Do managers take advantage of undervalued stock prices in Italy? The potential use of share repurchases as a good investment decision and their effects on the cost of equity capital and on the long-run abnormal returns.

Abstract

Share repurchases have become more and more important in recent years, around the world and even in Italy where the number of listed companies with shares repurchase activity has significantly grown.

This paper investigates the potential determinants of shares repurchase activity and the effects of buybacks on both the cost of equity capital and on the long-run abnormal returns. All the Italian listed companies between 2003 and 2009 have been considered.

The Italian context provides an interesting field for this study because of the access to "real" data on share repurchases and because of past studies on EU did not find long-term excess return after buybacks as in U.S.

My main results indicate that managers seem to buy more shares when the price fall and in order to reduce shareholders' common equity. Stock option plans could have a significant impact on share repurchase activity as well. Supporting signaling theory, managers that use share repurchase give a signal that reduces information asymmetry, thus reducing the cost of equity capital.

Unlike previous US studies, but consistent with prior research in continental Europe, I find that Italian firms with share repurchase activities do not generate long-term abnormal returns in the 2-year period after the buybacks.

1. Introduction

Share repurchases have become more and more important in recent years, around the world and even in Italy where the number of listed companies with transactions on treasury share has grown from 53 firms in 2003 to 136 in 2008, with a partial drop in 2009 where 109 companies showed transactions on treasury shares (source: Consob).

Companies' buybacks could be a topic of considerable interest to the accounting and financial reporting community, especially in a context were financial (phase 1) and economic (phase 2) crisis became grave. Actually, in these periods the likelihood that the market undervalued a company was higher, thus increasing the potential usefulness of buyback as an investment decision in the open market. In other terms, it could be of interest to verify if companies with excess cash or debt capacity have used share buybacks as an alternative investment decision, allowing managers to take advantage of temporary market inefficiency.

A study on buybacks, however, has a lot of difficulties due to the many-sided nature of share repurchase, that sometimes has seen as a "microcosm" of corporate finance (Vermaelen, 2005). Certainly, share repurchase is an investment itself, as opposed to investing in financial instruments, goods or in other companies but, at the same time, it could be a different kind of decision. Firstly, it could be both a payout decision, as an alternative to paying dividend, and a capital structure decision, since under the International Financial Reporting Standards (IFRS) it increases company's financial leverage. Moreover, share repurchase could be an instrument to increase the value of executive share options (managers' wealth), especially when a significant part of their

compensation is based on stock option plans. Finally, buyback could be an instrument to carry out some processes such as the capital reduction, decreasing company's shareholder common equity through cancellations of previously repurchased shares, or M&A operations especially when a company incorporate a target company without issuing new share for non-controlling shareholders (minorities).

Therefore, since the recent increase in the use of buybacks could be fuelled by many factors, such as the increasing adoption of stock option plans as a significant compensation tool, the change in regulation and in taxation rules, and the usefulness in both decreasing firms' shareholder common equity and M&A operations, in this paper I firstly examine the potential determinants of firms' shares repurchase activity in Italy, also examining the differences that could exist in the companies' payout policies (buybacks *vs.* dividends).

Next, following the signalling theory (Spence, 1974; Ross, 1977) the announcement of share repurchases should reveal to the market managers' inside information on the company. If it is the case, and assuming a semi-strong efficiency of the market, the information revealed by repurchase announcements should drive the price towards their fair value, thus dropping any opportunities of having advantages from buybacks in terms of investment. In this situation managers could find of interest repurchasing shares in order to convey information to the market that is useful to reduce information asymmetry, and the cost of equity capital as well.

Additionally, I considered the use of share repurchases as a way to take advantage of an undervalued stock price, controlling for the other valid reasons that could matter. This hypothesis traditionally assumes that the market

underreacts to buyback announcements, as a result of an underestimate of expected cash flow or an overestimates of risks. I test the hypothesis investigating the long-term abnormal returns.

Following both U.S. and international evidence (Lakonishok and Vermaelen, 1990; Ikenberry et. al., 1995; Ikenberry et. al., 2000; Oswald and Young, 2004) I examine long-term price behaviour after share repurchases, looking for abnormal returns (excess returns) over the two-year period after the share repurchases. Additionally, since small firms have by definition less analyst following, I control for firm size because small firms are more likely to be undervalued than large firms, thus having higher opportunities to have long-run abnormal returns.

Three factors are critical to the power of my empirical analysis: i) a sufficient cross-sectional variation in buybacks, ii) an appropriate time horizons of analysis, and iii) a sufficiently large sample. In order to address these concerns, I test my hypotheses running the regressions on the overall Italian listed companies on a 7-year dataset (2003-2009), based on 1.841 observations, and 369 companies with 496 transaction on treasury shares over the period investigated.

The focus on Italian context is interesting because past studies on EU did not find long-term excess return as in U.S. (Lasfer, 2002), and because the size of Italian market could help to design a specific context where studying firms undervaluation and the resulting use of share repurchases as good investment decision. Additionally, compared to prior studies, the Italian environment provides access to "real" data on share repurchase. Past studies pointed out that it is not always possible to exactly determine with publicly available information

how many shares a particular firm purchased in a given period after the repurchase program announcements (Jagannathan *et al.*, 2000), hence justifying alternative ways to estimate total buybacks.

Since the announcement of a buyback in essentially costless to the companies, firms usually protect themselves from potential violation of the law through the announcements whenever they just plan to repurchase treasury shares. The Italian context, on the contrary, seems interesting because of the Italian Securities and Exchange Commission (Consob) publicly release the monthly amount of transactions each listed company has on its shares (purchases and disposals).

The rest of the paper is organized as follow. Section 2 reviews the literature and presents the research hypotheses. Section 3 details the sample, the methodology, and the variables construction. Section 4 provides descriptive information regarding the evolution of buybacks in Italy over the period 2003-2009 and it exposes the results by examining share repurchases determinants, the effect on the cost of equity capital and on long-run abnormal returns. Concluding remarks are provided in Section 6.

2. Theoretical background and research propositions

2.1. The potential determinants of share repurchases

Prior literature on share repurchases usually focuses on the analysis of price behaviour around buyback announcements or in the long run. Thus, the analyses of the reasons why do companies repurchase shares have not been extensively investigate in the literature. As Vermaelen (2005) so rightly pointed out, financial and accounting researches have the advantage over biologists that they

can interview the subjects of their research. Thus, prior studies on the topic are usually based on both CFO's interviews or anonymous surveys (Brav *et al.*, 2005; Tsetsekos *et al.*, 1998; Wansley *et al.*, 1989). These studies found that two main factors drive share repurchase decision: i) the managers' belief that shares are undervalued and that shares are a good investment, ii) the offset against dilution that comes from stock option exercises.

Briefly, with reference to the latter results, employee stock options could influence payout decisions for two reasons. Firstly because the value of an option declines when a stock goes ex-dividend but not when a company repurchase shares. Secondly, managers prefer to use repurchase rather than new issued shares in case of exercise in order to avoid diluting share value and EPS (Weisbenner, 1998).

Additionally, in contrast with results from CFOs surveys, the free-cash flow hypothesis (Jensen, 1986) states that managers could also find interesting buyback when they have too much cash, in order to guarantee shareholders that cash is not invested into project with negative net present value. Consistent with this theory, Ditmar (2000) finds a positive relationship between shares repurchase activity and measures of cash flows (e.g. operating cash flow or cash and equivalents). Partially in contrast with this study, Jagannathan *et al*. (2000) found that firms with higher permanent operating cash flow usually pay dividends while share repurchases are usually used by firms with higher temporary, non-operating cash flows. Accordingly, my first two research prepositions on the potential determinants of firms' shares repurchase activity are:

***H1a**: shares repurchase activity is positively related to the availability of cash flows;*

***H1b**: shares repurchase activity is positively related to the use of stock options as a compensation tool for executives;*

Furthermore, prior studies do not consider the potential use of buyback to reduce firms' shareholder common equity instead of proportionally reduce the shares' nominal value. Thus, I put forward the following hypothesis:

***H1c**: shares repurchase activity is positively related to the reduction of firm's shareholder equity;*

2.2. The potential effect of share repurchases on the cost of equity capital

As already show in the former section, CFOs usually buying back shares when they believe that the stock is undervalued, suggesting that the market can underestimates firms' future cash flows or overestimates their risks. Since prior event-studies in U.S. generally documented that stock prices increase as a result of a repurchase announcements (Peyer and Vermaelen, 2005; Grullon and Michaely, 2004; Gaspar *et al*., 2005; Kahle, 2002; Ikenberry *et al*., 1995), these results suggest that buybacks are signals for the market, and the market (on average) believes in those signals.

