Stock Repurchases: Do They Stabilize Price and Enhance Liquidity?

Amedeo De Cesari*, Susanne Espenlaub and Arif Khurshed

Manchester Business School, The University of Manchester, Manchester, UK

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Abstract

In this paper we examine the effects of Italian open market share repurchases on liquidity and stock returns. Based on the "competing market maker hypothesis", we expect that companies can use share repurchasing to boost liquidity, in terms of a reduction in bid-ask spread and increase in trading volume. In light of recent research, we also expect that repurchasing can reduce short term return variance relative to long term variance (fundamental variance), and support the stock price making returns more positively skewed. By analyzing a comprehensive sample of Italian repurchase approval dates in the period 1997–2004, we find results partially in line with our expectations. Repurchases lead to a significant reduction in spread and short term variance relative to fundamental variance, especially for securities with high pre-event spread and short term variance. Our findings show that a repurchasing firm can successfully act as a "competing market maker".

Keywords: Repurchase, liquidity, price stabilization, bid-ask spread, volume, variance, skewness.
JEL classification: G12, G35.

**Corresponding author:* Amedeo De Cesari, Manchester Accounting and Finance Group, Manchester Business School, MBS Crawford House, The University of Manchester, Booth Street West, Manchester, M15 6PB, UK; email: amedeo.de-cesari@postgrad.manchester.ac.uk.

1. Introduction

The primary objective of this paper is to analyze whether buyback activities can contribute to the creation of a more liquid and stable stock market. The focus is on open market repurchases[1] taking place in the Italian stock market. This market is an ideal setting for our empirical investigation. As we show in this paper, Italian companies are often involved in repurchasing with the goal of improving their stocks' market liquidity and price stability. Moreover, by virtue of institutional differences between the two countries, Italian firms can trade own shares, and possibly enhance liquidity and price stability, in a more intense and flexible way than their US counterparts.

In contrast with the behaviour of repurchasing firms in Italy, the US mainstream academic literature on repurchases shows that liquidity enhancing and price stabilization activities do not rank high in the agendas of American managers promoting buyback programs. In this literature, the ideas that repurchases are an effective signalling device (see, e.g., Vermaelen, 1984; Ofer and Thakor, 1987) and that they constitute transactions designed to disburse excess cash to shareholders (see, e.g., Easterbrook, 1984; Jensen, 1986; Lie, 2000) are well established. Other common theoretical explanations are that buybacks are promoted to benefit from an increased level of leverage (see, e.g., Bierman and West, 1966) and to support stock option plans for employees (see, e.g., Dittmar, 2000). Several US surveys (Baker, Gallagher, and Morgan, 1981; Wansley, Lane, and Sarkar, 1989; Brav, Graham, Harvey, and Michaely, 2005) on managers' views about repurchases confirm the absence of a strong focus on market liquidity and price stability when shares are bought back.

The execution of share repurchase programs presents some very unusual features with respect to the status of the repurchasing company. In a buyback, the repurchasing firm can in fact decide whether, when, to what extent, and at what conditions purchases of its own stocks should take place. In countries like Italy repurchasing companies may also flexibly sell previously repurchased shares in the market, enjoying an even wider degree of freedom. It is therefore evident that repurchase programs constitute a valuable opportunity for the issuer to intervene in the market of its own shares. The issuer may potentially act as a market maker, providing liquidity, when it is lacking, and stabilizing market price in turbulent periods[2].

Anecdotal evidence confirms the relevance of price stabilization and liquidity enhancing activities in Italian stock repurchases. To justify the newly approved buyback program by the Board, on 26 March 1997, Marco Tronchetti Provera, the CEO of Pirelli Spa, affirmed that it would be carried out "… to stabilize the security". He added, "We have no intention to intervene if stock market prices

[1] There are different methods of repurchases. An open market repurchase program consists of acquisitions by a company of its own shares directly in the stock market, like any other investor. This type of repurchase is the focus of this paper, and below the terms "repurchase" and "buyback" will be used to refer exclusively to an open market repurchase.

[2] The term "price stabilization" in this paper refers to market transactions that are aimed at reducing the gap existing between intrinsic and market value of a stock. For example, when a stock is overvalued in the market price stabilization activities take place through sales. It is probably more common for a firm to stabilize the price of its security when it is undervalued. In this scenario, price stabilization could be, more properly, termed as "price support".

are satisfactory" (ANSA - Agenzia Nazionale Stampa Associata, news-report, 26/03/1997). On 25 September 2001, Ermenegildo Beghè, Biosearch Italia Spa's CFO, claimed that one of the goals of their new buyback was "…to use this instrument to reduce the volatility of the stock and support volumes…" (Reuters, news-report, 25/09/2001). On 29 April 2003, the shareholders of Bulgari Spa authorized the execution of a repurchase program. The CEO of the firm, Francesco Trapani, affirmed that "… the share repurchase program has been proposed in order to be able to intervene in the market and help the stock in peculiar moments like when, for example, there is little trading" (AGI – Agenzia Giornalistica Italiana, news-report, 29/04/2003)[3].

These are not rare statements in the Italian financial market. In the period 1997 – 2004, we find in this paper that around 40% of the released motivations when promoting a repurchase program show company intention of intervening in the secondary market of own stocks. Interventions are often finalized to reduce excess return volatility, support price, and increase liquidity.

The nature of the effects of repurchases on liquidity represents a relevant empirical issue. In an insightful paper, Barclay and Smith (1988) argue that buybacks may potentially lead to a reduction in market liquidity, because they allow transactions in own shares by the well informed managers and/or directors of the company ("information-asymmetry hypothesis"). In the same paper, the two authors highlight that the use of limit orders in trading of own shares may have the objective and the outcome of creating a deeper and broader order book ("competing market maker hypothesis"). In other words, *a priori* it is hard to suggest whether company trading in own shares reduces or increases liquidity. The related empirical evidence existing to date is mixed (see, e.g., Singh, Zaman, and Krishnamurti., 1994; Wiggins, 1994; Cook, Krigman, and Leach., 2004; Eberhart and Siddique, 2004). We hope this study can shed some light on the issue.

As for price stabilization, having a price discovery process (Schreiber and Schwartz, 1986) that is as smooth as possible, with a minimum level of noise (Black, 1986) and a maximized stock price in the market place, represents a natural goal for a firm. A high price facilitates the collection of new financial resources. In addition, keeping noise, and the resulting excess price volatility (French and Roll, 1986; Amihud and Mendelson, 1987), at a minimum level may reduce the gap between efficient and observed price. Hence, price stabilization helps firms to make sure that their market price fully reflects their intrinsic value. It is interesting to verify whether Italian firms are able to support and stabilize their market price through open market buybacks also because of the very limited empirical evidence (see, e.g., Hong, Wang, and Yu, 2005; McNally, Smith, and Barnes., 2006; Brockman and Chung, 2001) existing to date in the international financial literature. Moreover, with few exceptions, this literature focuses on short term stabilization activities. It tries to assess whether the timing of own share transactions is consistent with the goal of supporting market price, after price

[3] The news-reports mentioned in this paragraph have been published by well-known Italian and international news-agencies. The citations of executives' statements are the result of the author's translation from Italian into English.

drops. Our study focuses on the long term ability of firms to stabilize price. It is, for this reason, more practically relevant than most of the previous ones.

To identify a set of testable hypotheses, we consider the content of the previous literature and the motives declared by Italian companies, when promoting buybacks, in the sample period 1997 – 2004. The result of this investigation is a set of eight hypotheses concerning the variables relative spread, trading volume, return variance, and return skewness. These hypotheses predict that as a consequence of repurchase activities relative spreads become smaller and trading volume bigger, with an overall growth in market liquidity. This effect of repurchasing is more likely for shares traded in an illiquid market. Also, they imply that buying shares back has a decreasing impact on short term return variance, controlling for long term or fundamental variance, and an increasing one on return skewness. In other words, they suggest that buybacks are effective instruments to attenuate excess volatility or noise and to support stock prices.

We gather a sample of dates of annual general meetings of shareholders (AGMs) that approved a repurchase program in the sample period 1997 – 2004. An obvious control group of observations is given by dates of non-repurchase AGMs, i.e. AGMs that did not authorized repurchase programs. We run a series of univariate and multivariate tests to compare changes in spread, trading volume, return variance, and return skewness around repurchase AGMs with similar variations around non-repurchase AGMs.

The empirical findings indicate that there is a significant decrease in relative spread around approvals of buybacks, especially for shares with high pre-approval spread. We find similar results for variance given that, controlling for long term variance, securities with high short term variance in the pre-AGM period appears to benefit from a substantial reduction in this variable when a repurchase program is approved. No significant results are, on the other hand, found for trading volume and skewness. In most of the cases trading in own shares within buyback programs is a very tiny part of total trading activity, and this may explain why trading volume is practically unaffected. As for skewness, our hypothesis on this variable is based on the assumption that purchases of own shares are much more likely than sales. The fact that in Italy sales of previously repurchased stocks are quite frequent could drive our findings.

In conclusion, repurchase activities seem indeed to have the potential to improve market quality[4] in Italy. While the evidence on trading volume and return skewness is inconclusive, our paper shows that repurchasing has a positive effect on liquidity, by reducing spread, and on price discovery, by lowering short term excessive variance. Moreover, securities that need market quality improvements the most, being traded in an illiquid and noisy market, are the main beneficiaries of repurchases.

[4] Market quality is a concept with many facets. A comprehensive discussion of what market quality may mean in the market microstructure literature is presented by Schwarz and Francioni (2004), chapter 4.

We review the existing literature in Section 2. and in Section 3. we present our main hypotheses. Data collection and methodology are described in Section 4., while empirical findings are discussed in Section 5. The results of robustness checks are reported in Section 6. We express some concluding remarks in Section 7. Finally, an analysis of disclosed motives of Italian buybacks is presented in the Appendix.

2. Institutional background

According to the Italian regulation (Kim, Schremper, and Varaiya, 2005), directors and/or managers can carry out repurchase programs only after being formally authorized by the meeting of shareholders. A program can last for a maximum of 18 months. Moreover, companies can buy back up to 10% of the number of outstanding shares. In the USA, previously repurchased securities, still present in treasury, can only be sold in the open market following all the formalities prescribed for offers of shares to the general public[5]. By contrast, Italian companies, whenever sales of own shares are authorized by shareholders, can repeatedly purchase and sell own securities within a buyback program. This behaviour has always been very common, and was formally legalized by regulatory changes in 2003 (Pozzo, 2003, p. 521). Italian companies, therefore, enjoy a greater freedom than their US counterparts in trading own shares.

Repurchase activities are also influenced by the provisions of illegal insider trading and anti-manipulation regulations (Fried, 2005). For example, many commentators relate the substantial surge in US share repurchases in the mid-1980s to the introduction of the SEC rule 10b-18 in 1982 (e.g., Grullon and Michaely, 2002). This rule, which focuses on “manner, timing, price, and volume” of repurchases, provides repurchasing companies with a voluntary “safe harbour” from liability for stock manipulation practices. The enactment of this “safe harbour” rule probably stimulated the promotion of share buybacks, by reducing the ambiguity of the previous case law on the topic. This circumstance shows how companies can refrain from repurchasing shares when they feel this activity may represent a breach to the law. Therefore, less prohibitive anti-manipulation and insider trading laws, also in terms of enforcement by judicial and market authorities, are probably associated with more intense and flexible trading in own shares.

Compared to the USA, there is a lower level of shareholder protection in Italy; the latter country scores lower on measures of “rule of law” and “efficiency of judicial system” than the former (La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). In the period 1996-2005, Kaufmann, Kraay, and Mastruzzi (2006) confirm that the USA ranks substantially higher than Italy in terms of “rule of law”. As regards insider trading, Beny (2005) evaluates regulatory frameworks in many different countries, focusing on the content of the “formal insider trading law” and on “enforceability”. The

[5] We thank Jesse Fried and Jaemin Kim for helpful comments on this issue.

Italian law seems to be less restrictive, especially in terms of enforcement, than the US law. The weakness of the Italian regulatory framework, which is confirmed by other studies (Linciano, 2003), is not surprising given the much longer tradition in the field of illegal insider trading repression in the USA (Bhattacharya and Daouk, 2002). Bris (2000) estimates proxies for trading volume and market profits of insider trading in the period preceding the announcement of a takeover for several countries. His results show that insider trading is more common and profitable in Italy than in the USA. Research on stock market manipulation practices is very scant owing to very limited data availability. In any case, it is likely that Italian laws are less prohibitive and enforceable than US laws in this respect too. Taken all together, insider trading and anti-manipulation laws are probably a more relevant impediment for repurchase activities in the USA than in Italy.

