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**The effectiveness of insider trading
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The effectiveness of insider trading regulations: The case of the Italian tender offers

Riccardo Ferretti* · Pierpaolo Pattitoni** · Anna Salinas***

Abstract. This study analyzes the effectiveness of the Market Abuse Directive (MAD) in reducing the possible profits of insider trading during voluntary tender offers with the purpose of delisting initiated by controlling shareholders in Italy. Our results suggest that the introduction of the MAD did not produce appreciable effects on the magnitude of abnormal returns and volumes noted in the period preceding the announcement of a tender offer. However, a regression analysis reveals that the MAD has changed the manner in which certain corporate characteristics influence the capacity of insiders to achieve profits. In particular, in the post-MAD period, the market reaction to tender offer announcements tends to be greater for bigger firms. On the other hand, the effect of ownership concentration has become virtually null. We interpret the results in light of the economic problem of the potential insider who chooses the optimal level of insider trading by considering the marginal costs and benefits of the illegal activity.

Keywords. Market Abuse Directive; Tender offer; Delisting; Event study

JEL Classification. G14; G34; K2; K4

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1 Introduction

In many countries, primary and secondary regulations intended to prevent and punish the abuse of privileged information (so-called 'insider trading') have been in place for some time (Linciano 2003). As Rose and Sørpstad (2014) note

(t)he motivation for regulating insider trading is based upon an assumption that markets will function better and be more efficient if all participants are on an 'equal footing'.

In a related vein, the European regulation (Directive 2014/57/EU) states that

(a)n integrated and efficient financial market and stronger investor confidence requires market integrity. The smooth functioning of securities markets and public confidence in markets are prerequisites for economic growth and wealth. Market abuse harms the integrity of financial markets and public confidence in securities, derivatives and benchmarks.

If insider trading increases the conflict between minority shareholders (outsiders) and managers and/or controlling shareholders (insiders), an effective regulation should reduce the agency's costs and therefore increase the firm value, even though the literature is not unanimous that insider trading is always a negative element in the agency relationship (Beny 2008). Beny (2008) finds indeed that, in common law countries, stricter insider trading regulations and enforcement do increase firm value. However, the same result is not found in civil law countries, where, Beny (2008) notes, 'investor protections are relatively weaker'. Therefore, the effectiveness of insider trading regulations may depend on the institutional context in which they are applied.

Furthermore, the introduction of insider trading regulations does not always produce the desired effects. For example, Bris (2005), examining a sample of 52 countries, documents that the introduction of insider trading regulations makes, at times, insider trading even more profitable without appreciably decreasing its frequency. As Bris (2005) notes, this puzzling result is at the heart of the ‘fundamental dilemma’ faced by regulators: ‘by prohibiting insider trading, they make it more profitable’.

In Europe, the insider trading regulations are contained in the Market Abuse Directive (Directive 2003/6/CE - MAD) (Engelen 2006; Forbes 2013). In 2011, the European Commission proposed a reform to the MAD to address its ineffective application in the individual member states. Such reform came to fruition in 2014 with the transformation of the MAD into Regulation 596/2014 (MAR), which was immediately applicable in the member states, and the introduction of the Directive 2014/57/EU (MAD2) intended to establish a framework for criminal prosecution. Among the objectives of the reform was the tightening of regulations on market abuse and their extension to new negotiation platforms and the over-the-counter (OTC) markets, the development of which made monitoring activities in search of possible abuses difficult.

Our study is motivated by the debate on the revision to the MAD and the conflicting results of the application of the regulations on insider trading documented in the literature. In order to identify the critical aspects of the MAD and propose potential changes to improve its effectiveness, it is necessary to assess the effects of this directive from the moment in which it took effect. In our analysis, we specifically focus on the possibility of earning profits from insider trading during voluntary tender offers with the purpose of delisting initiated by controlling shareholders in Italy.

We chose this type of operation because, as noted by Keown and Pinkerton (1981), Meulbroek (1992), Bris (2005) and Pattitoni et al. (2015), tender offers are operations in which the risk of insider trading is particularly high. For example, during the time period of our analysis, 50% of all investigations for insider trading started by the Consob¹ concerned precisely tender offer operations. In these operations, the abuse of privileged information can be very profitable. Moreover, focusing on voluntary tender offers with the purpose of delisting initiated by controlling shareholders allows us to better identify the day when the operation is announced to the financial community, since the official announcement of a tender offer is rarely preceded by other press releases that can modify market expectations on the probability of the operation. In addition, analyzing these operations reduces the risk of unintentional leaks of information, since tender offers initiated by controlling shareholders are, in contrast with tender offers promoted by third parties, typically not preceded by lengthy negotiations. Finally, the effects of these operations on share prices are generally limited to the day of the announcement: voluntary tender offers with the purpose of delisting initiated by controlling shareholders concern, by definition, minority shares and, thus, do not attract competing bids that may increase the offer price.

On the other hand, we chose Italy in order to analyze a civil law country given the evidence of reduced effectiveness of insider trading regulations in countries with this type of legal system and, in particular, a country in which outsider protection is considered limited (Melis 2000; Volpin 2002). As Volpin (2002) notes, Italy is a country that ‘features weak legal protection of creditors and shareholders, inefficient law enforcement, high ownership concentration’. This low protection may indeed

¹ The Consob (*Commissione Nazionale per le Società e la Borsa* or National Commission for Companies and the Stock Exchange) is the authority that is responsible for protecting investors and the effectiveness, transparency, and development of the Italian securities market.

simplify the econometric identification of the effects investigated in our study as it worsens the problems caused by agency conflicts between outsiders and insiders.

In the first step of our analysis, we test by means of an event study if the MAD effectively discouraged insider-trading activities during tender offers. This analysis specifically aims at evaluating whether the introduction of the MAD produced appreciable effects on the magnitude of abnormal returns and volumes registered in the period preceding the announcement of tender offers, when the information on the operation is still confidential. Second, we perform a poolability test based on regression analysis to determine which corporate characteristics make the events of insider trading more relevant and whether the MAD has changed the influence of these characteristics on the capacity of insiders to achieve profits.

The paper is organized as follows. Section 2 illustrates the changes in the insider trading regulations arising from the adoption of the MAD and the approval of the savings protection reform law (L. 28/12/05, n. 262) in Italy. Section 3 proposes a case study concerning a voluntary tender offer initiated by majority shareholders in order to explain in detail the type of operations considered in our empirical analysis. Section 4 presents our empirical analysis and interpret the main findings in light of the economic problem of the potential insider who chooses the optimal level of insider trading by considering the marginal costs and benefits of the illegal activity. Section 5 provides some policy suggestions and concluding remarks.

2 Regulations on insider trading in Italy

Our empirical analysis proposes a comparison between the pre-MAD and post-MAD adoption period in Italy. In this section, we illustrate the Italian institutional context

and in particular how adopting the provisions of the European directive modified the Italian regulations.

Insider trading is considered a form of market abuse². The dense body of preventive and punitive provisions on insider trading is intended to ensure the integrity of the financial markets and increase investor confidence.