Signalling theory states that the signal has to be costly. If it is not the case, managers could lie without any cost. Shares repurchase are costly, firstly because of the managers that buy back shares usually pay more than the market price. Additionally, buybacks are costly because of the increase in leverage rises the expected bankruptcy cost of the firm (Ross, 1977). Finally, Leland and Pyle

(1977) show that a potential cost of buybacks is the loss in utility that follows the forced investment in shares by managers. In any cases, if signalling can be a convincing explanation, and if the market seems to believe in the managers' signals, thus the perceived risk of the firm that repurchases shares should fall, thus reducing the equity beta and the cost of equity capital. Consistent with this relation, prior empirical evidence suggests a potential significant decline in equity Beta after shares repurchase activity (Choi and Chen, 1997; Dan *et al.*, 1991). Consistent with this view, my research proposition is:

> ***H2****: managers can use share repurchases as a signal to convey information that are able to reduce information asymmetry, thus reducing the cost of capital. Hence, the use of share repurchases is negatively related to cost of equity capital;*

2.3. The potential effects of share repurchases on the long run abnormal returns

During the 1980s, prior U.S. research that examines long-term price behaviour after shares repurchase activity found that U.S. firms announcing stock repurchases and holding shares earned favorable long-run returns (Peyer and Vermaelen, 2005; Ikenberry *et al.*, 1995; Lakonishok and Vermaelen, 1990). The abnormal returns, however, seem to be more closely related to buybacks for small firms that, by definition, have lower analysts following, higher information asymmetry, and that more likely could be undervalued (Peyer and Vermaelen, 2005; Mitchell and Stafford, 2000; Lakonishok and Vermaelen, 1990).

Recently, concerns have been raised over the robustness of these findings. Even if literature has found statistically significant but smaller long-term abnormal returns after buybacks even in Canada (Ikenberry *et al*., 2000) and in

U.K. (Oswald and Young, 2004), some studies do not find the same results after repurchase plans in Europe (U.K., FRANCE, and ITALY), thus revealing that lower information asymmetries could exist in European firms (Lasfer, 2002). Therefore, consistent with prior research in Europe, I put forward the following hypothesis:

> ***H3****: share repurchases are not positively related to the abnormal returns in the long-run;*

4. Methodology and Data

4.1. Models

4.1.1. Potential determinants of share repurchases

To investigate the potential determinants of buybacks, I first estimate a logistic regression of the decision to repurchase shares for company *i* on the availability of cash flows (lagged operating profitability, permanence of operating profits, lagged non-operating cash flows and the lagged amount of cash and equivalents), the market undervaluation, the potential use of repurchased shares to reduce firm's shareholder common equity, information technology industry (because of Core and Guay, 2001 show that the overall size of stock option plans are usually higher from computer companies), and controlling for leverage and size.

Under the logistic model, the likelihood of the share repurchase activity is described as follows:

$$\text{Log}\,(p_i / 1\text{-}p_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_n X_n \qquad [1]$$

where p_i is the probability of a share repurchases for firm i, β_0 is a constant and there are n explanatory variables. For each firm in the sample, the probability is estimated as:

$$p_i = 1/(1+ e^{-Zi}) \qquad [2]$$

where e is the base of the natural logarithm, and

$Z_i = d_0 + d_1X_1 + d_2X_2 + \ldots \quad + d_nX_n$

My model assumes the following relation between the proposed explanatory variables and the share repurchases activity (the variables used in the model are thoroughly defined in section *4.3.* and in tables):

$$P_{(BUYBACK)i} = 1 / (1+e^{-Zi})$$

$$Z_i = \beta_0 + \beta\, ROA_{it-1} + \beta_2\, STDEV\_ROA_i + \beta_3\, CFNO_{it-1} + \beta_4\, CASH_{it-1} + \beta_5\, MTBV_i + \beta_6\, CE\_REDUCT_i + \beta_7\, IT_i + \beta_8\, LEV_i + \beta_9\, SIZE_i + \varepsilon_i \qquad [3]$$

Additionally, I estimate the panel logistic regression on the same variables in order to assess the robustness of my findings, taking time dimension and heterogeneity in firms explicitly into account. Consistent with prior research and my propositions, I expect a positive association between ROA, STDEV_ROA, and CASH (my measures of availability and persistence of cash flows) and shares repurchase activities, and a positive association between CS_REDUCT (my measure of reduction in companies' shareholder common equity) and IT (my

proxy to indirect control for the presence of executives stock options) and buybacks.

In order to assess if some differences exist in the determinants of distinctive payout policies (dividends *vs.* buybacks), the same variables of the previous model *(3)* are used to predict firm's decision to increase dividend payout. Even in this case, I firstly run a logistic regression. Additionally, the robustness of my findings has been checked through a longitudinal analysis that enables taking heterogeneity in firms explicitly into account. Thus, the following model is used to study that relationship (the variables used in the model are thoroughly defined in section *4.3.* and in tables):

$$P_{(\text{INC\_PAYOUT})i} = 1 / (1+e^{-Zi})$$

$$Z_{it} = \beta_0 + \beta\ \text{ROA}_{it-1} + \beta_2\,\text{STDEV\_ROA}_{it} + \beta_3\,\text{CFNO}_{it-1} + \beta_4\,\text{CASH}_{it-1} + \beta_5\,\text{MTBV}_{it} + \beta_6\,\text{CE\_REDUCT}_{it} + \beta_7\,\text{IT}_i + \beta_8\,\text{LEV}_{it} + \beta_9\,\text{SIZE}_{it} + \varepsilon_i \qquad [4]$$

4.1.2. Share repurchases and the cost of equity capital

The following OLS regression model is used to explore the effect of share repurchase activity on the cost of equity capital (the variables used in the model are thoroughly defined in section *4.3.* and in tables):

$$KE_{it} = \beta_0 + \beta 1\ \text{BUYBACK}_{it} + \beta_2\text{ROA}_{it-1} + \beta_2\,\text{LEV}_{it-1} + \beta_3\,\text{STDEV\_ROA}_{it} + \beta_4\,\text{SIZE}_{it} + \beta_5\,\text{MTBV}_{it} + \beta_6\,\text{Industry controls} + \varepsilon_i \qquad [5]$$

First I examined the effect of share repurchase activity on the cost of equity capital by using an OLS regressions and controlling for lagged (the year before)

profitability (ROA), lagged (the year before) leverage (LEV), persistence in profitability (STDEV_ROA), firm's size (SIZE), market-to-book value (MTBV), and the industry effects. In order to control for industry effects, I include in the model the following three different industry groups (combining 13 two-digit SIC primary code into 4 industry groups): financials (FIN), industrial (IND), information technology (IT), and a residual category.

Consistent with prior research and my propositions, I expect a negative association between shares repurchases activity (BUYBACK) and the cost of equity capital (KE).

Next, to check the stability of the model I run the OLS regression after checking for the presence of influential data points using Cook's D statistics. Additionally, instead of the cost of equity capital I also use as a dependent variable the weighted-average cost of capital (WACC), thus including both the firms' cost of debt and firm's leverage. Finally, I re-estimate the model using longitudinal data, thus taking time dimension and heterogeneity in firms explicitly into account.

4.1.3. Share repurchases and the abnormal returns

My last analysis uses the following model to explore the potential effects of shares repurchases activity on the current abnormal returns, and on the long-run abnormal returns (*n+1* and *n+*2):

$$AR_i = \beta_0 + \beta 1\ BUYBACK_{it} + \beta_2 ROA_{it} + \beta_2\ LEV_{it} + \beta_3\ STDEV\_ROA_{it} + \beta_4\ SIZE_{it} + \beta_5\ MTBV_{it} + \beta_6\ Industry\ controls + \varepsilon_i \quad [6]$$

The choice of the variables included in the model is based on economics theory and prior research on the economic consequences of share repurchases. More specifically, many papers (Gaspar *et al.*, 2005; Grullon and Michaely, 2004; Kahle, 2002; Ikenberry *et al.*, 1995; Raad and Wu, 1995; Vermaelen, 1981) found a few variables significantly related to excess return (with the sign of the relationship in parentheses) around the announcement of share repurchase authorizations: firm size (-), market-to book value (-), stock price change (-), and excess cash (+). Consistent with prior research on the relationship between buybacks and excess returns, I expect a negative association between size and excess returns, a negative association between MTBV and annual (current) abnormal returns, and a positive association between our measures of cash flows and their permanence (ROA, STDEV_ROA) and annual abnormal returns. Consistent with prior research in EU, I posit the absence of a positive association between BUYBACK and abnormal returns.