In light of the institutional differences highlighted above, the Italian stock market is an ideal setting to assess whether repurchase activities can have a relevant impact on stock market quality variables like liquidity and volatility. If companies can influence these variables through trading in own shares, this is more likely to be the case in a country like Italy than in the USA.

3. Literature review

The first formal study to raise the issue of the relation between liquidity and buybacks is Barclay and Smith (1988). They propose the "information-asymmetry hypothesis", suggesting that repurchases could be economically damaging and a potential cause of liquidity reductions. In fact, the presence of a well informed trader such as the company, in the market of its own stock, could increase the expected costs to institutional market makers or liquidity providers (traders that provide liquidity through their activity) of trading with a better informed player, the so-called "adverse selection costs". To compensate for these costs, market makers will increase bid-ask spreads and, thereby reduce liquidity (see., e.g., Bagehot, 1971; Glosten and Milgrom, 1985). Barclay and Smith recognize that liquidity could also be improved by the presence of a repurchasing firm, because it represents a sort of market maker who competes with the existing market makers and investors ("competing market maker hypothesis"). The two hypotheses are not mutually exclusive and may simultaneously affect liquidity, but in opposite ways. It is well-known that liquidity is crucial in that a more liquid stock has a higher and less volatile price than a less liquid one with the same features (Amihud and Mendelson, 1986; O'Hara, 2003)[6]. If the competing market maker hypothesis holds and repurchases increase liquidity, and in turn, market valuation of the stock, then the concerns of Italian managers about increasing liquidity through buybacks are clearly well justified.

[6] O'Hara (2003) presents a comprehensive review of the main analytical and empirical contributions on the relationship between liquidity costs and expected returns. It is worth mentioning that some authors (see, e.g., Constantinides, 1986; Heathon and Lucas, 1996; Vayanos, 1998) believe that liquidity should have a negligible second-order effect on asset prices.

To date there are only a limited number of empirical studies into the effects of buybacks on liquidity, and most of them use US data. The US evidence is mixed but overall supportive of the competing market maker hypothesis. In fact, while the findings of Barclay and Smith (1988) support the idea that a buyback reduces liquidity, Singh *at al.*, (1994), Wiggins (1994) and Kim (2005) reject that idea although they do not find that repurchases improve liquidity. By contrast, Miller and McConnel (1995), Franz, Rao, and Tripathy (1995), Ahn, Cao, and Choe (2001), Cook *et al.* (2004), Eberhart and Siddique (2005), and Hong *et al.* (2005) do find that a buyback can indeed make a stock more liquid.

Owing to the limited information disclosure in the US market, the great majority of the previously mentioned studies are not based on detailed information about timing and size of actual transactions in own shares. The only US work to use detailed daily data on effective purchases of own shares is Cook *et al.* (2004). Their dataset is unique in that it is based on information voluntarily disclosed by repurchasing firms to the authors.

Non-US empirical research in the field is, fortunately, often free from this constraint. Brockman and Chung (2001) study the market reaction to transactions in own shares in the Hong Kong market. They present evidence in support of the information-asymmetry hypothesis. Ginglinger and Hamon (2005) show similar results for the French stock market analyzing a detailed dataset of actual repurchases.

The literature on price stabilization and support by the issuing company is particularly recent. A fundamental analytical model is presented by Hong *et al.* (2005) in a very original paper. The main assumption of the model is that companies are keen to intervene in the market of their own stocks, operating as a sort of market maker, to limit and reduce discrepancies between market and fundamental values, whenever the intervention is economically convenient in terms of expected trading profits. They are, in other words, willing to match liquidity shocks that drive prices away from fundamental values only if the trading activity is potentially source of trading profits. An ancillary assumption is that this market making activity can be carried out either by repurchasing shares or issuing new shares. Moreover, the former activity, which increases prices, is considered more desirable and less costly. Hence, companies, in the execution of their stabilization activities, are much more similar to "buyers of last resort" (Hong *et al.*, 2005) than to pure market makers.

The model predicts that firms that are more capable of acting as buyers of last resort through share repurchases, i.e. firms that are less financially constrained, have a less noisy stock price. Less noise implies lower short term volatility, given a level of long term or fundamental volatility. It also predicts that stock market returns are more positively skewed for companies that are more able to intervene in the financial market with the objective of supporting the price of their own security.

Hong *et al.*'s paper also offers partial empirical support for the implications of its theoretical construction, using US and non-US data. The empirical evidence shown in the article is strongly supportive only of the existence of a price stabilization effect on volatility, driven by repurchases. The statistical support for the implication on return skewness is overall weak.

The evidence on price stabilization is limited. Cook, Krigman, and Leach. (2003), using a unique US dataset of privately disclosed information, find that corporations are more willing to run the risk of being subjected to price manipulation charges, owing to violations of SEC "safe harbour" Rule 10b-18, if transactions in own securities may have the effect of supporting the falling price of their shares on the market. They also highlight the support by the SEC, in the period following the 1987 stock market crisis, in favour of liquidity provision and price support, through open market buybacks, in such a critical phase. Using the same unique dataset, Cook *et al.* (2004) find that firms often buy their own stocks after price drops and that these transactions produce short term price stabilization.

Outside the USA, companies seem to buy shares back in periods when they are undervalued in Canada (Ikenberry, Lakonishock, and Vermaelen, 2000; McNally *et al.*, 2006), Hong Kong (Brockman and Chung, 2001; Zhang, 2005), Japan (Zhang, 2002), and France (Ginglinger and Hamon, 2005). This behaviour might be explained by the desire to accumulate trading profits, purchasing own shares at a convenient price. As shown by Hong *et al.*'s model, it may indirectly stabilize and support market price. Additional evidence is provided by analyses of repurchase motives, expressed by companies, in France (Ginglinger and L'Her, 2006) and in Korea (Lee *et al.*, 2005). According to these empirical studies, in both of these countries price stabilization appears to play a major role. For example, Ginglinger and L'Her (2006) show that in around 75% of cases French companies mention price stabilization as the main objective of announced repurchase programs. Furthermore, in about one fifth of the studied announcements this objective is the only one stated.

4. Hypotheses development

We carry out a thorough analysis of the motives that Italian managers affirm to justify buybacks. The results of this analysis are reported in the Appendix. They support the anecdotal evidence of Section 1., confirming that liquidity enhancing and price stabilization activities are common in Italian buybacks. We take into account the findings on buyback motives together with the literature review of the previous section to formulate our hypotheses.

Starting from liquidity enhancing activities, the most widely used liquidity proxy in the financial literature (see, e.g., Barclay and Smith, 1988; Miller and McConnel, 1995) is by far the spread between bid and ask price, or bid-ask spread. The higher this spread is, the less liquid a market may be defined. We use the bid-ask spread as the main liquidity proxy in this work and, also, as the focus of our first hypothesis:

H1: Repurchase activities reduce the size of bid-ask spreads in the markets of the stocks of the repurchasing companies.

This hypothesis, which we have previously termed as competing market maker hypothesis (Barclay and Smith, 1988), does not imply that Italian firms always desire to reduce spreads when carrying out a buyback. Our objective is to verify whether buyback activities have a positive impact on spreads, irrespective of the reasons why these activities are promoted.

As an interesting alternative to H1, it is also possible that the positive impact of buyback activities on spreads may be dependent on how liquid the affected stocks are for two main reasons. First, in a highly liquid market it is more difficult for any additional trader who, like the repurchasing firm, is not professionally involved in an active investment management business to produce a sizable effect on bid-ask spread. Second, the predictions of the competing market maker hypothesis only represent one side of the coin. As implied by the information-asymmetry hypothesis (Barclay and Smith, 1988), when firms are allowed to purchase and sell own shares liquidity may be negatively affected, because of the inside unique information that firms can exploit. Given that the beneficial impact of own share trading is probably greater in illiquid markets, we argue that the competing market maker hypothesis is prevalent in these markets, while the counter hypothesis is more relevant in liquid markets. We can therefore outline the following two hypotheses:

H2: Repurchase activities reduce the size of bid-ask spreads mainly in markets where liquidity is low.

H3: Repurchase activities increase the size of bid-ask spreads mainly in markets where liquidity is high.

Another, less commonly adopted, proxy for market liquidity is trading volume (see, e.g., Datar, Naik, and Radcliffe, 1998). This variable may be expressed in different formats. Typical is the case in which it corresponds to the number of shares traded, but variations to this definition are very frequent. Our choice of trading volume as an additional proxy of liquidity is not only motivated by its diffusion in the literature. It also derives from the findings in the Appendix which show that companies sometimes state that they want to support trading volume by buying shares back.

The predictions of the two hypotheses of Barclay and Smith (1988) can be easily extended to trading volume. On one side, the additional trading activity owing to repurchases must have an incremental impact on volume (competing market maker hypothesis). On the other, some traders may fear of trading with the well-informed issuer (information-asymmetry hypothesis) and, therefore, refrain from trading the stock. Given the similarities between volume and bid-ask spread, our next three hypotheses can be defined as follows:

H4: Repurchase activities, carried out by companies, make markets of their own stocks more active, with an increase in trading volume.

H5: Repurchase activities, carried out by companies, make markets of their own stocks more active, with an increase in trading volume, only in markets where liquidity is low.

H6: Repurchase activities, carried out by companies, makes markets of their own stocks less active, with a decrease in trading volume, only in markets where liquidity is high.

Moving on to price stabilization, Hong *et al.*(2005) provide two clear empirical predictions about the effects of repurchasing on return distribution, not only when price stabilization is the goal of this activity. The first of the two predictions can be summarized in the following way:

H7: Short term return variance, controlling for long term or fundamental variance, is reduced as a result of the repurchasing activities of companies.

The second empirical prediction of Hong *et al.*'s (2005) paper refers to return skewness. In Hong *et al.*'s model price stabilization is carried out either by repurchasing shares or selling own stocks through new issues. Share repurchases are assumed more common and desirable than equity issues since buybacks can increase stock price and are arguably more flexible and less costly than issues of new shares. In Italian buyback programs, managers are often authorized by shareholders to buy and sell own shares on the market. Italian companies can, therefore, stabilize stock market price through sales of own shares in a more flexible and less costly way than the generic firm in Hong *et al.*'s model. Despite this, we argue that Italian managers are more inclined to promote price-boosting repurchases than to carry out sales of own shares that could decrease market price. Hong *et al.*'s hypothesis on return skewness is plausible for Italian buybacks too and can be formulated in the following way:

H8: Stock return becomes more positively skewed, or less negatively skewed, as a result of the repurchasing activities of companies.

5. Data collection and methodology

5.1. Data collection

5.1.1. Bid price, ask price, trading volume, closing price and market value time series

Daily time series for bid and ask price, trading volume, expressed as number of shares traded in thousands, adjusted closing price, and market value and weekly time series for adjusted closing price for the sample period 01/01/1997 – 31/12/2004 are downloaded from Datastream.

The daily time series present values even in days when the market was closed because of a holiday or when trading of a security was suspended and, therefore, unable to provide a meaningful price. Utilizing information about holidays and trading halts taken from the official website of the Italian Stock Exchange[7] and the database Factiva, observations for dates in which the Stock Exchange was closed are deleted, while in case of trading halts data are set to missing.

5.1.2. Approval dates of buyback programs

The key event in our paper is the date in which a repurchase program is approved by shareholders, giving directors the right to trade own shares. We collect a comprehensive sample of these key events in the period 01/01/1997–31/12/2004. We gather newspaper articles and news-reports from news-agencies through a keyword search on the database Factiva. Only sources in Italian language are taken into account. The database used presents a broad coverage of the main Italian newspapers and news-agencies in the sample period. The keywords chosen are "azioni proprie", "buy back", "buyback" and all their possible combinations. The word "repurchase" is practically never used in Italian sources, and it is, for this reason, not adopted as a keyword here. Each of the collected articles and news-reports is thoroughly screened to make sure it complies with the following two criteria. First, the buyback must be an open market repurchase and concern ordinary shares. Second, the repurchasing company must be Italian and listed on the Milan Stock Exchange, and its legal form must either be "SPA" or "SAPA", hence excluding firms that are "SCRL"[8]. By analyzing the final group of collected articles and news-reports, we identify a total of 457 repurchase programs.

