The Predictive Power of Analysts' Target Prices

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Abstract

Target prices are the most accessible, affordable and explicit statement available to investors at large. While a great deal of academic research and business press attention has been devoted to the effect of analyst recommendation on stock returns or trading volumes, the effectiveness of target prices in anticipating future stock price has remained essentially unexplored. We address our research by developing a novel and unique database of nearly 10,000 analyst recommendations issued on companies listed on the Italian Stock Exchange. The motivation for data collection is that since 1999, CONSOB rule #11971 obliges authorized intermediaries in the market to publish research on a publicly accessible Stock-Exchange owned website, thus providing a comprehensive database. Since foreign-based research teams are not included in the rule obligation, we expect a consistent strategic representation bias to be observed. Our results strongly confirm our hypotheses showing that slightly less than 50% of security underwriting activity is performed by foreign investment firms which represent only 17% of the total research activity. We further examine the absolute predictive power of target prices as a function of the issuing firm, the sign and size of the recommendation issued and the implicit expected return. We show that prediction errors are large (38%) and, surprisingly, positively correlated with research intensity. We further investigate the effect on prediction errors of exogenous market factors like size, index bias, industry. We document large and consistent prediction errors. These results may be motivated by a strategic use of research activity by issuing firms: since extremely positive/negative reports can influence less informed investors portfolio allocation decisions, reporting activity may be affected by risk-transfer choices or portfolio decisions. Our results are also consistent with literature on sell-side analysts' conflict of interests.

1. Introduction

Security research provides investors with information on the current and future prospects of a listed company. Research is typically performed by high-standing entities like investment bank, consultancies or private research firms which have a considerable deal of reputation influence on investors' behavior.

Yet, gathering and managing information conveyed by research reports is a delicate, costly and time-consuming process due to the overwhelming amount of research published each day, making careful analysis of the assumptions and conclusion of a report a task open only to big investors.[1]

Typically, information is spread in the market by means of simple statements such as "Morgan Stanley analysts have set a medium-term upside target of 17,7 euro per share in Deutsche Telekom"[2] or "Amazon.com: Shares of the online retailer rose 3.5 percent after Bear Stearns raised its investment rating to "outperform" from "peer perform" saying it was poised for a very strong fourth quarter [...] target price 57 dollars".[3]

Arguably, target prices are the most explicit and informative statement available to investors at large given that they should represent, at the time of report release, the most accurate estimate of the "intrinsic value" for any firm, adjusted for macroeconomic factors like industry cycle and market momentum.

The importance of this piece of information is reflected in the growing attention devoted to analyst research by regulators worldwide, which have issued more stringent information disclosure rules and more effective provisions for granting independence of research.[4]

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[1] Scattered evidence on the cost of gathering information shows that, when available, reports can be purchased at an average price of 30 USD each.
[2] Frankfurter Allgemeine Zeitung, January 13, 2005.
[3] Yahoo Finance, US stock watch, December 28, 2004.
[4] In the US research activity regulation is based on SEC (Regulation analyst certification), NYSE (rule 472) and NASD (rule 2711) regulations. In 2002 the Sarbanes-Oxley Act has established more stringent requirements and obligations for analyst research and has defined harsher penalties for rule breaches. The main goal is to have firms to fully disclose information about sell-side analyst remuneration policy, relevant ties between analysts and companies and relationships between companies and other banking divisions. Italy rules establish that if an information is suitable for influencing prices of financial instruments, must be released to the market by immediate publication on publicly accesible media..

While a great deal of academic research and business press attention has been devoted to the effect of analyst recommendation on stock returns or trading volumes, the effectiveness of target prices in anticipating future stock price has remained essentially unexplored. Analogously, the relationship between research teams' reputation value and their ability to issue recommendation that effectively predict future stock prices, is only marginally understood.

Using a novel and uniquely developed database of nearly 10,000[5] analyst recommendations issued on companies listed on the Italian Stock Exchange, we try to fill this gap by focusing on three research issues.