In Europe, the current legislation on insider trading is based on the MAD (Directive 2003/6/EC of January 28, 2003) that sets forth the combined rules to combat insider trading and market manipulation (together defined as market abuses). The adoption of the MAD was implemented according to the so-called Lamfalussy Procedure. This procedure provides for the cascading application of a first-level directive (the MAD) and a series of second-level directives (2003/124/EC, 2003/125/EC, 2004/72/EC) and community regulations (2003/2272/EC). The procedure also relies on the guidelines of the Committee of European Securities Regulators (CESR/04-505b, CESR/06-562b, CESR/09-219), today the European Securities and Markets Authority.

In Italy, the MAD was adopted by Community Law 2004 (Law no. 62 of April 18, 2005), taking effect on May 12, 2005. The Community Law 2004 included changes to the Consolidated Finance Act (*Testo Unico della Finanza*, TUF)³. Because of these changes, the Consob reformed the Issuers' Regulation (*Regolamento Emittenti*) and the Market Regulation (*Regolamento Mercati*). The rules and regulations governing insider trading in Italy have therefore undergone profound changes following the introduction of the MAD (Annunziata 2006).

² Market abuse refers to conduct based on the exploitation of inside information and the manipulation of the market (manipulation of information and deception of various types intended to disturb the proper conduct of the market).

³ The TUF is the primary Italian regulatory source in matters of finance and financial intermediation.

We summarize the main changes arising from the adoption of the MAD, although we make no claims to completeness, since we focus on aspects related to insider trading only.

- **Broadening of the definition of privileged information.** The MAD broadened the definition of ‘privileged information.’ The new definition extends to events or circumstances that have not yet occurred, but which could reasonably occur. This extension requires that listed companies pay greater attention to the process of formation, circulation, and communication to third parties of privileged information in order to avoid market abuses.

- **Legitimization of the delay in communication of privileged information.** The public communication of privileged information may be postponed when the disclosure of the information could hurt the legitimate interests of the listed company, provided that the delay does not mislead the public. The company, however, must guarantee the confidentiality of the privileged information for the entire period of the delay.

- **Limitation of selective disclosure.** The MAD limits the risk that privileged information be disclosed only to certain parties (selective disclosure), permitting disclosure to third parties only through ‘the normal course of the exercise of his employment, profession, or duties.’ If the third party is not bound by obligations of confidentiality, the privileged information must be immediately provided to the public in order to restore the conditions of parity of information. The disclosure to the public must be simultaneous in the event of intentional selective disclosure and ‘without delay’ in case of unintentional selective disclosure.

- **New prevention measures.** The MAD introduced new prevention measures intended to promote traceability of offenses and transparency of operations conducted by primary insiders and refined the existing measures. In particular, listed companies must create a record of persons with access to privileged information. This record must be regularly updated. In addition, intermediaries are obligated to report operations that could have originated in insider trading or market manipulation. Reporting is made only to the competent authorities, without informing the subjects on behalf of whom the operations were performed.

- **Introduction of administrative penalties in addition to the penalties already in place.** One of the most innovative elements of the MAD is the addition of administrative penalties to the penalties already in place. Because of Law No. 262/2005, following the adoption of the MAD, the amounts of administrative penalties increased fivefold: from a minimum of €60,000 to a maximum of €15,000,000. The administrative penalties were also required for secondary insiders and, more generally, anyone capable of recognizing the ‘privileged’ nature of the acquired information.

- **Reinforcing the powers of the Consob.** The MAD provided for an increase in the Consob’s powers of investigation and verification. The Consob also has the option of directly applying administrative penalties.

3 A voluntary tender offer with the purpose of delisting: the case of Benetton

Our empirical analysis considers the possibility of obtaining profits from insider trading during voluntary tender offers with the purpose of delisting, initiated by controlling shareholders. To better understand the type of operation in question, this section contains a presentation of a case study involving the delisting of Benetton.

On January 31, 2012 at 1:58 p.m., Edizione S.r.l announced the delisting of the subsidiary Benetton, one of the symbols of ‘made in Italy’ listed on the market since 1986. At the request of Edizione S.r.l, trading on Benetton shares was suspended (suspension maintained until February 1). Each Benetton share at that time was worth €4.05 for a total capitalization of €740 million. Considering the reduction in the listing price of the security in 2012 (-40%) and the drastic decrease in profits (down to €70 million), the decision to delist was evaluated positively by financial analysts. The decision to delist was motivated by the need to regain total control of the company to determine its future ‘without needing to take into account non-controlling interests’ (Filippetti 2012a).

On February 1, 2012, at 7:27 p.m., Edizione S.r.l officially communicated the details of the tender offer. The estimated cost of the operation, assuming a positive response on the part of all of the minority shareholders, was equal to €276 million. The offer price of €4.60 included an increase of 40% over the average price of the security in the last month and 60% over the average price in 2011 (Filippetti 2012b), therefore providing an advantage to those who had recently acquired Benetton shares. For

longer-term investors, however, the tender offer probably entailed a loss: in 1986, the shares were set at €4.65 and in October 2009, they were quoted at €7.55 (Liera 2012).

At the same time of the announcement of the offer, Consob initiated investigations of the trade that had taken place before the announcement. On January 30 and 31, 2012, the doubling in the number of traded Benetton shares and the strong increase in price (+19.82%) led the parent company Edizione S.r.l. to communicate to the market the company's intention to delist and request suspension of trading on Benetton shares while awaiting the details of the tender offer. The announcement of the tender offer resulted in a consistent increase in trading of the security and an increase in prices: on the first open market day following the announcement (February 2, 2012), Benetton shares witnessed an increase of +17%, coming in at €4.70, a little above the offer price. Figure 1 presents the changes in prices and volumes in the days around the announcement.

[Figure 1]

In light of the abnormal movements in prices and volumes in the days preceding the official announcement of the operation, the Consob decided to determine whether incidents of insider trading occurred, who initiated the trading, and if the trading occurred among a limited number of operators. Similar to the Consob investigation, our empirical analysis intends to identify indications of insider trading by noting the abnormal movements in prices and volumes prior to the official announcement of the delisting operation. We use the word 'indications' because abnormal changes in prices and volumes can be caused by factors other than illegal insider trading: for example, the capacity of the market to anticipate the event and/or the circulation of rumors. In the Benetton case, for example, in the days preceding the tender offer announcement,

rumors circulated (even reported by Bloomberg) of a merger between the company and Zara, which Benetton officially denied at 12 p.m. on January 31.

4 Empirical analysis

4.1 Description of the data set

Our initial data set included all of the Italian tender offers between 1998 and March 2012 that met three selection criteria. The examined tender offers were (1) voluntary, (2) had the purpose of delisting, and (3) were initiated by a shareholder directly or indirectly holding at least 20% of the voting rights in the ordinary general shareholders' meeting and, in any case, with a share at least double that of the second largest shareholder (insider shareholder). We choose the 20% share as this is the threshold typically used in the literature on corporate control (La Porta et al. 1999; Faccio and Lang 2002). On the other hand, the condition of the largest shareholder's holding being at least double that of the second largest shareholder is related to the two-thirds quorum required by Italian regulations for the control of the extraordinary shareholders' meeting (Bajo et al. 2011).