We use additional information from annual reports to complement the previously gathered information and find further repurchase programs and the missing approval dates for some of the 457 programs above. A list of all the Italian companies listed on the Milan Stock Exchange in the sample period is created, using information found on the official website of the Italian Stock Exchange. The final list is made up off 386 listed Italian companies ("SPA" and "SAPA" only). For each of the firms in the list we gather all the annual reports, during the sample period, from the database Thomson One Banker, the official website of the Italian Stock Exchange, and the websites of the companies themselves. After a thorough search through the annual reports, and exclusively keeping programs referring to ordinary shares, the final number of key dates in which a repurchase program is approved by shareholders amounts to 669.

[7] http://www.borsaitaliana.it.

[8] A "SPA" is a typical limited company and most of the listed firms are part of this category. A "SAPA" (only one in our sample) is a company in which only a subgroup of shareholders enjoy limited liability. A "SCRL" is a cooperative firm that can potentially be involved in repurchases but under a regulatory framework that is far different from the one in place for an "SPA" and a "SAPA". The listed "SCRL" we find through our keyword search are commercial banks.

For 25 companies the price and trading volume series cannot be found in Datastream. As a result, the total number of buyback approvals by shareholders' meetings decreases from the original level of 669 to 653.

The methodological framework is based on changes of relevant variables around approvals of repurchase programs. These changes are computed comparing pre-approval values, in the interval (-120 , -11), with post-approval values, in the interval (+11 , +120). Time 0 is the event date, or approval date. In light of the methodology, we exclude those observations that do not conform to the following four criteria.

First, in order to make sure that there are enough trading days to calculate changes around key dates, in the period between the initial listing date and the approval date there must be at least 120 trading days. In case of a delisted stock, the same applies for the time interval between the approval and the delisting date.

Second, in the interval between trading day –120 and trading day +120 there must not be approvals of repurchases, for the same security, different from the one taking place at time 0. This criterion is imposed to ensure that variations in the variables under analysis are exclusively driven by one approval at a time.

Third, observations that are potentially contaminated by equity capital adjustments, such as stock splits and rights issues, taking place in the interval from trading day –120 to trading day +120 must not be considered. We refer to all those transactions that, causing an arbitrary and sudden change in the market value of a stock, might have on impact on liquidity. In the extensive literature on stock splits some authors argue that there is an optimal trading range for each security at which its liquidity can be maximised (Copeland, 1979) and managers seem to be convinced of the existence of this range (Baker and Gallagher, 1980). A split can represent an instrument to alter the price of a stock and reach its optimal trading range, even though the empirical evidence on the issue is mixed (see, e.g., Conroy *et al.*, 1990; Lipson, 1999; Goyenko *et al.*, 2006). Similarly to stock splits, transactions such as reverse-stock splits, stock dividends, rights issues, big extraordinary dividends, one-off distributions of equity capital, issues of convertible bonds and warrants, and demergers can dramatically modify the price of a stock and, assuming the existence of an optimal trading range, its liquidity. We therefore exclude all those observations that are potentially contaminated by such transactions. These transactions are reflected in variations in adjustment factors that must be applied to daily financial time series to make sure they are comparable across time. The information about changes in these factors is obtained from Datastream and the official website of the Italian association of financial analysts (AIAF)[9]. We exclude an observation if in the interval between day –120 and day +120 there is a variation in the adjustment factor for the repurchasing company.

[9] http://www.aiaf.it.

Finally, an observation is included only if it is feasible to gather information about possible past buyback approvals in the two previous fiscal years. Only in this case it is possible to ensure that results are not contaminated by previous repurchase programs.

98 observations are excluded taking the four criteria above into account. The final sample of approval dates consists of 555 key events. 149 of them are defined as initiations since they are not preceded by another approval in the two previous trading years (506 trading days)[10] and/or because they are the first approval in the sample for a particular company since its listing date. The remaining 406 observations are defined as renewals.

We also create two sub-samples of approval dates, in order to separate Extraordinary General Meetings (EGMs) from Annual General Meetings (AGMs). There are 90 EGM approval dates and 465 observations for the sub-sample of AGMs. In this latter sample 106 observations are initiations and 359 renewals. The empirical analyses in this paper are based on this sample of AGM approval dates and on a control group of non-repurchase AGMs, i.e. AGMs that did not authorize a repurchase program.

We use the information included in annual reports and presented by the official website of the Italian Stock Exchange to form the control sample of non-repurchase AGMs. The previously outlined criteria about nationality and legal form of the company, sample period (01/01/1997 – 31/12/2004), and availability of data from Datastream determine the exclusion of some observations. Non-repurchase AGM dates are used to compute changes in relevant variables, using pre-AGM and post-AGM values. Consistently with the previous part of this work, listing and delisting dates must not be part of the interval of calculation (from day –120 to day +120), and cases contaminated by equity adjustment transactions are not included in the final sample. Finally, a non-repurchase AGM is excluded if a repurchase program is approved in the interval between trading day –120 and trading day +120 around the observation.

The final sample of non-repurchase AGMs comprises a total of 892 key dates.

5.2. Methodology

5.2.1. Bid-ask spread, trading volume, return variance, and return skewness proxies

The empirical proxy that we use for the bid-ask spread is the well-known relative bid-ask spread. It is given by the difference between ask and bid price divided by the arithmetic average of the

[10] 18 months is the maximum duration of a repurchase program. Hence, two years seem a proper choice to separate initiations from renewals given that our methodology considers a pre-approval period of slightly less than six months to compute variations of relevant variables around key dates.

two prices[11]. The ratio between number of shares traded and number of shares outstanding, often called turnover, is our proxy for the variable trading volume[12]. Return variance is the sample variance of log-returns. Finally, return skewness is computed using log-returns and following a standard statistical formula, scaling the sample third moment of daily log-returns by the sample standard deviation of the same returns (Hong *et al.*, 2005). For instance, in case of a generic stock in a sample period comprising *n* trading days with a valid log-return (*R*) we apply the following formula:

$$SKEW = \left[n(n-1)^{3/2} \sum_{i=1}^{n} \left(R_i - \overline{R}\right)^3 \right] \Big/ \left[(n-1)(n-2) \left(\sum_{i=1}^{n} \left(R_i - \overline{R}\right)^2 \right)^{3/2} \right]$$

5.2.2. Univariate analysis

We focus on variations in relative spread, turnover, return variance, and return skewness around the 465 key dates in which an AGM of shareholders authorized a repurchase program (repurchase AGMs). We exclude the 90 EGM repurchase approvals (see Section 5.1.2.) to have a homogeneous sample of AGM approvals to be compared with a homogeneous control sample of non-repurchase AGMs.

In the case of relative spread, turnover, and variance the variation around an AGM date is calculated as log-percentage change. A natural logarithmic transformation is applied to the simple percentage change plus the constant one in order to alleviate the high degree of positive skewness and leptokurtosis in the percentage changes and apply standard statistical tests that rely on normality. Figure 1 shows how the percentage change around repurchase approvals is computed. The approval date is defined as day 0, and daily time series from trading day –120 to trading day +120 are used in the calculation, with the exception of the intervals between trading days –10 and –1 and trading days +1 and +10. Given that this work is focused on long term changes in the dependent variables, these two periods are excluded from the computation in order to avoid that results are influenced by short term dynamics around day 0.

For spread and turnover a simple arithmetic average is applied to the 110 observations in the pre-approval period and in the post-approval period, obtaining average values for the two variables before and after an approval date. The percentage change around an approval date is simply calculated as a ratio having as numerator the average in the post-approval period minus the average in the pre-approval period, and as denominator the average in the pre-approval period.

[11] We obtain qualitatively similar results using, as spread proxy, the difference between ask and bid price. This second spread proxy cannot be adopted in some of our analyses given that it is not comparable across different securities.

[12] Contrary to turnover, trading volume proxies like number of shares traded and number of shares traded multiplied by current price are not appropriate to draw comparisons among stocks. In any case, whenever possible we repeat our estimations utilizing these two alternative proxies finding similar results.

In the case of the variance of log-returns a single value for this variable is computed both for the pre- and the post-approval period of 110 trading days. The percentage change is then calculated using these two values, and a logarithmic transformation is again applied for statistical purposes.

The variable return skewness comprises both positive and negative values. We therefore use the simple difference between post- and pre-approval return skewness around approvals instead of the percentage change.

AGMs are clustered in Italy, generally taking place between March and June. Changes in spread, turnover, variance, and skewness around repurchase AGMs may, therefore, simply be the by-product of seasonal patterns. Similar problems can be highlighted with respect to the increase in magnitude and frequency of market-relevant information disclosure during an AGM and in the period leading to it. It is therefore necessary to compare the results related to the sample of repurchases with those obtained as the outcome of similar empirical analyses on a proper control sample. A natural choice for the latter is given by the sample of 892 AGM dates in which a buyback plan was not authorized.

We compare the mean change in relative spread, turnover, return variance, and return skewness around repurchase AGMs with the mean change in the same variables around non-repurchase AGMs. To run the comparison we use a standard t-test for unpaired samples. We also carry out the same statistical tests dividing the sample of approvals into initiations and renewals, and using the overall group of non-repurchase AGMs as a control sample.

Ceteris paribus, it is reasonable to expect to have much stronger results for initiations than for renewals. Moreover, in our sub-sample of renewals we often have cases in which an existing ongoing buyback program is simply extended. This circumstance does not imply that renewal dates are often irrelevant events in this study. The simple extension of an existing program may be correlated with future planned trading in own shares and be, for this reason, a clear identifier of the desire of companies to repurchase shares. Also, renewals can be an opportunity to increase the quantitative limits directors have to comply with when repurchasing shares.

For each of the four variables of interest, we create three sub-samples of repurchase AGMs, each of them with 155 observations, in order to differentiate our results in relation to the pre-approval level of each variable. This level is simply given by the pre-approval value that is used to calculate the change around the approval date. Once, for each of the four variables, the original repurchase AGM sample has been ordered by pre-approval level, we create one sub-sample with high pre-approval levels, one sub-sample with low pre-approval levels, and one with medium values. We then gather a control sample with 155 observations of non-repurchase AGMs for each of the sub-samples. Control samples are obtained by finding, for each repurchase AGM, a matching non-repurchase AGM satisfying the following two criteria. First, the fiscal year of the matching observation must be the same as the fiscal year of the repurchase AGM. Second, the matching observation must have the most similar pre-event level. We run the previously described univariate tests on each couple of sub-samples of repurchase and non-repurchase AGMs.

5.2.3. Multivariate analysis

We estimate four different groups of equations, each of them related to one of the four empirical proxies of Section 5.2.1. In equations for relative spread, trading volume, and return variance the dependent variable is the change in these variables computed as explained in section 5.2.2. The dependent variable for skewness equations is simply the value of this variable in the post-AGM period (from day +11 to day +120). The sample used for the estimation comprises a total of 1,357 observations, of which 465 are related to repurchase AGMs and 892 to non-repurchase AGMs.

There are several explanatory variables, which are of fundamental relevance in testing our hypotheses, that are commonly used across the four different groups of equations. The dummy variable *APP* takes the value one when the observation is related to a repurchase AGM and zero otherwise. In the same way, *IN* is a dummy variable associated with initiations of buybacks and *REN* with renewals. In the case of equations for relative spread and trading volume, the variable *PLEV* is simply the daily average of these two proxies in the interval (-120 , -11). For return variance and skewness, *PLEV* is the value of these variables in the same interval. *PLEV* is a crucial variable in our analysis. It is in fact interacted with the dummies *APP*, *IN*, and *REN* in order to study the impact of repurchase activities on the four dependent variables conditional on previous market conditions of the securities involved.

IPO is a dummy taking the value of one if the interval of calculation of the dependent variable comprises at least one trading day in the first year (253 trading days) of listing in the stock market. The inclusion of this dummy is aimed at controlling for potentially peculiar conditions in this early period of trading. For example, the expiration of lock up agreements could have an impact on liquidity (Cao *et al.*, 2004). Also, seven dummies appear in all the estimated equations to control for year effects (*YEAR*), together with six industry dummies (*IND*) to take industrial effects into consideration[13].

The existing literature on the determinants of bid-ask spread is particularly wide. This stream of finance research shows that stock return volatility, trading activity, and stock price play a role in explaining variations in spread. It empirically finds that there is a direct relation between volatility and spread (see, e.g., Tinic, 1972; Branch and Freed, 1977; Stoll, 1978; Stoll, 2000), an inverse relation between the latter and trading volume (see, e.g., Demsetz, 1968; Tinic, 1972; Branch and Freed, 1977; Stoll, 1978; Stoll, 2000) and, again, an inverse relation between price and relative spread (see, e.g.,

[13] The group of industry dummies was originally meant to reflect the ten SIC macro industrial categories, but industries are actually only seven in this analysis because for one of the macro groups there are no observations at all and three of these big categories are grouped into only one.