Furthermore, the model has been run using as a dependent variable the lagged abnormal returns (year n+1 and n+2) and CARs. Then, to check the stability of the model I run the OLS regression after checking for the presence of influential data points using Cook's D statistics. Finally, I re-estimate the model using longitudinal data, thus taking time dimension and heterogeneity in firms explicitly into account.

4.2. Stock return model

Using a standard one-factor CAPM approach, I simply estimate abnormal performances regressing the time series of monthly excess returns to the companies on excess market returns:

$$R_{p,t} - R_{f,t} = \alpha + \beta\,(R_{mkt,t} - R_{f,t}) \qquad [7]$$

where $R_{p,t}$ is the monthly return for firms, $R_{f,t}$ is the risk-free return to the short-term Italian government bill (BOT). The return to the Italian FTSE MIB index is the market return ($R_{mkt,t}$). Abnormal performance is measured by α.

The excess return on the market portfolio of stocks (R_{mkt}-R_f) should captures great part of common variation in stock returns even if an important fact is that the market leaves much variation in stock return that might be explain by other factors, such us both value/growth and size factors. It seems, however, that the model should have a good fit especially for big stocks and for low book-to-market firms (Fama-French, 1993).

Monthly stock returns were obtained from Capital IQ database and Datastream. From these sources, I also located returns for FTSE MIB index, my measure for the market return. The risk-free rate was obtained from the Banca d'Italia (source: "Supplemento al Bollettino Statistico"). On a monthly base, it released the annual risk-free rate for the short-term Italian government bill (BOT). In order to adequately estimate abnormal returns by the equation (7), I converted the interest annual rate into the equivalent monthly rate, adopting the following equation (annual compounded interest):

$$i_{12} = (1+i)^{1/12} - 1 \qquad [8]$$

where i_{12} is the equivalent monthly interest rate, and i is the annual risk-free rate for the short-term Italian government bill (BOT). In this case, I did not take into consideration any fiscal aspect.

4.3. Sample and variable construction

To carry out the research, I firstly obtained the complete record of Italian firms that had shares repurchases (and trade) activity between 2003 and 2009 from the Italian Securities and Exchange Commission (Consob). For Italian listed companies, Consob releases on a monthly base information regarding all firms' transactions (both repurchases and trades) on their shares. During this time period, 369 Italian companies completed 496 transactions on treasury shares.

Therefore, to generate the sample I considered all the companies listed at the Borsa Italiana during the period investigated (2003-2009), even without a continued listing status. Starting from an unbalanced dataset of 1.841 observations (firm-year), I excluded all the observations with missing values for the variables investigated. Due to missing values, the total sample size is 1.214 observations (firm-year) for the model (3) (potential determinants of share repurchases), 771 observations (firm-year) for the model (4) (differences in payout policies), 1.198 observations (firm-year) for the model (5) (share repurchases and the cost of equity capital), and 1.218 observations (firm-year) for the model (6) (share repurchases and the abnormal returns).

The focus on Italian context is interesting because past studies on EU did not find long-term excess return as in US (Lasfer, 2002), and because the size of Italian market could help to design a specific context where studying firms undervaluation and the resulting use of share repurchases as good investment

decision. Additionally, compared to prior studies, the Italian environment provides access to "real" data on share repurchases. Past studies pointed out that it is not always possible to exactly determine with publicly available information how many shares a particular firm purchased in a given period after the repurchase program announcements (Jagannathan *et al.*, 2000), hence justifying alternative ways to estimate total buybacks. Since the announcement of a buyback in essentially costless to the companies, firms usually protect themselves from potential violation of the law through the announcements whenever they just plan to repurchase treasury shares. The Italian context, on the contrary, seems interesting because of, as already explain, the Italian Securities and Exchange Commission (Consob) publicly release the monthly amount of transactions each listed company has on its shares (purchases and disposals). Thus, simply pricing share transactions through the monthly average share price I accurately measure companies' share repurchases value.

With reference to the variables, my analysis requires both market data and fundamental (accounting) information. CAPITAL IQ was my primary source for this information. However, CAPITAL IQ's coverage of Italian firms is not complete. In addition, I use DATASTREAM database.

Using these two databases, I construct proxies of the explanatory variables for both the current period and the year before both each share repurchases activity and dividend payout increase (models 3 and 4). Specifically, my analysis firstly focuses on cash flows and their components: operating income, non-operating cash flows, and cash and equivalents. Both the models (3) and (4) present lagged variables for these components. The lagged return of asset (ROA_1) is the prior year's ratio of operating income to total assets. The non-operating cash flow

(CFNO_1) is the prior year's ratio of non-operating cash flow (given by the sum of cash flows from financial and investment activities) to total assets. The lagged amount of cash and equivalents (CASH_1) is the prior year's amount of cash and equivalents scaled by total assets.

Additionally, the lagged debt ratio (LEV_1) is the prior year's ratio of the total debt to total assets. The standard deviation of operating income (STDEV_ROA), my measure for the persistence in both operating profits and thus operating cash flows, is the standard deviation of the ratio of operating income to total asset, measured over the 3-year period from year -3 through -1. The market-to book ratio (MTBV) is the ratio of the year-end market value of equity to the book value of equity. I use the natural log of total assets as my measure of firm size (SIZE). CE_REDUCT is a dummy variable I use to control for the companies that reduce the shareholders' common equity in the year of buyback. The variable equals to 1 if the company reduce shareholders' common equity in the year of share repurchases, and 0 otherwise.

Finally, in order to indirectly control for stock options, I use an industry variables for information technology (IT) since past studies demonstrate an increasing use of employee options especially when the relative importance of human capital is a factor of production (Core and Guay, 2001) or, especially for CEO compensations, when firms have liquidity-constrained issues (Yermack, 1995). Additionally, Core and Guay, 2001, show that the overall size of stock option plans is usually higher from computer companies.

Briefly, employee stock options could influence payout decisions for two reasons. Firstly because the value of an option declines when a stock goes ex-dividend but not when a company repurchase shares. Secondly, managers prefer

to use repurchase rather than new issued shares in case of exercise in order to avoid diluting share value and EPS (Weisbenner, 1998).

In my empirical research I do not directly control for the impact of executive stock options because of the sample size, since the data on stock options have to be hand-collected and are not available in other forms. Furthermore, this data is not always available especially for the beginning of the period investigated due to the lack of availability of several annual reports.

With reference to the regressands, in the model (3) I use a dummy variable (BUYBACK) that equals to 1 if the company repurchases shares, and 0 otherwise. In the model (4) the dependent variable is a dummy variable (INC_PAYOUT) that equals to 1 if the firm increases dividend payout respect to prior year, and 0 otherwise. The dividend payout is the ratio of the total dividend for the year to the prior year's net income. The increase in dividend payout is estimated as the difference between the dividend payout for the year minus the dividend payout for the previous year.

Shifting the focus on the models (5) and (6) that I use to estimate the potential effects of share repurchase activity on both the cost of equity capital and the abnormal returns, I add new variables respect to previous models. Specifically, in both models (5) and (6) I use as explanatory variable a dummy variable (BUYBACK) that equal to 1 if the firm repurchases shares, and 0 otherwise. Additionally, in both models I control for industry effects including three different industry groups (combining 13 two-digit SIC primary code into 4 industry groups): financials (FIN), industrial (IND), and information technology (IT). Finally, in model (6) the return on assets (ROA) and the debt ratio (LEV) are

variables estimated over the year (not lagged variables) since the effects are studies not only in the current year, but also over the following 2-year period.

With reference to the regressands, consistent with practice and prior research, in my model (5) I simply estimate the cost of equity capital (KE) with the Capital Asset Pricing Model (CAPM), which defines expected return as the sum of the expected risk free rate (R_f) and the product of a firm's estimated market beta (β) and the expected risk premium ($R_{mkt} - R_f$). The annual risk free rate (R_f) has been estimated using data obtained from the Banca d'Italia (source: "Supplemento al Bollettino Statistico"). Since on a monthly base has been released the annual risk-free rate for the short-term Italian government bill (BOT), I simply measure the annual risk free rate as the average value of the rates available for each year (see section *4.2.*). The return to the Italian FTSE MIB index is the market return ($R_{mkt,}$) and firm's Beta (β_i) for each year has been estimated as the slope coefficient in the regression of monthly market returns of a year *t* on firm's monthly returns for the same year. In model (6) abnormal returns have been estimated as described in section *4.2*, while CARs for year t+1 are the sum of the annual abnormal returns for the 2-year period from year 0 through +1, and CARs for year t+2 are the sum of the annual abnormal returns for the 3-year period from year 0 through +2. A summary of variable definitions is presented in Table 1.

