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Price run-ups and insider trading laws under different regulatory environments

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Abstract

We examine target firms' price run-ups prior to takeovers in two different exchange regulatory environments within the same country. We show that target firms listed both in the secondary market of the UK, known as the Alternative Investment Market (AIM), and in the traditionally regulated Main Market (MM), experience significant abnormal stock returns prior to takeover announcements. These results persist after controlling for market anticipation, indicating signs of information leakage. Contrary to the narrative that secondary markets may be more susceptible to market abusive behaviors, we find that the AIM targets experience significantly lower pre-announcement returns. In addition, we do not find support that the introduction of stricter laws reduces the price run-ups in any of the two markets. In sharp contrast, we find support that the enforcement of insider trading laws, through criminal convictions, reduces the pre-announcement abnormal stock returns but only in the market in which the enforcement focuses.

JEL classification: G10, G14.

Keywords: Price run-ups; Takeovers; Insider trading laws; Alternative Investment Market (AIM); Main Market (MM)

1. Introduction

Secondary markets, and particularly the London Stock Exchange's (LSE) Alternative Investment Market (AIM), have attracted criticism as low-quality markets, susceptible to market abusive behaviors and fraud.[1] However, Marcus Scuttard, head of the AIM, has rejected these claims, arguing that *"if AIM was a casino it wouldn't have its 20 years of longevity and maturity"*.[2] In support of this, Mendoza (2008) and Doukas and Hoque (2016) argue that the UK's secondary market is one of the most popular secondary markets in the world.

In this study, we explore whether the light-touch regulated AIM offers a comparable investment environment with respect to informed trading compared to the traditional regulated LSE's Main Market (MM). In particular, we examine the impact of exchange regulations on the price run-ups prior to the announcement of takeovers, a major corporate event, notorious for information leaks and illegal trading (Keown and Pinkerton, 1981; Keown et al., 1985; Jabbour et al., 2000; King, 2009; Agrawal and Nasser, 2012).[3] The UK offers a unique setup for this examination as it offers two markets under the same legal and economic regime but subject to different monitoring and listing requirements.

[1] John Thain, New York Stock Exchange (NYSE) executive was quoted at the World Economic Forum in Davos Switzerland in January 2007 referring to the AIM as it "*did not have any standards at all and anyone could list*" (https://www.ft.com/content/beb09508-ad27-11db-8709-0000779e2340). Moreover, Roel Campos, a Securities and Exchange Commission member was quoted on a Dow Jones newswire in March 2007 saying "*I am concerned that 30% of issuers that list in AIM are gone in a year. That feels like a casino to me and I believe investors will treat it as such*" (https://www.ft.com/content/cd0530e2-cdab-11db-839d-000b5df10621). Finally, Kate Burgess, a journalist of the FT wrote "*AIM's numerous corporate collapses and scandals have earned the market its label as a wild west exchange where cowboys are allowed to roam free*" (https://www.ft.com/content/2cb37958-af6a-11e7-beba-5521c713abf4).

[2] Interview of Marcus Scuttard to Proactive Investors in 2015 on the market's 20th anniversary (https://www.proactiveinvestors.co.uk/companies/news/108159/if-aim-was-just-a-casino-it-wouldnt-have-lasted-20-years-108159.html)

[3] Apart from the academic literature, the UK regulators also tend to focus on M&As when it comes to information leakage. For example, the FCA has introduced the "*market cleanliness statistic*", a statistic which is included in the FCA's annual reports and focuses mostly on price run-ups prior to the announcement of M&As (Dubow and Monteiro, 2006). This measure is an indicator of insider trading in the UK markets and a reduction signifies that the UK markets are clearer from informed trading. Moreover, 70% of the criminal sanctions related to insider trading in the UK are due to insider trading prior to takeovers showcasing the importance of M&As in this set up (an example of a UK criminal sanction and links to other cases can be found at https://www.fca.org.uk/news/press-releases/three-charged-insider-dealing).

The importance of examining the price run-ups in this context is threefold. First, secondary markets are becoming increasingly popular around the world, with more and more countries introducing secondary markets with similar regulatory regimes to the AIM following its success in the UK. Examples of countries that implement secondary markets include Belgium, France, Japan, Portugal, Spain as well as the Nordic countries.[4] Another indicator of their popularity is that the number of firms listed in the most prevalent secondary markets increased from 121 in 1995 to over 2,000 in 2018. The total market capitalization of secondary markets also increased from approximately $4 billion in 1995 to over $145 billion in 2018 (see Appendix A). The idea of secondary markets also gains traction in the US.[5] Specifically, in 2012 the US introduced the Jumpstart Our Business Startups (JOBS) Act that exempts small firms from the Sarbanes-Oxley (SOX) Act of 2002, effectively reducing the hinders of small firms seeking capital. The increased interest for secondary markets and their international growth highlights the importance for an investigation of their price run-up levels.

Second, prior literature focuses on the impact of strict insider trading cross-country laws. For example, Bris (2005) reports that it is the toughness of the laws that matters rather than the introduction of insider trading regulations. Beny (2005) finds that countries with stronger insider trading laws experience more accurate stock prices, more liquid stock markets and more dispersed equity ownership. Frijns et al. (2008) argue that effective insider trading regulations reduce the level of information asymmetry on the price volatility and on the cost of trading. In addition, studies have examined whether securities regulations and international stock exchange laws matter. For instance, Brockman and Chung (2003), examining changes in the investor protection rules of the Hong Kong stock exchange, report that stricter rules enhance

[4] The Euronext Growth (formerly known as Alternext) was formed in 2005 and operates in Belgium, France and Portugal; the Mercado Alternativo was formed in 2008 and operates in Spain; Nasdaq's First North was introduced in 2008 and operates in the Nordic countries; the Tokyo Pro market (formerly known as Tokyo AIM) was formed in Japan in 2009.

[5] See for example the white paper from the CFA Institute in May 2016 (https://www.cfainstitute.org/-/media/documents/article/position-paper/united-states-venture-market.ashx).

liquidity. Hail and Leuz (2006) find that countries with strong exchange rules display a lower cost of capital. Cumming et al. (2011), focusing on international stock exchange differences, show that trading activity is related to insider trading and market manipulation exchange rules. We add to this debate by providing evidence on the importance of different exchange regulatory regimes under the same investor protection and legal environment.

Third, this study builds on the literature that highlights the enforcement as the most important part when introducing a new law. For example, Bhattacharya and Daouk (2002) suggest that the introduction of insider trading laws has no effect on the cost of capital; nevertheless, they find a significant reduction following the first enforcement. Frijns et al. (2013) report that the introduction of criminal sanctions in New Zealand in 2008 was unsuccessful due to the country's poor enforcement. Finally, Bhattacharya and Daouk (2009) find that countries that enact laws but do not enforce them, experience higher costs of capital than those that do not enact insider trading laws at all. They conclude that for insider trading laws to work, they must be enforced. Otherwise, if laws are poorly enforced it may be better to have no laws at all. Hence, this paper further examines the effect of the introduction but also the enforcement of stricter country insider trading laws across the two different exchanges.

Our empirical tests are summarized as follows. First, we examine the price run-up patterns for target firms listed in the AIM and in the MM. Due to the different regulatory nature of these two markets and in line with the common view that secondary markets are of lower quality, we examine whether the AIM target firms experience higher levels of abnormal stock returns prior to their takeover announcement compared to their MM counterparts. Second, we examine whether such patterns change following the introduction of stricter insider trading laws. To that end, we use the price run-up patterns around the enactment of the Financial Services & Markets Act (FSMA) in 2001. This Act established the Financial Conduct Authority[6] (FCA) as the

[6] Formerly known as Financial Service Authority or FSA.

single regulator for both markets, with the scope of preventing market abuse and promoting investor protection. Third, we explore whether the increase in regulatory enforcement in the form of criminal convictions in the UK since 2009[7] has changed the perception of potentially informed investors regarding the likelihood of being caught across the two markets.

Our results are summarized as follows. We find abnormal stock returns 40 trading days prior to takeover announcements in both the secondary and the traditional regulated market between 1995 and 2018. The abnormal stock returns persist after controlling for firms that have a high probability of being taken over. This pattern is indicative of information leakage related to the forthcoming takeover prior to its public announcement (Keown and Pinkerton, 1981; Eyssell and Arshadi, 1993; King, 2009). Interestingly, although the AIM has been criticized as a market susceptible to fraud, we find that the returns are 9% higher in the MM compared to those of the AIM. This difference is robust after controlling for a range of market and deal anticipation proxies proposed in relevant studies (Palepu, 1986; Jarrell and Poulsen, 1989; Espahbodi and Espahbodi, 2003). We further find that the difference in the price run-ups reported in the two markets has also an impact on the premium paid by the bidders. We find that the bidders incur part of the cost of information leakage that occurs prior to the announcement by paying higher premiums in the MM but not in the AIM.

We interpret these findings as follows. Even though the AIM market is a light touch regulation market, all firms listed in the AIM are scrutinized and guided by specialist advisers, known as Nominated Advisers (Nomads). The Nomads are accountable to supervise the stock prices of the firms they oversee to track any abnormal behaviors (London Stock Exchange, 2014; 2015b). We conjecture that this framework of close supervision by the Nomads provides better monitoring on informed trading compared to the structure of traditional regulated markets. This result is in line with the view that the optimal level of regulation varies amongst

[7] In 2009, the FCA achieved its first successful criminal sentence for insider trading which was followed by a series of other convictions with regards to insider trading (Goldman et al., 2014).

firms, showcasing that regulators cannot offer "one size fits all" regimes (Mendoza, 2008; Jenkinson and Ramadorai, 2013; Campbell and Tabner, 2014). Another possible interpretation is that large hedge funds typically trade in the MM to pursue larger deals with higher impact on returns. These large funds have recourses to spend on expert networks which provide specialized information about firms. However, although expert networks provide sophisticated advice, they have occasionally been accused of providing confidential price sensitive information. Meanwhile, large funds may also afford to spend resources to track companies in order to gain information edge.[8]

Regarding the insider trading law changes, we find that the introduction of stricter regulations in 2001 with the FSMA does not lead to a reduction in abnormal stock returns prior to takeover deals in any of the two markets. However, we find support that the underline mechanism that reduces pre-announcement price run-ups is the enforcement of the law. Specifically, we find that the manifestation of regulatory enforcement in the form of criminal sanctions in 2009, has a significantly negative effect on the price run-ups for target firms in the MM but not in the AIM. A possible explanation is that the focus of the enforcement is in the MM. In particular, only 11.1% of the prison sentences given to individuals are due to trading in AIM firms, while 75.3% is due to trading in MM firms and the remaining 13.6% is due to trading in non-UK firms.[9] Our results are in line with prior studies reporting that it is the strict enforcement of laws that matters (Bhattacharya and Daouk, 2009; Frijns et al., 2013). We extend this discussion by showing that the focus of the regulatory enforcement within the same country also matters in countering information leakage. Moreover, we show that the number

[8] We thank an anonymous reviewer for these valuable insights. See for example: (https://www.marketwatch.com/story/expert-networks-key-to-sec-insider-trading-cases-2012-11-21) and (https://www.bloomberg.com/news/articles/2017-01-27/hedge-funds-track-j-j-private-jet-for-an-edge-on-actelion-score)

[9] We thank the FCA for providing us with information regarding criminal convictions for insider trading in the UK.

of criminal convictions and the severity of the conviction penalties further assist in reducing the pre-announcement abnormal stock returns.

The contribution of the study is twofold. First, we extend the literature on price run-ups prior to takeovers (e.g., Jabbour et al., 2000; King, 2009; Siganos and Papa, 2015; Dutordoir et al., 2020) by providing first-hand evidence in the unexplored but important setting of two differently regulated markets within the same legal and economic environment. This dimension is critical due to the lack of comparative evidence on price run-up levels between main and secondary markets. This examination is important given the increase in popularity of secondary markets around the world and the volume of takeovers in these markets in particular. For example, the value of takeovers in the AIM has reached a total of over $2.5 billion with more than 200 successful deals between 1995 and 2018. Second, we add to the debate of the influence of insider trading regulations and regulatory enforcement on stock prices (Bhattacharya and Daouk, 2002; Fernandes and Ferreira, 2009; Del Guercio et al., 2017), by assessing their impact on price run-ups in two different regulatory exchanges. We highlight the significance of criminal convictions and further add the important dimension of the regulatory focus within the same country in battling leakage of information.

