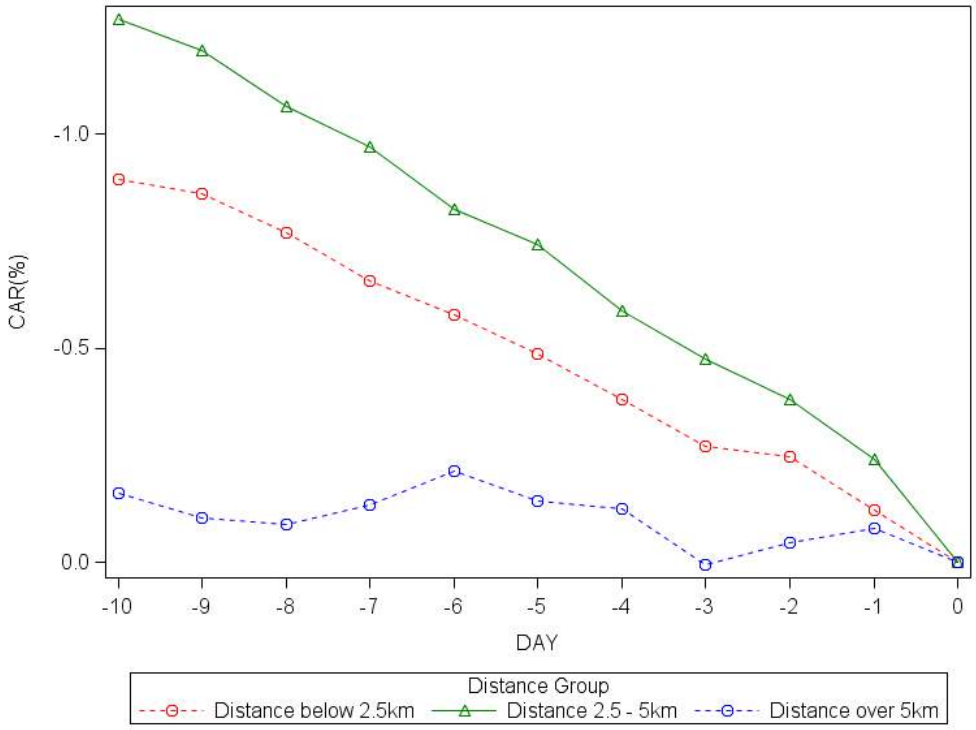
Internet Appendix

IA.1 Abnormal return of stocks prior to short trades

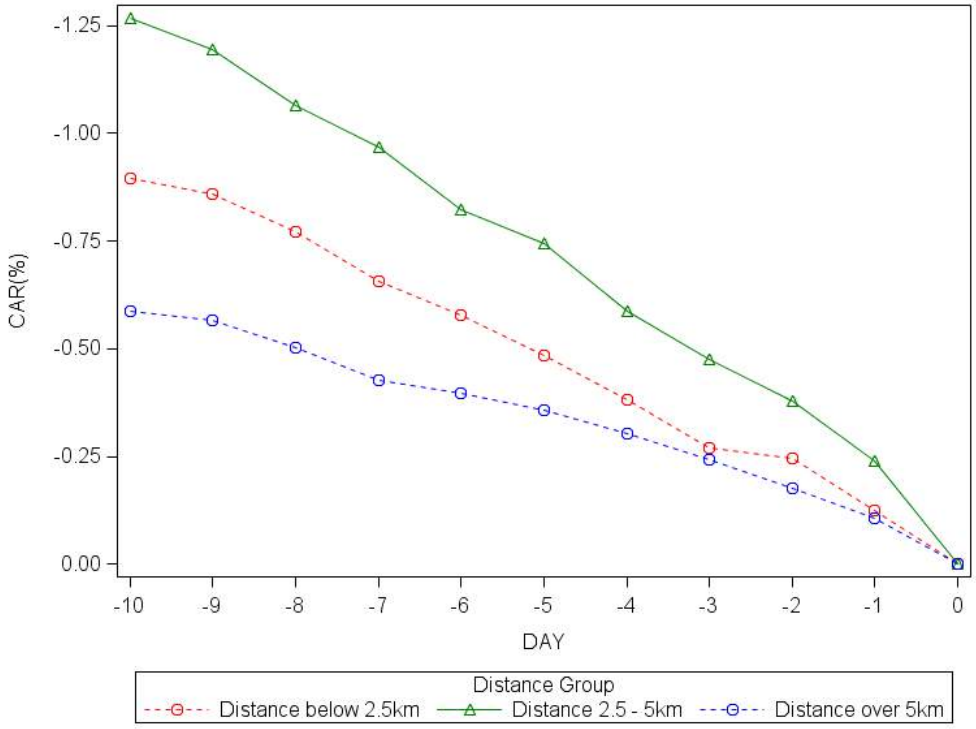
Figure IA.1: Cumulative abnormal return of stocks prior to short trades

This figure shows the average cumulative abnormal stock return prior to a short trade. Panel A (B) includes all short trades in London-based (UK-based) companies.