TABLE 1 (INSERT HERE)

5. Empirical findings

5.1. Descriptive statistics

Table 2 presents the evolution of firms' transactions on their own shares over the period investigated (2003-2009). The table shows an increase in the number and the value of transactions during the period of analysis, especially in the last three-year investigated (2007-2009), revealing an increasing interest in such a transactions over the years by the Italian listed companies.

TABLE 2 (INSERT HERE)

Panel 2 and Panel 3 show the same information but they enable to distinguish the net acquisitions of treasury share (companies whose acquisitions were higher than disposals during each year) from the disposals of treasury shares (companies whose acquisitions were lower than disposals during each year). It seems interesting to point out that during the first three year of analysis (2003-2005) the number of transactions is uniformly distributed between the two groups but that relation seems to change over years, with an increase in the number of acquisitions compared with the number of disposals. For instance, over the period of analysis, the number of net acquisitions (sum of acquisitions higher than the sum of disposals over the year for each company) of treasury shares (n=346) is higher than the number of disposals (n=141). Nine transactions were not considered because of the lack of the data required to price the transactions. Considering the transactions, however, the value of acquisitions is steadily higher than the value of disposals, justifying my focus on these transactions in the following analysis.

With reference to the net value of acquisitions (buyback from now on), both the average value and the total value reach a pick in 2007. In this year, however, the

average value is significantly influenced by specific transactions that are reflected in the maximum value and in the median value. It seems interesting to point out that from 2006 to 2008 the 50% of the companies with buyback has a transaction value lower than 3.7 mln/euro (2.53 mln in 2006 and 3.66 mln in 2007), while the 75% do not exceed 20 mln/euro. Standard deviation confirms a significant difference in the value of transactions among companies in each year investigated.

TABLE 3 (INSERT HERE)

Before presenting the results of the multivariate analysis, I report the Pearson correlation matrix for the independent variables (Table 3). The table shows that statistically significant correlations exist at a level less than .05 or .01 between the explanatory variables even if these values are relatively low. The highest correlation (-.3961) is between SIZE and LEV_1, showing that the largest is the companies the higher is the leverage (lagged variable estimated in the previous year). Next, the larger is the firm, the lower is the amount of cash and equivalents (CASH_1) available (lagged variable measured the year before), and more permanent are the company's performances (STDEV_ROA). Additionally, better performances are positively related with cash and equivalents available in financial statements and negatively related with leverage and cash flows that did not come from operations (thus from investment and financials). Thus, the more the firms increase their results from operation, the more are the cash flows from operation that enables to reduce the leverage.

However, the correlations do not exceeding .3961 suggest that multi-collinearity is not likely to be a significant issue in the multivariate analysis. The Spearman rank correlation (untabulated) shows similar results.

5.2. Multivariate analysis

The multivariate analysis is performed using four different analyses. Firstly, I perform a logistic regression in order to verify the potential determinant of buybacks in Italy. Furthermore, I regress the same explanatory variables on a dummy variable, which is a proxy for the increase in the dividend payout, in order to verify if some differences exist between firms that choose dissimilar payout methods. Finally, OLS regressions and longitudinal analyses have been performed in order to test the potential effects of share buybacks on both the cost of equity capital and on the long term abnormal returns.

Determinants of buybacks (Logistic regression)

The results of the first logistic model are presented in table 4. The model is estimated in order to verify the potential determinant of buybacks and it is significant at .000, with a pseudo R^2 of .0526.

TABLE 4 (INSERT HERE)

The coefficients for ROA_1 and LEV_1 are positive and significant (p< .05 and p< .10, respectively). Consistent with previous research (Ditmar, 2000) and my first proposition (H1a), this suggests that the better is the firm's profitability the higher is the probability to choose buybacks to payout cash. At the same time,

the higher is the firm's leverage, the higher is the probability to repurchase stocks. I also find that the SIZE has a coefficient positive and significant as well (p< .05). Thus, the larger firms seem to have higher probability to carry out buyback transactions.

Contrarily to previous research (Jagannathan *et al.*, 2000), results show that in Italy repurchasing firms do not have much more volatile profitability (STDEV_ROA, measured in the previous three years), and that buybacks are not only used by firms with higher "temporary" non-operating cash-flows (CFNO_1 is not statistically significant). Additionally, contrarily to the theory that firms that have too little debt (because they have too much cash) and very few growth opportunities (measured through the market-to-book value) should have higher level of share repurchases (Dittmar, 2000), I did not find CASH_1 (lagged variable of cash and equivalents) and market-to-book value as a significant predictors of repurchase activity.

Overall, consistent with the "agency cost of free cash flow" theory and with previous results (Dittmar, 2000), however, I document a positive relation between repurchase activity and my measure of operating results (ROA_1), a variable sometimes used as a proxy for the primary component of operating cash flow (Jagannathan *et al*., 2000).

Considering the negative association between CASH_1 and ROA_1 in the descriptive analysis, these results seem to indicate that firms with better operating results should produce higher level of operating cash and they have higher probability to use these flows to have repurchase activity. These companies, however, do not seem to increase the level of cash available.

Furthermore, two covariates seem to reveal an interesting explanation for buybacks in Italy. Firstly, CS_REDUCT, a dummy variable used to measure the reduction of shareholder equity in the same year of share repurchases, is positively related and significant ($p < .05$). Additionally, an independent variable used to control for stock options plans through the industry that prior studies found more interested in such a compensation tool (information technology) has a coefficient positive and significant as well.

Consistent with my propositions (H1b and H1c), these results seem to indicate that Italian companies frequently use share repurchases in order to reduce the shareholders' common equity, and that stock option plans could have a significant impact on share repurchase activity.

As already pointed out before, I indirectly control for stock options through industry (information technology) since past studies demonstrate an increasing use of employee options especially when the relative importance of human capital is a factor of production (Core and Guay, 2001) or, especially for CEOs compensations, when firms have liquidity-constrained issues (Yermack, 1995).

I do not directly control for the impact of executive stock options in my empirical research because of the sample size, since the data on stock options have to be hand-collected and are not available in other forms. Furthermore, this data is not always available especially for the beginning of the period investigated due to the lack of availability of several annual reports.

Following Hosmer and Lemeshow (2000) I measure the covariate pattern's influence in logistic regression (that is, the consequences of dropping all observations with a particular combination of *x* values), as Cook's D measures an individual observation's influence in OLS, by means of plotting change in

deviance *versus* predicted (buybacks) probability. I simply removed the eight observations that poorly fit *x* patterns (influential observations) and the results of the model remain stable (untabulated).

Additionally, I also re-estimated the model adopting a panel logistic regression in order to assess the robustness of my findings. Since the reasons why each company decide to use share repurchase activity cannot be considered as a time-invariant characteristics, and I have reason to believe that differences across entities have some influence on our dependent variable, random effect model (RE) has been used. Furthermore, RE enable me to include time invariant variable (industry) that should have been absorbed by the intercept in the fixed effects model.

These results reinforce my findings that profitability, size, reduction in shareholders' common equity, and information technology industry should positively influence share repurchase activity for Italian firms. In the panel model, however, LEV_1 is not statistically significant.

Finally, since the Housman test shows that preferred model should be fixed effects, I also run the fixed effect logistic regression (untabulated) and results do not significantly differ from those reported.

Differences in payout policies (Logistic regression)

The results for the dividends payout model are presented in table 5. Due to the lack of information on firms' dividend policies, the number of observation dropped to 771 over the period investigated (2003-2009). Firstly, the model is estimated using a simple logistic regression. Next, I re-estimated the model using a robust regression. I measure the covariate pattern's influence in logistic

regression by means of plotting change in deviance *versus* predicted (increase in dividend payout) probability. I simply removed two observations that poorly fit *x* patterns (influential observations) and results do not change (untabulated). The model is significant at .0249, with a pseudo R^2 of .0179.

TABLE 5 (INSERT HERE)

Consistent with Jagannathan *et al*. (2000) the results show a negative coefficient statistically significant for ROA_1 ($p< .001$) and a positive coefficient for MTBV ($p< .032$). The former result is due to the fact that the dependent variable, the dividend payout, is measured as the ratio of the total dividends for the year to the prior year's net income. The latter result could be explained considering that prior studies demonstrate that dividend-increasing firms have significantly higher market returns (Jagannathan *et al*., 2000). At the same time, however, firms are overestimated by the market if they have higher potential future cash-flows, and the prospects of higher "permanent" cash flow is the essential circumstance to increase dividends.