Based on the information recorded in the archives of Borsa Italiana S.p.A.⁴, the application of these criteria led to a sample of 70 tender offers concerning 84 shares. From this initial sample, we excluded the operations preceded by events that could have prepared the financial community for a potential tender offer⁵ (and which would therefore make it impossible to determine whether abnormal market movements

⁴ "Borsa Italiana S.p.A. is responsible for the organization and management of the Italian stock exchange."

⁵ An example is the voluntary tender offer of convertible savings shares of Marzotto in September 2007, which was excluded from the analysis because it was preceded by the July 2007 tender offer (the latter, however, is included in the sample).

occurred) and those for which it was not possible to obtain the necessary data for the analysis. The final sample includes 60 tender offers concerning 71 shares: 56 ordinary shares, 13 savings shares (including 3 saving shares that could be converted into ordinary shares), and 2 preferred shares.

Figure 2 shows the temporal distribution of the tender offers in our sample. The figure shows that the number of voluntary delistings typically increases during negative economic times. A first wave occurred in the two-year period between 2002 and 2003. This first wave is probably due to the effects of the global slowdown in economic activity beginning in 2001 following a series of negative events (from the delayed effects of the rise in oil prices to the terrorist attacks of September 11 and the bankruptcy of Enron), and became more pronounced in 2002 (in the period around the Argentine crisis). A second wave occurred in 2008, when the effects of the worldwide crisis, following the subprime mortgage crisis, were felt,

[Figure 2]

For each of the 71 observations of our data set, we collected information concerning the characteristics of the company undergoing the tender offer contained in the offer prospectuses. We gathered additional information from Datastream. In particular, we have the following information at our disposal:

- the degree of **ownership concentration** of the firm undergoing the tender offer, measured by the percentage of the share of the largest shareholder (source: offer prospectus);
- a dummy variable that indicates whether the company in question is a **family firm** (source: offer prospectus);

- two dummy variables that indicate whether the company is an **industrial** or **financial firm** (source: offer prospectus);
- a dummy variable that indicates whether the shares affected by the tender offer are **ordinary shares** (source: offer prospectus);
- the **firm size**, measured by the natural logarithm of market capitalization (source: Datastream);
- the degree of **liquidity** of the share, measured by the turnover ratio in the 250 days prior to the observation period (source: Datastream).

The Table 1 contains descriptive statistics concerning these variables, distinguishing between the Pre-MAD period (64.79% of the observations) and the Post-MAD period (35.21%). Encouragingly, the difference tests (of averages for continuous variables and proportions for dummy variables) of the two periods reveal a certain degree of homogeneity between the Pre-MAD and Post-MAD sub-samples with regard to the examined variables. The only difference between the two sub-samples concerns the proportion of ordinary shares in the two periods. However, this difference is probably due to the structural reduction in the number of savings shares and preferred shares compared to ordinary shares, which interested Italy during the period in question (Mancinelli and Ozkan 2006), and not to a systematic difference caused by the introduction of the MAD. Since firm characteristics are balanced across the two sub-samples, we are more confident in comparing Pre-MAD and Post-MAD observations to understand if adopting the provisions of the European directive effectively discouraged insider-trading activities during tender offers.

[Table 1]

4.2 Methodology

Our analysis intends to determine the effect of the introduction of the MAD on the activities of potential insiders. The occurrence of illegal insider trading is typically proven through careful investigation by the competent authorities (e.g., the Consob). However, abnormal changes in the prices and volumes of shares undergoing a tender offer during the days preceding the announcement of the offer itself may be considered as indications of transactions based on information that was still confidential (Lin and Howe 1990; Bris 2005; Betzer and Theissen 2009). For example, the Committee of European Securities Regulators (CESR), today the European Securities and Markets Authority, in its representative document (CESR/04-505b), indicates the following possible indicators of insider trading

(u)nusual trading in the shares of a company before the announcement of price sensitive information relating to the company; transactions resulting in sudden and unusual changes in the volume of orders and shares prices before public announcements regarding the security in question.

The event study methodology (Brown and Warner 1985; Ajinkya and Jain 1989; MacKinley 1997) can be used to determine the effects of a particular event on the prices and volumes of trade of the shares of a company and therefore represents an indirect method to identify the presence of illegal insider trading⁶. As Bris (2005) notes, '(t)his approach circumvents the difficulties of drawing any empirical conclusion from the sole use of detected insider trading'.

⁶ In the case of the Italian market, Baccolini et al. (1991) use the event study methodology on a sample of 18 companies in the period before the approval of the national anti-insider trading law (Law 157/1991) and find evidence of abnormal returns in the days preceding the publication of privileged information concerning acquisitions, earnings surprises or changes in ownership.

To apply the event study methodology, we need to identify the moment in which the privileged information entered the public domain (the so-called event date, indicated by convention as $t = 0$). Based on the TUF, privileged information becomes public through the dissemination of a press release. In our study, therefore, the event date is that of the press release of the tender offer pursuant to Article 102 (or 114) of the TUF or the following day if the press release was issued when the market was closed. On the event day, there is no longer any asymmetry in information between insiders and outsiders.

Once the date of the event is identified, we can calculate the abnormal returns (ARs) and volumes (AVs) that occurred concomitantly with the event. The abnormal return for the security i at the time t is

$$AR_{it} = r_{it} - E(r_{it}) \quad (1)$$

where AR_{it} , r_{it} and $E(r_{it})$ are the abnormal return, the observed return and the expected return (or normal return), respectively. To calculate the expected return, we used the market-adjusted model, the market model and the industry-adjusted model. The three models produced similar results. Therefore, for the sake of simplicity, we are reporting only the results obtained using the industry-adjusted model, in which $E(r_{it})$ was estimated as the return of the sector stock index corresponding to the examined security⁷. The overall reaction of the market in the period prior to the

⁷ Although the three models used to calculate the expected return produced similar results, we believe that there are theoretical reasons to prefer the industry-adjusted model in the particular context of our study. In the market-adjusted model, the expected return is estimated as a market index return. This model therefore could obscure certain structural characteristics of the security, which, however, a sector index (being composed of comparable firms) takes into account. In the market model, the expected return is estimated using a regression model. Since the degree of liquidity of some of the securities in our sample is relatively limited, the application of this model could result in an

communication of the tender offer was calculated by cumulating the abnormal returns (Jensen and Ruback 1983; Mikkelson and Ruback 1985; Sanders and Zdanowicz 1992; Bris 2005). For example, the cumulative abnormal return (CAR) in the five days preceding the notification of the tender offer was obtained by cumulating the corresponding abnormal returns. Once the ARs and the CARs were obtained for each of the firms in our sample, we calculated the average AR and the average CAR and tested the statistical significance of the results⁸.