Branch and Freed, 1977; Stoll, 1978; Stoll, 2000). In addition, a few empirical papers show that market-wide liquidity (Chordia *et al.*, 2000; Brockman and Chung, 2002) is a relevant determinant of firm-specific liquidity. We therefore estimate the following equation for the change in relative spread:

$$DSPR = \beta_0 + \beta_1 APP (or \beta_2 IN + \beta_3 REN) + \beta_4 PLEV + \beta_5 APP \times PLEV (or \beta_6 IN \times PLEV + \beta_7 REN \times PLEV) + \\ + \beta_8 DTV + \beta_9 DVAR + \beta_{10} IPO + \beta_{11} DPR + \beta_{12} DVWSPR + \sum_{i=13}^{19} \beta_i YEAR_{i-6} + \sum_{j=20}^{25} \beta_j IND_{j-13} + \varepsilon$$

In the equation, the variables and parameters in brackets can be used to replace the terms that immediately precede them. Therefore, there are two main models that can be estimated: one with the dummy *APP* for all the repurchase AGM observations and one with the two dummies *IN* and *REN* for initiations and renewals respectively. The equations below for the three remaining dependent variables are expressed in a similar way. The dependent variable *DSPR* is the log-percentage change in relative spread. *DTV*, *DVAR*, *DPR*, and *DVWSPR* are, in the same order, log-percentage changes in turnover, return variance, closing price, and value-weighted average market spread. The calculation of *DVWSPR* is quite simple. It follows the method used to compute *DSPR* with the only difference that, instead of the spread for one security, the value-weighted average market spread is used, considering all the listed securities. For each observation, data for the company to which the observation relates are not used to compute *DVWSPR*.

The previous literature on the determinants of trading volume shows that high relative spreads, and in general high trading costs, lead to less active trading in the market place (see, e.g., Wang and Yau, 2000; Daves *et al.*, 2003). Another well-established quantitative result implies a contemporaneous positive correlation between trading volume and return volatility (see, e.g., Karpoff, 1987; Harris and Raviv, 1993; Shalen, 1993), while a causal relation going from volatility to volume is supported by some articles (see, e.g., Gallant *et al.*, 1992; Shalen, 1993; Kim and Verrecchia, 1991; Lee and Rui, 2002). Other papers show that price changes lead variations in trading volume (see, e.g. Karpoff, 1987; Campbell *et al.*, 1993; Hiemstra and Jones, 1994; Lee and Rui, 2002). Finally, firm-specific trading volume may be affected by changes in market-wide trading activity proxies (Bamber *et al.*, 1989; Brockman and Chung, 2002). We therefore estimate the following model:

$$DTV = \beta_0 + \beta_1 APP (or \beta_2 IN + \beta_3 REN) + \beta_4 PLEV + \beta_5 APP \times PLEV (or \beta_6 IN \times PLEV + \beta_7 REN \times PLEV) + \\ + \beta_8 DSPR + \beta_9 DVAR + \beta_{10} IPO + \beta_{11} DPR + \beta_{12} DVWTV + \sum_{i=13}^{19} \beta_i YEAR_{i-6} + \sum_{j=20}^{25} \beta_j IND_{j-13} + \varepsilon$$

The only new variable we need to describe in this equation is *DVWTV*, which is the change in value-weighted average market turnover. It is computed in the same way as *DVWSPR*, replacing daily spread series with daily turnover series.

To specify an empirical model for the variation in return variance we can again rely on a well-developed literature. Several quantitative analyses find that an increase in trading frictions like spreads produces an upward movement in volatility (see, e.g., Amihud and Mendelson, 1987; Kaul and Nimalendran, 1990; Koski, 1998; Wang and Yau, 2000). We have already mentioned the body of empirical findings showing a contemporaneous positive correlation between trading volume and volatility (see, e.g., Karpoff, 1987; Harris and Raviv, 1993; Shalen, 1993). Some additional empirical evidence shows that changes in trading volume lead variations in volatility (see, e.g., Schwert, 1989; Gallant *et al.*, 1992; Lamourex and Lastrapes, 1990; Stoll and Whaley, 1990; Lee and Rui, 2002). The evidence about the role of price as a determinant of volatility is more mixed (Duffee, 1995), but it still suggests that changes in price have an influence on volatility levels. Finally, to test our seventh testable hypothesis (H7) We include the change in long-term return variance. The variance is computed using three-weekly log-returns[14]. We can, in this way, separate long term volatility, more related to fundamental factors, from short term volatility, mainly reflecting the effect of noise. Noise may be the product of investors' over- and/or under-reaction to newly available information, of irrational reactions to irrelevant new information and/or to each other's trade, and of transitory liquidity needs by investors (French and Roll, 1986; Amihud and Mendelson, 1987). Hence, the following equation is estimated:

$$DVAR = \beta_0 + \beta_1 APP(or\beta_2 IN + \beta_3 REN) + \beta_4 PLEV + \beta_5 APP \times PLEV(or\beta_6 IN \times PLEV + \beta_7 REN \times PLEV) + \\ + \beta_8 DSPR + \beta_9 DTV + \beta_{10} IPO + \beta_{11} DPR + \beta_{12} DVWVAR + \beta_{13} DVARL + \sum_{i=14}^{20} \beta_i YEAR_{i-6} + \sum_{j=21}^{26} \beta_j IND_{j-13} + \varepsilon$$

The variable *DVARL* is the three-weekly return variance, while *DVWVAR* is the variation in value-weighted market variance, which is considered to control for market-wide changes in volatility. This variable is calculated similarly to *DVWSPR* and *DVWTV*, using variations in daily return variance for all the securities in the market.

We refer both to the paper of Hong *et al.*(2005) and to the original work of Chen, Hong, and Stein (2001), on which the former is partly based, to specify the equation for return skewness. In these papers the authors estimate a series of equations having as dependent variable the level of skewness and as independent variables lagged levels of a group of variables. In their forecasting models crucial regressors are lagged skewness, trading volume, market return, volatility, book-to-market ratio, market capitalization and leverage. Given the nature of our dataset we cannot use proxies for lagged book-to-market ratio and lagged leverage. Hence, we specify our equation in the following way:

[14] Results are qualitatively similar if two-weekly or four-weekly return variances are used instead.

$$SKEW = \beta_0 + \beta_1 APP(or \beta_2 IN + \beta_3 REN) + \beta_4 PLEV + \beta_5 APP \times PLEV(or \beta_6 IN \times PLEV + \beta_7 REN \times PLEV) +$$
$$+ \beta_8 SD + \beta_9 MV + \beta_{10} TV + \beta_{11} RET + \beta_{12} VWSKEW + \sum_{i=13}^{19} \beta_i YEAR_{i-6} + \sum_{j=20}^{25} \beta_j IND_{j-13} + \varepsilon$$

SKEW is the return skewness in the post-AGM period (+11 , +120). *SD* is the standard deviation of log-returns in the pre-AGM period (-11 , -120), while *MV* is the average daily log-market value in the same period. The average daily turnover in the pre-AGM period is *TV* and *RET* is the average daily log-return for the same time interval[15]. In analogy with the three previous specifications, we include the control variable *VWSKEW* that is the level of the value-weighted average market skewness in the post-AGM period.

We estimate the four models both through an ordinary least squares (OLS) and a fixed effects (FE) estimation method for panel data. This multiple approach is probably the best way to draw some reliable conclusions. On one hand, FE is a natural choice to deal with potential omitted variable and unobserved heterogeneity problems that might afflict OLS in panel data and make estimation results biased and inconsistent. On the other, the dummies *APP*, *IN*, and *REN*, which are of critical importance, do not exhibit great intra-cross sectional variation in our data. Low inter-temporal variation in variables can inflate standard errors and, in this setting, statistically significant results are very unlikely to emerge. FE estimations must be carried out on a reduced sample of 1,328 observations because for some companies there is only one observation.

6. Empirical findings

6.1. Univariate analysis

Some standard descriptive statistics for the dependent variables change in spread (*DSPR*), change in return variance (*DVAR*), change in turnover (*DTV*), and change in return skewness (*DSKEW*) are presented in Table 1. It is worth noting the common negative sign in the means of these variables across the four different samples and sub-samples of AGMs. For variables like *DSPR* and *DVAR* this may partly be the product of a likely long term improvement in financial market quality in Italy. In general, it probably reflects strong seasonal variations in our proxies around highly temporally clustered events like AGMs. Another interesting column is the one for the mean value of the variable *PLEV*[16]. By analyzing its content we can conclude that spread is lower before initiation AGMs than before renewals. Returns are more positively skewed in the pre-approval period for initiations rather

[15] In the baseline specification of the return skewness equation in Chen *et al.* (2001) market-adjusted returns are used instead of raw returns to compute the skewness, the standard deviation and the return variables. A detrended version of the trading volume is also adopted. We have tried to use market-adjusted returns and a detrended trading volume proxy finding qualitatively similar results.

[16] As explained in section 5.2.3., *PLEV* can either be the average spread, the average turnover, the return variance or the return skewness in the pre-AGM period (-11 , -120).

than for renewals. Trading volume and return variance are quite similar between the two sub-samples of repurchase AGMs.

Mean values of the four dependent variables, across the same samples and sub-samples of observations, are formally compared in Table 2. The comparison is carried out between the mean of a sample or sub-sample of repurchase AGMs and the mean of the control sample of non-repurchase AGMs.

Starting from the variable *DSPR*, there is a highly statistically significant (p-value less than 1%) stronger decrease in relative spread around approvals of repurchases than around control AGMs. This can be also said for the sub-sample of renewals, while *DSPR* behaves differently around initiations. This variable is in fact less negative for this type of buyback approvals than for non-repurchase AGMs.

Similar conclusions can be put forward when the investigation focuses on *DVAR*. The reduction in return variance is in fact bigger around a repurchase AGM than around a non-repurchase AGM, though this conclusion is drawn from marginally statistically insignificant results (p-value of 13.27%). The reduction in variance in the overall sample of repurchase AGMs appears to be driven by the sub-sample of renewals. The mean value for this sub-sample is significantly different from the one of the control sample at a 5% level. By contrast, mean *DVAR* is less negative for initiations than for non-repurchase AGMs.

Mean *DTV* is very similar across the sample and the two sub-samples of approvals. It is also always bigger than in the case of non-repurchase AGMs, indicating that trading activity decreases less when a repurchase program is promoted. Differences in means are never statistically significant.

As for *DSKEW*, with the exception of renewals, return skewness seems to become less positive (or more negative) around repurchase AGMs than around non-repurchase AGMs. In case of renewals, mean *DSKEW* is less negative for the sub-sample of approvals than for the control sample of AGMs. Overall, we cannot reliably say much on return skewness given that findings are statistically very weak.

We also test whether differences in mean values of *DSPR*, *DTV*, *DVAR*, and *DSKEW*, between repurchase and non-repurchase AGMs, depend on the level of the variable *PLEV*. The results of this analysis are shown in Table 3. The means for the variables *DSPR* and *DVAR* are statistically significantly lower, at least at the 10% level, for approvals than for control AGMs only when *PLEV* is high. In other words, buyback activities appear to be particularly beneficial, in terms of abnormal decreases in spread and variance, when securities present high levels of these two variables in the pre-approval period. Findings are, on the other hand, in most of the cases statistically insignificant for trading volume and return skewness.

With reference to the main hypotheses of Section 4., we interpret the univariate findings in the following way. H1 cannot be rejected, given that spreads decrease more around repurchase AGMs than around non-repurchase AGMs (Table 2). H2 cannot also be rejected since repurchases are particularly beneficial for stocks with high pre-approval spread (Table 3). On the other hand, our findings do not support H3. The evidence presented here offers very weak support to the argument that trading volume is positively influenced by buybacks. We can conclude that H4, H5, and H6 are all rejected, in light of the absence of significant supportive findings. Also, we can state that H7 is weakly supported since results are not statistically significant at standard levels, but the p-value of 13.27% is still quite small. H7 cannot be rejected when only shares with high pre-approval variance are under analysis. Finally, we can confidently say that H8 is not supported. It appears to be more likely to have a reduction in return skewness when firms promote buybacks than when they do not approve these transactions.

6.2. Multivariate analysis

Multivariate results for the four dependent variables are presented in Tables 4, 5, 6, and 7. The structure of the tables is very similar across the four variables. It is based on eight different specifications of the same base equations of Section 5.2.3. These specifications reflect alternative options concerning estimation method, the choice between the unique dummy *APP* and its sub-dummies *IN* and *REN*, and the presence of the variable *PLEV* and its interactions with the dummies above.