Our findings and related discussion have important implications for companies and their managers, policy makers and investors in two ways. First, we show that, in contrast to the general view and press critique, the AIM could be a comparable investment environment to the MM, with regards to informed trading. Second, we provide insights on the role of regulatory changes, regulatory focus and criminal sanctions in battling informed trading in the UK for which evidence is lacking.

The remaining of the paper is as follows. Section 2 discusses the background of the UK markets and develops our hypotheses. Section 3 discusses the data selection and summary statistics. Section 4 presents the empirical results and sensitivity tests, and Section 5 concludes.

2. The two UK markets, existing literature, and hypothesis development

2.1 The differences between the two UK exchanges

The UK has two different stock markets. The first market is the MM which provides a large and knowledgeable investor pool, high analyst coverage and offers prestige to the listed firms. It is a world leading market with companies from more than sixty countries across forty sectors (London Stock Exchange, 2010). In addition, the MM features a traditional regulated market. This means that the firms listed in the MM are subject to strict obligations and are monitored and regulated directly by the FCA.The second market is the AIM. It was founded in 1995 to facilitate small firms in need of finance by offering low eligibility listing criteria. The AIM initially acted as a stepping-stone to the MM, however it rapidly started attracting hundreds of firms from the MM gaining its own identity and reputation (Jenkinson and Ramadorai, 2013; Campbell and Tabner, 2014; Siganos et al., 2021). Today it is considered one of the most popular secondary exchanges in the world (Mendoza, 2008; Doukas and Hoque, 2016). The firms listed in the AIM are regulated by the LSE which works closely with other regulators and law enforcement agencies (i.e., the FCA) (Arcot et al., 2007; Gerakos et al., 2013).

The two markets differ substantially on firms' eligibility criteria and ongoing obligations. First, the admission criteria for the AIM are less stringent compared to those of the MM. Specifically, the listing criteria for admission to the AIM (specified by the "*AIM rules for companies*") mandate (1) no minimum percentage of float; (2) no requirement of audited financial statements in the years prior to the listing (nonetheless there is a requirement for a minimum of three years of audited financial statements for the companies that have been trading in other exchanges) and; (3) no minimum market capitalisation. In contrast, the admission to the MM (mandated by the Listing Rules (LR)) require (1) a minimum 25% of float; (2) a minimum of three years of audited financial statements before the admission and (3) a minimum market capitalisation of £700,000. Second, the two exchanges differ in the

annual and compliance costs. Specifically, the AIM is regarded as a less expensive market according to its principles of facilitating small firms in need of finance (London Stock Exchange, 2010; 2015a; b; 2016).

Third, firms listed in the AIM should have a Nomad for the whole duration they are in the exchange, including the time of their listing. No such requirement holds for the firms listed in the MM. The Nomads which are typically accounting firms, investment banks or financial firms, oversee and guide the AIM firms. Specifically, they advise and prepare firms for their listing as well as maintain regular contact and guide them throughout their existence in the exchange. In addition, the Nomads are responsible to regulate the AIM firms and ensure that they comprehend and adhere to the "*AIM rules for companies*". Moreover, and in direct relevance to our study, the Nomads are responsible to monitor the stock prices of the firms they oversee, especially ahead of important corporate events, while they are expected to have draft public announcements before important corporate events to be used in case there is a leakage of sensitive information (London Stock Exchange, 2014; 2015a; b).

Fourth, the MM firms are subject to the UK Corporate Governance Code which stipulates a "*comply or explain*" approach to its provisions. The AIM firms are not subject to the Code, however, they are expected to adhere to a recognised corporate governance code which most of the times is the Quoted Companies Alliance , a governance code for small and medium firms (London Stock Exchange, 2012). Finally, the MM firms are required to produce an insider list that includes details of all individuals with access to inside information. These differences are important as firms with stronger corporate governance are reported to have lower information asymmetries (Karamanou and Vafeas, 2005; Kanagaretnam et al., 2007) which could result in lower informed trading. In addition, the insider list assists on identifying individuals who have access to price sensitive information, which may also lead to less informed trading.

2.2 Price run-ups across the two markets

The asymmetrical information between investors who possess private information about a firm and investors who have access only to public information creates an adverse selection problem in markets where informed investors trade based on price sensitive information (Brown and Hillegeist, 2007). This information advantage could incentivise insiders to pass information to other investors in order to trade on their behalf or sell this private information for profit. Both actions are particularly difficult or even impossible for regulators to monitor.[10] This act of price sensitive information sharing to other trusted individuals for the purpose of trading is known as information leakage. The information chain usually originates from high ranked members of the board, such as executives, followed by close friends and family, and finally business associates (Ahern, 2017).

Prior literature views systematic abnormal stock returns as a sign of leakage of inside information prior to the public announcement of takeovers. For example, in the US, Mandelker (1974), Keown and Pinkerton (1981) and Eyssell and Arshadi (1993) find abnormal stock returns and abnormal trading volume prior to the announcement of M&As and attribute this to leakage of inside information. In Canada, Jabbour et al. (2000) and King (2009) examining samples in the Toronto Stock Exchange (TSE) find price run-ups approximately 50 days prior to the announcement of takeovers. Consistent with these findings, Siganos and Papa (2015) find that rumors cannot fully explain the price run-ups reported prior to takeovers in the UK during the period of 1998-2010, and conclude that there are also signs of information leakage.

In this study, we examine whether different regulatory markets influence the price run-ups prior to the takeover announcements. This is an interesting set-up since the firms listed in the MM are subject to strict regulations (in relation to eligibility criteria, ongoing obligations and

[10] As stated by Margaret Cole, FSA's former managing director of enforcement and financial crime, insider trading cases are always difficult, time-consuming and expensive (https://www.bloomberg.com/features/2016-operation-tabernula/).

corporate governance) while they are subject to higher levels of transparency (Doukas and Hoque, 2016). These features can assist in the reduction of information asymmetry (Kanagaretnam et al., 2007) and thus information leakage. In addition, the MM firms are followed by more analysts and have a larger investor pool. High analyst coverage acts as an external monitoring mechanism which can further contribute in reducing information asymmetry (Jensen and Meckling, 1976; Healy and Palepu, 2001; Yu, 2008). Therefore, the MM could be regarded as a safer investment environment in relation to market exploitation compared to the lightly regulated AIM which has been criticised as being susceptible to market abusive behaviors. Building on that, we formulate our first hypothesis as follows:

Hypothesis 1: Target firms listed in the MM experience lower levels of price run-ups prior to the announcement of takeovers.

An alternative explanation for the price run-ups could be market expectations for the upcoming deals through disclosures, press releases and observations made by market participants (Jensen and Ruback, 1983; Jarrell and Poulsen, 1989). In addition, given the larger investor pool of the MM, it could be expected to have higher market anticipation compared to the AIM. Therefore, we address market anticipation as a potential alternative explanation in sections 4.2 and 4.3.

2.3 The impact of the enactment of insider trading regulations and regulatory enforcement on price run-ups across the two markets

In November 2001, the UK parliament introduced a civil offence on market abuse by enacting the FSMA, targeting to promote investors' protection and to reduce market exploitation. The FSMA expanded upon the Criminal Justice Act 1993 by introducing unlimited fines on market abuse. It further established the FCA in order to regulate the financial markets, exchanges and firms as well as consolidate the UK's financial services law (Cole, 2007). The FCA is an independent, non-governmental body which is funded by the firms it regulates. It holds accountable to the Treasury Ministers and through them to the UK parliament. Its objective is

to reduce financial crime, enhance investor protection and market confidence and promote financial stability in the UK markets. The FCA has the power to prosecute insider trading cases under criminal law while under the Financial Service Act of 2010 it has the power to ban financial professionals for market abuse. The FSMA provides a good opportunity to examine the pre-announcement price-run ups of the AIM and the MM target firms, because it introduced stricter laws with a single regulator for both UK markets. The enactment of FSMA can thus act as a natural experiment for the implementation of strict laws.

However, prior literature suggests that good laws that deter prohibited activities must have a combination of both punishment severity and high probability of detection (Becker, 1968). Meanwhile, the enforcement actions are very important in keeping public confidence in the markets (Persons, 1997). Literature reports that the establishment of insider trading laws can be unsuccessful due to a country's poor enforcement (Bhattacharya and Daouk, 2002; 2009; Frijns et al., 2013; Gębka et al., 2017). This is relevant to our setting because even though the FSMA introduced stricter laws, it has received criticism for poor enforcement.[11] Thus, this event provides an exogenous shock of stricter regulation with low enforcement.

In fact, empirical studies argue that the first-time enforcement of insider trading laws is what often matters. More specifically, first-time enforcement is associated with lower cost of capital (Bhattacharya and Daouk, 2002) and higher stock price informativeness (Fernandes and Ferreira, 2009). Furthermore, Del Guercio et al. (2017) report that insider trading enforcement in the form of increasing SEC's annual budgets to combat insider trading, reduces the pre-announcement run-ups of earnings announcements and takeovers. The first criminal conviction on insider trading in the UK took place on March 2009, followed by numerous convictions.

[11] Some examples of the FCA criticism are the following articles titled: "*FSA failed to issue specific warnings to Dunfermline*" (https://www.ft.com/content/68492f9e-7c60-11de-a7bf-00144feabdc0), "*FSA failed spectacularly over banks"* (https://www.ft.com/content/d42a2a5c-7d31-11de-b8ee-00144feabdc0) and "*Regulator's light touch led to failure"* (https://www.ft.com/content/2bf14c52-24ce-11e1-bfb3-00144feabdc0).

Since criminal convictions are characterised as the strongest form of penalty,[12] we use the first criminal sanctions related to insider trading as an exogenous shock that may influence the price run-ups prior to the announcements of takeovers. We formulate our second hypothesis as follows:

Hypothesis 2a: The introduction of FSMA does not lead to a reduction in the price run-ups prior to the takeovers' announcement.

Hypothesis 2b: The enforcement of insider trading regulations in the form of criminal convictions reduces takeovers' pre-announcement run-ups.

3. Data selection and summary statistics

We collect data on takeovers in the AIM and the MM from 1995 to 2018 and deal characteristics from Refinitiv database. The stock prices, trading volume and stock indices data are employed from Refintiv Datastream database. The accounting data are from Refintiv Worldscope database. Data on the number of individuals convicted for insider trading in the UK are kindly provided by the FCA. The imprisonment penalties and the target firms related to these trades are hand-collected from the FCA announcements or relevant newspapers (e.g., Financial Times). We exclude 13 firms that do not have stock data availability. Hence, the initial sample comprises 3,290 unique firms and 4,840 deals. We then exclude firms that do not have their primary listing in the UK (i.e., AIM or the MM is not the primary exchange), which results in a sample of 4,338 deals. We focus our analysis on publicly listed firms, and, we further exclude Leveraged Buy Outs (LBOs)[13], minority stake purchases, repurchases, privatizations, liquidations, restructurings, reverse takeovers, bankruptcy acquisitions, going

[12] Sara George, a lawyer and partner at Allen & Overy who achieved a successful FCA criminal prosecution related to market abuse, shared her thoughts on the importance of prosecution penalties in the Financial Times "*When the worst that can happen is that you might lose your job and be fined an amount, you can afford to lose. Prison - and you start off in a normal one, it's not straight to Ford (open prison) - that really will make people think twice*" (https://www.ft.com/content/7dc845ea-c9e6-11dc-b5dc-000077b07658).

[13] LBOs constitute approximately 2% of our sample. If we include LBOs, we obtain qualitatively similar results (unreported for brevity) on our empirical tests.

private transactions and deals that worth less than $1 million following Golubov et al. (2012). The final dataset comprises 913 deals of which 682 occurred in the MM and 231 in the AIM.

Table 1 lists the number of takeovers by year along with their respective mean values. Table 2 presents the summary statistics of the target firms by exchange of listing and information about the convictions with regards to insider trading after 2009. There are eight takeovers on average per year in the AIM, with a mean value of $11.66 million per deal. In the MM, there are on average 21 deals per year with a mean value of $36.29 million per deal. Target firms in the MM are typically larger, with higher growth opportunities as seen by the market to book ratio and higher free cash flows. More specifically, the mean total assets of the MM targets are $3,022m with a mean M/B of 2.51, while the respective figures for the AIM targets are $168m and 1.94. In addition, AIM target firms have significantly higher sale growth rates, exhibiting a 61% increase on average prior to takeovers, as opposed to a 17% increase observed in the MM firms.