Additionally, firms with an increase in dividend payout have lower levels of debt (LEV_1 significant at .081) and a lower levels of non-operating cash-flows (CFNO significant at .028).

Finally, I estimate the same model using a conditional random effect (panel) logistic regression. I use a random effect model because of the Hausman test shows that the unique errors (u_i) are not correlated with the regressors ($p< .9117$). Results do not differ from those reported when I used logistic regression

The potential effect of share repurchases: the cost of equity capital

Two OLS regressions have been performed in order to test the potential effects of share repurchases on both the cost of equity capital and the abnormal returns, controlling for profitability (ROA_1), leverage (LEV_1), persistence in profitability (STDEV_ROA), market-to-book value (MTBV), and the industry.

TABLE 6 (INSERT HERE)

The results for the cost of equity model (linear) are presented in column (1) of table 6. The model is significant at 0.000 with an adjusted R^2 of .0314. Consistent with our predictions (research proposition H2), I find a negative and significant association between BUYBACK and the cost of equity capital (p< .000). This result supports signaling theory that states that managers can use share repurchase as a signal that could reduce information asymmetry, thus reducing the cost of capital. Consistent with prior research on the cost of equity capital (Botosan, 1997), results also show a negative and significant association between market-to-book value (MTBV) and the cost of equity capital (p< .094). Higher levels of market-to-book value reveal firms with growth opportunities, increase demand for the firm's securities and raises the current price of the firm's stock, thus reducing the cost of equity capital (Diamond and Verrecchia, 1991).

The results have been checked for the presence of influential data points using Cook's D statistics (with a conventional cut-off point of 4/n). Results reinforce the findings that share repurchases is significant and negative related with the cost of equity capital, thus revealing buybacks as a signal useful to convey to the

market information that are able to reduce the firm's perceived risk (BUYBACK coefficient negative and significant at .000; numbers of observations equal to 1.123).

In order to assess the robustness of these findings, I first use as a dependent variable the WACC, thus including both the firms' cost of debt and leverage. The results (untabulated) do not substantially differ from those presented, showing a significant and negative association between BUYBACK and the weighted average cost of capital ($p< .0000$). Additionally, I re-estimate the model using a fixed-effect panel data. I use a fixed effect model because of the Hausman's test shows that the unique errors (u_i) are correlated with the regressors ($p< .000$).

Results do not differ from those reported when I used OLS regression, except for the coefficients of ROA_1 and SIZE that become significant (respectively, $p< .006$ and $p< .001$). Thus, results confirm a negative and significant association between BUYBACK and the cost of equity capital ($p< .0000$), and a negative and significant association between MTBV and the cost of equity capital. With reference to the ROA_1, the negative and significant coefficient shows that better profitability seems to reduce the cost of equity capital. Additionally, the negative and significant coefficient of SIZE suggests that the larger is the firm's size the lower is the cost of equity capital. These results are consistent with prior research that provides evidence that the analysts' ratings are increasing in firm size and in firm performance (Lang and Lundholm, 1993). If the analysts' ratings increase, the perceived-risk for the firms should decrease, thus reducing the cost of equity capital. Finally, the result of SIZE is consistent with prior studies that find that the number of analysts following a firm is increasing in firm size (Bhushan, 1989; Lang and Lundholm, 1996), and with studies that show a

positive association between the firm's size and the quality of disclosure (Lang and Lundholm, 1996). The increase in the analysts' following and in the quality of disclosure could reduce information asymmetry, thus reducing the cost of equity capital. Industry (FIN, IND and IT) does not seem to have any influence on the firm's cost of equity capital.

Lastly, it is interesting to note that all the variables show a VIF lower than 2, revealing that the model is not subject to multi-collinearity problems.

The potential effect of share repurchases: the abnormal returns

My last analysis concerns the study of the abnormal returns during the year of the shares repurchase activity, and over the following two years. As already explain, the analysis of long-term excess returns in Italy is driven by the fact that prior studies in EU found different results compared with US research (Lasfer, 2002).

In my research, the covariates remain the same of the previous analysis (that investigates the effects of buybacks on the cost of equity capital), except for the MTBV and both the ROA_1 and LEV_1. The former variable (MTBV) has been dropped out from the analysis because of the expected influence the regressand could have on it. The latter lagged variables (ROA_1 and LEV_1) have been replaced by variables estimated in the current year of share repurchases (ROA and LEV), because of the dependent variable became a lagged variable (abnormal returns have been also studied over the 2-year period after the share repurchase activity, from year 0 to year +1 and from year 0 to year +2).

TABLE 7 (INSERT HERE)

The results of the OLS regression for the abnormal returns of the year 0 are presented in column (1) of Table 7. The model is significant at .0000 with an adjusted R^2 of 0.0298. All the variables show a VIF lower than 2, revealing that the model is not subject to multi-collinearity problems.

I found a negative and significant association between shares repurchase activity (BUYBACK) and the abnormal return for the year ($p< 0.020$). Even if the method used and the level of the analysis are not the same, the result is consistent with Ikenberry *et al*. (2000) because of managers seem to buy more shares when the price fall. This result suggests that perceived undervaluation by managers could be an important consideration for buybacks.

Additionally, profitability and industry seems to influence the abnormal returns. The coefficient of ROA suggests that companies with better (operating) performances have higher abnormal returns in the same year. It is interesting to point out that the correlation between annual returns and earnings is usually used as a proxy for information asymmetry (Lang and Lundholm, 1993). If a significant association between (operating) earnings and abnormal annual returns exists, I can posit that information about firm value is captured by earnings disclosure, thus providing incentive for private information acquisition about current earnings. If it is the case, managers should tend to disclose more to reduce incentive for private information, hence reducing information asymmetry. This result is consistent with prior research that found low level of information asymmetries in European firms (Lasfer, 2002).

Finally, industrial companies seem to perform better in terms of abnormal returns compared with other industries (coefficient positive and significant at .061).

To assess the robustness of these findings, the results have been firstly checked for the presence of influential data points using Cook's D statistics (with a conventional cut-off point of 4/n). The number of observations dropped to 1.155. Results (untabulated) reinforce the findings that share repurchases and ROA are significantly related (respectively, negatively at .0000 and positively at .0000) with the current abnormal returns, thus revealing that perceived undervaluation by managers could be an important consideration for buybacks and that exists a low level of information asymmetry because of information about firm value is captured by (operating) earnings disclosed. Conversely, the coefficient for industrial industry (IND) becomes not significant (*p-value* 0.184).

Table 7, columns (2) and (3), show long-term abnormal returns behaviour after one year and two years, respectively. All the variables show a VIF lower than 2, revealing that the model is not subject to multi-collinearity problems.

The results for BUYBACK show that, in general, firms with share repurchase activities do not generate higher long-term abnormal returns in the periods examined ($p<$ .324 in the year +1 and .850 in the year +2). The result is not consistent with prior studies in U.S. (Lakonishok and Vermaelen, 1990; Ikenberry *et al.*, 1995), in Canada (Ikenberry *et al.*, 2000), and in U.K. (Oswald and Young, 2004), that found long-term abnormal returns by firms that buying share and holding them for two or more years. My result, however, is consistent with prior studies in continental Europe that do not find positive long-term excess returns (Lasfer, 2002). Lasfer explained the difference in result with U.S.

studies by the lower information asymmetry that could exists in European firms. This explanation seems to be supported by my previous results, that show a positive and significant association between firms' performance and abnormal returns. Thus, the lower level of information asymmetry could reduce the probability to generate abnormal returns.

Additionally, another potential explanation for this result could be find in the different methods used in the cited studies. Specifically, it is difficult to assess if my results are consistent or not with both Lakonishok and Vermaelen (1990) and Ikenberry *et al*. (1995) because of these studies only focuses on firms that buying shares and holding them for more than one year. My study, on the contrary, concerns all the companies with shares repurchase activity in the period investigated, trying to find a more generalised use of share repurchase as a good investment decision.

Consistent with prior research (Gaspar *et al.*, 2005; Grullon and Michaely, 2004; Kahle, 2002; Ikenberry *et al.*, 1995; Raad and Wu, 1995; Vermaelen, 1981), in year +1 I found a significant and negative association between firm size and the excess return. The result is also consistent with the theory that posits that the larger is the company, the larger is the number of analyst following and thus the lower is the level of information asymmetry (Lang and Lundholm, 1993; Lang and Lundholm, 1996). The ROA coefficient remains significant and positive in year +1.