OLS and FE estimates of the empirical model for *DSPR* are presented in Table 4. The estimated coefficients of the control variables change in turnover (*DTV*), change in return variance (*DVAR*), and change in value-weighted average market spread (*DVWSPR*) always have the expected sign and are often highly statistically significant. By contrast, the ones for the initial public offer dummy (*IPO*) and for the change in price (*DPR*) do not generally seem to be significant. In equations (1) to (4) the variable *PLEV* and its interaction terms are not included. These estimated equations are, therefore, useful to test whether abnormal changes in relative spread take place around repurchase approvals, irrespective of pre-AGM spread. The coefficient for *APP* is negative in equations (1) and (2) but only weakly statistically significant or insignificant. In contrast with what could be expected, the additional evidence of equations (3) and (4) clearly shows that abnormal reductions in spread only take place around renewals of buyback programs. With the inclusion of the variable *PLEV* and its interaction terms in equations from (5) to (8) there is a substantial increase in the adjusted *R squared*. Focusing first on equations (5) and (6), the negative sign for *PLEV* and the high significance of its coefficient clearly suggest that pre-AGM levels of relative spread are very useful in predicting values for *DSPR*. When pre-AGM liquidity is low, with high *PLEV*, *DSPR* is expected to take a more negative value than when it is high. Coefficients for *APP* and the interaction term *APP*PLEV* are highly significant, implying that the above underlined dynamics of *DSPR* may be different around approvals of repurchase programs. Always assuming a value of one for *APP*, the combined effect of this dummy and of its interaction term may have both a positive and a negative impact on the dependent variable. The latter is clearly more likely with a low pre-AGM liquidity, or high *PLEV*, and vice versa. For example, taking the coefficients of equation (5) into account, when *PLEV* is at its median level of 0.0107 the combined impact of *APP* and *APP*PLEV* is negative and equal to -0.0266, accounting for around 5% of the standard deviation of *DSPR* (0.5145 for the overall sample). At a level of 0.0177, which corresponds to the third quartile of *PLEV*, this impact is -0.2007, equal to about 39% of the standard deviation. It is therefore the case that for a substantial part of the observations in our sample, with high *PLEV*, liquidity is predicted to increase far more, or decrease far less, around approvals of repurchases than around non-repurchase AGMs. Once *PLEV* is controlled for as in equations (7) and (8), the impact of initiations and renewals on changes in spread is very similar. The puzzling results of equations (3) and (4) on the difference between these two sub-groups of approvals are probably caused by the lower level of the variable *PLEV* for initiations (see Table 1). The multivariate findings on the variable *DSPR* are, overall, very similar to the univariate ones. We can state that H2 is strongly supported. H1 cannot be rejected, even though the evidence in favour of this hypotheses is not statistically strong. Contrary to the univariate analysis, there is also some evidence here in favour of H3, given that when *PLEV* is small, implying pre-AGM high liquidity, *DSPR* is bigger for repurchase-AGMs than for non-repurchase AGMs.

Findings for the dependent variable *DTV* are shown in Table 5. Across the eight equations the coefficients for the control variables *DSPR*, *DVAR*, and *DPR* are strongly statistically significant and present the expected signs. *IPO* does not seem to have noteworthy explanatory power in the empirical model, while results for the variable change in value-weighted average turnover (*DVWTV*) are highly dependent on the choice between OLS and FE. We would expect to have a direct relation between changes in firm-specific and market-wide trading volume. This relation is actually supported only in empirical models estimated by OLS. The coefficient for *DVWTV* has a negative sign when FE is chosen instead[17]. Like for relative spread, results for the independent variable *PLEV* are highly significant and show strong predictability with respect to the evolution of the dependent variable. The negative sign of the coefficient for *PLEV* is a clear indication that *DTV* is expected to be significantly more positive or less negative when pre-AGM trading volume is low, and vice versa. As for the crucial variables *APP*, *IN*, *REN*, and their interactions with *PLEV*, all their coefficients are very far from being significant. Hence, all these variables are not relevant explanatory factors in our model, and there are no abnormal changes in trading volume around approvals of repurchase programs. This conclusion leads to the rejection of H4, H5, and H6.

[17] If the total amount investments in the market is pretty stable it is possible to conceive an indirect relation between *DTV* and *DVWTV*. In this setting, a strong increase in market-wide trading activity must, necessarily, damage firm-specific trading activity if the proxy for the former does not take changes in the latter into account. By construction, data used to calculate *DTV* are excluded in the computation of *DVWTV*, and this might explain our results for FE.

Multivariate results for the dependent variable *DVAR*, which are shown in Table 6, are pretty similar to those for *DSPR*. Coefficients for the dependent variables change in long-term return variance (*DVARL*), *DSPR*, *DTV*, *DPR*, and change in value-weighted average market variance (*DVWVAR*) are generally highly statistically significant. They also confirm the originally expected relation with *DVAR*. The explanatory variable *IPO* appears, again, to be very weakly related with the dependent variable. Wherever it appears, the variable *PLEV* is very statistically significant and inversely related with the dependent variable. As for *APP*, *IN*, and *REN* they are not significant, from the statistical point of view, in equations (1) to (4). Even after controlling for *PLEV*, in equations (5) to (8), these crucial dummies rarely seem to play an important role in explaining variations in return variance. This circumstance does not imply that repurchase approvals are irrelevant events in relation to changes in return variance. In fact, the coefficient for the interaction term *APP*PLEV* in equations (5) and (6) is negative and very significant, implying that, around repurchase AGMs, *DVAR* becomes smaller when pre-approval return variance increases. Similar results are found when estimating equations (7) and (8) in which initiations are distinguished from renewals. Like for *DSPR*, it is interesting to look at the combined effect of the coefficients for *APP* and *APP*PLEV* of equation (5), assuming that the dummy *APP* is equal to one. When *PLEV* takes its median level of 0.000511 in the sample the dependent variable is reduced by -0.0216, which makes for around 2.7% of the standard deviation of *DVAR* (0.789 in the overall sample). If the value of its third quartile (0.000793) is used instead the effect on the dependent variable becomes -0.0569, which is about 7% of the standard deviation of *DVAR*. Especially for securities with high pre-AGM variance, the change in return variance seems to be more negative or less positive around repurchase AGMs than around non-repurchase AGMs. Overall, we can argue that H7 is not rejected.

Finally, Table 7 includes the eight estimated equations for the dependent variable *SKEW*. The coefficients for the regressors return standard deviation (*SD*), log-market value (*MV*), turnover (*TV*), log-return (*RET*), and value-weighted average market skewness (*VWSKEW*) present the expected signs, even though they are not always statistically significant. There is a positive relationship between *SKEW* and *PLEV* in OLS equations, while this relationship is negative when a FE methodology is adopted. The first result shows that securities with high (low) pre-AGM skewness are more likely to have high (low) skewness in the post-AGM period. The second finding probably reflects the fact that securities with a pre-AGM skewness that is higher (lower) than their average skewness across time are more likely to have a lower (higher) than average skewness in the post-AGM period. The adjusted *R squared* is particularly low when fixed effects are not controlled for. The results for the dummy *APP* in equations (1) and (2) show that skewness is lower in the post-AGM period when a repurchase program is approved than when this event does not take place. This negative relation is confirmed for the variables *IN* and *REN* in equations (3) and (4). On the whole, results for the dummies *APP*, *IN*, and *REN* are most of the times not statistically significant in equations (1) to (4). In equations (5) and (6) an interaction term between *APP* and *PLEV* is introduced. The coefficient for this term is positive and not statistically significant. It seems that the effect of a repurchase approval on *SKEW* is not affected by the level of *PLEV*. Moreover, the negative sign for the coefficient of *APP*, which is statistically significant only in equation (6), suggest that repurchase-AGM generally lead to a reduction in *SKEW*. Similar findings are reported for equations (7) and (8) where the dummy *APP* is split into two sub-groups. To sum up, we can say that H8 can be rejected. Results are in most cases statistically very weak and, even when strong, contrary to this hypothesis.

7. Robustness checks

The well-established literature, mentioned in Section 5.2.3., on the determinants of the dependent variables *DSPR*, *DTV*, and *DVAR* clearly shows how each of them is also a fundamental explanatory factor for the other two variables. This is strongly confirmed by the findings of the previous section. The three dependent variables are, for this reason, likely to be jointly determined. The econometric implication of what just stated is that our multivariate results might be biased and inconsistent, even when a FE approach is chosen. Therefore, we repeat our multivariate estimations adopting a standard two-stage least squares approach. We focus on two different systems of three simultaneous equations, the first with the original data and the second with time-demeaned data. One of them is given by equation (5) in Tables 4, 5, and 6 and the other by equation (6) in the same three tables. Equations (5) and (6) are chosen because they include the variable *PLEV* and its interaction terms, which are highly relevant, and they avoid the split between initiations and renewals that, in light of our findings, does not appear important. In each system, all the exogenous variables are taken as valid instruments. The results, which are shown in Table 8, are very similar to those obtained by using OLS and FE. Simultaneity biases are not driving the multivariate findings.

The four dependent variables utilized in this paper are all potentially very sensitive to structural changes in market microstructure characteristics. It is extremely important to check whether our findings are in reality driven by such changes. A major modification in the institutional features of the Italian stock market took place in April 2001. Among the other things, a non negligible number of securities started trading in a brand-new specialist-based segment of the exchange, shifting from a purely electronic auction market. There is some evidence that this shift caused a sizable decrease in spread (Frino, Gerace, and Lepone, 2006). To eliminate potentially contaminated observations we create a reduced sample free from all AGMs occurring in 2001. This new sample is then used to re-estimate equations (5) and (6) for each of the four dependent variables. The new results, which are presented in Table 9, are qualitatively the same as the previous ones.

8. Conclusions

In this paper we study two motives of share repurchases, namely liquidity enhancement and price stabilization, which have been partially ignored by the existing literature. Trades in own shares may support market liquidity in periods in which it is weak. Also, if trades are properly directed to counterbalance heavy trading in a particular direction, they may induce price stabilization. It is likely for price stabilization activities to be mainly utilized to support a falling and/or undervalued price.

We analyze a sample of Italian share repurchase approvals in the period 01/01/1997 – 31/12/2004. We find that share repurchases in Italy can have a significant impact on liquidity by inducing a reduction in spread. This impact mainly affects illiquid stocks that are characterized by a high spread in the pre-event period. Our empirical findings also suggest that repurchase activities can successfully reduce short term price instability, thereby smoothing price discovery. In fact, once long term fundamental variance is controlled for, short term variance abnormally decreases around repurchase approvals. Like in the case of spread, this reduction in price instability is mostly beneficial for shares with high pre-event short term return variance. Further, we find that trading volume is not significantly affected by repurchases possibly because of the negligible size of trading in own shares. Finally, we also do not find return skewness to be significantly influenced by repurchases. This could be because sales of own shares, common in Italian repurchase programs, may significantly attenuate the upward price movements produced by purchases.

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Figure 1.
Graphical outline of methodology to calculate changes of relevant variables around an AGM date. The horizontal axis represents the number of trading days around a generic AGM taking place at time 0. To calculate the percentage change in a variable around an AGM it is necessary to have a unique value of that variable for a period before date 0 and for a period successive to date 0. For the variables relative spread, trading volume, closing price, value-weighted market relative spread, and value-weighted market trading volume the pre-AGM value is simply given by the arithmetic average of the daily time series in the interval between trading day –120 and trading day –11, with the two days –120 and –11 included. Similarly, the post-AGM value is again an average of daily observations this time going from day +11 to day +120. Once pre- and post-AGM values are obtained it is very straightforward to compute the percentage change. It is in fact given by the difference between post- and pre-approval average divided by pre-approval average. In the case of return variance and value-weighted market variance the only difference is that a single value for the variables is calculated for each of the two periods of interest using 110 log-returns in the pre-AGM period and 110 log-returns in the post-AGM period. The variation for the variable return skewness is, on the other hand, given by the value of this variables in the post-AGM period minus its value in the pre-AGM period. With the exception of the skewness variable, changes used in empirical analyses here are always log-percentage changes. These are the result of adding the constant one to the percentage change and then applying a natural logarithmic transformation to the result.