We performed a similar analysis on the volumes (measured using the turnover ratio)⁹.

The abnormal volume for the security i at the time t is

$$AV_{it} = V_{it} - E(V_{it}) \quad (2)$$

where AV_{it} , V_{it} and $E(V_{it})$ are respectively the abnormal volume, the observed volume, and the expected volume (or normal volume). To estimate the expected volume, we used the average turnover ratio of the security calculated in an estimation window of 250 days which range from $t = -275$ to $t = -26$ compared to the day of the event ($t = 0$). The overall market reaction in the period prior to the notification of the tender offer is calculated by summing the abnormal volumes (CAV). Based on the AVs and the CAVs of the individual securities, we calculated the average AV and CAV and tested the statistical significance of the results.

underestimate of the beta of the security with a consequent overestimate of the abnormal returns. For this reason, we prefer to report the results obtained with the industry-adjusted model, which does not pose this risk.

⁸ To test the statistical significance of the results, we considered both parametric tests (Boehmer et al. 1991) and non-parametric tests (Wilcoxon test). As an additional robustness check, we also considered the results of bootstrap tests. The results obtained using the three methods are qualitatively similar. For the sake of simplicity, we only report the traditional parametric tests.

⁹ Several measures for volumes and abnormal volumes exist. Different measures often produce comparable results (Cervellati et al. 2014). For methods similar to those followed in our study see, inter alia, Pacini and Marlett (2001) and Clarkson et al. (2006).

To conclude this section, we present a critical remark on the described methodology. In the case of illegal insider trading, it is conceivable to note abnormal returns and volumes in the days preceding the announcement. However, as already pointed out in Section 3, the presence of abnormal returns and volumes could also be attributed to the capacity of the market to anticipate the event and/or to rumors circulation in the media, in addition to illegal insider trading. To consider abnormal returns and volumes as a true indicator of illegal insider trading, we will therefore need to control for these two alternative explanations in the empirical analysis.

4.3 Market reaction in the days preceding the event

In this section, we assess whether the introduction of the MAD reduced the size of the abnormal returns and volumes before the announcement of the tender offer.

Figure 3 shows the CARs and the AVs in the days around the announcement of the tender offer in the pre-MAD and post-MAD periods. The CARs and the AVs in the pre-MAD period do not seem significantly different from those in the post-MAD period: the series of pre-MAD and post-MAD CARs almost overlap and the same applies to the series of pre-MAD and post-MAD AVs. This descriptive analysis seems therefore to suggest that the introduction of the MAD did not produce appreciable effects on the size of abnormal returns and volumes recorded in the period preceding the announcement of the tender offer.

[Figure 3]

This preliminary analysis results are investigated more in depth in Table 2, which compares the CARs and the CAVs from the pre-MAD period with those from the

post-MAD period. To calculate the CARs and CAVs, we set the intervals at [-25, -1] and [-5, -1] compared to the day of the event.¹⁰

[Table 2]

The results show significant CARs in both the pre-MAD and post-MAD periods. The difference between the pre-MAD and post-MAD CARs is not statistically significant. Together, these results seem to confirm what has already been indicated in Figure 3: the introduction of the MAD does not seem to have reduced the capacity to achieve abnormal returns before the announcement.

However, with regard to the abnormal volumes, the results do not show significant CAVs either in the pre-MAD period or in the post-MAD period (excluding the case of post-MAD CAVs in the interval [-5, -1], the significance of which is moreover due not to an increase in abnormal volumes but in a reduction of their standard error). The presence of significant CARs and insignificant CAVs seems to suggest that the transactions that generate abnormal returns are limited in magnitude. This evidence is consistent with the ‘stealth trading hypothesis’ (Barclay and Warner 1993; Ryu, 2012), according to which potential insiders perform small transactions in order not to reveal their confidential information.

As we mentioned in the previous section, the presence of abnormal returns in the period preceding the announcement does not necessarily imply illegal insider trading activities. In fact, these abnormal returns could be attributed to the market’s capacity to anticipate the event and/or to rumors. To mitigate this risk, we present additional results in Table 3.

¹⁰ In Italy, there are no mandatory restrictions on insider dealing (e.g., blackout periods). There are only disclosure requirements to respect.

First, we calculated abnormal returns and volumes corresponding to the day of the event. The presence of significant ARs and AVs on the day of the announcement suggests that the communication of the tender offer is an unexpected event for the majority of investors.

Secondly, we recalculated the CARs in the period preceding the announcement, excluding cases that could be influenced by rumors. In particular, we excluded from the analysis the observations related to companies regarding which articles appeared in two major Italian financial newspapers (Il Sole 24 Ore and MF-Milano Finanza) containing a reference to a potential tender offer within five days preceding the official announcement. We excluded 15 cases from the sample. However, the exclusion of these cases does not result in significant changes to the CARs. In light of these results, it is therefore plausible that the presence of CARs in the days prior to the communication is attributable (at least in part) to insider trading.

As shown by Bris (2005), the insider trading regulations should include an increase of the reaction in the day of the announcement and a reduction in the reaction in the prior days. A result which, in fact, our analysis seems to reject. Therefore, although the adoption of the MAD significantly reinforced the insider trading regulations at the formal level, the price dynamics in the days preceding the announcement of the tender offer seem to contain, even post-MAD, indications of illegal insider trading that are very similar to those in the pre-MAD period.

It should also be said that, as pointed out by Bhattacharya and Daouk (2002), the effects of the insider trading regulations should not be assessed from the time of their introduction but from the time of their first concrete application. Therefore, as an additional robustness check, in Table 3 we report the results in which we include in

the post-MAD sub-sample only observations after 2005 (and not 2004). However, our results are also confirmed in this case.

To investigate the matter even further, we estimated the profits of insider trading in the 25 days prior to the announcement of the tender offer, adapting the Bris (2005) method to our context. The results presented in Table 4 seem to suggest that the post-MAD profits (0.79%) are greater (even though the difference is not statistically significant) than the pre-MAD profits (0.66%). This result is also confirmed in the sample in which we excluded observations with the risk of rumors (in fact, when these cases are excluded, significant profits are only achieved in the post-MAD period). This result is, at least in part, consistent with that of Bris (2005) for Western Europe, who observed that the average insider trading profits increase after the first application of anti-insider regulations.

[Table 4]

In summary, our results suggest that the MAD is at least partially ineffective against this specific phenomenon. This result seems unjustified in light of the deep changes to the rules and regulations governing insider trading caused by the introduction of MAD, as discussed in Section 2. However, theoretical analysis could explain this phenomenon.