Panel A: London sample



Panel B: UK sample



IA.2 The distribution of short trades

Table IA.1
The distribution of short trades – by year

.

Panel A: London

Year	Number of trade	Percentage
2013	610	8%
2014	709	9%
2015	1,082	14%
2016	1,331	17%
2017	1,425	18%
2018	1,474	19%
2019	1,166	15%
Total	7,797	100%

Panel B: UK

Year	Number of trade	Percentage
2013	1,171	7%
2014	1,407	8%
2015	2,052	12%
2016	2,789	16%
2017	3,321	20%
2018	3,558	21%
2019	2,721	16%
Total	17,019	100%

IA.3 Geographic clustering in short trades – additional specifications

Table IA.2
Geographic clustering in short trades - by week

The dependent variable is *Same trade*, a dummy variable that equals one if the other fund in the fund pair also shorts the same stock within the following week. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: Summary statistics – London

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.051	0.219	0.000	0.000	0.000
Geography					
Distance (km)	2.625	1.830	0.372	2.366	5.330
Distance below 0.5km	0.151	0.358	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.378	0.485	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	3.004	2.458	0.385	2.461	6.762
ln(Market cap)	21.387	1.034	19.769	21.624	22.635
Market-to-book	2.562	2.060	0.604	1.885	5.335
Past return (t-1)	-0.021	0.100	-0.157	-0.014	0.108
Past return (t-12,t-2)	-0.108	0.286	-0.503	-0.116	0.276
Asset growth	0.095	0.194	-0.098	0.039	0.349
Volatility	2.376	1.030	1.314	2.088	4.067
N	132,309				

Panel B: Summary statistics – UK

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.034	0.181	0.000	0.000	0.000
Geography					
Distance (km)	3.899	26.643	0.343	2.366	5.219
Distance below 0.5km	0.160	0.366	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.372	0.483	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.520	2.092	0.399	1.768	5.923
ln(Market cap)	21.246	0.963	19.804	21.293	22.502
Market-to-book	3.391	3.345	0.791	2.225	7.845
Past return (t-1)	-0.020	0.100	-0.157	-0.015	0.109
Past return (t-12,t-2)	-0.083	0.289	-0.462	-0.104	0.318
Asset growth	0.115	0.204	-0.073	0.056	0.410
Volatility	2.296	0.913	1.339	2.043	3.758
N	445,044				

Panel C: Clustering of short trades

	London			UK		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance below 0.5km	0.009***	0.010***	0.010***	0.008***	0.008***	0.008***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Distance 0.5 - 2.5km	0.004**	0.004**	0.004**	0.003**	0.003**	0.003**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Stock controls	No	Yes	Yes	No	Yes	Yes
Week FE	No	No	Yes	No	No	Yes
Fund 1-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund 2-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
N	130,420	125,214	125,214	439,321	416,462	416,462
R^2	0.446	0.442	0.445	0.373	0.369	0.371

Significance levels: * 0.1, ** 0.05, * 0.01.**

Table IA.3
Geographic clustering in short trades - by month

The dependent variable is *Same trade*, a dummy variable that equals one if the other fund in the fund pair also shorts the same stock within the following month. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

Panel A: Summary statistics – London

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.047	0.212	0.000	0.000	0.000
Geography					
Distance (km)	2.594	1.830	0.370	2.366	5.219
Distance below 0.5km	0.156	0.362	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.373	0.483	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	3.024	2.546	0.390	2.392	6.873
ln(Market cap)	21.380	1.047	19.782	21.595	22.651
Market-to-book	2.562	1.999	0.620	1.910	5.344
Past return (t-1)	-0.017	0.096	-0.151	-0.012	0.109
Past return (t-12,t-2)	-0.098	0.284	-0.495	-0.106	0.279
Asset growth	0.098	0.196	-0.098	0.041	0.365
Volatility	2.322	1.000	1.289	2.062	3.923
N	89,018				

Panel B: Summary statistics – UK

	Mean	Std	p10	p50	p90
Geographic clustering					
Same trade	0.032	0.176	0.000	0.000	0.000
Geography					
Distance (km)	3.970	27.626	0.342	2.339	5.017
Distance below 0.5km	0.165	0.371	0.000	0.000	1.000
Distance 0.5 - 2.5km	0.367	0.482	0.000	0.000	1.000
Stock characteristics					
Market cap (GBP bn)	2.492	2.104	0.394	1.717	5.972
ln(Market cap)	21.227	0.969	19.791	21.264	22.510
Market-to-book	3.490	3.442	0.797	2.275	8.110
Past return (t-1)	-0.016	0.096	-0.150	-0.012	0.109
Past return (t-12,t-2)	-0.080	0.282	-0.455	-0.097	0.318
Asset growth	0.119	0.207	-0.073	0.061	0.445
Volatility	2.255	0.885	1.316	2.008	3.691
N	305,284				