The mean stock illiquidity is slightly higher in the AIM (0.19) compared to the MM (0.14). Higher illiquidity could lead to lower insider trading profits as well as a higher likelihood of detection (Admati and Pfleiderer, 1988). In addition, it could generate higher price impact for the same amount of trading, which could lead to biased results. However, this is not the case in our setting as the mean difference between the two markets is not statistically significant. Furthermore, there is no significant difference in the mean R&D and leverage between the target firms in the two markets.

After the first conviction for insider trading in 2009, when two individuals were convicted, 29 more individuals have been convicted between 2009 and 2018 bringing the total number to 31 individuals. The highest number of individuals that have been imprisoned in one year is 10, while following the first criminal conviction, the respective mean (median) number by year is 3.1 (2.5). Further, the mean sentence received per individual is 2.17 years with sentences

ranging from 8 months to 4.5 years. Finally, the mean severity of punishment (sum of imprisonment years over the individuals imprisoned by year) is 1.61 years.

[Insert Tables 1 & 2 about here]

4. Empirical findings

4.1 Price run-ups and abnormal trading volume prior to the announcement of takeover deals

We begin our tests by calculating the abnormal stock returns and abnormal trading volume ahead of takeover deal announcements in both the AIM and the MM, in order to examine whether they experience any differences in their trading patterns. We employ a standard event study methodology. Event study methodology as suggested in Fama et al. (1969), is arguably a widely used methodology to measure price reactions around corporate events (Binder, 1998). For our event study, we use an OLS market model as in Brown and Warner (1985).[14] The abnormal returns are estimated as follows:

$$AR_{i,t} = R_{i,t} - \widehat{\alpha_{i,t}} - \widehat{\beta_{i,t}} * R_{M,t} \quad (1)$$

Where $AR_{i,t}$ is the abnormal return of a security i on day t; $R_{i,t}$ is the natural logarithm of the return of security i on day t, $\hat{\alpha}$ and $\hat{\beta}$ coefficients are estimated based on 150 trading days before day -100 relative to the takeover announcement date and $R_{M,t}$ is the return of the market M on day t. As the market benchmark we use the FTSE All Share index for the MM firms and the FTSE AIM All Share index for the AIM firms.

We use the standardized residual test employed in Brown and Warner (1985) to report the significance levels of the pre-announcement returns. We note that although the event study methods are reported to capture abnormal returns adequately when the event dates are known, in cases where the event date is uncertain they do not reject the null hypothesis of zero abnormal

[14] Even though short-horizon abnormal returns are not sensitive to different event models (Armitage, 1995; Dionysiou, 2015), we have also estimated the abnormal returns using the market model and the Buy and Hold Abnormal Returns (BHARs) and find that the results are qualitatively similar.

returns as frequent as they should (Ball and Torous, 1988). Moreover, concerns have been raised on whether event-induced increases in the returns' variance may influence the ability of event studies to capture whether the average effect on stock returns is in fact zero or not (Brown and Warner, 1980; 1985; Brown et al., 1988; Boehmer et al., 1991). To ensure the robustness of our results, we also use alternative approaches to estimate the statistical significance following relevant literature (Penman, 1982; Froot, 1989; Rosenstein and Wyatt, 1990; Boehmer et al., 1991; Cowan, 1992). These include a) sign test, b) cross-sectional test, c) standardised cross-sectional test and, d) the method of moments estimation.

For the estimation of the abnormal trading volume, we follow Bris (2005) and employ the following formula:

$$AV_{i,t} = V_{i,t} - (\bar{V}_i + 2S_{vol})\ if\ V_{i.,t} > \bar{V}_i + 2S_{vol}\ otherwise\ AV_{i,t} = 0 \qquad (2)$$

Where $AV_{i,\,t}$ is the abnormal trading volume of a firm *i* on day *t*; $V_{i,t}$ is the trading volume of firm *i* on day *t* over the number of common shares outstanding and $\bar{V}_i$ and S_{vol} are the mean and standard deviation of firm *i* over the estimation window (-250, -101). The event window is (-40, -1) matching the event window of the abnormal stock returns.

As illustrated in Figure 1, the first sign of abnormal stock returns in the MM appears approximately 40 trading days prior to each deal announcement, hence day -40 is the starting day of our event window (-40, -1). However, to ensure that our results are not influenced by the selection of this specific window, we further use the event windows of -30, -20, and -10 days to day -1. Figure 1 shows that the MM firms experience higher abnormal stock returns compared to the AIM firms. We further analyze the abnormal stock returns and abnormal trading volume in Table 3 which reports the Cumulative Average Abnormal Returns (CAAR) and the Cumulative Average Abnormal Volume (CAAV).

[Insert Figure 1 about here]

In Panel A of Table 3 we find that the difference in the announcement reaction to takeovers (i.e., in CAARs and CAAV) is not significantly different between the two markets, which

shows that they do not respond differently to the takeover announcement news. With regards to our first hypothesis, we find that the target firms in the AIM experience CAARs of 2.3% and CAAV of 0.4%, significant at the 1% level, 40 trading days prior to the announcement of the deal. The target firms in the MM experience higher CAARs of 11.3% and CAAV of 2.0% during the same period. These results are significant at the 1% level. [15] The difference in the price run-ups and the abnormal trading volume between the two samples in the (-40, -1) window is 9% and 1.6% respectively with the results being significant at the 1% level.[16] The results are qualitatively similar when we use the alternative windows of (-30, -1), (-20, -1) and (-10, -1). Our findings show that the target firms in the AIM experience lower abnormal stock returns and trading volume when compared to the MM target firms. However, these abnormal stock returns could be attributed either to information leakage or market anticipation (Jensen and Ruback, 1983). Further, the lower abnormal stock returns in the AIM could be either attributed to lower information leakage in the AIM or to more speculative discussions and in turn higher anticipation of a takeovers for firms listed in a larger market with a larger investor pool such as the MM. We explore these alternative explanations in the next sections.

[Insert Table 3 about here]

4.2. Takeover probability

In this section, we explore whether the abnormal price reactions reported prior to both markets and the abnormal stock return differences between the AIM and the MM are associated with a higher likelihood for a firm to be a takeover target. To do so, we follow prior literature that predicts M&As (Powell, 2004; Brar et al., 2009) and perform a logit regression where target firms are equal to one and control firms are equal to zero. The control firms for the AIM and the MM targets are firms featured in the yearly constituent lists of the FTSE AIM All Share

[15] The statistical significance of CAARs is qualitatively similar when we test the significance levels using a) sign test, b) cross-sectional test, c) standardised cross-sectional test and, d) the method of moments estimation.
[16] To ensure that our results are not influenced by the announcement effect, we replicate our tests using the interval periods of (-40, -2 and -40, -3). The results are qualitatively similar.

and the FTSE All Share, respectively, and have not been takeover targets during that year. We select three control firms per target firm and match them based on year and industry characteristics following Espahbodi and Espahbodi (2003).

We add a number of firm characteristic variables that could be associated with market anticipation. Specifically, we include size (*Size)*, sales growth *(Sales Growth)*, market-to-book ratio (*M/B*), free cash flows (*FCF*), research and development expenses (*R&D*), dividend yield (*Dividend Yield*), leverage (*Leverage*), liquidity (*Liquidity*), growth-resource mismatch (*GR mismatch)* following relevant literature (Hasbrouck, 1985; Jensen, 1986; Palepu, 1986; Smith Jr and Watts, 1992; Song and Walkling, 1993; 2000; Espahbodi and Espahbodi, 2003). We further include the mean abnormal stock returns over the past three years *(Historical stock return)* as a proxy for management inefficiency (Palepu, 1986) and momentum (Brophy et al., 2009; Lins et al., 2017; Dissanaike et al., 2020). All continuous variables are winsorised at the 1 and 99% level. A list with the definitions of all variables is presented in Appendix B.

The results of the logit regression (untabulated for brevity) show that large firms with high free cash flow and growth-resource imbalance are more likely to become takeover targets in the AIM. In addition, firms with low growth, low leverage, low historical stock returns, high free cash flow and growth-resource imbalance, have higher probability to become takeover targets in the MM.

Next, we split the target firms into firms with high and low probability of being taken over and re-calculate their returns.[17] If firms with high probability of being taken over have

[17] To split the sample into two groups, we compare the estimated takeover probability of each firm with the optimal cut-off probability (Palepu, 1986). If a firm's probability is higher (lower) than the cut-off probability, the firm is classified as a firm with high (low) probability of being taken over. For the calculation of the cut-off probability, we construct ten deciles sorted in descending order based on takeover probability following Powell (2004) and Brar et al. (2009). Each decile has the same number of firms. The optimal cut-off probability is then the first takeover probability in the portfolio with the highest concentration ratio (ratio of takeovers over the total number of firms in the portfolio). In untabulated results, we find that the highest concentration ratio is in the second to last decile for the AIM targets and the last decile for the MM targets. Specifically, the cut-off probability for the AIM targets is 0.30, and for the MM targets is 0.40. On average, the model predicts approximately 70% of target and non-target firms for both markets.

significantly higher returns compared to their counterparts, this would suggest that the abnormal stock returns are due to market anticipation. As reported in Panel B of Table 3, we find no significant differences between the two groups in the 40-day pre-announcement window. We also find that firms with low probability of being taken over, experience abnormal stock returns of 12.2% in the MM and 1.6% in the AIM. These findings suggest that only a part of the abnormal returns can be attributed to market anticipation offering support to the information leakage hypothesis.

Finally, we calculate the difference of the 40-day pre-announcement stock returns between the two markets, only for the groups of firms with low takeover probability. The difference between the two markets is 10.6% significant at the 1% level. This finding suggests that the difference between the two markets is attributed to lower levels of information leakage in the AIM.

These findings contradict our first hypothesis and the general view that the AIM firms are more prone to market abusive behaviors. We interpret the results as follows. The lower abnormal stock returns in the AIM could be attributed to lower information leakage, due to the distinctive Nomad regulation. The Nomads are responsible to monitor the stock prices of the firms they regulate (London Stock Exchange, 2014; 2015b) and have been reported to play an important role in the AIM as they reduce information leakage of firms which switch between the AIM and the MM (Siganos et al., 2021). Indicative of the influence and contribution of the Nomads on the firms they oversee, is that they have been reported to increase the survivability rates of the AIM firms by a median of 33 months (Espenlaub et al., 2012). An alternative explanation for this result could be that large hedge funds that often trade in the MM could afford to acquire an information edge through participation in expert networks. While these networks are legal, the information shared might cross the line to price sensitive information leading to higher price run-ups in the MM.

4.3 Market anticipation

In this section, we examine whether the difference in the pre-announcement returns between the two samples persists after the inclusion of control variables that are associated with higher market and deal anticipation. We estimate the following multivariate regression:

$$CAAR_{i,t} = \alpha + \beta_1 * AIM_{i.t} + \beta_2 * Firm\ controls_{i,t-1} + \beta_3 * Deal\ controls_{i,t} + \beta_4 * Industry\ activity_{i,t} + \gamma * Year + \varepsilon_{i,t} \quad (3)$$

The dependent variable is the *CAAR* which represents the cumulative average abnormal stock returns for the period (-40, -1). The independent variable of interest is the *AIM*. If the abnormal stock price differences are due to lower information leakage levels in the AIM, we expect this variable to be negative and significant. We control for all firm characteristics discussed in Section 4.2 (Size, sales growth, market-to-book ratio, free cash flows, research and development expenses, dividend yield, leverage, liquidity, growth-resource mismatch and historical stock returns). We also include a number of deal and market characteristics that could be associated with high likelihood of acquisition. Specifically we include stock illiquidity (*Stock illiquidity*), rumors from media[18] (*Rumors*), hostile bidders (*Hostile*), whether there is already an established equity position from the acquirer (*Toehold*), whether the target was pursued by another firm in the preceding year (*Past acquisition*), the number of bidders (*Number of bidders),* the number of target advisors (*Number of target advisors),* whether the offer is cash only *(Cash offer),* whether the bidder is a public firm *(Public Bidder),*whether the acquirer and the target operate in the same industry *(Same Industry),* whether the deal is cross-border *(Cross-border)* and whether there was another takeover in the target firm's industry in the previous year (*Industry activity)* following relevant literature[19] (Jensen and Ruback, 1983; Kyle, 1985; Huang and Walkling, 1987; Admati and Pfleiderer, 1988; Jarrell and Poulsen,

[18] It has been reported that market anticipation over acquisitions could stem from information provided in various press releases (Jensen and Ruback, 1983).