It is possible to imagine that the potential insider weighs the benefits and expected costs when selecting the magnitude of the insider trading operation. Suppose that the benefits are an increasing and concave function of the level of insider trading, $B(q)$, with $B'(q) > 0$, $B''(q) < 0$. Assume in addition that the costs in the event of discovery by the authorities are proportional (through the constant θ) to the level of insider

trading $C(q) = \theta q$. Then, if we indicate with π the probability of being discovered, the expected costs of insider trading are equal to $\pi C(q) = \pi \theta q$ and the economic problem of the potential insider is

$$\max_q B(q) - \pi \theta q \quad (3)$$

the maximum of which is implicitly determined by the condition $B'(q^*) = \pi \theta$ ¹¹. A simple comparative static exercise reveals that the optimal level of insider trading decreases with the increase of the penalty (ex-ante) and the increase in probability of being discovered (ex-post),

$$\frac{\partial q^*}{\partial \theta} = \frac{\pi}{B''(q^*)} < 0 \quad \text{and} \quad \frac{\partial q^*}{\partial \pi} = \frac{\theta}{B''(q^*)} < 0 \quad (4)$$

In general, it is therefore true that increasing the size of the penalty (increasing θ) reduces the level of insider trading, and, in this sense, the MAD represented a step forward from the previous regulations. The majority of the new elements introduced by the MAD discussed in Section 2 are (more or less directly) geared towards increasing θ . However, it is also true that the success of the insider trading regulations requires the presence of effective ex-post monitoring activities on the part of the competent bodies. If due to the clearly established objective difficulties in investigating cases of insider trading, the probability of being discovered is relatively low (or close to zero), the ex-ante punitive measures may be not very effective (or even non-effective at all since in the Equation 4, $\pi \rightarrow 0$ implies $\partial q^*/\partial \theta \rightarrow 0$). When

¹¹ This formulation is based on the more general model by Becker (1968) on the economy of crime and is presented in these terms in Balducci et al. (2001). A similar model is applied to the topic of tax evasion in Allingham and Sandmo (1972).

the probability of being discovered is relatively low, the only concern of the insiders would be ‘masking’ their operations (a result consistent with the ‘stealth trading hypothesis’).

In addition, the reduction in the per-operation resources dedicated to monitoring (or an increase in monitoring costs) reduces the monitoring activities themselves and therefore the probability of being discovered. For example in the context of our analysis, the broadening of the definition of privileged information discussed in Section 2 may have increased the number of potential cases of insider trading to monitor and, keeping the total resources fixed, reduced the per-operation resources dedicated to monitoring and, in turn, the number of actual cases investigated.¹² In our simple model, this reduction in the per-operation resources translates in a decrease of π (say from π_{pre} to π_{post} with $\pi_{post} < \pi_{pre}$), which may compensate the effect of the increase of θ (say from θ_{pre} to θ_{post} with $\theta_{post} > \theta_{pre}$). In particular, the increase of θ is completely vanished if the probability of being discovered following the introduction of the law is reduced to

$$\pi_{post} = \pi_{pre} \frac{\theta_{pre}}{\theta_{post}} \quad (5)$$

In this case, a form of ‘crowding-out effect’ occurs, which means that the solution of the problem in Equation 3 remains unchanged and equal to q^* despite $\theta_{post} > \theta_{pre}$.

¹² Following the introduction of the MAD, the number of investigations for insider trading started by the Consob has been greatly reduced (from 94 cases in the period 1998-2004 to 21 cases in the period 2005-2011). This evidence, probably due to limited per-operation resources, may actually lead to a reduction of π .

Lastly, if we consider, as a limiting case, that an increase in penalties may be accompanied by an increase in monitoring costs and therefore by a reduction in π , an increase of θ may be followed by an increase (rather than a reduction) in the optimal level of insider trading, $\partial q^*/\partial\theta > 0$. In fact, the comparative static regarding the solution of the problem in Equation 3 in the event that π depends on θ becomes

$$\frac{\partial q^*}{\partial\theta} = \frac{\pi + \theta \partial\pi/\partial\theta}{B''(q^*)} \quad (6)$$

where for $\pi + \theta \partial\pi/\partial\theta < 0$, we obtain $\partial q^*/\partial\theta > 0$ ¹³.

In light of the empirical results and this discussion, we therefore believe that the apparent ineffectiveness of the MAD is attributable, at least in part, to a problem that concerns the ex-post monitoring activities (Bajo and Petracchi 2006; Pattitoni et al. 2013).

4.4 The effect of corporate characteristics

The analysis in the previous section suggests that the introduction of the MAD did not produce appreciable effects on the capacity of potential insiders to obtain profits using privileged information in the period preceding the tender offer announcement. We hypothesized that this result is attributable, at least in part, to the reduced effectiveness of the monitoring activities, due to the objective difficulties in investigating insider trading and the high costs involved in these activities (or, more generally, to limited resources). As noted in the previous section, the effectiveness of monitoring activities is a decreasing function of their costs: when costs are high,

¹³ Note that $\partial\pi/\partial\theta < 0$ is a necessary but not sufficient condition for the result.

monitoring activities are reduced, and, consequently, the probability of insiders being discovered is reduced as well. In this section, we wonder, therefore, if it is possible to direct the competent bodies to particular companies in order to make monitoring activities more efficient (and therefore less costly) and improve (indirectly) the effectiveness of the insider trading regulations. In particular, we wonder (1) if certain corporate characteristics influence the capacity of insiders to earn profits, and (2) if the MAD has made it more difficult to earn such profits at least for certain categories of companies (for example family or financial companies) given that, on the whole, its effectiveness has at least been questionable (see Section 4.3).

To respond to these questions, we perform a poolability test (Patuelli et al. 2010; Verbeek 2012) based on regression models with respect to the pre-MAD/post-MAD subdivision. This poolability test checks for sub-sample stability of the estimated regression coefficients to determine the relationship between corporate characteristics and the capacity of insiders to achieve profits and whether the MAD has changed this relationship.

In these regression models, the dependent variable is the ratio $CAR(-5,-1)/CAR(-5,0)$ ¹⁴. Given that $CAR(-5,-1)$ and $CAR(-5,0)$ typically have a concordant sign and that the majority of the market reaction occurs in $t = 0$ (so that $|CAR(-5,0)| > |CAR(-5,-1)|$), this variable (which for the sake of simplicity we call CAR-ratio) may be interpreted as an indicator of the part of the total market reaction attributable to trading activities preceding the announcements. An advantage of this variable over the simple $CAR(-5,-1)$ is that it corrects, by putting together two CARs

¹⁴ We repeated the analysis also considering the period [-25, -1] and obtained qualitatively similar results. However, we only report the results for the period [-5, -1], since Figure 3 and Tables 2 and 3 show that the largest part of the market reaction occurs in the last five days prior to the announcement of the tender offer.

referring to the same event, for the potential effect of the tender offer price on the size of the CARs and for a potential residual observation-level heterogeneity which the explanatory variables are not able to take into account.