We begin by examining the absolute predictive power of target prices as a function of the issuing firm and the recommendation issued. We expect prediction errors to be greater for firms which are more actively publishing research, due to a survivorship bias-like phenomenon: research firms which are not willing to reveal their information, will publish less and express more conservative estimates.[6] Secondly we expect target prices to be significantly and consistently biased upwards (downwards) the more (less) recommendations are optimistic (Strong buy/buy). After having addressed the problem of the prediction horizon, we document statistically significant prediction errors with the expected signs. Finally, we investigate the effect on prediction errors of exogenous market factors like size, index bias, industry. We expect prediction errors to be smaller for stocks that do not embed potentially high price swings and, consequently, are generally underrepresented in investors portfolios or are less actively traded. Consistently with our hypothesis, prediction errors are –among others- positively correlated with inclusion in the stock market index, market momentum and trading

[5] When this paper has been prepared we were updating the database with 2004 data. The process will increase the sample size by approximately 3000 report.

[6] Art. 69 of 11971 CONSOB (the Italian SEC equivalent) regulation establishes that only intermediaries authorized to operate on the Italian market (e.g. issuing and trading shares, raising funds, etc) are obliged to send to Borsa Italiana (Stock Market Authorities) any research report issued about financial instruments negotiated on Italian markets. Therefore Borsa Italiana database lists all report issued by Authorized Intermediaries but not all analyst researches on Italian companies available in Italy. International firms like JP Morgan or Citigroup are subject to compulsory publication only for reports issued by their Italian branch. Foreign firms research intensity is therefore the outcome of an explicit disclosure choice.

volumes and negatively correlated with analyst coverage ratios. Size is significant but inconclusive.

Our study also adds to the existing literature because of our choice to study prediction errors in every target price/report instead of focusing on aggregate measures like consensus forecasts. This approach helps in supporting the hypothesis that research activity is a largely inefficient effort which is widely influenced by research firms' strategic choices. Since extremely positive/negative reports can influence less informed investors portfolio allocation decisions, a potential for risk-shifting from more informed investors to less informed investors is likely to exist.

The paper is structured as follows: Section II reviews literature and outlines the contribution of this paper to existing research; Section III describes data collection; Section IV introduces variables and research hypothesis; Section V presents results; Section VI concludes and introduces future research agenda.

2. Related research

During the last decade, security analysts' reports have been the subject of extensive empirical research. Early investigations are primarily related to either the market's reaction to revisions in analysts' earnings forecasts or recommendations. Most of this work shows positive(negative) abnormal returns for upward(downward) earnings forecast revisions or new buy(sell) recommendations. For example, Abdel-Khalik and Ajinkya (1982) find significant abnormal returns during the publication week of forecast revisions by Merrill Lynch analysts. Similarly, Lys and Sohn (1990) present evidence consistent with forecast revisions having information content (see also Stickel, Scott 1990).

Research on revisions in analyst recommendations has also found a positive association between abnormal returns and the direction of a recommendation change. Lloyd-Davies and Canes (1978) indirectly examine the market reaction to security analyst recommendations by studying stock suggestions appearing in the Wall Street Journal's "Heard on the Street" column. They find an event day return of 0.93% (-2.37%) for new buy (sell) recommendations (see also Bjerring, Lakonishok, and Vermaelen, 1983; Elton, Gruber, and Grossman, 1986; Liu, Smith, and Syed, 1990;

Beneish, 1991; Stickel, 1995). More recently, Womack (1996) uses First Call data to directly examine price reactions for stock recommendation changes to and from the most extreme buy and sell categories.

He documents a significant initial price and volume reaction: size adjusted prices increase 3% for buy recommendations and drop 4,7% for sell recommendations in the event window. In addiction he finds a significant post-recommendations stock price drift in the direction of forecast by the analysts: buy recommendations caused a mean adjusted return of 2,4% for the first post-event month, sell recommendations caused a post recommendations drift of –9,1% over a longer six months post-event period.