[19] Malatesta and Walkling (1988) and Comment and Schwert (1995) also report that firm with poison pill takeover defences tend to be less likely to become takeover targets. In our sample, there are no firms with poison pill defences in place and as such we do not include this variable.

1989; Holmström and Tirole, 1993; Mitchell and Mulherin, 1996; Cole, 2007; Eckbo, 2009; Brigida and Madura, 2012; Betton et al., 2014; Madura et al., 2014; Dai et al., 2017; Dutordoir et al., 2020).

All continuous variables are winsorised at the 1% and 99% level. A list with the definitions of all variables is presented in Appendix B. The correlations (untabulated for brevity) among the variables used in our empirical tests do not raise any concerns of multicollinearity.

The estimates of the multivariate regressions are presented in Table 4. We find that the pre-announcement abnormal stock returns are significantly lower in the AIM compared to the ones in the MM, even after controlling for several market and deal anticipation characteristics. More specifically, the AIM target firms experience 7.2% lower CAARs compared to the MM target firms.[20] This result is significant at the 1% level. This finding showcases that the difference in the abnormal pre-announcement stock returns between the two markets is not fully explained by the greater anticipation in the MM and hence it could be attributed to the different regulatory structure of the exchanges. Consistent with the literature (e.g., Jarrell and Poulsen, 1989; Sanders and Zdanowicz, 1992), we find that the pre-announcement abnormal stock returns are greater by 8.2% when there are rumors about the forthcoming deal. In addition, as expected based on relevant studies (e.g., Madura et al., 2014), when the target and bidder are in the same industry the pre-announcement stock returns are lower by 6.4%.

[Insert Table 4 about here]

4.4 Introduction and enforcement of stricter insider trading regulations across the two markets

In this section, we examine the effectiveness of stricter regulations as well as of greater regulatory enforcement to address hypothesis two. As discussed in Section 2.3, the introduction of FSMA in 2001 serves as an exogenous shock of a strict law with low enforcement while the

[20] Once again, the results are qualitatively similar when we replicate the regressions using the interval periods of (-40, -2) and (-40, -3) to mitigate concerns of the announcement effect in our results.

first criminal sanction for insider trading in 2009 serves as an exogenous shock of high enforcement since it reflects the first of many convictions.

First, we plot the mean 40-day pre-announcement abnormal stock returns for each market by year, number of convictions and severity of penalty (in mean years of imprisonment) to examine whether there is any correlation between these patterns. As seen in Figure 2, the severity of penalties is not pronounced on a specific year. In addition, the introduction of FSMA is not followed by a reduction in the abnormal returns in any of the two markets. In contrast, there is a marked decrease in the abnormal stock returns the year after the first criminal conviction related to insider trading in the MM. However, this is not evident in the AIM. A possible explanation is that approximately 75% of all convictions are related to trading in MM firms while only 11.1% are related to trading in the AIM. The reduction in pre-announcement stock returns is evident from year 2010 which is the year when the FCA achieved the highest amount of convictions ever. This indicates that regulatory enforcement matters albeit only in the markets where the regulators focus on.

[Insert Figure 2 about here]

To delve further into this, first, we re-estimate equation (3) by adding two indicator variables. The first indicator variable is the *FSMA*, which takes the value of one if the deal was announced between November 2001 and February 2009 and zero otherwise, capturing the date after the introduction of FSMA and before the first insider trading conviction. The second indicator variable is the *Enforcement* which takes the value of one if the deal was announced between March 2009 and December 2018 and zero otherwise, capturing the date after the first insider trading conviction to the end of our sample.

As shown in Column (1) of Table 5, we do not find that FSMA and reduces the pre-announcement price run-ups. This suggests that regulation alone does not significantly aid in limiting market abusive behaviors. In contrast, we find evidence that the enforcement significantly reduces the price run-ups prior to the takeover announcements. Specifically, we

find that after the first criminal conviction the CAARs are reduced by approximately 7% on the full sample. These results are in line with previous studies that report that it is the enforcement that matters rather than the introduction of a strict regulation (Bhattacharya and Daouk, 2002; 2009; Frijns et al., 2013).

In Columns (2) and (3), we split the sample into AIM and MM targets to assess whether the enforcement impacts only the MM target firms as indicated from Figure 2. We find that indeed the reduction in the CAARs is driven by the MM target firms since for AIM targets the enforcement coefficient is not significant. This supports our earlier argument that the focus of enforcement in the MM has an impact in the reduction of pre-announcement abnormal stock returns.

To further confirm our previous findings, we examine whether the impact of the enforcement on the MM target firms is significantly different to the impact on the AIM target firms. We therefore employ a difference in differences specification. *AIM* is a binary variable that takes the value one if the firm is listed in the AIM and zero if the firm is listed in the MM. *Enforcement* is a binary variable that takes the value of one if the M&A took place after the enforcement of insider trading laws (March 2009), and zero otherwise. The variable of interest in this test is the effect of the enforcement of insider trading laws on price run-ups conditional on the exchange of listing, i.e., the interaction term *AIM * Enforcement* presented in column (4) of Table 5. In line with our previous findings, we observe that the coefficient on the interaction is 0.092 and significant at the 10% level, showing that after the first criminal conviction, the MM target firms experienced an incremental decrease in the pre-announcement price run-ups of 9.2% compared to the AIM target firms.

As a robustness check, we re-estimate the regressions using two alternative time period sub-samples. First, in Column (5) we examine the effect of FSMA before and after its introduction but censoring the sample to before the initiation of enforcement through criminal convictions. This is from January 1995 to February 2009. Consistent to our previous findings,

we do not find that FSMA significantly affects pre-announcement stock returns. Second, to provide a cleaner test on the impact of stricter enforcement, in Column (6) we censor our sample below 2001 thus keeping only the sub-sample of target firms after the introduction of FSMA. We do so to assess the period before and after the initiation of stricter enforcement while FSMA was in place. In line with our previous findings, we find that stricter enforcement reduces the pre-announcement abnormal stock returns by 5.8%.

Finally, to examine whether the magnitude and severity of the enforcement influences the reduction in the pre-announcement stock returns we add the variables *Conviction* and *Severity*.[21] *Conviction* reflects the number of individuals imprisoned for insider trading each year and proxies for the extent of enforcement. *Severity* captures the severity of punishment measured as the sum of imprisonment years over the individuals imprisoned in each year. Columns (7) and (9) show the results for the AIM targets and Columns (8) and (10) present the respective results for the MM targets. We note that in line with our expectations, the *Conviction* and *Severity* coefficients are negative and significant for the MM targets indicating that the higher the number of convictions and the higher the severity the lower the price run-up levels. However, consistent to our earlier findings, the number of convictions and the severity of punishment do not yield significant results in AIM targets.

In summary, the results in Table 5 indicate that the introduction of stricter regulations with FSMA in November 2001 did not significantly reduce the price run-ups. However, the enforcement of law through criminal convictions from March 2009 onwards, significantly reduced the pre-announcement price run-ups of target firms trading in the MM. These findings suggest that the enforcement of strict laws plays an important role in countering potential leakages of information prior to takeovers. We further note that the enforcement has a higher impact on the market with the greater regulatory focus. This is evident by the reduction of price

[21] These are added interchangeably due to high correlation between them.

run-ups in MM targets, where 75% of the convictions are related to trading in this market. Thus, we bring a new dimension that should be taken into account when battling leakage of information. Our results are supported by the additional tests incorporating the number and severity of convictions.

[Insert Table 5 about here]

4.5 Additional tests

4.5.1 The impact of run-ups on premiums

In this section, we examine the impact of run-ups on the premiums paid by the acquiror. According to the substitution effect hypothesis, higher pre-announcement run-ups can affect the premium paid by the acquiror. More specifically, bidders may attempt to offset a portion of the higher target run-up price with a lower bid premium. Schwert (1996) shows that US bidders do not consider the pre-announcement run-ups when determining the total premium. In contrast, Madura et al. (2014) find a positive relation between the premium offered by the bidder and the pre-announcement price run-ups in Europe. To examine whether the information leakage experienced by target firms is associated with the premium paid by the bidders, we follow Schwert (1996) and Madura et al. (2014) and estimate the following multivariate regression:

$$Premium_{i,t} = \alpha + \beta_1 * CAAR\ residual_{i.t} + \beta_2 * Firm\ controls_{i,t-1} + \beta_3 * Deal\ controls_{i,t} + \beta_4 * Industry\ activity_{i,t} + \gamma * Year + \varepsilon_{i,t} \quad (4)$$

The dependent variable is the *Premium*, which represents the difference of the offer price and the target firm's stock price, four weeks before the acquisition announcement, divided by the latter. CAAR residual is the residual from the regression in equation (3). The residual captures the target's pre-announcement stock run-up in excess of the expected run-up when taking into account firm and deal characteristics. We further control for firm and deal characteristics as described in equation (3).

As reported in Table 6, we find no relation between *Premium* and *CAAR residual* for the full sample. However, when we split the sample into AIM and MM deals, we find a positive relation between the two variables in the MM sample where the price-run ups are significantly higher. More specifically, the coefficient is 0.447 and significant at the 1% level.[22] These results suggest that bidders pay higher premiums when the pre-announcement price run-ups are high. The results are in line with Madura et al. (2014) and imply that bidders incur part of the cost of informed trading that occurs prior to the announcements of takeovers. Thus, we show that the difference in the run-ups reported in the two markets has a systematic impact on the premiums paid for targets.

[Insert Table 6 about here]

4.5.2 Robustness tests

In this section, we employ a series of additional tests to assess the robustness of our findings. Firms that trade in the AIM are typically small. This may raise concerns over the stock liquidity of these firms. To mitigate such concerns we estimate the CAARs using two different methodologies developed by Scholes and Williams (1977) and Dimson (1979) aiming to control for thin trading by making use of lags and leads for the estimation of the model parameters. The results presented in Panels A and B of Table 7, report that the CAARs are qualitatively similar to our main findings. This suggests that our baseline results are not biased by thin trading.

To ensure the comparability of target firms listed in the two markets and to alleviate concerns that the different pre-announcement returns may reflect differences in deal quality[23],

[22] The results are qualitatively similar when we use two alternative measurements for the calculation of *Premium*: 1) the ratio of the offer price to the target's stock price four weeks before the acquisition announcement minus one (Levi et al., 2014) and 2) the difference between the offer price and the target's total assets per share over the latter (Li et al., 2019). Furthermore, the results are qualitatively similar when we use one week premium (difference between offer price and the target firm's stock price, one week before the acquisition announcement divided by the latter).

[23] In particular, one concern could be that higher pre-announcement returns in one market may reflect higher deal quality (more valuable synergies, expectation of lower premium paid). With this measure, pre-announcement runups are normalized by deal quality, captured by (-40, 0) and hence these concerns are mitigated.

we follow Jarrell and Poulsen (1989) and Meulbroek (1992) and measure the proportion of total price movement that occurs prior to the takeover announcements. More specifically, we scale the pre-bid stock price run-up (-40, -1) by the total stock price run-up (-40, 0) for each target firm. The results reported in Panel C of Table 7 show that the scaled price movement before the takeover announcements is economically (12.9% vs 39.8%) and statistically different (at the 10% level) between the AIM and the MM targets. To further ensure comparability, we match the AIM with the MM targets within the same year and industry (using ICB classification) that have the smallest deviation in the sum of their size and M/B. As reported in Panel D of Table 7, the CAAR difference between the two markets when following this alternative matching approach, is 7.2%, significant at the 5% level.[24] These findings confirm our baseline results that the MM targets experience significantly higher levels of price run-ups prior to the takeover announcement compared to their AIM counterparts.