Indicating the CAR-ratio with y_i and the vector of explanatory variables (described in Section 4.1) with \mathbf{x}_i , the general model for our poolability test is

$$y_i = \mathbf{x}_i' \boldsymbol{\beta} + p_i \mathbf{x}_i' \boldsymbol{\delta} + \varepsilon_i \quad (7)$$

where p_i is a dummy variable equal to 1 in the post-MAD period, ε_i is a zero-mean stochastic error term and $\boldsymbol{\beta}$ and $\boldsymbol{\delta}$ are vectors of coefficients to be estimated. In particular, the coefficients included in the vector $\boldsymbol{\beta}$ measure the effect of the corporate characteristics on the CAR-ratio in the pre-MAD period. The coefficients included in the vector $\boldsymbol{\delta}$ measure the variation in the effect of these characteristics following the introduction of the MAD. Finally, by adding $\boldsymbol{\beta}$ and $\boldsymbol{\delta}$, we obtain the partial effects of the corporate characteristics on the CAR-ratio in the post-MAD period. The poolability test consists, therefore, of assessing the joint significance (or individual significance) of the coefficients included in the vector $\boldsymbol{\delta}$, in order to determine if the introduction of the MAD had consequences for companies with particular characteristics.

We present the results in Table 5. Model [1] presents the estimate of the full-model described by Equation 7. In the lower panel of the table, we present the estimates of the coefficients of the explanatory variables described in Section 4.1 (i.e., the estimate of the elements of vector $\boldsymbol{\beta}$). In the upper panel of the table, we present the estimates of the coefficients of the same explanatory variables interacted with the post-MAD

dummy variable (i.e., the estimate of the elements of vector δ). The poolability test presented at the bottom of Model [1] is not significant and suggests that on average the effect of the explanatory variables on the CAR-ratio is the same in the pre-MAD and post-MAD periods (a result that seems consistent with those of the previous section). However, it is worth noting that before the introduction of the MAD, ownership concentration had a negative effect on CAR-ratio, while after the introduction of the MAD, the firm size has a positive effect on CAR-ratio. Excluding these two cases, the other variables included in Model [1] are, however, not significant.

Given the limited number of observations in our data set, we estimated restricted models to improve efficiency with respect to Model [1]. Models [2] and [3] are restricted models estimated based on Model [1] using two different selection procedures from the general to the specific (Verbeek 2012). In Model [2], we eliminated each pair of variables (pre-MAD and post-MAD) with a p-value greater than 0.2. Therefore, in this model a variable and its interaction with the post-MAD dummy are considered as a single unit and can only be eliminated together¹⁵. In Model [3], we eliminated all variables with a p-value greater than 0.2. Unlike Model [2], in Model [3] a variable and its interaction with the post-MAD dummy variable are considered separately and may also be eliminated individually¹⁶.

Models [2] and [3], although obtained using different selection procedures, essentially confirm what was already shown by Model [1], especially concerning the negative

¹⁵ For example, we excluded the dummy variable regarding family companies from the explanatory variables because the joint significance test associated with this variable and its interaction with the post-MAD dummy has a p-value greater than 0.2. We believe that the level of 0.2 represents a good compromise between the desire to preserve the consistency of the model by including all relevant variables and improving the efficiency of the model by including only the significant variables.

¹⁶ This fact occurs, for example, in the case of the ordinary shares variable in the post-MAD period.

effect of the ownership concentration in the pre-MAD period and, at least in Model [3], the positive effect of the firm size in the post-MAD period. Model [3] adds to these results that the introduction of the MAD acted as a moderator of the negative effect of concentration. In Model [3], the interaction between the concentration variable and the post-MAD dummy has a positive coefficient approximately equal to the absolute value of the coefficient of the concentration variable ($2.3493 \cong |-2.4766|$). This result implies that the effect of concentration in the post-MAD period is approximately null. Furthermore, the negative and significant coefficient of the post-MAD dummy variable suggests that, once certain relevant corporate characteristics are taken into account, the market reaction in the post-MAD period seems reduced.

[Table 5]

It is possible to interpret these results in light of the changes introduced by the MAD as discussed in Section 2 and particularly the type of operation considered in our analysis. The negative coefficient of the post-MAD dummy variable may be attributed to the fact that the changes introduced by the MAD concerned (more or less directly) certain categories of companies more than others. Therefore, despite the approximately null effect in terms of unconditional mean documented in Section 4.3, the MAD seems effective after controlling for certain corporate characteristics. The positive effect of size in the post-MAD period could be justified by the fact that some of the changes introduced by the law (for example, the stricter requirements in terms of transparency) made it relatively more difficult to earn profits on less capitalized

firms¹⁷. We could interpret in a related vein the result regarding the vanished effect of firm concentration in the post-MAD period. In concentrated companies, the possibility of earning profits is partially precluded by the fact that the controlling shareholder who has initiated the tender offer holds a larger share of capital in the company (thereby limiting the number of shares that can actually be traded by the insider). In terms of the economic problem of the potential insider described in Equation 3, this limit translates into a constraint on the optimal level of insider trading. The problem therefore becomes:

$$\max_q B(q) - \pi\theta q \quad \text{sub} \quad q \leq q_{\max} \quad (8)$$

Suppose that in the pre-MAD period the constraint $q \leq q_{\max}$ is active. Therefore, in case of non-concentrated firms, the economic problem of the insider is the same as the unconstrained problem in Equation 3, and the optimal choice is q_{pre}^* ¹⁸. With respect to concentrated firms, on the other hand, the economic problem of the insider is that of Equation 8, and the optimal choice (assuming an active constraint¹⁹) is $q_{\max} < q_{pre}^*$. Since the market reaction is positively related to the size of the insider trading operation, at the empirical level, this result implies a greater reaction for non-concentrated companies and, therefore, a negative relationship between firm concentration and CAR-ratio.

¹⁷ It is furthermore plausible that in larger companies the number of subjects involved in the organization of the tender offer is greater (for example because they participate in technical committees as consultants), and, therefore, the larger probability of rumors and indiscretions may result in an abnormal market reaction. Lastly, it is in case of bigger firms that the weight of trading from foreign countries is greater, making them more difficult for the oversight bodies to monitor.

¹⁸ Of course, we are considering a conditional version of the problem, as we have not noted appreciable differences in the unconditional market reaction following the introduction of the MAD.

¹⁹ It is reasonable to hypothesize that potential insiders have found an alternative means to use their private information, for example, using derivatives on the security undergoing the tender offer to best take advantage of leverage effects.

In the post-MAD period, the increase in the magnitude of the penalties resulted, in a conditional reduction in the optimal level of insider trading. Thus, in the post-MAD period, the solution of the problem in Equation 3 is $q_{post}^* < q_{pre}^*$. If we hypothesize that $q_{post}^* < q_{max}$, the constraint of the problem in Equation 7 is no longer active, and the optimal choice, equal to q_{post}^* , is the same for concentrated and non-concentrated firms. At the empirical level, this result implies a null relationship between firm concentration and CAR-ratio.

Figure 4 shows a graphic representation of the problem: in the pre-MAD period, $q_{max} < q_{pre}^*$; in the post-MAD period, the marginal cost curve of insider trading moves upwards and $q_{post}^* < q_{max}$. Therefore, in the pre-MAD period, the choice of the optimal level of insider trading is different for concentrated (q_{max}) and non-concentrated (q_{pre}^*) firms; in the post-MAD period; however, for both concentrated and non-concentrated firms the choice is the same (q_{post}^*).