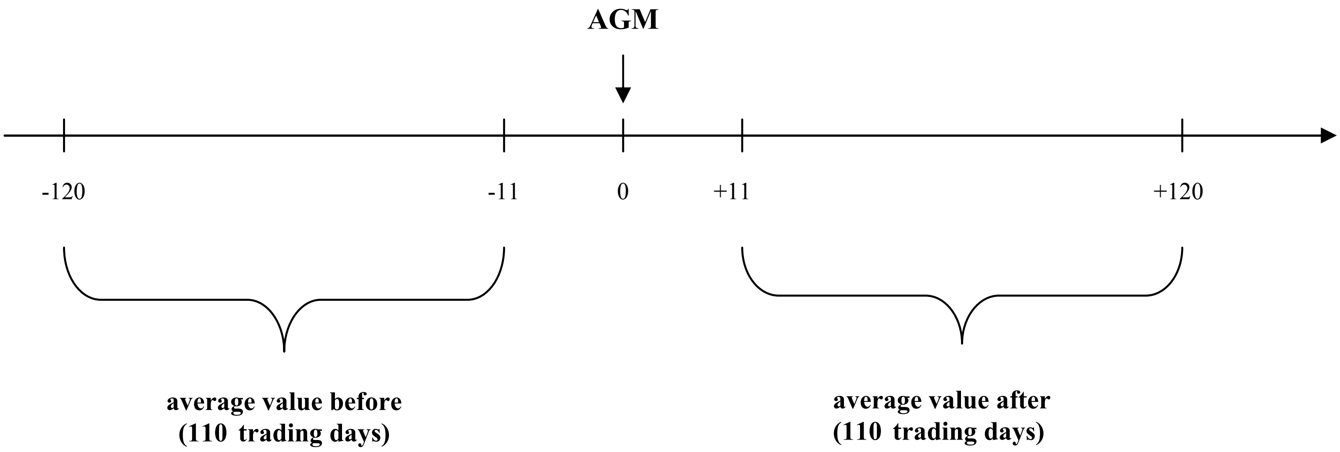

Table 1. Descriptive statistics for the variables *DSPR*, *DTV*, *DVAR*, and *DSKEW*.
The table presents some descriptive statistics related to changes in four variables around repurchase-AGM dates. Changes are obtained following the steps explained in Figure 1. *DSPR*, *DTV*, *DVAR*, and *DSKEW* are, in the same order, changes in relative spread, trading volume, return variance, and skewness. Relative spread is the difference between ask and bid price divided by the simple average of the two prices. Trading volume represents the daily number of shares traded in the market divided by the total number of outstanding shares. Return variance is the variance of daily log-returns. Skewness is calculated using a standard statistical formula and taking daily log-returns into consideration. For each of the variables, in the first column of the table there are four groups of observations. The first of them consists of all the approvals in the sample. *Initiations* and *renewals* are two non-overlapping subgroups of the previous macro category, representing approvals of new buybacks and simple continuations of existing repurchases respectively. The fourth group of observations is the control sample of non-repurchase AGMs. For each of the four variables and each of the four groups the table shows some descriptive statistics. *N* is the number of observations, while *mean* is the arithmetic average. *SD*, *max*, and *min* refer to the standard deviation, the maximum and the minimum value respectively. The denominations *skewness* and *kurtosis* are self-explanatory. *PLEV* is the pre-AGM level, in the closed interval from trading day -120 to trading day -11, used to compute changes around AGMs (see Figure 1). The column called *mean PLEV* reports the mean value of this variable.

Variable	N	Mean	SD	Max	Min	Skewness	Kurtosis	Mean PLEV
DSPR:								
All repurchase AGMs	465	-0.1483	0.5364	1.291	-3.9583	-2.5844	13.4875	0.0123
Initiations	106	-0.0193	0.5176	1.291	-3.9583	-4.0273	31.5529	0.0115
Renewals	359	-0.1864	0.5366	1.171	-3.5714	-2.2915	10.2021	0.0126
Non-repurchase AGMs	892	-0.0585	0.5003	2.4196	-3.2185	-1.3027	8.5634	0.0196
DTV:								
All repurchase AGMs	465	-0.1974	0.6958	3.3452	-2.5661	0.0319	1.6501	0.0024
Initiations	106	-0.2005	0.5996	1.3853	-1.9499	0.1624	0.6856	0.0024
Renewals	359	-0.1964	0.7225	3.3452	-2.5661	0.0089	1.6964	0.0024
Non-repurchase AGMs	892	-0.247	0.8161	2.9769	-3.7451	0.0233	0.9849	0.0026
DVAR:								
All repurchase AGMs	465	-0.2099	0.728	2.3521	-2.0433	0.1493	-0.0719	0.0006
Initiations	106	-0.0701	0.696	1.7131	-1.7569	-0.2086	-0.1069	0.0006
Renewals	359	-0.2512	0.7329	2.3521	-2.0433	0.2573	0.0432	0.0005
Non-repurchase AGMs	892	-0.1445	0.8185	3.7945	-3.3977	-0.0761	1.2966	0.0008
DSKEW:								
All repurchase AGMs	465	-0.1778	1.0019	3.2743	-5.6496	-0.7939	4.4464	0.4356
Initiations	106	-0.3283	0.9748	2.4124	-3.433	-0.255	1.0045	0.4972
Renewals	359	-0.1334	1.0068	3.2743	-5.6496	-0.9565	5.5684	0.4175
Non-repurchase AGMs	892	-0.1574	1.3087	8.6764	-13.3111	-1.4108	19.2274	0.4653

Table 2. Univariate tests on mean values of the variables *DSPR*, *DTV*, *DVAR,* and *DSKEW*.
The table shows the number of observations *N* and the *mean* of the change, around AGMs, concerning four variables and four different samples of AGMs for each variable. The four variables are denominated *DSPR*, *DTV*, *DVAR*, and *DSKEW*, and they are defined in Table 1. The first column of the table presents a short definition of the four samples of AGMs that are exactly the same as those in Table 1. The last column includes the two-sided p-value of a standard t-test on the means of two unpaired samples. Within each variable, the p-value in a particular row is related to the result of the test between the mean of the change for the sample to which the row refers and the mean of the change for the group of observations denominated *non-repurchase AGMs*.

Variable	N	Mean	t-test
DSPR:			
All repurchase AGMs	465	-0.1483	0.0028
Initiations	106	-0.0193	0.4607
Renewals	359	-0.1864	< 0.0001
Non-repurchase AGMs	892	-0.0585	-
DTV:			
All repurchase AGMs	465	-0.1974	0.2407
Initiations	106	-0.2005	0.4712
Renewals	359	-0.1964	0.2814
Non-repurchase AGMs	892	-0.247	-
DVAR:			
All repurchase AGMs	465	-0.2099	0.1327
Initiations	106	-0.0701	0.3098
Renewals	359	-0.2512	0.0247
Non-repurchase AGMs	892	-0.1445	-
DSKEW:			
All repurchase AGMs	465	-0.1778	0.7491
Initiations	106	-0.3283	0.1035
Renewals	359	-0.1334	0.7276
Non-repurchase AGMs	892	-0.1574	-

Table 3. Univariate tests on mean values of the variables *DSPR*, *DTV*, *DVAR*, and *DSKEW* across different sub-samples of repurchase and non-repurchase AGMs with high, medium, and low levels of the variable *PLEV*.

The table presents number of observations *N* and mean values of changes around key dates for sub-samples of repurchase AGMs (*mean repurchase AGMs*) and matching control samples of non-repurchase AGMs (*mean non-repurchase AGMs*). Like in Table 1, the variables under investigation are *DSPR*, *DTV*, *DVAR* and *DSKEW*. For each of them there are three non-overlapping sub-samples of repurchase AGMs, defined in the first column of the table. These sub-samples of repurchase AGMs are created separating observations with high, medium and low levels of the variable *PLEV* (see Table 1 for a description). Control samples are constructed by finding a matching non-repurchase AGM, for each repurchase AGM, having the most similar value of *PLEV* and occurring in the same fiscal year. P-values for standard t-test of differences between means of two unpaired samples are reported in the last column of the table. Each p-value refers to the test between the mean of a sub-sample of repurchase AGMs and the mean of the corresponding control sample.

Variable	N	Mean repurchase AGMs	Mean non-repurchase AGMs	t-test
DSPR:				
Low spread	155	-0.0663	-0.0135	0.1867
Medium spread	155	-0.0493	-0.0552	0.8894
High spread	155	-0.3293	-0.1995	0.0896
DTV:				
High trading volume	155	-0.4542	-0.4711	0.8385
Medium trading volume	155	-0.2438	-0.278	0.6583
Low trading volume	155	0.106	0.1218	0.8489
DVAR:				
Low variance	155	0.0654	0.1142	0.5332
Medium variance	155	-0.1373	-0.1597	0.7855
High variance	155	-0.5577	-0.356	0.0108
DSKEW:				
High skewness	155	-0.6744	-0.553	0.2794
Medium skewness	155	-0.1954	0.0075	0.0345
Low skewness	155	0.3363	0.4318	0.4049

Table 4. *OLS* and *FE* estimations for several equations of the dependent variable *DSPR*.
This table includes ordinary least squares (*OLS*) and fixed-effects (*FE*) estimation results of eight different equations for the dependent variable *DSPR*. A detailed description of the dependent variable and of the explanatory variables *DTV*, *DVAR*, and *PLEV* is provided in Table 1. *APP* is a dummy variable that is equal to one when the observation is a repurchase AGM and to zero otherwise. The dummy variable *IN* takes the value one if the observation refers to a repurchase AGM and it is not preceded by another approval of a buyback plan in the past 506 trading days. The dummy variable *REN* is, on the other hand, meant to identify renewals of buybacks. *IPO* is another dummy variable equal to one if at least one trading day belonging to the first year of negotiation (253 trading days) of the stock is comprised in the interval of calculation of percentage changes. *DPR* and *DVWSPR* are, respectively, changes in closing price and value-weighted average market relative spread. These changes are calculated as explained in Figure 1.There are two sets of dummy variables which are not shown in the table but are considered in the estimation. One of the sets includes seven year dummies while the second one is made up off six industry dummies. *Constant* is the standard intercept for *OLS* estimations while it is the average value of fixed effects across all the cross sections in case of *FE*. *F-test fixed effects* is the p-value of a standard test for the joint significance of all cross-sectional fixed effects. *Number observations* clearly regards the number of valid observations utilized in the estimation, while *R squared* is the usual statistic. Robust t-statistics for heteroscedasticity and serial correlation, within each cross section, are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	Dependent variable: DSPR							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
independent variables:								
constant	-0.0385	-0.0787 *	-0.0359	-0.0748 *	0.1342	0.3329 ***	0.1379	0.3357 ***
	(-0.31)	(-1.76)	(-0.29)	(-1.65)	(0.87)	(4.71)	(0.89)	(4.71)
APP	-0.052 *	-0.0257			0.2395 ***	0.2588 ***		
	(-1.84)	(-0.59)			(5.5)	(4.98)		
IN			0.023	0.0261			0.2688 ***	0.2487 ***
			(0.43)	(0.45)			(3.09)	(4.38)
REN			-0.0751 **	-0.0625			0.2304 ***	0.251 ***
			(-2.46)	(-1.29)			(4.86)	(4.33)
PLEV					-3.3065 **	-13.3969 ***	-3.319 **	-13.4132 ***
					(-2.08)	(-4.91)	(-2.08)	(-4.9)
APP * PLEV					-24.8681 ***	-23.4495 ***		
					(-6.66)	(-6.39)		
IN * PLEV							-22.9528 ***	-20.5965 ***
							(-2.96)	(-5.63)
REN * PLEV							-25.409 ***	-24.1821 ***
							(-6)	(-5.74)
IPO	0.041	-0.0319	0.0178	-0.0509	0.003	-0.0517	-0.0124	-0.0603 *
	(1.37)	(-0.77)	(0.54)	(-1.18)	(0.1)	(-1.47)	(-0.4)	(-1.71)
DTV	-0.1922 ***	-0.1791 ***	-0.1926 ***	-0.1788 ***	-0.1787 ***	-0.1427 ***	-0.1788 ***	-0.1421 ***
	(-8.4)	(-7.51)	(-8.41)	(-7.51)	(-7.98)	(-6.8)	(-7.98)	(-6.77)
DVAR	0.1321 ***	0.1096 ***	0.1316 ***	0.1089 ***	0.1535 ***	0.1324 ***	0.1532 ***	0.1318 ***
	(5.52)	(3.95)	(5.49)	(3.91)	(6.41)	(5.06)	(6.42)	(5.03)
DPR	-0.0306	0.1224	-0.0322	0.1184	-0.0924	-0.0363	-0.0947	-0.04
	(-0.44)	(1.34)	(-0.46)	(1.3)	(-1.58)	(-0.62)	(-1.62)	(-0.68)
DVWSPR	0.1674 ***	0.1419 *	0.1672 ***	0.1429 *	0.1263 **	0.1084	0.1274 **	0.1106
	(2.68)	(1.78)	(2.67)	(1.79)	(2.1)	(1.48)	(2.11)	(1.51)
F-test fixed effects	-	0.1347	-	0.1498	-	< 0.0001	-	< 0.0001
R squared	0.2254	0.4096	0.2269	0.4107	0.3717	0.6613	0.3719	0.6618
number observations	1,357	1,328	1,357	1,328	1,357	1,328	1,357	1,328