We further exclude deals on the years 1999-2000 and on the years 2007-2008 in order to examine whether our results are driven by the dot-com bubble and the global financial crisis following relevant literature (Falato and Liang, 2016; Dissanaike et al., 2020; Li, 2020; Andriosopoulos and Panetsidou, 2021). The results reported in Panel E of Table 7, show that the CAARs are qualitatively similar to our main findings suggesting that our results are not driven by the dot-com bubble or the global financial crisis.

[Insert Table 7 about here]

Next, we re-run our baseline regression (equation 3) converting all negative price run-ups into zeros. This is because negative run-ups might occur when private information is overwhelmed by the target's adverse conditions (Jarrell and Poulsen, 1989; Madura et al., 2014). The results of these tests are reported in Panel A of Table 8 and show that our findings do not change when we proceed with this conversion. Furthermore, although the event window

[24] The results are qualitatively similar when we estimate equation (3) for matched firms.

that we choose in our baseline results is reflecting the fact that the price run-ups initiate approximately on day -40, to ensure that our results are not influenced by the specific window chosen, we use alternative event windows. We re-run equation (3) using the event windows of, -30, -20 and -10 days to day -1 of the announcement of the takeover deals. Panel B of Table 8 includes three different specifications, each with a different CAARs window as described above. The coefficients on the *AIM*, which is the variable of interest, range from -5.2% (on the -30, -1 window) to -3.1% (on the -10, -1 window) and are significant at least at the 5% level. These findings confirm our baseline results that target firms trading in the AIM experience lower levels of price run-ups that could be attributed to lower levels of information leakage prior to the announcement of takeovers.

[Insert Table 8 about here]

Finally, we examine whether target firms in the AIM experience significantly lower abnormal trading volume compared to MM target firms, when controlling for deal anticipation variables. Prior literature has reported that abnormal trading volume prior to the announcement of takeovers could be another sign of information leakage (Keown and Pinkerton, 1981; Eyssell and Arshadi, 1993; Jabbour et al., 2000; King, 2009). In line with this literature and our previous results on abnormal stock returns, Table 9 shows that AIM target firms experience approximately 4% lower CAAV, 40 trading days prior to the takeover announcement compared to the MM target firms after controlling for market anticipation. These results are significant at the 5% level. We note that these results should be interpreted with caution due to the limited data availability on trading volume.

[Insert Table 9 about here]

5. Conclusion

This study explores the levels of price run-ups between a secondary market and a traditional regulated market in the UK. The UK offers a unique environment as it is home to two exchanges with different exchange regulations under the same legal and economic

environment. In addition, it hosts one of the most popular, rapid growing and successful secondary markets in the world (Mendoza, 2008; Vismara et al., 2012) that inspired the introduction of numerous other secondary markets around the globe, highlighting the importance of an exploration on secondary markets trading environment. Our assessment focuses on takeover deals as not only are they major corporate events but they are known to significantly impact the stock prices (Servaes, 1991; Kaplan and Weisbach, 1992). Consequently, takeovers could create incentives for informed trading and thereby information leakage. Furthermore, this study examines the impact of the implementation of insider trading regulations and stricter enforcement across the two markets.

We find that target firms in the AIM experience significantly lower abnormal stock returns and trading volume 40 trading days prior to takeover announcements compared to MM target firms. These results are robust after controlling for firm and deal characteristics that could be associated with high likelihood of acquisition, indicating that market anticipation cannot fully explain the abnormal stock returns thus providing support to the information leakage hypothesis. In addition, we find that the difference in the run-ups reported in the two markets has also an impact on the premiums paid for targets in the MM. These findings indicate that in contrast to the controversial reputation of the AIM, it could be considered to offer high quality monitoring when it comes to information leakage. In addition, we report that the introduction of strict regulations does not reduce the abnormal price patterns in any of the two markets. However, we find that the strict enforcement of laws through criminal convictions, reduce the price run-ups prior to the takeover deals in the MM but not in the AIM. We argue that the enforcement is effective on the market with the greater regulatory focus, as approximately 75% of the convictions related to insider trading are due to trading in the MM. Finally, we report that the number of convictions and the severity of punishment also play a significant role in reducing the price run-up levels.

Our study contributes to the growing literature of information leakage by shedding light on the importance of the exchange regulatory environments, regulatory changes, enforcement and focus in monitoring the pre-announcement abnormal behaviors prior to takeovers. Our results have important policy implications, as they show that exchange regulations should be considered in addressing informed trading. More specifically, the use of Nomads for large firms could merit consideration by policy makers given their effectiveness in battling price run-ups prior to M&A announcements. Our results further highlight the importance of criminal convictions in limiting price run-ups prior to takeovers. Our findings in the success of criminal convictions in reducing price run-ups prior to M&As in the UK could therefore be considered in other jurisdictions. Overall, our findings can be of importance to regulators on the monitoring of markets, to policy makers in understanding the behavior and regulatory needs of secondary markets and implicitly to investors in avoiding market exploitation.

A limitation of our study is that, in line with other studies which explore abnormal stock returns prior to public announcements (Keown and Pinkerton, 1981; Meulbroek, 1992; Jabbour et al., 2000; King, 2009; Dutordoir et al., 2020), our results can only indicate that there are transactions by a wider pool of investors with inside information, without being able to offer proof. Still, this approach is valid and often used by the SEC and the FCA as the first sign of abusive behavior by a firm or an individual (Mitchell and Netter, 1994; Goldman et al., 2014). In addition, although we use alternative tests to ensure the statistical significance of our results, we acknowledge the limitations of the event study methodology.

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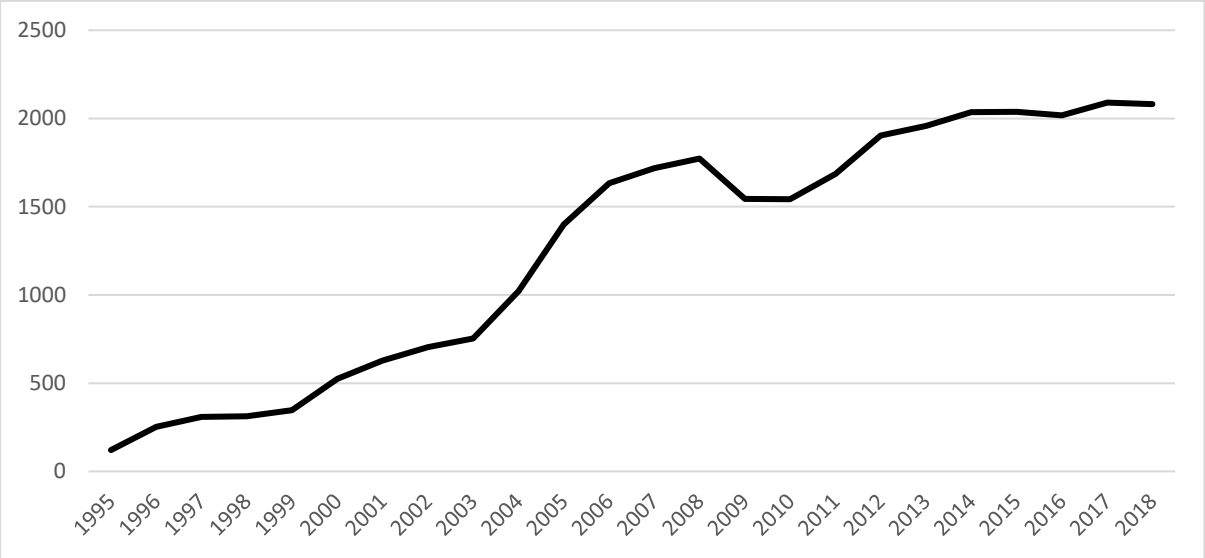
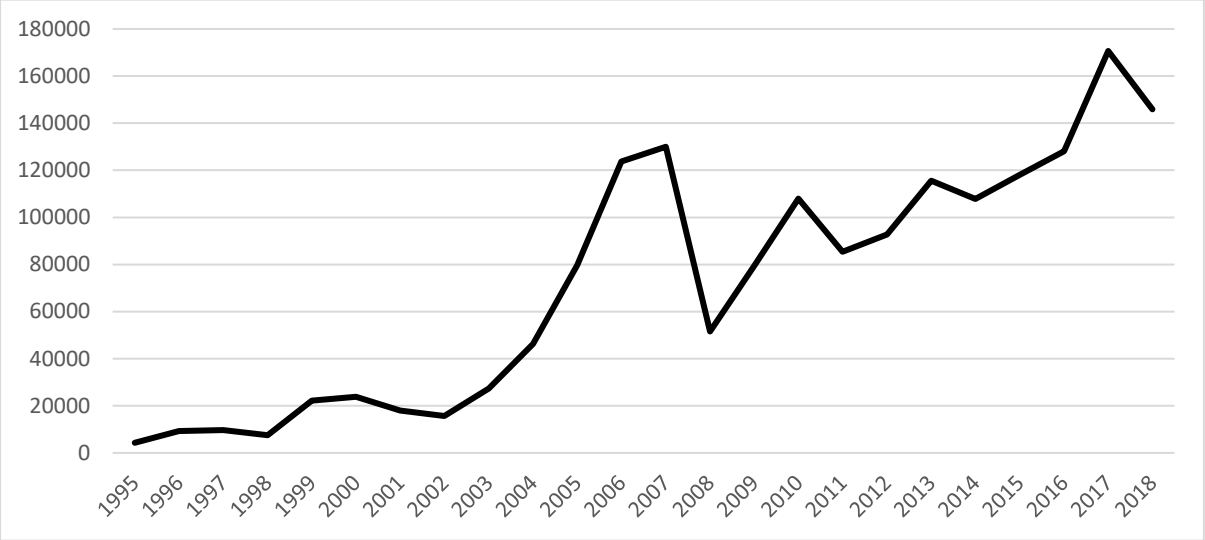
Appendix A: Historical total listing and market capitalization in secondary markets

Total listings



Market capitalization ($mil)



This appendix presents the total number of firms listed and the market capitalization of the largest secondary markets from 1995 to 2018. These secondary markets include: the AIM in the UK, the Bratislava MTF in Slovenia, the Euronext growth in Belgium, France and Portugal, the Mercado Alternativo in Spain, the Nasdaq's First North in Nordic countries, the NewConnect in Poland and the Tokyo Pro market in Japan. The data are hand collected from the exchanges' websites. The market capitalization is shown in 2015 US dollars.