[Image 4]

5 Concluding remarks

Our empirical analysis examined a sample of voluntary tender offers with the purpose of delisting initiated by controlling shareholders to determine whether the introduction of the MAD resulted in appreciable differences in the magnitude of profits achieved before the announcement of the operation and attributable, at least in part, to insider trading activities.

The results show that the abnormal returns and volumes recorded in the pre-MAD and post-MAD periods are not significantly different, and this evidence suggests at least a partial ineffectiveness of the MAD against this specific phenomenon in question. This result would seem unjustified in light of the considerable changes introduced by the MAD to rules and regulations governing insider trading. However, some simple theoretical considerations seem to suggest that the problem is to be found in the reduced effectiveness (which does not mean reduced commitment) of the ex-post monitoring activities on the part of the competent bodies. In fact, in the presence of objective limits in proving illegal insider trading, the ex-ante punitive actions are not very effective. At the limit, if the changes of the MAD indirectly reduced the resources intended for monitoring any potential insider trading operations (such as, for example, by broadening the definition of privileged information), then the effect of the increase in ex-ante punitive actions is plausibly vanished ex-post by the crowding-out effect of the reduction in the probability of insiders being discovered.

Therefore, in order to implement more efficient monitoring, a regression analysis examined how certain corporate characteristics can influence the capacity of insiders to achieve profits. The results suggest that the MAD at least had a conditional effect based on the presence of certain corporate characteristics, if not an unconditional effect that is therefore generalizable to the entire market. For example, market reactions that precede tender offer announcements tend to be greater for bigger firms. Therefore, monitoring activity should be intensified for companies with greater capitalization. Moreover, following the introduction of the MAD, the effect of ownership concentration seems to have become irrelevant.

Further research could expand these results by considering other markets. Although the Italian market may be considered an ideal context for our empirical analysis due to its structural characteristics, research on other European countries could check for further implications of the model. These implications would be useful to stimulate further debate regarding the changes of the MAD.

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Table 1 Descriptive statistics and pre-MAD and post-MAD difference tests

Variable	Pre-MAD (64.79%)				Post-MAD (35.21%)				Diff	Sign ^a
	Mean	SD	Min	Max	Mean	SD	Min	Max		
Ownership concentration	0.5745	0.2056	0.1469	0.9335	0.5730	0.2081	0.1811	0.8950	-0.0015	
Family firm	0.4565				0.4800				0.0235	
Industrial firm	0.5652				0.6400				0.0748	
Financial firm	0.1304				0.2000				0.0696	
Ordinary share	0.7174				0.9200				0.2026	**
Firm size	5.1851	0.8186	3.7214	7.6000	5.4008	0.7859	4.1188	7.0380	0.2157	
Liquidity	0.0021	0.0026	0.0001	0.0126	0.0029	0.0030	0.0001	0.0112	0.0009	

***, ** and * denote significance at the 1, 5 and 10 per cent levels

^a Two-sample t-tests for continuous variables and two-sample tests of proportions for dummy variables

Table 2 Event study and pre-MAD and post-MAD difference tests

Variable	Pre-MAD			Post-MAD			Difference		
	Coef	SE	Sign	Coef	SE	Sign	Coef	SE	Sign
CAR(-25,-1)	0.0707	0.0172	***	0.0955	0.0204	***	0.0247	0.0266	
CAR(-5,-1)	0.0511	0.0094	***	0.0618	0.0117	***	0.0107	0.0150	
CAV(-25,-1)	0.0190	0.0123		0.0129	0.0148		-0.0061	0.0193	
CAV(-5,-1)	0.0136	0.0092		0.0095	0.0046	**	-0.0041	0.0103	

***, ** and * denote significance at the 1, 5 and 10 per cent levels

Table 3 Event study and pre-MAD and post-MAD difference tests (robustness checks)

Variable	Pre-MAD			Post-MAD			Difference		
	Coef	SE	Sign	Coef	SE	Sign	Coef	SE	Sign
AR ₀	0.1304	0.0134	***	0.1254	0.0178	***	-0.0050	0.0223	
AV ₀	0.0390	0.0093	***	0.0325	0.0086	***	-0.0066	0.0126	
CAR(-25,-1) ^a	0.0667	0.0204	***	0.0923	0.0263	***	0.0256	0.0333	
CAR(-5,-1) ^a	0.0434	0.0093	***	0.0542	0.0116	***	0.0108	0.0149	
CAR(-25,-1) ^b	0.0721	0.0165	***	0.0948	0.0220	***	0.0228	0.0275	
CAR(-5,-1) ^b	0.0505	0.0090	***	0.0640	0.0125	***	0.0136	0.0154	

***, ** and * denote significance at the 1, 5 and 10 per cent levels

^a No rumors

^b Post-MAD if year is greater or equal to 2006

Table 4 Profit analysis and pre-MAD and post-MAD difference tests

Variable	Pre-MAD			Post-MAD			Difference		
	Coef	SE	Sign	Coef	SE	Sign	Coef	SE	Sign
Average profit	0.0066	0.0031	**	0.0079	0.0041	*	0.0014	0.0051	
Average profit ^a	0.0029	0.0025		0.0082	0.0035	**	0.0052	0.0043	

***, ** and * denote significance at the 1, 5 and 10 per cent levels

^a No rumors

Table 5 Regression analysis and poolability test

Variable	Model [1] CAR-ratio			Model [2] CAR-ratio			Model [3] CAR-ratio		
	Coef	SE	Sign	Coef	SE	Sign	Coef	SE	Sign
Ownership concentration (Post-MAD)	1.9942	1.6819		2.0147	1.2624		2.3493	1.3939	*
Family firm (Post-MAD)	0.2195	0.6109					0.6401	0.4140	
Industrial firm (Post-MAD)	1.4002	1.0477							
Financial firm (Post-MAD)	0.1418	0.6969							
Ordinary share (Post-MAD)	-0.3407	0.5922							
Firm size (Post-MAD)	1.1021	0.6501	*	0.5930	0.3813		0.3909	0.1879	**
Liquidity (Post-MAD)	-24.9541	177.8692							
Rumors (Post-MAD)	0.1211	0.6076							
Post-MAD	-7.4934	4.9496		-4.3409	2.7215		-3.5253	1.6494	**
Ownership concentration	-2.3901	1.3828	*	-2.1267	1.1425	*	-2.4766	1.3707	*
Family firm	-0.6444	0.4987					-0.6061	0.4356	
Industrial firm	-1.0806	1.0223							
Financial firm	-0.3615	0.6629							
Ordinary share	-0.1792	0.4514					-0.4216	0.3022	
Firm size	-0.6861	0.5942		-0.3510	0.3584				
Liquidity	-18.3377	149.8653							
Rumors	-0.1889	0.5412							
Constant	6.5210	4.7327		3.4802	2.6121		2.1379	1.1776	*
Poolability F-test	1.0300								
R ²	0.2686			0.1156			0.1279		

***, ** and * denote significance at the 1, 5 and 10 per cent levels.

Inference is based on robust SEs.