Panel C: Clustering of short trades

	London			UK		
	(1)	(2)	(3)	(4)	(5)	(6)
Distance below 0.5km	0.007***	0.007***	0.007***	0.006***	0.006***	0.006***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Distance 0.5 - 2.5km	0.006***	0.006***	0.006***	0.003***	0.003***	0.003***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Stock controls	No	Yes	Yes	No	Yes	Yes
Year-month FE	No	No	Yes	No	No	Yes
Fund 1-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund 2-stock FE	Yes	Yes	Yes	Yes	Yes	Yes
N	86,434	82,945	82,945	297,786	282,496	282,496
R^2	0.433	0.433	0.436	0.368	0.367	0.368

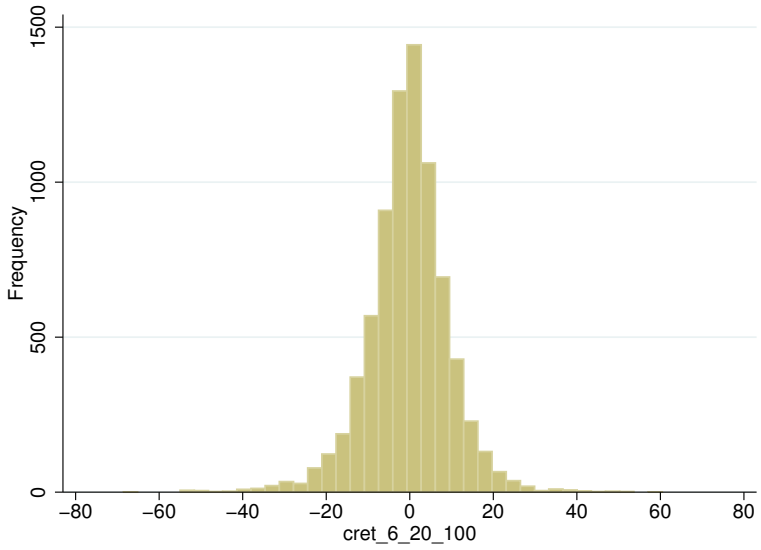
Significance levels: * 0.1, ** 0.05, * 0.01.**

IA.4 Additional analysis

Figure IA.2: Cumulative abnormal return of stocks following short trades

This figure shows the average cumulative abnormal stock return following a short trade. Panel A (B) includes all short trades in London-based (UK-based) companies.

Panel A: London sample



Panel B: UK sample

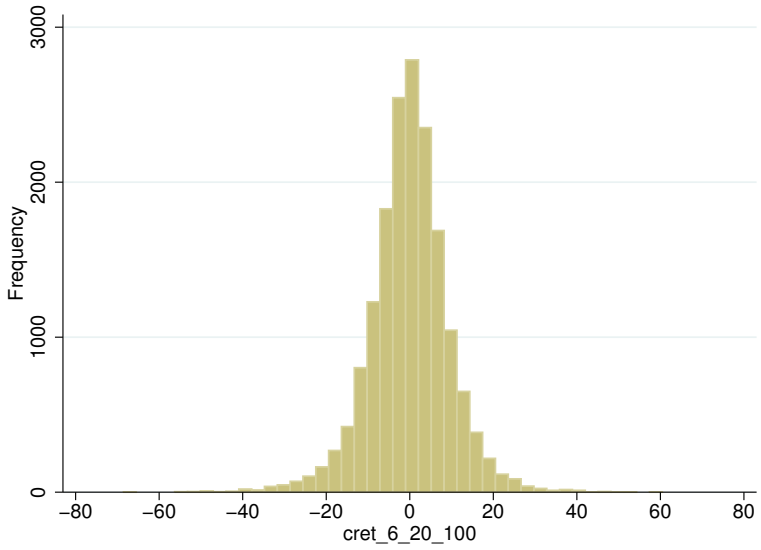


Table IA.4
Stock return following short trades – different specifications

The dependent variable is *CAR (1,20)*, the four-factor-adjusted cumulative abnormal return following a short trade. *Distance below 2.5km* is a dummy taking the value one if the distance between the investor office and the shorted firm headquarters is less than 2.5km. *Distance 2.5 - 5km* and *Distance 5 - 75km* are similar dummies indicating these distance ranges. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