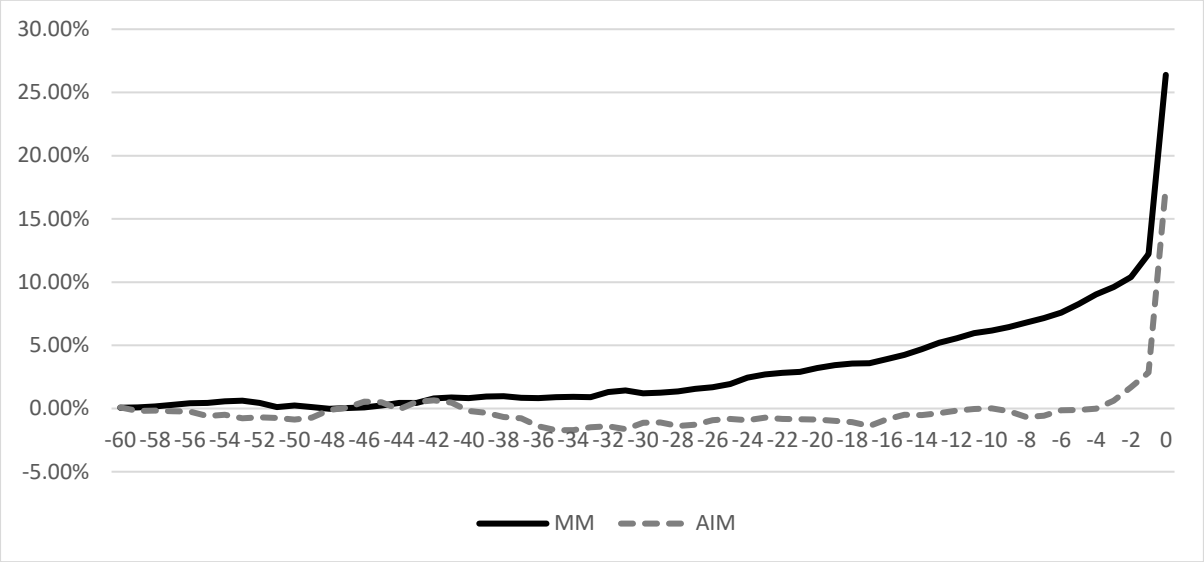
Appendix B: Variable definitions

Variable	Definition
AIM	An indicator variable that takes the value of one if the target firm was listed in the AIM and zero otherwise.
CAAR	A variable that represents the cumulative average abnormal stock returns for the period (-40, -1) following an OLS market model as in Brown and Warner (1985).
CAAR residual	A variable that represents the residual from the regression in equation (3).
Cash offer	An indicator variable that takes the value of one if the offer is cash only and zero otherwise (Thomson One item "Consideration structure").
Conviction	A variable that indicates the number of individuals imprisoned for insider trading. Data is provided by the FCA.
Cross-border	An indicator variable that takes the value of one if the deal is cross-border and zero otherwise (Thomson One item "Cross-border deal").
Dividend yield	Dividend per share as a percentage of the share price (DS item DY).
Enforcement	An indicator variable that takes the value of one if the deal was announced between March 2009 and December 2018.
FCF	The ratio of free cash flow calculated as cash flow from operations (WS item WC04860) less cash flow from investing activities (WS item WC04870) scaled by the total assets (WS item WC02999).
FSMA	An indicator variable that takes the value of one if the deal was announced between November 2001 and February 2009.
Growth resource mismatch	An indicator variable that takes the value of one if the target firm has a combination of i) above average growth, below average liquidity and above average leverage; or ii) below average growth, above average liquidity and below average leverage and zero otherwise.
Historical stock return	Average abnormal stock returns compared to the FTSE AIM all share for the AIM targets or compared to the FTSE all share for the MM targets over the three years prior to the deal (-750, -40).
Hostile	An indicator variable that takes the value of one if the bid was hostile and zero otherwise (Thomson One item "Deal Started as Unsolicited Flag").
Industry activity	An indicator variable that takes the value of one if there was another takeover in the target firm industry (using ICB industry classification) in the previous year and zero otherwise.
Leverage	Average leverage ratio calculated as total debt (WS item WC032555) to total assets over the three years prior to the deal announcement. If there is no data for three consecutive years, we use the previous two years instead.
Liquidity	Average liquidity ratio calculated as cash (WS item WC02003) to total assets over the three years prior to the deal announcement. If there is no data for three consecutive years, we use the previous two years instead.
M/B	Market to book ratio of the target firm (DS item MVTB).
Number of bidders	A variable that indicates the number of bidders interested in the target firm (Thomson One item "Number of Bidders").
Number of target advisors	A variable that indicates the number of advisors of the target firm involved in the deal (Thomson One item "Number of Target Advisors").
Past acquisition	An indicator variable that takes the value of one if the target is pursued by another firm in the previous year and zero otherwise.
Premium	The difference between the offer price and the target firm's stock price, four weeks before the acquisition announcement divided by the latter (Thomson One item "Offer price to target stock price premium 4 weeks prior to announcement").
Public bidder	An indicator variable that takes the value of one if the bidder is a public firm and zero otherwise (Thomson One item "Acq Public Status").

R&D	The ratio of R&D expensed over total assets (WS item WC01201).
Rumors	An indicator variable that takes the value of one if the acquisition was rumored prior to the deal announcement and zero otherwise (Thomson One item "Deal Began as Rumor")
Sales growth	Average sales (WS item WC01001) percentage change over the three years prior to the takeover announcement. If there is no data for three consecutive years, we use the previous two years instead.
Same industry	An indicator variable that takes the value of one if both the target and bidder are in the same industry and zero otherwise.
Severity	A variable that indicates the severity of punishment calculated as the sum of imprisonment years over the number of individuals imprisoned. The years of imprisonment are hand-collected from FCA announcements and relevant newspapers such as the Financial Times.
Size	The natural logarithm of the total assets (WS item WC02999) of the target firm in thousand US dollars.
Stock illiquidity	Stock illiquidity is measured using the Amihud illiquidity ratio (Amihud, 2002). This is calculated as the average absolute value of the daily stock return over the daily dollar volume (price multiplied by volume) over the period -250 to -101 days prior to the takeover announcement.
Toehold	An indicator variable that takes the value of one when the acquirer holds a toehold and zero otherwise (Thomson One item "Percent of Shares Held at Announcement").

This appendix presents the variables used in the empirical analysis. All accounting data are measured at the fiscal year end prior to the announcement of the deal, unless stated otherwise.

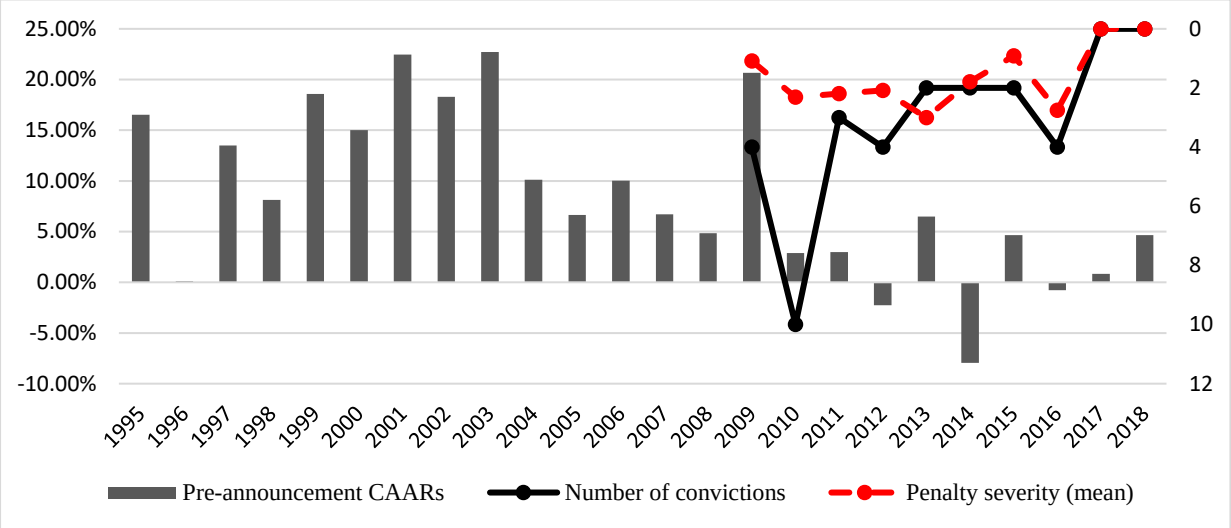
Figure 1: Cumulative abnormal returns on the two UK exchanges



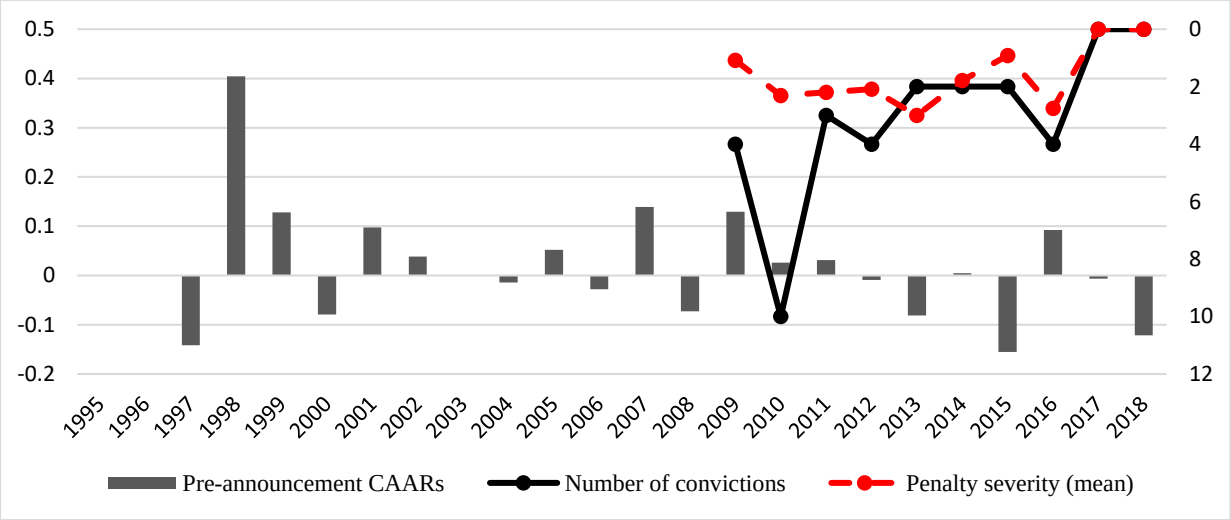
This figure shows the moving average of the cumulative abnormal stock returns of target firms in the two different UK exchanges. The horizontal axis represents the days, and the vertical axis represents the cumulative abnormal stock returns. The event day is day 0. The solid line represents the abnormal returns of the Main Market (MM) targets, and the dotted line shows the abnormal returns of the Alternative Investment Market (AIM) targets.

Figure 2: Cumulative average abnormal returns, convictions and severity by year

MM



AIM



This figure shows the cumulative average abnormal stock returns (CAAR) of target firms in the MM and the AIM along with the number of individuals imprisoned by the FCA and the mean penalty severity by year. For the calculation of the CAAR we use an OLS market model, following Brown and Warner (1985).

Table 1: Takeover deals by year

Year	Panel A: AIM targets			Panel B: MM targets		
	Number of deals	Total value ($m)	Mean value ($m)	Number of deals	Total value ($m)	Mean value ($m)
1995	0	0.00	0.00	23	1,181.48	51.37
1996	0	0.00	0.00	25	554.64	22.19
1997	1	16.00	16.00	51	391.82	7.68
1998	1	7.00	7.00	76	578.78	7.62
1999	12	37.08	3.09	102	523.79	5.14
2000	11	106.45	9.68	70	1,301.63	18.59
2001	5	36.60	7.32	37	805.78	21.78
2002	6	46.00	7.67	20	939.65	46.98
2003	5	19.80	3.96	20	519.45	25.97
2004	11	34.36	3.12	22	1,405.14	63.87
2005	12	117.17	9.76	40	1,821.25	45.53
2006	18	84.28	4.68	27	458.81	16.99
2007	29	246.86	8.51	28	1,341.46	47.91
2008	19	216.68	11.40	19	2,626.95	138.26
2009	21	129.14	6.15	10	789.80	78.98
2010	16	117.63	7.35	19	717.11	37.74
2011	10	184.50	18.45	11	520.00	47.27
2012	6	206.17	34.36	10	664.20	66.42
2013	11	47.27	4.30	5	1,075.00	215.00
2014	8	700.38	87.55	7	1,317.71	188.24
2015	8	97.75	12.22	25	1,356.40	54.26
2016	8	128.25	16.03	13	414.85	31.91
2017	6	62.17	10.36	15	2,468.20	164.55
2018	7	52.14	7.45	7	974.00	139.14
Total	231	2,693.68	11.66	682	24,747.90	36.29

This table reports the number and dollar value (total and average) of takeover deals by year between 1995 and 2018. Panel A shows the takeover deals in the AIM and Panel B shows the respective MM targets. Data on takeovers are collected from Thomson One.