Overall, results show that companies with better performances and larger in size should have lower levels of information asymmetry (because of they should have better analysts' ratings and higher analysts' following), thus reducing the effects on abnormal returns.

Since the variables are estimated in year 0, the absence of significance for the variables in year +2 seems to be an expected result.

Even in this case, results have been firstly checked for the presence of influential data points using Cook's D statistics (with a conventional cut-off point of 4/n). The number of observations dropped to 1.061 in year +1, and 1.010 in year +2. Results (untabulated) reinforce the findings that shares repurchase activity is not related to long-term abnormal returns and that profitability and size are significantly related to excess returns, with a positive association ($p<$ .002) and a negative association ($p<$ .005), respectively.

To assess the robustness of these findings, I firstly re-estimate the model using as a dependent variable the cumulated abnormal returns (CARs). The results (untabulated), show that profitability (ROA) is significant and positively related to CARs in year +1 (990 observations and significant with a $p<$ .005) while the company's size (SIZE) is significant and negatively related to CARs in year +2 ($p<$ .064).

TABLE 8 (INSERT HERE)

Additionally, table 8 presents the results of the fixed-effect panel model. Results do not significantly differ from those reported when I use OLS regression. Consistent with previous results, the coefficient for shares repurchase activity is negative and significant ($p<$ .079) only in year 0. This suggests that managers seem to buy more shares when the price fall but buyback do not generally produce excess returns in the long run. Also, the coefficient for SIZE is negative and significant in the 3-year period examined ($p<$ .003, $p<$ .000,

p< .000, respectively) and the coefficient for ROA is positive and significant in year 0 (*p*< .000).

These results reinforce my findings, suggesting that the larger is the company, the larger is the number of analyst following and thus the lower is the level of information asymmetry, thus reducing the probability to generate long-term abnormal returns.

6. Conclusions and avenues for future research

This paper examines the potential determinants of shares repurchase activity in Italy, and whether buybacks by Italian listed companies have some influences on both the cost of equity capital and the long-term abnormal returns. I choose to focus on Italian firms because past studies on EU did not find long-term excess return as in U.S., and because the size of Italian market could help to design a specific context where studying firms undervaluation and the resulting use of share repurchases as good investment decision. Additionally, compared to prior studies, the Italian environment provides access to "real" data on share repurchases because of the Italian Securities and Exchange Commission (Consob) publicly release the monthly amount of transactions each listed company has on its shares (purchases and disposals).

My results indicate that managers seem to buy more shares when the price fall, confirming that perceived undervaluation by managers could be an important consideration for buybacks in Italy. Next, consistent with the "agency cost of free cash flow" theory and with previous results (Dittmar, 2000), I document a positive relation between repurchase activity and the lagged return

on assets, a variable sometimes used as a proxy for the primary component of operating cash flow (Jagannathan *et al*., 2000).

Furthermore, two new covariates seem to reveal an interesting explanation for buybacks in Italy: a dummy variable used to measure the reduction of shareholders' common equity in the same year of share repurchases and a variable used to control for stock options plans through the industry that prior studies found more interested in such a compensation tool. Consistent with my propositions, these results seem to indicate that Italian companies frequently use share repurchases in order to reduce the shareholders' common equity, and that stock option plans could have a significant impact on share repurchase activity.

With reference to the second question, I seek to answer, the possible effect of shares repurchase activity on the cost of equity capital, I find a negative and significant association between buybacks and the cost of equity capital, supporting signaling theory that states that managers can use share repurchase as a signal that could reduce information asymmetry, thus reducing the cost of equity capital. Consistent with prior research on the cost of equity capital, results also confirm a negative and significant association between market-to-book value and the cost of equity capital. I also find significant and negative association between both size and profitability and the cost of equity capital. These results are consistent with prior research that provides evidence that the analysts' ratings are increasing in firm size and in firm performance. If the analysts' ratings increase, the perceived-risk for the firms should decrease, thus reducing the cost of equity capital.

Finally, Italian firms with share repurchase activities do not generate higher long-term abnormal returns in the 2-year period after buybacks. The result is not

consistent with prior studies in U.S., in Canada, and in U.K. My result, however, is consistent with prior studies in continental Europe that do not find positive long-term excess returns. A potential explanation of the difference in result with U.S. studies could be found in the lower information asymmetry that could exist in European firms. This explanation seems to be supported by my result that shows a positive and significant association between firms' performance and abnormal returns. Hence, the lower level of information asymmetry could reduce the probability to generate abnormal returns.

Consistent with prior research, in year +1 I also found a significant and negative association between firm size and the excess return. The result confirms the theory that posits that the larger is the company, the larger is the number of analyst's following and thus the lower is the level of information asymmetry.

However, my research has its limitations, and future avenues for investigation can be suggested. Firstly, in order to improve the robustness of my findings, it could be useful to directly control for the stock options plans as a potential determinant of shares repurchase activity, instead of testing the proposition through the IT industry. Next, in order to better verify the consistency of my findings on long-run abnormal returns and prior U.S. research, future research on Italian listed companies could focus on firms that buying shares and holding them for more than one year, therefore on the disaggregate monthly data of shares transactions.

Future research in the Italian context should also control for the reasons that drive companies to use buybacks to reduce shareholders' common equity and better investigate the impact of M&A in shares repurchases activity.

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Table 1 – *Variables definition*

REGRESSAND		
BUYBACK (equation 3)	=	Dichotomous variable taking the value 1 if the firm repurchases shares, and 0 otherwise.
INC_PAYOUT (equation 4)	=	Dichotomous variable taking the value 1 if the firm increases dividend payout respect to prior year, and 0 otherwise.
KE (equation 5)	=	Cost of equity capital estimated with the Capital Asset Pricing Model (CAPM), which defines expected return as the sum of the expected risk free rate (R_f) and the product of a firm's estimated market beta (β) and the expected risk premium ($R_{mkt} - R_f$).
AR (equation 6)	=	Abnormal returns estimated regressing the time series of monthly excess returns to the companies on excess market returns: $(Rp–Rf) = \alpha + \beta\ (Rmkt–Rf)$. Rp is the monthly return for firms, Rf is the risk-free return to the short-term Italian government bill (BOT). The return to the Italian FTSE MIB index is the market return (Rmkt). Abnormal performance is measured by α.
REGRESSOR		
ROA_1	=	Lagged (prior year's) ratio of operating income to total assets.
ROA	=	Operating income to total assets.
STDEV_ROA	=	Standard deviation of operating income, measured over the 3-year period from year -3 through -1
CFNO_1	=	Lagged (prior year's) ratio of non-operating cash flow (given by the sum of cash flows from financial and investment activities) to total assets.
CASH_1	=	Lagged (prior year's) amount of cash and equivalents scaled by total assets.
MTBV	=	Ratio of the year-end market value of equity to the book value of equity (at December, 31st)
CE_REDUCT	=	Dichotomous variable taking the value 1 if the firm reduces the shareholder's equity in the year of buyback, and 0 otherwise.
LEV_1	=	Lagged (prior year's) ratio of the total debt to total assets.
LEV	=	Total debt to total assets.
SIZE	=	Natural log of total assets at the end of the year (December, 31st).
IT	=	Industry variables for information technology (IT) to indirectly control for stock options. Dichotomous variable taking the value 1 if the firm belongs to IT industry, 0 otherwise.
FIN	=	Dichotomous variable taking the value 1 if the firm is a financial company, 0 otherwise (industry controls).
IND	=	Dichotomous variable taking the value 1 if the firm is an industrial company, 0 otherwise (industry controls).
BUYBACK	=	Dichotomous variable taking the value 1 if the firm repurchases shares, and 0 otherwise.