Table 5. *OLS* and *FE* estimations for several equations of the dependent variable *DTV*.
This table includes ordinary least squares (*OLS*) and fixed-effects (*FE*) estimation results of eight different equations for the dependent variable *DTV*. With the exception of *DVWTV*, all the variables in the table are described in Tables 1 and 4. *DVWTV* is the variation, around a key date, of the value-weighted average market trading volume. This variation is computed following the steps put forward in Figure 1. Two sets of dummy variables, one of seven year dummies and one of six industry dummies, are included among the explanatory variables to estimate the equations. *Constant* is the standard intercept for *OLS* estimations while it is the average value of fixed effects across all the cross sections in case of *FE*. *F-test fixed effects* is the p-value of a standard test for the joint significance of all cross-sectional fixed effects. *Number observations* clearly regards the number of valid observations utilized in the estimation, while *R squared* is the usual statistic. Robust t-statistics for heteroscedasticity and serial correlation, within each cross section, are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	Dependent variable: DTV							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
independent variables:								
constant	0.0546	0.2985 ***	0.0554	0.2984 ***	0.121	0.3843 ***	0.1195	0.3817 ***
	(0.34)	(2.98)	(0.34)	(2.98)	(0.82)	(4.23)	(0.81)	(4.19)
APP	-0.0016	0.0422			-0.007	0.048		
	(-0.05)	(0.82)			(-0.16)	(0.74)		
IN			0.0409	0.0403			-0.0067	-0.0259
			(0.8)	(0.64)			(-0.09)	(-0.3)
REN			-0.0148	0.0435			-0.0071	0.071
			(-0.43)	(0.73)			(-0.15)	(0.95)
PLEV					-44.7857 ***	-78.4724 ***	-44.6993 ***	-78.3738 ***
					(-5.03)	(-6.4)	(-5.03)	(-6.4)
APP * PLEV					0.1592	-11.7445		
					(0.01)	(-0.69)		
IN * PLEV							16.7318	14.07
							(0.8)	(0.57)
REN * PLEV							-5.1301	-19.5546
							(-0.32)	(-0.97)
IPO	-0.0293	-0.0278	-0.0374	-0.0271	0.0053	0.0433	-0.0081	0.0457
	(-0.47)	(-0.4)	(-0.73)	(-0.39)	(0.1)	(0.64)	(-0.16)	(0.67)
DSPR	-0.295 ***	-0.2751 ***	-0.2963 ***	-0.275 ***	-0.3236 ***	-0.2754 ***	-0.3251***	-0.2743 ***
	(-5.5)	(-5.07)	(-5.49)	(-5.07)	(-6.05)	(-5.32)	(-6.03)	(-5.31)
DVAR	0.5041 ***	0.5417 ***	0.5037 ***	0.5417 ***	0.4587 ***	0.4514 ***	0.4581 ***	0.4511 ***
	(13.11)	(13.49)	(13.08)	(13.47)	(12.08)	(11.82)	(12.03)	(11.81)
DPR	0.3847 ***	0.5663 ***	0.3836 ***	0.5664 ***	0.2934 ***	0.5423 ***	0.2918 ***	0.5399 ***
	(4.7)	(5.44)	(4.69)	(5.44)	(3.57)	(5.35)	(3.55)	(5.32)
DVWTV	0.243	-1.2076 ***	0.246	-1.208 ***	0.2599	-0.9417 ***	0.2637	-0.9326 ***
	(0.8)	(-3.08)	(0.81)	(-3.07)	(0.89)	(-2.68)	(0.91)	(-2.63)
F-test fixed effects	-	0.1626	-	0.1718	-	0.0005	-	0.0005
R squared	0.4208	0.5624	0.4207	0.5624	0.4459	0.6047	0.4456	0.6052
number observations	1,357	1,328	1,357	1,328	1,357	1,328	1,357	1,328

Table 6. *OLS* and *FE* estimations for several equations of the dependent variable *DVAR*.
This table includes ordinary least squares (*OLS*) and fixed-effects (*FE*) estimation results of eight different equations for the dependent variable *DVAR*. A description of most of the variables in the table is presented in Tables 1 and 4. The change in three-week return variance, around an AGM date, is given by *DVARL*. *DVWVAR* is the variation of the value-weighted average market return variance. Both *DVARL* and *DVWVAR* are computed following the steps laid out in Figure 1. Two sets of dummy variables, one of seven year dummies and one of six industry dummies, are included among the explanatory variables to estimate the equations. *Constant* is the standard intercept for *OLS* estimations while it is the average value of fixed effects across all the cross sections in case of *FE*. *F-test fixed effects* is the p-value of a standard test for the joint significance of all cross-sectional fixed effects. *Number observations* clearly regards the number of valid observations utilized in the estimation, while *R squared* is the usual statistic. Robust t-statistics for heteroscedasticity and serial correlation, within each cross section, are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	Dependent variable: DVAR							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
independent variables:								
constant	0.2313 **	0.0906	0.2318 **	0.0942	0.279 ***	0.1641 ***	0.2796 ***	0.1672 ***
	(2.58)	(1.58)	(2.58)	(1.65)	(3.2)	(2.75)	(3.2)	(2.8)
APP	-0.0094	-0.0189			0.0423	0.0837		
	(-0.37)	(-0.46)			(0.93)	(1.5)		
IN			0.0078	0.0328			0.0594	0.1672 **
			(0.17)	(0.61)			(0.82)	(2.21)
REN			-0.0147	-0.0554			0.0381	0.0394
			(-0.54)	(-1.14)			(0.78)	(0.61)
PLEV					-93.162 ***	-118.321 ***	-93.1632 ***	-118.043 ***
					(-3.75)	(-3.56)	(-3.75)	(-3.56)
APP * PLEV					-125.0714 **	-204.068 ***		
					(-2.12)	(-3.24)		
IN * PLEV							-117.7111	-250.116 ***
							(-1.61)	(-3.11)
REN * PLEV							-129.4691 *	-195.152 ***
							(-1.86)	(-2.59)
DVARL	0.2543 ***	0.2489 ***	0.2543 ***	0.2491 ***	0.2358 ***	0.2255 ***	0.2358 ***	0.2257 ***
	(15.83)	(13.86)	(15.81)	(13.83)	(14.17)	(12.46)	(14.14)	(12.44)
IPO	-0.0044	-0.0481	-0.0096	-0.0668	-0.0022	-0.0304	-0.0089	-0.0494
	(-0.1)	(-0.86)	(-0.21)	(-1.13)	(-0.05)	(-0.56)	(-0.21)	(-0.89)
DSPR	0.1521 ***	0.1163 ***	0.1515 ***	0.1143 ***	0.1394 ***	0.0928 **	0.1386 ***	0.0903 **
	(4.17)	(2.83)	(4.15)	(2.78)	(3.97)	(2.36)	(3.94)	(2.29)
DTV	0.2739 ***	0.2955 ***	0.2737 ***	0.2949 ***	0.2683 ***	0.2745 ***	0.268 ***	0.2739 ***
	(9.53)	(10.36)	(9.51)	(10.33)	(10.67)	(9.82)	(10.63)	(9.79)
DPR	-0.1378 *	-0.1387	-0.1381 *	-0.142	-0.1982 ***	-0.1269	-0.1984 ***	-0.1304
	(-1.84)	(-1.56)	(-1.84)	(-1.59)	(-2.74)	(-1.5)	(-2.74)	(-1.54)
DVWVAR	0.3326 ***	0.3548 ***	0.333 ***	0.3574 ***	0.3229 ***	0.3415 ***	0.3237 ***	0.3423 ***
	(6.82)	(6.61)	(6.83)	(6.67)	(6.94)	(6.32)	(6.91)	(6.36)
F-test fixed effects	-	0.4119	-	0.3888	-	0.5986	-	0.5689
R squared	0.6335	0.7175	0.6333	0.718	0.6589	0.7414	0.6585	0.742
number observations	1,357	1,328	1,357	1,328	1,357	1,328	1,357	1,328

Table 7. *OLS* and *FE* estimations for several equations of the dependent variable *SKEW*.
This table includes ordinary least squares (*OLS*) and fixed-effects (*FE*) estimation results of eight different equations for the dependent variable *SKEW* which is the return skewness in the post-AGM period (+11,+120). A description of the variables *APP*, *IN*, *REN*, and *PLEV* is presented in Tables 1 and 4. *SD*, *MV*, *TV*, and *RET* are, in the same order, the return standard deviation, the average daily log-market value, the average daily turnover, and the average daily log-return in the pre-AGM period (-11,-120). *VWSKEW* is the value-weighted average skewness in the post-AGM period. Two sets of dummy variables, one of seven year dummies and one of six industry dummies, are included among the explanatory variables to estimate the equations. *Constant* is the standard intercept for *OLS* estimations while it is the average value of fixed effects across all the cross sections in case of *FE*. *F-test fixed effects* is the p-value of a standard test for the joint significance of all cross-sectional fixed effects. *Number observations* clearly regards the number of valid observations utilized in the estimation, while *R squared* is the usual statistic. Robust t-statistics for heteroscedasticity and serial correlation, within each cross section, are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	Dependent variable: SKEW							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
independent variables:								
constant	-0.3813	0.4479	-0.3818	0.4454	-0.394	0.4266	-0.3986	0.4258
	(-0.84)	(0.95)	(-0.84)	(0.94)	(-0.86)	(0.92)	(-0.87)	(0.91)
APP	-0.031	-0.1562 **			-0.0662	-0.2276 **		
	(-0.57)	(-2.16)			(-0.89)	(-2.51)		
IN			-0.106	-0.1965 **			-0.2017 *	-0.312 **
			(-1.35)	(-2.14)			(-1.69)	(-2.13)
REN			-0.0077	-0.1282			-0.0284	-0.1829 *
			(-0.13)	(-1.6)			(-0.36)	(-1.94)
PLEV	0.1	-0.0241	0.1012	-0.0235	0.0842	-0.0581	0.0843	-0.058
	(1.41)	(-0.3)	(1.42)	(-0.29)	(0.98)	(-0.59)	(0.99)	(-0.59)
APP * PLEV					0.0758	0.1627		
					(0.71)	(1.35)		
IN * PLEV							0.1909	0.232
							(1.34)	(1.33)
REN * PLEV							0.0423	0.1464
							(0.36)	(1.15)
SD	13.8652 ***	12.7203 *	13.8586 ***	12.7791 *	13.9521 ***	12.884 *	13.9789 ***	12.9718 *
	(2.69)	(1.84)	(2.69)	(1.84)	(2.71)	(1.92)	(2.71)	(1.93)
MV	-0.0127	-0.0974	-0.013	-0.0971	-0.0111	-0.0953	-0.0111	-0.0956
	(-0.57)	(-1.13)	(-0.58)	(-1.13)	(-0.51)	(-1.12)	(-0.51)	(-1.12)
TV	-11.8081	-34.0702 *	-11.6505	-34.0662 *	-12.045	-34.5513 *	-11.9472	-34.521 *
	(-0.61)	(-1.69)	(-0.6)	(-1.69)	(-0.62)	(-1.73)	(-0.61)	(-1.73)
RET	-75.075 ***	-56.7377 ***	-75.6322 ***	-57.1381 ***	-75.046 ***	-56.4118 ***	-75.3422 ***	-59.9092 ***
	(-4.8)	(-3.21)	(-4.82)	(-3.25)	(-4.81)	(-3.22)	(-4.81)	(-3.25)
VWSKEW	0.1793	0.3863	0.1801	0.386	0.195	0.4275	0.1975	0.4265
	(0.89)	(1.36)	(0.89)	(1.36)	(0.94)	(1.52)	(0.95)	(1.52)
F-test fixed effects	-	< 0.0001	-	< 0.0001	-	< 0.0001	-	< 0.0001
R squared	0.114	0.3811	0.114	0.3813	0.114	0.3834	0.114	0.3813
number observations	1,357	1,328	1,357	1,328	1,357	1,328	1,357	1,328