	London		UK	
	(1) Mkt-adj	(2) FF3-model	(3) Mkt-adj	(4) FF3-model
Distance below 2.5km	-1.098**	-1.482***	-0.689*	-0.937**
	(0.513)	(0.466)	(0.401)	(0.449)
Distance 2.5 - 5km	-0.203	-0.516	-0.012	-0.215
	(0.567)	(0.501)	(0.530)	(0.562)
ln(Market cap)	-3.794***	-3.999***	-2.537***	-2.638***
	(0.774)	(0.791)	(0.466)	(0.547)
Market-to-book	0.411***	0.434**	0.265***	0.236***
	(0.136)	(0.167)	(0.068)	(0.076)
Past return (t-1)	-1.155	-1.828	-2.673*	-2.350*
	(2.067)	(2.048)	(1.411)	(1.342)
Past return (t-12,t-2)	-4.061***	-3.916***	-3.271***	-3.249***
	(1.130)	(1.254)	(0.657)	(0.710)
Asset growth	1.831	2.068	-0.287	0.034
	(1.419)	(1.539)	(0.783)	(0.779)
Volatility	-0.861**	-0.623	-0.173	-0.056
	(0.347)	(0.431)	(0.288)	(0.288)
Stock FE	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes
N	7,451	7,451	16,046	16,046
R^2	0.207	0.214	0.160	0.171

Significance levels: * 0.1, ** 0.05, * 0.01.**

IA.5 Earnings surprise – Additional specifications

Table IA.5
Earnings surprises and short selling regression – additional specifications

The dependent variable is SUE, defined as the difference in EPS between two concecutive fiscal years, divided by stock price. The regression is on the stock-event level. For columnns (1) and (3) (columns (2) and (4)), *Short (Distance below 2.5km)* is a dummy variable that equals one if the stock has been shorted by any institutions within 2.5km radius of its headquarter in the 15-trading day (60-trading day) window before the earnings announcement; *Short* is a dummy variable that equals one if the stock has been shorted in the 15-trading day (60-trading day) window before the earnings announcement. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

	London		UK	
	(1)	(2)	(3)	(4)
	15 days	60 days	15 days	60 days
Short (Distance below 2.5km)	-0.009	-0.012**	-0.007*	-0.008*
	(0.006)	(0.005)	(0.004)	(0.004)
Short	0.005	0.006*	0.000	0.000
	(0.005)	(0.004)	(0.002)	(0.002)
ln(Market cap)	0.013***	0.013***	0.010***	0.010***
	(0.004)	(0.004)	(0.003)	(0.003)
Market-to-book	-0.000	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)
Past return (t-1)	-0.011	-0.012	-0.000	-0.000
	(0.023)	(0.023)	(0.015)	(0.015)
Past return (t-12,t-2)	0.031***	0.031***	0.025***	0.025***
	(0.007)	(0.006)	(0.004)	(0.004)
Asset growth	-0.003	-0.004	-0.004	-0.004
	(0.009)	(0.009)	(0.005)	(0.005)
Volatility	-0.017***	-0.017***	-0.016***	-0.016***
	(0.003)	(0.003)	(0.002)	(0.002)
Year-month FE	Yes	Yes	Yes	Yes
Stock FE	Yes	Yes	Yes	Yes
N	983	983	2,474	2,474
R^2	0.424	0.427	0.354	0.355

Significance levels: * 0.1, ** 0.05, * 0.01.**

IA.6 The relation between the probability of short selling and distance

Table IA.6
The relation between the probability of short selling and distance

The dependent variable is *trade prob*, a dummy variable that equals one if the fund in the fund-stock pair shorts the stock within our whole sample period. From column (1) to (4), the fund-stock pair is constructed by the distinct funds and distinct stocks in each sample, and is called "Aggregate level" analysis. From column (5) to (8), the fund-stock pair is constructed by the following methods: for each stock and its shorted date, we pair all the distinct funds in the corresponding sample to this stock and its trading day, then define the dummy *trade prob*, and we call it "Trade level" analysis. The independent variables are the distance measures between funds and stocks. Heteroscedasticity-consistent standard errors, clustered by fund, are shown in parentheses.

	Aggregate level				Trade level			
	(1) London	(2) London	(3) UK	(4) UK	(5) London	(6) London	(7) UK	(8) UK
Distance below 2.5km	-0.009		-0.005		-0.005		-0.004	
	(0.009)		(0.005)		(0.007)		(0.005)	
Distance 2.5 - 5km	-0.010		-0.007		-0.004		-0.003	
	(0.008)		(0.005)		(0.008)		(0.006)	
ln(Distance)		0.000		-0.000		-0.000		0.000
		(0.003)		(0.002)		(0.001)		(0.001)
Stock controls	No	No	No	No	Yes	Yes	Yes	Yes
Stock FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	No	No	No	No	Yes	Yes	Yes	Yes
N	19,780	19,767	55,620	55,601	436,901	436,616	975,117	974,746
R^2	0.186	0.186	0.188	0.188	0.081	0.081	0.079	0.079

Significance levels: * 0.1, ** 0.05, * 0.01.**