More recent research investigates security returns conditional on examining both earnings forecast and recommendation revisions simultaneously. Francis and Soffer (1997) find that neither earnings forecast revisions nor stock recommendations completely incorporate the information in the other signal. They also show that when a report is summarized by a favorable stock recommendation, investors rely on earnings forecast revisions to a greater extent. Stickel (1995) includes proxies for the magnitude of the recommendation revision, the analyst's reputation, the size of the analyst's brokerage house, and the analyzed firm's information environment. His results are consistent with those of Francis and Soffer while both show low R^2.

Recent academic research incorporates price targets as a source of information. Bradshaw (2002) documents, using a sample of 103 analyst reports, that target prices are reported more frequently in favorable reports. Bradshaw and Brown (2002), using a large sample of firms, find that price targets are realized a majority of the time and that individual analysts differ in their accuracy. Brav and Lehavy (2003) reexamine Francis and Soffer's question of simultaneous information by adding price targets to earnings forecasts and recommendation levels. Using a large database of price targets, they find a significant market reaction to price targets both unconditionally and conditional on simultaneous recommendation and earnings forecast revisions.

The effects associated with a lack of independence are similar to those found in Michaely and Womack (1999), which documents that the mean excess returns around a buy recommendation revision are lower when the recommendation is made by an underwriter rather than by an unaffiliated brokerage.

Asquith, Mikhail, and Au (2004) examine the complete text of a large sample of actual analyst reports and provide information beyond earnings forecasts, recommendations, and price targets. They show that other information, such as the strength of the analyst's justifications, is also important and when considered simultaneously reduces, and in some models eliminates, the significance of the information available in earnings forecasts and recommendation revisions. By controlling for the simultaneous release of other information, they show that analyst reports do not merely repeat other firm releases of information, but also provide new and independent analysis to the market. Furthermore, the only elements that matter for reiterations are target prices and the strength of the arguments. Finally, their R^2 of nearly 26% is over three times larger than that of other studies using only partial content from analyst reports.

Jegadeesh, Kim, Krische, and Lee (2004) investigates the source of the investment value provided by analyst stock recommendations and changes in recommendations. They also assess the extent to which sell-side analysts make full use of available information signals in formulating stock recommendations. They find that analysts do not fully take into account the ability of various stock characteristics to predict returns. Moreover, their evidence shows that the direction of the bias in analyst recommendations is in line with economic incentives faced by sell-side brokerage firms.

Academic research on markets others than the US is available only for Italy.[7] Belcredi, Bozzi and Rigamonti (2003) have studied stock market price and volume reaction following upgrade (downgrade) recommendations. The authors observe abnormal returns around stock recommendation release (+1;-1 days) but not in prior or subsequent period.

Barucci Bianchi and Passaporti (2003) document market reaction to release of new analyst recommendations. They show that positive/negative recommendations (buy, strong buy/sell, strong sell) yield positive/negative Abnormal Returns.

Finally Dalla Bina (2004), documents potential conflict of interest in non-independent research analyst issuing research on recently listed companies. By analyzing 1099 reports on 63 companies that went public in the period 1st January 2000

[7] Based on SSRN and Econlit databases survey.

– 29th December 2001, he shows that IPOs recommended by non-independent analysts perform worse than those recommended by independent analysts.

3. Data Collection

3.1 Regulatory issues

Our database has been constructed from analyst recommendations published on the Borsa Italiana website, issued on companies listed on the Italian Stock Exchange. Italy has been a pioneer in regulating the activity of research teams and the dissemination of information to the public.

Research activity is ruled by TUF (Testo Unico della Finanza) approved by Italian Parliament in 1998. Section IV (Comunicazioni al pubblico),[8] article 114 states that all non public information which can, if revealed to the market, have an effect on market prices of financial instruments, must be compulsory transmitted to the public. It is also established that CONSOB (Italian Stock Exchange Commission) is demanded to set and update, if needed, rules concerning what is considered to be a "price sensitive" information.

In 1999, CONSOB issued regulation #11971. Article 69 states that research reports on listed companies must be sent to CONSOB and to Borsa Italiana within the day they are issued for immediate publication in full format on Borsa Italiana website. Exception is given by research privately produced for financial institution or specific customers which has to be transmitted to CONSOB and Borsa Italiana within 60 days from the issuing date. This delay is granted for preserving value for firms' customers who pay for additional research.