Table 8. *2SLS* estimations for the dependent variables *DSPR*, *DTV*, and *DVAR*.
This table includes two-stage least squares (*2SLS*) estimates of six different equations for the dependent variables *DSPR*, *DTV* and *DVAR*. *2SLS* is applied either on the original data (*OLS/SLS*) or on time-demeaned data, without fixed effects (*FE/2SLS*). A description of all the variables in the table is presented in Tables 2, 5, 6, and 7. *DVW* is either *DVWSPR*., *DVWTV* or *DVVAR*. Two sets of dummy variables, one of seven year dummies and one of six industry dummies, are included among the explanatory variables to estimate the equations. *Constant* is the standard intercept for *OLS* estimations. *Number observations* clearly regards the number of valid observations utilized in the estimation. Standard t-statistics are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	DSPR		DTV		DVAR	
	OLS/2SLS	FE/2SLS	OLS/2SLS	FE/2SLS	OLS/2SLS	FE/2SLS
independent variables:						
constant	0.0934	0.3313 ***	0.1364	0.4422 ***	0.2028 *	0.1335 ***
	(0.67)	(8.06)	(0.95)	(4.82)	(1.91)	(2.61)
APP	0.255 ***	0.257 ***	0.0126	0.0592	0.0046	0.0637
	(5.68)	(6.48)	(0.28)	(0.87)	(0.1)	(1.09)
PLEV	-2.9783 *	-13.5579 ***	-34.077 ***	-68.814 ***	-92.2693 ***	-121.5901 ***
	(-1.76)	(-18.61)	(-3.75)	(-7.8)	(-3.69)	(-8.71)
APP * PLEV	-26.452 ***	-23.5954 ***	0.0274	-12.4451	-97.3934 *	-183.6908 ***
	(-7.32)	(-13.09)	(0)	(-0.75)	(-1.69)	(-2.68)
IPO	0.0196	-0.0515	-0.0124	0.0484	0.0237	-0.0289
	(0.5)	(-1.22)	(-0.24)	(0.7)	(0.54)	(-0.5)
DSPR			-0.0352	-0.1248 **	-0.2095 **	-0.089 *
			(-0.38)	(-2.13)	(-2.12)	(-1.79)
DTV	0.2205	-0.0862 *			0.4459 ***	0.3486 ***
	(1.47)	(-1.67)			(4.62)	(5.12)
DVAR	-0.1297	0.0906 **	0.5628 ***	0.5657 ***		
	(-1.14)	(2.16)	(8.43)	(12.07)		
DPR	-0.2685 ***	-0.0633	0.3582 ***	0.5413 ***	-0.3069 ***	-0.1602 *
	(-2.96)	(-0.99)	(4.2)	(5.84)	(-3.54)	(-1.89)
DVARL					0.1916 ***	0.2052 ***
					(6.84)	(10.53)
DVW	0.0302	0.0997 **	0.0479	-1.3196 ***	0.3754 ***	0.3751 ***
	(0.4)	(2.16)	(0.15)	(-3.58)	(7.02)	(6.25)
number observations	1,357	1,328	1,357	1,328	1,357	1,328

Table 9. *OLS* and *FE* estimations for the dependent variables *DSPR*, *DTV*, *DVAR*, and *SKEW* using the original sample of AGMs excluding observations in fiscal year 2001.

This table includes ordinary least squares (*OLS*) and fixed-effects (*FE*) estimation results of eight different equations for the dependent variables *DSPR*, *DTV*, *DVAR*, and *SKEW*. Apart from *VW*, a description of the variables in the table is presented in Tables 2, 5, 6, 7, and 8. *VW* is either *DVWSPR*, *DVWTV, DVVAR* or *VWSKEW*. Observations for the fiscal year 2001 are not used in the estimations. Two sets of dummy variables, one of seven year dummies and one of six industry dummies, are included among the explanatory variables to estimate the equations. *Constant* is the standard intercept for *OLS* estimations while it is the average value of fixed effects across all the cross sections in case of *FE*. *F-test fixed effects* is the p-value of a standard test for the joint significance of all cross-sectional fixed effects. *Number observations* clearly regards the number of valid observations utilized in the estimation, while *R squared* is the usual statistic. Robust t-statistics for heteroscedasticity and serial correlation, within each cross section, are reported in brackets. * : the coefficient is significant at the 10% level. ** : the coefficient is significant at the 5% level. *** : the coefficient is significant at the 1% level.

	DSPR		DTV		DVAR		SKEW	
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
independent variables:								
constant	0.1556	0.3356 ***	0.0765	0.3443 ***	0.2585 ***	0.1546 ***	-0.3434	0.5536
	(0.92)	(4.7)	(0.46)	(3.24)	(2.77)	(2.65)	(-0.67)	(1.06)
APP	0.2837 ***	0.2692 ***	-0.0207	0.0527	0.06	0.1011	-0.0646	-0.2749 ***
	(6.26)	(4.78)	(-0.42)	(0.72)	(1.24)	(1.59)	(-0.81)	(-2.73)
PLEV	-3.5224 **	-13.0501 ***	-45.8328 ***	-81.0786 ***	-85.7611 ***	-111.238 ***	0.0608	-0.0612
	(-2.06)	(-4.83)	(-4.62)	(-6.09)	(-3.54)	(-3.67)	(0.66)	(-0.57)
APP * PLEV	-27.6119 ***	-25.0647 ***	-1.147	-10.6373	-149.9513 **	-224.779 ***	0.1228	0.182
	(-7.5)	(-6.55)	(-0.08)	(-0.59)	(-2.23)	(-3.04)	(1.05)	(1.41)
IPO	0.0179	-0.0392	-0.0263	0.0337	0.0076	-0.0503		
	(0.53)	(-0.94)	(-0.45)	(0.42)	(0.16)	(-0.78)		
DSPR			-0.3021 ***	-0.2806 ***	0.137 ***	0.0886 **		
			(-5.64)	(-5.16)	(3.88)	(2.21)		
DTV	-0.1609 ***	-0.1413 ***			0.2775 ***	0.2667 ***		
	(-5.97)	(-5.98)			(9.71)	(8.36)		
DVAR	0.1572 ***	0.1324 ***	0.4915 ***	0.4518 ***				
	(6.17)	(4.71)	(11.93)	(10.88)				
DPR	-0.1557 **	-0.0499	0.4463 ***	0.7528 ***	-0.2128 **	-0.0344		
	(-2.15)	(-0.66)	(4.6)	(6.46)	(-2.53)	(-0.35)		
DVARL					0.2297 ***	0.2222 ***		
					(12.85)	(11.35)		
SD							10.5425 **	10.8273
							(2.08)	(1.5)
MV							-0.0163	-0.0983
							(-0.64)	(-1.05)
TV							-16.5757	-46.4629
							(-0.65)	(-1.45)
RET							-67.5632 ***	-62.1425 ***
							(-3.63)	(-3.04)
VW	0.1107	0.0613	0.2161	-0.876 *	0.3 ***	0.29 ***	0.0715	0.2157
	(1.1)	(0.52)	(0.75)	(-1.89)	(5.47)	(3.92)	(0.25)	(0.52)
F-test fixed effects	-	< 0.0001	-	0.0008	-	0.5562	-	< 0.0001
R squared	0.3766	0.6824	0.4793	0.6493	0.6456	0.745	0.091	0.3825
number observations	1,170	1,134	1,170	1,134	1,170	1,134	1,170	1,134

Appendix: declared motives for repurchases.

The sample we use to analyze declared motives for Italian repurchases is the group of 457 buyback programs described at length in the first part of Section 5.1.2. It is found through a keyword search on the database Factiva to identify news-articles and news-reports documenting repurchases in the sample period 01/01/1997 – 31/12/2004. Some of these articles and reports are excluded since they do not refer to an open market repurchase that was authorized by shareholders' meetings in the period of interest. Others are scrapped given that they refer to non-Italian and/or unlisted companies, and/or to firms of which legal form is not "SPA" or "SAPA".

We carefully examine our sample of articles and news-reports in search for the declared motives of the 457 buybacks. By declared motives we mean reasons mentioned by company representatives to justify the execution of the intended repurchases. Only in 134 cases, out of the original 457, it is possible to find some information about companies' declared motives. For these 134 repurchases we highlight the existence of 41 different non-overlapping categories of expressed motives. These motives are briefly described in the first column of Panel A in Table A1. The number of times in which a buyback is justified mentioning a particular motive is shown in the second column of the same section of the table. This variable is calculated adopting a multiple-counting approach. If several motives are stated to justify the same buyback, the variable, for each of them, is increased by one unit.

We then group the 41 detailed categories into seven major groups. The grouping of the motives is, of course, in part subjective but it is crucial in order to facilitate the interpretation process. Panel B of Table A1 shows, in its first column, a brief description of the content of the seven macro categories. As usual, the second column in the same section of the table includes the number of observations for each of the groups.

Out of the seven main groups, the one that has the largest number of observations is the motive defined as "to intervene in the secondary market". With 92 observations out of a total of 226, this group accounts for just above 40% of the overall sample. Companies' interventions are carried out to improve market quality in a variety of ways. Liquidity seems to play a major role given that it is clearly mentioned in at least 26 cases. This number could increase by four cases if the motive "to support volume of own security in secondary market" is assumed to be linked to the idea of creating a more active and liquid market. Companies appear to pay even greater attention to the excessive market volatility of their stock and to the possible discrepancy between intrinsic and market values, both caused by noise trading (Amihud and Mendelson, 1987). In fact, in 43 cases they want to trade their own shares to stabilize market price and in four additional circumstances they explicitly assert that one of the goals of the proposed and/or approved buyback is volatility reduction in the market of their security. Also, in 12 additional instances they want to pursue the goal of supporting the market value of their security by purchasing shares back.

The findings in this part of the paper add much weight to the anecdotal evidence exposed in Section 1. Among the most common opportunities that Italian companies appear to foresee by launching a buyback we can certainly include the possibility to smoothen price discovery process, limiting unjustified erratic movements in market values, and supporting market liquidity when trading is thin.

Table A1. Analysis of declared motives for open market repurchases.
Declared motives from company representatives for 134 repurchase plans approved in the sample period 01/01/1997 – 31/12/2004. The motives are inferred from the content of newspaper articles and news-reports from news-agencies. In both Panel A and B the first column offers a brief description of the declared motives while the second shows the number of buybacks, out of a total of 134, that are justified by a particular motive. The information employed to create the two panels is the same, but in the second the originally 41 possible motives are grouped into seven main categories.

Panel A:

The company promotes the repurchase:	Observations
To stabilize secondary market price	43
To gather own shares to be used in stock option plans for managers and employees	33
To improve secondary market liquidity	22
To gather own shares necessary for future mergers and acquisitions	15
To gather shares to be used in stock grant plans for managers and employees	13
To gather own shares to be used to buy shareholdings in other companies	12
To support secondary market price	12
To signal the intrinsic value of the company	7
To invest free cash flow in own shares	6
To gather own shares necessary for future strategic alliances with other companies	6
To gather own shares necessary for future financial transactions aimed at promoting external development of company's activities	5
To reduce volatility of secondary market stock price	4
To support volume of own security in secondary market	4
To improve secondary market liquidity even benefiting from the services of a specialist	4
To invest free cash flow in own shares which are currently undervalued	3
To gather own shares to be used to finalize future commercial agreements	3
To gather own shares to be used in incentive plans for managers and employees	3
To gather own shares to be used in incentive plans for commercial dealers	2
To invest in own shares within the management of mutual and pension funds	2
To invest free cash flow in an efficient way	2
To invest free cash flow	2
To create a regular market by trading own shares	2
To distribute free cash flow	2
To gather own shares to satisfy holders of warrants	2
To optimize financial leverage	1
To gather own shares necessary to finalise operations on equity capital	1
To carry out operations in the secondary market	1
To fend off a takeover	1
To facilitate currency conversion from Lira into Euro	1
To increase shareholders' value	1
To gather own shares to be used to finalize future industrial projects	1
To gather own shares necessary for future agreements with strategic partners	1
To gather own shares necessary to support future strategic development	1
To gather own shares necessary to pursue strategic objectives	1
To gather own shares necessary to conslude R&D agreements	1
To grant own shares to institutional investors and facilitate their participation in the firm	1
To distribute free cash flow in a tax efficient way	1
To boost EPS	1
To show the company is confident about its future	1
To signal undervaluation in secondary market	1
To intervene in the secondary market	1
Total	**226**

Panel B:

The company promotes the repurchase:	Observations
To intervene in the secondary market	92
To gather own shares necessary for incentive plans for managers and employees	49
To gather own shares necessary to finalize future startegic transactions	46
To invest free cash flow in own shares	13
To signal the intrinsic value of the company	9
To distribute free cash flow	3
Other motivations	14
Total	**226**