Table 2: Summary statistics of target firms and insider trading convictions

	Mean	Median	Minimum	Maximum	SD	N
Panel A: AIM targets						
Size	168.51	38.72	0.37	12,000.00	871.72	205
Sales growth	0.61	0.05	-1.00	37.41	3.12	196
M/B	1.94	1.43	-11.24	29.52	3.44	202
Free cash flow	-0.12	-0.03	-2.74	0.78	0.34	204
R&D	0.02	0.00	0.00	0.72	0.08	205
Dividend yield	1.00	0.00	0.00	15.38	1.91	208
Leverage	0.18	0.07	0.00	7.62	0.55	204
Liquidity	0.18	0.13	0.00	0.83	0.18	178
Stock illiquidity	0.19	0.01	0.00	11.25	1.14	227
Panel B: MM targets						
Size	3,022.00	189.67	4.30	120,000.00	14,300.00	625
Sales growth	0.17	0.01	-0.57	39.90	1.71	630
M/B	2.51	1.72	-11.24	29.52	3.72	599
Free cash flow	0.01	0.14	-1.62	3.84	0.24	604
R&D	0.02	0.00	0.00	0.81	0.06	625
Dividend yield	3.35	3.25	0.00	17.39	2.92	661
Leverage	0.20	0.18	0.00	1.33	0.17	619
Liquidity	0.10	0.06	0.00	0.93	0.13	552
Stock illiquidity	0.14	0.00	0.00	11.26	1.16	565

Panel C: Differences between the two markets				
	Mean	p-value	Median	p-value
Size	-2,853.49***	(0.000)	-150.95***	(0.000)
Sales growth	0.44*	(0.063)	0.04***	(0.004)
M/B	-0.57**	(0.048)	-0.29***	(0.009)
Free cash flow	-0.13***	(0.000)	-0.17***	(0.000)
R&D	-0.00	(0.553)	0.00	(0.134)
Dividend yield	-2.35***	(0.000)	-3.25***	(0.000)
Leverage	-0.02	(0.561)	-0.11***	(0.000)
Liquidity	0.08***	(0.000)	0.07***	(0.000)
Stock illiquidity	0.05	(0.596)	0.01***	(0.000)

Panel D: Individuals imprisoned for insider trading following the first conviction in 2009						
	Mean	Median	Minimum	Maximum	SD	Sum
Conviction	3.10	2.50	0.00	10.00	2.85	31.00
Years in prison	2.17	2.00	0.66	4.50	1.12	70.37
Severity	1.61	1.94	0.00	3.00	1.07	16.12

This table shows the summary statistics of the takeover targets and information on individuals imprisoned for insider trading. Panel A reports the statistics of the AIM target firms, Panel B presents the statistics of the MM target firms, Panel C shows the differences between the two markets and Panel D shows the statistics on the individuals and prison sentences after the first criminal conviction. For a detailed description of all variables please see Appendix B. Stock and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. Information on conviction cases is provided by the FCA and imprisonment penalties data are hand-collected from FCA announcements or relevant newspapers (e.g., Financial Times). p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 3: Abnormal stock returns and trading volume of target firms

Panel A: Stock returns and trading volume differences between the AIM and the MM targets			
	AIM deals	MM deals	Difference
Cumulative average abnormal returns (CAAR)			
(-40, -1)	0.023***	0.113***	-0.090***
	(0.000)	(0.000)	(0.000)
(-30, -1)	0.045***	0.108***	-0.063***
	(0.000)	(0.000)	(0.000)
(-20, -1)	0.037***	0.093***	-0.056***
	(0.000)	(0.000)	(0.000)
(-10, -1)	0.029***	0.062***	-0.033***
	(0.000)	(0.000)	(0.000)
(-1, 1)	0.165***	0.171***	-0.006
	(0.000)	(0.000)	(0.718)
N	231	682	913
Cumulative average abnormal volume (CAAV)			
(-40, -1)	0.004***	0.020***	-0.016***
	(0.000)	(0.000)	(0.001)
(-30, -1)	0.003***	0.016***	-0.013***
	(0.000)	(0.000)	(0.002)
(-20, -1)	0.001***	0.012***	-0.011***
	(0.001)	(0.000)	(0.004)
(-10, -1)	0.001**	0.003***	-0.002*
	(0.046)	(0.000)	(0.055)
(-1, 1)	0.022***	0.030***	-0.008
	(0.000)	(0.000)	(0.535)
N	35	93	128
Panel B: Stock returns differences between high and low takeover probability firms			
	High probability	Low probability	Difference
AIM deals			
(-40, -1)	0.028***	0.016***	0.012
	(0.000)	(0.000)	(0.761)
(-1, 1)	0.202***	0.183***	0.019
	(0.000)	(0.000)	(0.629)
N	43	103	146
MM deals			
(-40, -1)	0.142***	0.122***	0.020
	(0.000)	(0.000)	(0.413)
(-1, 1)	0.219***	0.168***	0.051***
	(0.000)	(0.000)	(0.006)
N	115	375	490
Panel C: Stock returns differences between AIM and MM firms with low takeover probability			
	AIM deals	MM deals	Difference
(-40, -1)	0.016***	0.122***	-0.106***
	(0.000)	(0.000)	(0.000)
(-1, 1)	0.183***	0.168***	0.015
	(0.000)	(0.000)	(0.532)
N	103	375	478

This table shows the CAARs and the CAAV of the AIM and the MM target firms. Panel A shows the CAAR and CAAV differences between AIM and MM targets. Panel B reports the CAAR differences between firms with high and low takeover probability and Panel C shows the CAAR differences between AIM and MM targets for firms with low takeover probability. Stock returns, trading volume and indices data are retrieved from Refinitiv Datastream. p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 4: Abnormal stock returns and exchange differences

	Dependent variable: Cumulative average abnormal returns	
	(1)	(2)
	(-40, -1)	(-40, -1)
AIM	-0.069***	-0.072***
	(0.002)	(0.005)
Size		-0.000
		(0.403)
Sales growth		0.003*
		(0.086)
M/B		0.001
		(0.815)
Free cash flow		0.012
		(0.823)
R&D		-0.198
		(0.226)
Dividend yield		-0.002
		(0.600)
Leverage		0.005
		(0.820)
Liquidity		0.014
		(0.869)
GR mismatch		-0.024
		(0.255)
Historical stock return		-3.573
		(0.675)
Stock illiquidity		-0.066
		(0.254)
Rumors		0.082**
		(0.013)
Hostile		-0.022
		(0.479)
Toehold		-0.013
		(0.596)
Past acquisition		0.048
		(0.127)
Number of bidders		0.039
		(0.280)
Number of target advisors		0.015
		(0.313)
Cash offer		0.044
		(0.107)
Public bidder		-0.002
		(0.919)
Same industry		-0.064**
		(0.015)
Cross border		-0.003
		(0.909)
Industry activity		0.001
		(0.969)
Constant	0.165***	-0.043
	(0.000)	(0.623)
Year fixed effects	Yes	Yes
R^2	0.089	0.163
N	913	529

This table shows the estimates of the regressions. The dependent variable is the 40-day pre-announcement CAAR of target firms. The first column reports a univariate regression, and the second column shows a multivariate regression which includes controls for various market and deal anticipation characteristics. For a detailed description of all variables please see Appendix B. Stock and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 5: Stricter laws and enforcement analysis

	Dependent variable: Cumulative average abnormal returns									
	(1) Full sample	(2) AIM	(3) MM	(4) Diff in Diff	(5) Pre-enforcement	(6) Post-FSMA	(7) AIM conviction	(8) MM conviction	(9) AIM severity	(10) MM severity
	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)	(-40, -1)
AIM	-0.077***			-0.121***	-0.138***	-0.058**				
	(0.002)			(0.000)	(0.000)	(0.023)				
FSMA	-0.013	0.110	-0.004		-0.002					
	(0.636)	(0.485)	(0.883)		(0.946)					
Enforcement	-0.068**	0.098	-0.085**	-0.091***		-0.058**				
	(0.032)	(0.546)	(0.017)	(0.001)		(0.017)				
AIM*Enforcement				0.092*						
				(0.058)						
Conviction							0.001	-0.012**		
							(0.877)	(0.011)		
Severity									-0.017	-0.040**
									(0.562)	(0.019)
Size	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	0.000	-0.000
	(0.543)	(0.584)	(0.583)	(0.563)	(0.991)	(0.389)	(0.656)	(0.539)	(0.506)	(0.531)
Sales growth	0.004**	0.004	0.002	0.005***	0.006**	0.003*	0.003*	0.004*	0.003	0.003
	(0.020)	(0.139)	(0.309)	(0.007)	(0.010)	(0.081)	(0.071)	(0.084)	(0.124)	(0.135)
M/B	0.001	0.006	0.002	0.001	-0.000	0.000	0.006	0.002	0.006	0.002
	(0.708)	(0.443)	(0.683)	(0.700)	(0.990)	(0.923)	(0.441)	(0.624)	(0.468)	(0.672)
Free cash flow	0.018	0.128	-0.133*	0.011	-0.014	0.062	0.119	-0.124*	0.137	-0.131*
	(0.746)	(0.191)	(0.056)	(0.835)	(0.838)	(0.312)	(0.213)	(0.069)	(0.199)	(0.054)
R&D	-0.219	-0.157	-0.145	-0.223	-0.258	-0.190	-0.162	-0.107	-0.135	-0.113
	(0.152)	(0.550)	(0.348)	(0.147)	(0.183)	(0.280)	(0.535)	(0.459)	(0.616)	(0.441)
Dividend yield	-0.004	-0.004	-0.004	-0.004	-0.009*	0.001	-0.004	-0.002	-0.003	-0.003
	(0.306)	(0.750)	(0.395)	(0.270)	(0.065)	(0.863)	(0.694)	(0.572)	(0.804)	(0.493)
Leverage	0.006	0.067	0.060	-0.001	0.062	0.026	0.063	0.062	0.069	0.067
	(0.790)	(0.131)	(0.416)	(0.966)	(0.405)	(0.295)	(0.143)	(0.400)	(0.133)	(0.361)
Liquidity	0.010	-0.155	0.089	0.006	0.070	-0.011	-0.151	0.079	-0.137	0.087
	(0.907)	(0.307)	(0.393)	(0.939)	(0.446)	(0.904)	(0.329)	(0.439)	(0.354)	(0.402)
GR mismatch	-0.021	-0.018	-0.034	-0.023	-0.037	-0.010	-0.016	-0.032	-0.012	-0.035
	(0.301)	(0.697)	(0.198)	(0.251)	(0.187)	(0.659)	(0.727)	(0.227)	(0.800)	(0.185)
Hist. stock return	-5.597	37.009***	-20.192*	-4.858	-12.713	-1.966	37.096***	-21.441*	38.143***	-21.067*
	(0.520)	(0.002)	(0.084)	(0.577)	(0.198)	(0.833)	(0.002)	(0.058)	(0.002)	(0.064)

Stock illiquidity	-0.061	-0.090	0.134	-0.052	-0.075	-0.071	-0.086	0.130	-0.099	0.177
	(0.380)	(0.189)	(0.703)	(0.431)	(0.318)	(0.298)	(0.198)	(0.707)	(0.188)	(0.621)
Rumors	0.098***	0.113	0.092***	0.098***	0.109***	0.107***	0.098	0.099***	0.101	0.096***
	(0.000)	(0.165)	(0.001)	(0.000)	(0.000)	(0.001)	(0.191)	(0.000)	(0.171)	(0.001)
Hostile	-0.034	-0.020	-0.030	-0.028	-0.031	-0.018	-0.013	-0.035	-0.030	-0.033
	(0.234)	(0.651)	(0.368)	(0.334)	(0.455)	(0.530)	(0.771)	(0.299)	(0.554)	(0.321)
Toehold	-0.011	-0.076	0.011	-0.012	0.012	-0.043*	-0.073	0.013	-0.070	0.016
	(0.631)	(0.121)	(0.697)	(0.603)	(0.649)	(0.085)	(0.139)	(0.631)	(0.151)	(0.576)
Past acquisition	0.059**	0.120	0.038	0.057**	0.031	0.058*	0.117	0.043	0.119	0.040
	(0.041)	(0.153)	(0.196)	(0.044)	(0.329)	(0.083)	(0.150)	(0.143)	(0.150)	(0.170)
No of bidders	0.037	-0.005	0.046	0.036	0.034	0.015	-0.003	0.048	0.000	0.051
	(0.210)	(0.931)	(0.210)	(0.230)	(0.277)	(0.569)	(0.955)	(0.177)	(0.996)	(0.165)
No of T. Advisors	0.014	-0.019	0.016	0.015	0.002	0.016	-0.020	0.008	-0.016	0.009
	(0.341)	(0.625)	(0.313)	(0.289)	(0.912)	(0.292)	(0.597)	(0.588)	(0.690)	(0.547)
Cash offer	0.039	0.102*	0.011	0.038	0.057*	0.036	0.106*	0.010	0.107*	0.011
	(0.137)	(0.093)	(0.701)	(0.137)	(0.076)	(0.241)	(0.086)	(0.729)	(0.091)	(0.707)
Public bidder	-0.003	0.015	-0.007	-0.001	-0.012	0.003	0.013	-0.002	0.011	-0.004
	(0.907)	(0.764)	(0.762)	(0.968)	(0.666)	(0.895)	(0.798)	(0.947)	(0.829)	(0.879)
Same industry	-0.062**	-0.058	-0.060***	-0.061**	-0.061**	-0.077**	-0.055	-0.059***	-0.062	-0.061***
	(0.011)	(0.457)	(0.006)	(0.012)	(0.018)	(0.010)	(0.483)	(0.007)	(0.443)	(0.005)
Cross border	-0.012	-0.023	-0.008	-0.009	-0.005	-0.032	-0.022	-0.014	-0.024	-0.009
	(0.567)	(0.652)	(0.723)	(0.687)	(0.870)	(0.183)	(0.666)	(0.539)	(0.632)	(0.685)
Industry activity	0.012	-0.098	0.036	0.018	0.068	-0.004	-0.094	0.039	-0.109	0.033
	(0.747)	(0.168)	(0.360)	(0.615)	(0.118)	(0.932)	(0.155)	(0.309)	(0.132)	(0.387)
Constant	0.056	0.001	0.019	0.050	0.018	0.077	0.093	0.006	0.114	0.012
	(0.362)	(0.995)	(0.793)	(0.400)	(0.808)	(0.227)	(0.433)	(0.932)	(0.355)	(0.867)
R^2	0.124	0.254	0.130	0.130	0.154	0.128	0.250	0.123	0.254	0.130
N	529	136	393	529	361	379	136	393	136	393