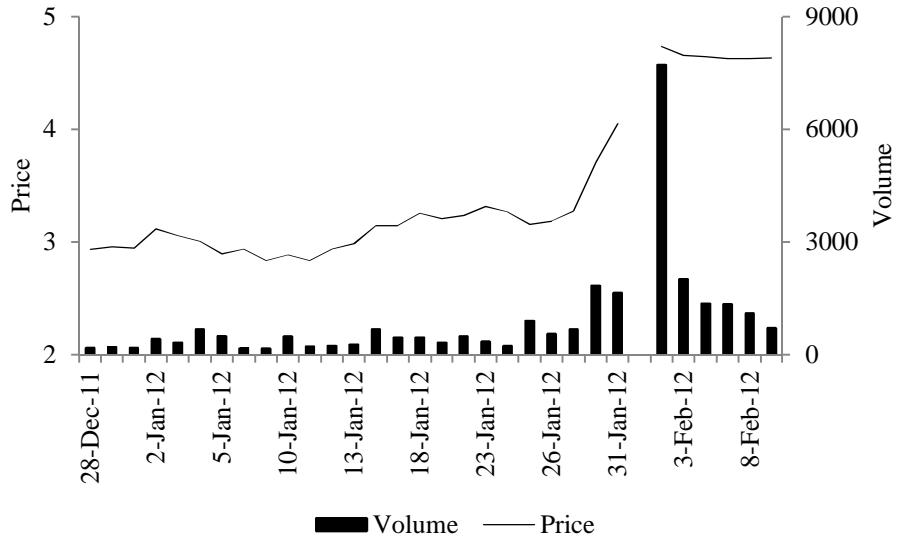


Fig. 1 Benetton prices and volumes

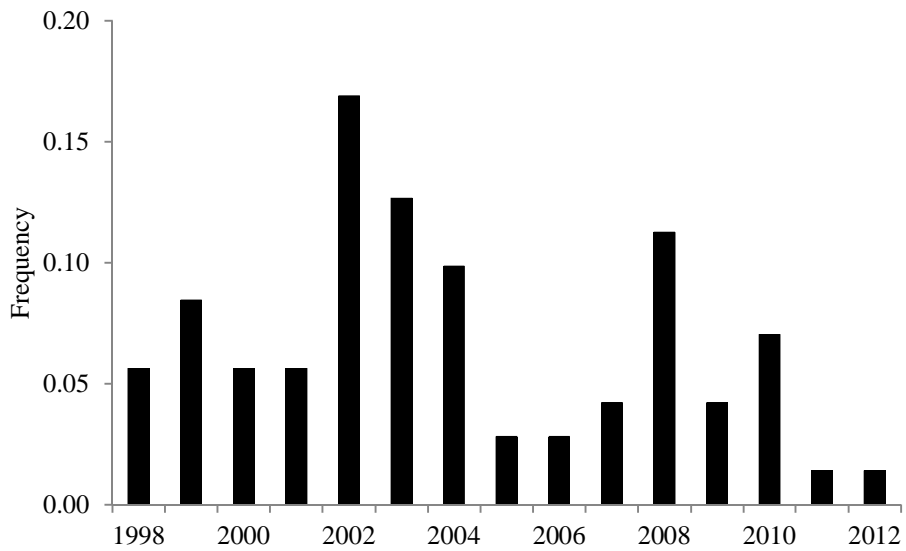


Fig. 2 Frequency of tender offers per year

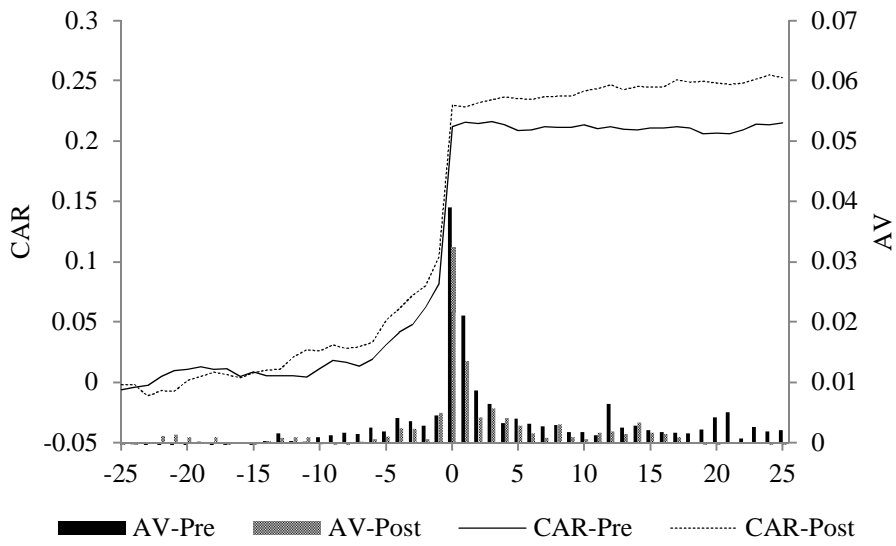


Fig. 3 CAR e AV in the pre-MAD and post-MAD period

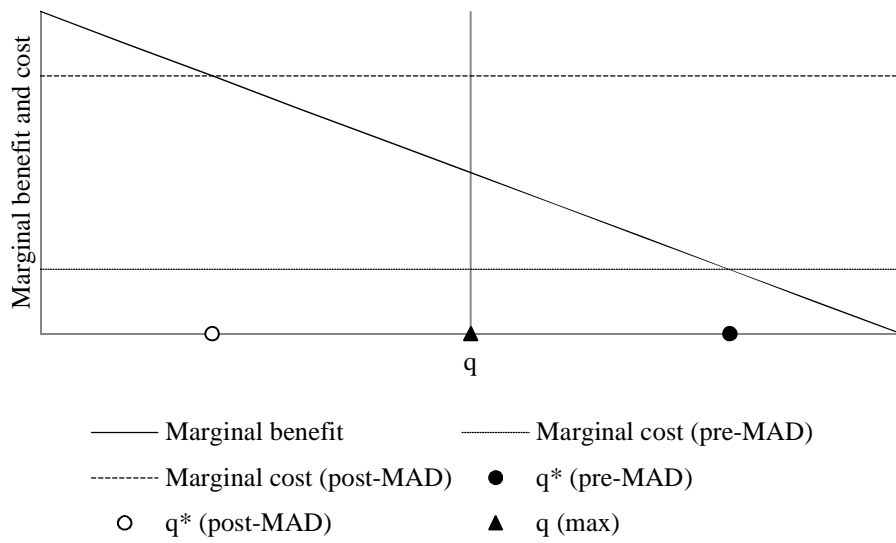


Fig 4. Marginal benefits and costs of the insider trading activity in the pre-MAD and post-MAD period

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