Table 2 – *Summary Statistics by year for firms' share repurchases and disposals (euro/mln)*

Panel 1 – Total number and value of transactions (obs. = 487)

Year	*N.*	*Sum.*	*Mean*	*Std. dev.*	*Min.*	*p25*	*p50*	*p75*	*Max.*
2003	44	279.0433	6.341892	49.60275	-.717714	-.0007404	.5926616	-22.9293	325.8195
2004	29	378.8829	13.06493	58.71812	-.968661	.1528576	1.890226	-24.16418	309.852
2005	28	978.1108	34.93253	179.7475	-1.326637	.0047001	.6813185	-21.81201	949.9234
2006	78	1645.167	21.09188	135.1323	-1.342919	.188343	5.689826	-220.2403	1094.482
2007	92	6088.296	66.17714	321.1783	.0884108	2.195748	9.177145	-8.733588	2639.314
2008	111	642.3724	5.787139	207.9983	.4689336	2.342556	11.7438	-1992.567	769.1312
2009	105	-51.60396	-.4914663	39.66595	-.2033005	.1681027	1.206829	-340.4734	201.1359

Panel 2 – Total number and value of net acquisitions (obs. = 346)

Year	*N.*	*Sum.*	*Mean*	*Std. dev.*	*Min.*	*p25*	*p50*	*p75*	*Max.*
2003	22	359.7231	16.35105	69.17492	.0051632	.3002791	.5926616	1.467538	325.8195
2004	15	429.0755	28.60504	79.502	.1528576	.5126595	1.890226	16.01604	309.852
2005	14	1036.535	74.03822	252.5079	.009706	.1219351	.6813185	5.331174	949.9234
2006	47	2086.306	44.38948	167.7325	0	.5404491	2.536575	15.86036	1094.482
2007	73	6117.87	83.80644	358.9572	.0006621	.7871627	3.669342	19.16443	2639.314
2008	102	2666.285	26.14005	84.56788	.0209941	.9687635	3.171036	16.4418	769.1312
2009	73	423.8317	5.805914	24.07116	.0000735	.1623724	.6717883	2.525377	201.1359

Panel 3 – Total numbers and value of net disposals (obs. = 141)

Year	*N.*	*Sum.*	*Mean*	*Std. dev.*	*Min.*	*p25*	*p50*	*p75*	*Max.*
2003	22	-80.67981	-3.667264	6.553818	-22.9293	-4.313219	-.717714	-.1150322	-.006644
2004	14	-50.19269	-3.585192	6.488766	24.16418	-2.494555	-1.379746	-.2924843	-.017609
2005	14	-58.42427	-4.173162	7.045907	-21.81201	-3.759651	-1.326637	-.1236051	-.0003059
2006	31	-441.1388	-14.23028	39.88161	-220.2403	-10.18236	-2.561867	-.2585948	-.0028336
2007	19	-29.57348	-1.556499	2.037471	-8.733588	-1.802355	-.9174296	-.2905769	-.0184612
2008	9	-2023.912	-224.8791	662.903	-1992.567	-6.15	-3.019712	-.6310057	-.0754185
2009	32	-475.4356	-14.85736	60.21866	-340.4734	-3.393599	-1.241333	-.2844442	-.0170832

This table provides the descriptive statistics by year for the total transactions Italian firms had on their own shares over the period investigated (2003-3009). The summary statistics also distinguish companies with buybacks (companies whose acquisitions were higher than disposals during the year) from companies with disposals (companies whose acquisitions were lower than disposals during the year). Nine transactions were not considered because of the lack of the data required to price the transactions. Since CONSOB only release the quantity of share repurchased or sold, I priced the transactions using the monthly average price of the share. Data analysis using StataSE 11.

Table 3 – *Pearson correlation matrix*

Variables	ROA_1	LEV_1	CFNO_1	CASH_1	STDEV_ROA	CE_REDUCT	MTBV	SIZE
ROA_1	1,000							
LEV_1	-0.2630 **(0.000)****	1,000						
CFNO_1	-0.3478 **(0.000)****	0.1036 **(0.000)****	1,000					
CASH_1	-0.1154 **(0.000)****	-0.4372 **(0.000)****	0.1144 **(0.000)****	1,000				
STDEV_ROA	-0.2617 **(0.000)****	-0.0497 **(0.070)****	0.0912 **(0.001)****	0.1077 **(0.000)****	1,000			
CE_REDUCT	-0.0734 **(0.003)****	0.0544 **(0.030)****	0.0199 (0.437)	-0.0439 **(0.082)***	-0.0097 (0.724)	1,000		
MTBV	0.0882 **(0.000)****	-0.0028 (0.913)	-0.0407 **(0.120)**	-0.0344 (0.182)	0.0742 **(0.007)****	0.000 (0.999)	1,000	
SIZE	0.1139 **(0.000)****	0.3961 **(0.000)****	-0.0531 **(0.040)****	-0.2558 **(0.000)****	0.3614 **(0.000)****	-0.0790 **(0.001)****	-0.0250 (0.312)	1,000

This table provides the Pearson correlations for the explanatory variables. The values indicated in bold show statistically significant relationships between variables, while the *p-value* is shown in brackets. *,** indicate statistical significance at less than the 5 percent and the 1 percent level, respectively (two-tailed). The Spearman (Rank) correlation (untabulated) shows similar results. ROA_1 = lagged (prior year's) ratio of operating income to total assets; LEV_1 = lagged (prior year's) ratio of the total debt to total assets; CFNO_1 = lagged (prior year's) ratio of non-operating cash flow (given by the sum of cash flows from financial and investment activities) to total assets; CASH_1 = lagged (prior year's) amount of cash and equivalents scaled by total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; CE_REDUCT = dichotomous variable taking the value 1 if the firm reduces the shareholder's equity in the year of buyback, and 0 otherwise (dummy); MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; SIZE = natural log of total assets at the end of the year (December, 31st). Data analysis using StataSE 11.

Table 4 – *Determinants of buybacks (2003-2009)*

Dependent variable (BUYBACK) =dummy variables that equal to 1 if the firm repurchases shares in the year, 0 otherwise.

	Determinants of buybacks (logistic regression)		*Determinants of buybacks (panel logistic regression)*	
	Coefficient	*p-value*	*Coefficient*	*p-value*
ROA_1	**4.590626**	**0.000****	**4.970475**	**0.007****
STDEV_ROA	-4.318968	0.204	-2.704376	0.561
CFNO_1	.8144294	0.290	.6674045	0.493
CASH_1	-1.335855	0.219	-1.493422	0.349
MTBV	.0134594	0.449	.0264044	0.260
CE_REDUCT	**.9161541**	**0.000****	**1.15568**	**0.000****
IT	**.8177583**	**0.001****	**1.091481**	**0.017****
LEV_1	**.7953206**	**0.099***	.5488052	0.478
SIZE	**.1264431**	**0.004****	**.2478372**	**0.003****
_cons	-2.934194	0.000	-4.257554	0.000
	N. obs. = 1.214		N. obs. = 1.214	
	LR chi^2 = 65.31		Number of groups = 267	
	Prob > chi^2 = 0.0000		Prob > chi^2 = 0.0000	
	Pseudo R^2 = 0.0526		Wald chi^2 = 39.43	
	Log likelihood = -588.70847		Log likelihood = -550.94477	

This table presents both logistic regression and panel logistic regression results. Values indicated in bold show statistically significant relationships between variables. *,** indicate statistical significance at less than the 5 percent and 1 percent level, respectively (two-tailed). Dependent variable (BUYBACK): dichotomous variable taking the value 1 if the firm repurchases shares, and 0 otherwise. Independent variables: ROA_1 = lagged (prior year's) ratio of operating income to total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; CFNO_1 = lagged (prior year's) ratio of non-operating cash flow (given by the sum of cash flows from financial and investment activities) to total assets; CASH_1 = lagged (prior year's) amount of cash and equivalents scaled by total assets; MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; CE_REDUCT = dichotomous variable taking the value 1 if the firm reduces the shareholder's equity in the year of buyback, and 0 otherwise (dummy); IT = industry variable for information technology (IT) to indirectly control for stock options. Dichotomous variable taking the value 1 if the firm belongs to IT industry, 0 otherwise; LEV_1 = lagged (prior year's) ratio of the total debt to total assets; SIZE = natural log of total assets at the end of the year (December, 31st). Data analysis using StataSE 11.