This table shows the reaction of price run-ups in the target firms listed in the AIM and the MM after the introduction of FSMA in November 2001, and after the first criminal conviction with regards to insider trading from the FCA in March 2009. The dependent variable is the Cumulative average abnormal returns. Column (1) reports the results for the full sample. Columns (2) and (3) show the results separately for the AIM and the MM takeover targets, respectively. Column (4) presents the difference in differences analysis. Column (5) shows the results taking into account only the pre-enforcement period, January 1995 to February 2009. Column (6) shows the results considering only the post FSMA introduction period, November 2001 to December 2018. Columns (7) – (10) report alternative tests using the number and the severity of convictions in the AIM and the MM. For a detailed description of all variables please see Appendix B. Stock and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. Information on conviction cases is provided by the FCA and imprisonment penalties data are hand-collected from FCA announcements or relevant newspapers (e.g., Financial Times). p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 6: The effect of price run-ups on premiums

	Dependent variable: Premium		
	Full sample	AIM	MM
Residual CAAR	0.145	-0.206	0.447***
	(0.360)	(0.585)	(0.000)
Size	-0.000	-0.000	-0.000**
	(0.154)	(0.880)	(0.044)
Sales growth	-0.013	-0.046	0.000
	(0.220)	(0.194)	(0.933)
M/B	-0.009*	0.038	-0.008*
	(0.060)	(0.335)	(0.055)
Free cash flow	0.140	0.797	0.367***
	(0.258)	(0.301)	(0.008)
R&D	0.195	-1.024	0.545
	(0.694)	(0.479)	(0.190)
Dividend yield	-0.018	0.016	-0.011
	(0.165)	(0.754)	(0.103)
Leverage	0.279**	0.771**	-0.331***
	(0.015)	(0.037)	(0.009)
Liquidity	0.104	0.713	-0.260
	(0.519)	(0.135)	(0.118)
GR mismatch	0.043	0.287	0.074*
	(0.578)	(0.307)	(0.085)
Historical stock return	-75.246***	-144.613	-60.344***
	(0.007)	(0.110)	(0.002)
Stock illiquidity	-0.138	-0.592	-0.936
	(0.588)	(0.368)	(0.104)
Rumors	0.183***	0.014	0.198***
	(0.006)	(0.970)	(0.001)
Hostile	0.062	-0.156	0.115**
	(0.492)	(0.715)	(0.046)
Toehold	0.149	0.547	-0.033
	(0.367)	(0.267)	(0.468)
Past acquisition	0.077	0.022	0.062
	(0.319)	(0.941)	(0.202)
No of bidders	0.104*	0.112	0.122**
	(0.084)	(0.679)	(0.016)
No of T. advisors	-0.049	0.077	-0.050*
	(0.164)	(0.643)	(0.066)
Cash offer	0.007	-0.390	0.159***
	(0.960)	(0.361)	(0.000)
Public bidder	-0.108**	-0.694*	-0.061*
	(0.036)	(0.067)	(0.095)
Same industry	-0.007	0.097	0.002
	(0.890)	(0.559)	(0.965)
Cross border	0.087	-0.076	0.066*
	(0.148)	(0.685)	(0.062)
Industry activity	-0.240	-1.554	0.037
	(0.404)	(0.247)	(0.538)
Constant	0.668**	3.809	0.447***
	(0.039)	(0.134)	(0.000)
Year fixed effects	Yes	Yes	Yes
R^2	0.153	0.341	0.347
N	529	136	393

This table shows the estimates of the regressions. The dependent variable is the Premium. For a detailed description of all variables please see Appendix B. Stock and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 7: Abnormal stock returns, thin trading and matching, robustness test

	AIM deals	MM deals	Difference
Panel A: Cumulative average abnormal returns, Scholes and Williams (1977)			
(-40, -1)	0.022***	0.111***	-0.089***
	(0.000)	(0.000)	(0.000)
(-1, 1)	0.164***	0.170***	-0.006
	(0.000)	(0.000)	(0.709)
N	231	682	913
Panel B: Cumulative average abnormal returns, Dimson (1979)			
(-40, -1)	0.024***	0.115***	-0.091***
	(0.000)	(0.000)	(0.000)
(-1, 1)	0.165***	0.171***	-0.006
	(0.000)	(0.000)	(0.719)
N	231	682	913
Panel C: Proportion of pre-announcement price-run ups			
(-40, -1) / (-40, 0)	0.129***	0.398***	-0.269*
	(0.000)	(0.000)	(0.059)
	231	682	913
Panel D: Cumulative average abnormal returns, Matching between AIM and MM targets			
(-40, -1)	0.039***	0.111***	-0.072**
	(0.000)	(0.000)	(0.014)
(-1, 1)	0.179***	0.201***	-0.022
	(0.000)	(0.000)	(0.419)
N	131	131	262
Panel E: Cumulative average abnormal returns, excluding dot-com and global financial crisis			
(-40, -1)	0.013***	0.097***	-0.078***
	(0.000)	(0.000)	(0.001)
(-1, 1)	0.163***	0.173***	-0.010
	(0.000)	(0.000)	(0.599)
N	160	460	775

This table shows the CAAR of the AIM and the MM target firms as well as the difference between them using different methodologies. Panels A and B present the differences considering the issue of thin trading. Panel A shows the CAAR following the methodology of Scholes and Williams (1977) and Panel B following the methodology of Dimson (1979). Panel C reports the pre-announcement price-run ups calculated as CAAR (-40-1) over CAAR (-40, 0). Panel D shows the CAAR on matched AIM and MM targets. Panel E shows the CAAR excluding the years of the dot-com bubble and the global financial crisis. Stock returns and indices data are retrieved from Refinitiv Datastream. p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 8: Different event windows and no negative returns, robustness test

	Dependent variable: Cumulative average abnormal returns			
	Panel A: No negatives	Panel B: Different windows		
	(-40, -1)	(-30, -1)	(-20, -1)	(-10, -1)
AIM	-0.041**	-0.052**	-0.051***	-0.031**
	(0.020)	(0.014)	(0.004)	(0.024)
Size	-0.000**	-0.000	-0.000	0.000
	(0.016)	(0.603)	(0.545)	(0.390)
Sales growth	0.001	0.004**	0.008**	0.000
	(0.480)	(0.011)	(0.041)	(0.956)
M/B	0.002	0.003	-0.001	0.001
	(0.465)	(0.286)	(0.748)	(0.517)
Free cash flow	-0.031	-0.006	-0.014	-0.017
	(0.412)	(0.896)	(0.717)	(0.601)
R&D	-0.145	-0.252*	-0.090	-0.168**
	(0.145)	(0.086)	(0.365)	(0.048)
Dividend yield	-0.005*	0.001	0.000	-0.001
	(0.092)	(0.885)	(0.928)	(0.768)
Leverage	0.001	0.009	-0.001	-0.014
	(0.949)	(0.631)	(0.932)	(0.291)
Liquidity	0.002	0.023	-0.001	0.023
	(0.973)	(0.737)	(0.977)	(0.582)
GR mismatch	-0.027*	-0.013	0.013	0.013
	(0.072)	(0.463)	(0.406)	(0.296)
Historical stock	-15.200**	-9.844	-9.532	-4.513
	(0.012)	(0.187)	(0.127)	(0.339)
Stock illiquidity	-0.010	-0.036	0.053	0.014
	(0.776)	(0.347)	(0.287)	(0.691)
Rumors	0.053**	0.078***	0.070***	0.041**
	(0.030)	(0.004)	(0.005)	(0.043)
Hostile	-0.021	-0.019	-0.019	-0.013
	(0.381)	(0.433)	(0.374)	(0.383)
Toehold	-0.023	-0.011	-0.007	0.016
	(0.255)	(0.615)	(0.726)	(0.303)
Past acquisition	0.032	0.044	0.029	0.012
	(0.185)	(0.130)	(0.210)	(0.475)
No of bidders	0.034	0.029	0.017	0.007
	(0.261)	(0.335)	(0.461)	(0.608)
No of T. advisors	0.008	0.009	0.005	0.003
	(0.483)	(0.493)	(0.628)	(0.700)
Cash offer	0.009	0.048**	0.041**	0.038***
	(0.598)	(0.043)	(0.049)	(0.010)
Public bidder	-0.009	-0.005	0.001	0.010
	(0.566)	(0.809)	(0.963)	(0.431)
Same industry	-0.047***	-0.047**	-0.016	-0.025*
	(0.004)	(0.026)	(0.340)	(0.076)
Cross border	0.011	-0.007	0.006	0.008
	(0.472)	(0.725)	(0.701)	(0.514)
Industry activity	0.021	0.038	0.051**	0.051***
	(0.491)	(0.215)	(0.049)	(0.007)
Constant	0.039	0.103	0.103*	-0.013
	(0.567)	(0.142)	(0.089)	(0.803)
Year fixed effects	Yes	Yes	Yes	Yes
R^2	0.201	0.179	0.173	0.165
N	529	529	529	529

This table shows the estimates of the regressions. The dependent variable is the 40-day pre-announcement CAAR of target firms. Panel A shows the CAAR when converting all negative CAAR into zeros and Panel B when using different event windows. For a detailed description of all variables please see Appendix B. Stock and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. p-values are shown in the parentheses. The symbols *, ** and *** show significance at the 10, 5 and 1% levels, respectively.

Table 9: Abnormal trading volume and exchange differences

	Dependent: Cumulative average abnormal volume	
	(1)	(2)
	(-40, -1)	(-40, -1)
AIM	-0.017**	-0.042**
	(0.022)	(0.012)
Size		-0.000
		(0.942)
Sales growth		0.038
		(0.204)
M/B		-0.001
		(0.763)
Free cash flow		0.030
		(0.673)
R&D		-0.021
		(0.936)
Dividend yield		-0.001
		(0.919)
Leverage		0.072
		(0.303)
Liquidity		0.041
		(0.469)
GR mismatch		0.005
		(0.773)
Historical stock return		-4.212
		(0.436)
Stock illiquidity		0.273
		(0.347)
Rumors		0.025
		(0.334)
Hostile		-0.003
		(0.845)
Toehold		0.023
		(0.200)
Past acquisition		-0.000
		(0.999)
Number of bidders		0.021
		(0.163)
Number of target advisors		0.001
		(0.949)
Cash offer		0.002
		(0.894)
Public bidder		-0.005
		(0.710)
Same industry		-0.010
		(0.462)
Cross border		-0.006
		(0.604)
Industry activity		-0.015
		(0.394)
Constant	0.027***	-0.051
	(0.000)	(0.378)
Year fixed effects	Yes	Yes
R^2	0.286	0.513
N	107	71

This table shows the estimates of the regressions. The dependent variable is the 40-day pre-announcement CAAV of target firms. Column (1) reports a univariate regression, and the second column shows a multivariate regression controlling for various deal anticipation characteristics. For a detailed description of all variables please see Appendix B. Volume and indices data are retrieved from Refinitiv Datastream. Financial data are collected from Refinitiv Worldscope. p-values are shown in the parentheses. The symbols ** and *** show significance at the 5 and 1% levels, respectively.

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