Table 5 – *Increase in dividend payout (2003-2009)*

Dependent variable (INC_PAYOUT) =dummy variables (equal to 1 if the firm increase dividend payout in the year, 0 otherwise)

	Determinants of buybacks (logistic regression)		*Determinants of buybacks (panel logistic regression)*	
	Coefficient	*p-value*	*Coefficient*	*p-value*
ROA_1	**-5.965832**	**0.001****	**-5.964769**	**0.001****
STDEV_ROA	-1.636383	0.733	-1.637913	0.732
CFNO_1	**-1.956291**	**0.028****	**-1.955998**	**0.028****
CASH_1	-.1829019	0.838	-.1829334	0.838
MTBV	**.1608986**	**0.032****	**.160893**	**0.032****
CE_REDUCT	.2321916	0.401	.2321658	0.401
IT	-.1881533	0.538	-.1881055	0.538
LEV_1	**-.9551198**	**0.081***	**-.9549718**	**0.081***
SIZE	.0524387	0.263	.0524263	0.263
_cons	.1172038	0.790	.1171969	0.790
	N. obs. = 771		N. obs. = 771	
	LR chi^2 = 19.04		Number of groups = 198	
	Prob > chi^2 = 0.0249		Prob > chi^2 = 0.0393	
	Pseudo R^2 = 0.0179		Wald chi^2 = 17.66	
	Log likelihood = -523.34007		Log likelihood = -523.34012	

This table presents both logistic regression and panel logistic regression results. The values indicated in bold show statistically significant relationships between variables. *,** indicate statistical significance at less than the 5 percent and 1 percent level, respectively (two-tailed). Dependent variable: INC_PAYOUT = dichotomous variable taking the value 1 if the firm increases dividend payout respect to prior year, and 0 otherwise. Independent variables: ROA_1 = lagged (prior year's) ratio of operating income to total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; CFNO_1 = lagged (prior year's) ratio of non-operating cash flow (given by the sum of cash flows from financial and investment activities) to total assets; CASH_1 = lagged (prior year's) amount of cash and equivalents scaled by total assets; MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; CE_REDUCT = dichotomous variable taking the value 1 if the firm reduces the shareholder's equity in the year of buyback, and 0 otherwise (dummy); IT = industry variable for information technology (IT) to indirectly control for stock options. Dichotomous variable taking the value 1 if the firm belongs to IT industry, 0 otherwise; LEV_1 = lagged (prior year's) ratio of the total debt to total assets; SIZE = natural log of total assets at the end of the year (December, 31st). Data analysis using StataSE 11.

Table 6 – *The effect of buybacks: the cost of equity capital (2003-2009).*

	OLS Regression (1)			*FE panel data (2)*	
Variables	*Coefficient*	*p-value*	*V.I.F.*	*Coefficient*	*P-value*
BUYBACK	**-.1318955**	**0.000 ****	1.04	**-.1780504**	**0.000****
ROA_1	-.0849502	0.495	1.28	**-.6025805**	**0.006 ****
LEV_1	.0231808	0.626	1.47	-.0082298	0.940
STDEV_ROA	-.112832	0.726	1.25	.7279709	0.173
SIZE	.0009781	0.855	1.86	**-.1225127**	**0.001****
MTBV	**-.003577**	**0.094***	1.01	**-.0059425**	**0.067 ****
FIN	-.0011378	0.963	1.53	(omitted)	
IND	-.0077195	0.728	1.15	(omitted)	
IT	.0113804	0.697	1.19	(omitted)	
_cons	.0325558	0.444		.9229403	0.000
N. obs.	1.198			1.198	
Prob > F	0.0000			0.0000	
R^2	0.0386			0.0838 (within)	
Adj. R^2	0.0314				
N. groups				272	

This table presents both OLS regression and fixed-effect panel data results. The values indicated in bold show statistically significant relationships between variables. *,** indicate statistical significance at less than the 5 percent and 1 percent level, respectively (two-tailed). Dependent variable: KE = cost of equity capital estimated with the Capital Asset Pricing Model (CAPM), which defines expected return as the sum of the expected risk free rate (Rf) and the product of a firm's estimated market beta (β) and the expected risk premium (Rmkt – Rf). Independent variables: BUYBACK = dichotomous variable taking the value 1 if the firm repurchases shares, and 0 otherwise (dummy); ROA_1 = lagged (prior year's) ratio of operating income to total assets; LEV_1 = lagged (prior year's) ratio of the total debt to total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; SIZE = natural log of total assets at the end of the year (December, 31st); MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; FIN = industry variable for financial companies; IND = industry variable for industrial companies; IT = industry variable for information technology. Data analysis using StataSE 11.

Table 7 – *The effect of buybacks: the long-run abnormal returns (2003-2009). OLS regression.*

	(1) Abnormal returns (n)			*(2) Abnormal returns (n+1)*			*(3) Abnormal returns (n+2)*		
Variables	*Coefficient*	*p-value*	*V.I.F.*	*Coefficient*	*p-value*	*V.I.F.*	*Coefficient*	*p-value*	*V.I.F.*
BUYBACK	**-.0053054**	**0.020****	1.04	-.0024304	0.324	1.04	-.0005068	0.850	1.04
ROA	**.081056**	**0.000****	1.33	**.047174**	**0.004****	1.29	-.0089577	0.614	1.32
LEV	.0075146	0.158	1.51	**.0139338**	**0.019****	1.49	.0081493	0.219	1.53
STDEV_ROA	**.0696319**	**0.043****	1.22	.0217449	0.566	1.23	**.087112**	**0.033****	1.24
SIZE	-.0004127	0.491	1.88	**-.0011924**	**0.067***	1.82	-.0007362	0.305	1.85
FIN	-.0010926	0.689	1.52	**-.0053104**	**0.075***	1.51	**-.0106166**	**0.001****	1.53
IND	**.0046111**	**0.061***	1.14	**.0054377**	**0.044****	1.14	**.0058262**	**0.050****	1.14
IT	.0042705	0.187	1.20	-.0030389	0.398	1.20	.0008769	0.822	1.21
_cons	.0042025	0.371		-.0003324	0.950		-.0017297	0.767	
N. obs.	1.218			1.124			1.063		
Prob > F	0.0000			0.0005			0.0000		
R^2	0.0362			0.0248			0.0367		
Adj. R^2	0.0298			0.0178			0.0294		

This table presents OLS regression results. The values indicated in bold show statistically significant relationships between variables. *,** indicate statistical significance at less than the 5 percent and 1 percent level, respectively (two-tailed). Dependent variable: AR = abnormal returns estimated regressing the time series of monthly excess returns to the companies on excess market returns: $(Rp–Rf) = \alpha + \beta (Rmkt–Rf)$. Rp is the monthly return for firms, Rf is the risk-free return to the short-term Italian government bill (BOT). The return to the Italian FTSE MIB index is the market return (Rmkt). Abnormal performance is measured by α. Independent variables: ROA = operating income to total assets; LEV = total debt to total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; SIZE = natural log of total assets at the end of the year (December, 31st); MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; FIN = industry variable for financial companies; IND = industry variable for industrial companies; IT = industry variable for information technology. Data analysis using StataSE 11.

Table 8 – *The effect of buybacks: the long-run abnormal returns (2003-2009). Panel data.*

	(1) Abnormal returns (0)		*(2) Abnormal returns (+1)*		*(3) Abnormal returns (+2)*	
Variables	*Coefficient*	*p-value*	*Coefficient*	*p-value*	*Coefficient*	*p-value*
BUYBACK	**-.0049412**	**0.079***	.0012831	0.672	.0038954	0.218
ROA	**.136373**	**0.000****	.0360452	0.161	**-.0622742**	**0.018****
LEV	**.0313152**	**0.012****	**.035171**	**0.010****	**.038682**	**0.007****
STDEV_ROA	**.1134993**	**0.037****	.0310093	0.602	**.1468559**	**0.017****
SIZE	**-.0107752**	**0.003****	**-.018297**	**0.000****	**-.0147716**	**0.000****
FIN	(omitted)		(omitted)		(omitted)	
IND	(omitted)		(omitted)		(omitted)	
IT	(omitted)		(omitted)		(omitted)	
_cons	.0489755	0.054	.1043435	0.000	.0752577	0.011
N. obs.	1.218		1.124		1.063	
Prob > F	0.0000		0.0001		0.0000	
N. groups	276		239		229	

This table presents fixed-effects panel data results. The values indicated in bold show statistically significant relationships between variables. *,** indicate statistical significance at less than the 5 percent and 1 percent level, respectively (two-tailed). Dependent variable: AR = abnormal returns estimated regressing the time series of monthly excess returns to the companies on excess market returns: $(Rp–Rf) = \alpha + \beta\ (Rmkt–Rf)$. Rp is the monthly return for firms, Rf is the risk-free return to the short-term Italian government bill (BOT). The return to the Italian FTSE MIB index is the market return (Rmkt). Abnormal performance is measured by α. Independent variables: ROA = operating income to total assets; LEV = total debt to total assets; STDEV_ROA = standard deviation of operating income measured over the 3-year period from year -3 through -1; SIZE = natural log of total assets at the end of the year (December, 31st); MTBV = ratio of the year-end market value of equity to the book value of equity at December, 31st; FIN = industry variable for financial companies; IND = industry variable for industrial companies; IT = industry variable for information technology. Data analysis using StataSE 11.