3.2 Database construction

We collected over 13000 reports published from 1st January 2000 up to 31st December 2003, on the Borsa Italiana website. We then selected 9690 reports published by 47 distinct research firms from Selected reports cover 98 companies listed on the Milan Stock Exchange[9] representing approximately 405.32 bn€ or 81,96% of the

[8] *Comunicazioni al pubblico* i.e. "Information released to the market".
[9] Out of a total of 262 as of 31st December 2003.

overall Market Cap. Surprisingly, over 140 stocks are not covered or marginally covered by research. This suggests that their representation in investors portfolio and the relative trading activity is rather small.

Reports have been included in the first sub sample of 9690 if they satisfied three criteria: first each report accepted for inclusion in the database ought to represent companies continuously listed in the whole period of analysis, therefore we have excluded delisted companies' reports. Secondly, reports focusing on firms that went public later than January 1999 were excluded due to the potential of upward bias, as showed by Michaely and Womack (1999) and Della Bina (2004). Third, for any research firm, we exclude "single report companies", i.e. companies for which only one report has been published across the time interval of analysis. The above defined three criteria resulted also in excluding all reports targeting companies listed in the technological stock market "Nuovo Mercato".

On this original database, two filters have been applied: the first filtering has excluded from the database all "damaged"[10] reports and all "mirror"[11] reports for a total of 1825, reports or 18,83% of the original set. The second filter has been applied to generate an "informationally efficient" sample aimed at solving quasi-duplications. Whenever two reports on the same company by the same research firm were available with publishing date smaller or equal to 14 days, we excluded either the former or the latter according to the following principle: if the two reports presented identical recommendation and target price we excluded the latter because we assumed a mis-publishing had occurred; if the two reports expressed different recommendations or target price, we excluded the former because of the assumption that an unanticipated, extraordinary event had occurred.[12] This filtering has excluded some further 865 reports.

[10] By damaged we mean: unreadable, empty, compiled in formats non supported by standard readers such as Acrobat, MS Word, Word perfect etc and/or with missing information.
[11] Mirror reports have been defined as identical reports published twice under two different filename or classification.
[12] Some examples include: mistakes in publications, corrections in data originated and released by the reported company.

Jointly, the two filtering have reduced the sample to 7036 reports which we consider to be a consistent representation of the publicly available information in our research perimeter.

Additional information about reported companies – such as market capitalization, daily closing prices, daily trading volumes - has been collected by Datastream. Industry classification is based on FTSE Global Classification system for which, given the characteristics of our sample, we chose the "Economics group" level 3 of detail. Stock Market Index Composition has been extracted from Datastream.

Table 1 and Table 2 provide details of the sample.

TABLE 1 PANEL A HERE

TABLE 1 PANEL B HERE

Table 1, panel A provides descriptive statistics of the 98 companies included in the database. 6 companies totalise over 200 reports each, being the most represented in the sample: Bulgari, ENI, Enel, Mediaset, TIM and Telecom Italia. The relative number of report per companies evidences that the top-analysed company ENI, with 225 reports, weighs only 3,198% on the total sample, therefore allowing us to exclude major biases in sample representation. Table 1, panel B presents reports distribution across firms. The most actively publishing firms are: Intermonte (815 reports), Euromobiliare (614), UBM (500) and Deutsche Bank (455). All these firms contribute by less than 11% to the full sample.

Table 1, panel C shows summary statistics for reports distribution by companies, firms and industry. Companies are researched on average by 72 reports, but data on standard deviation and median show hints of some skewness in distribution. Standard deviation is high 66,08 and median is 46,5. Report sorted by firm shows that financial institution on average issue 149,75 reports in four years, with standard deviation equal to 18 and median equal to 92; maximum issuing is 815,by Intermonte, and minimum is 1 by Axia.

Table 1, panel C presents companies' industry. Data show that Financials is the most represented industry with 29 companies and 2109 reports; Cyclical industries are also well represented both in terms of companies and reports. A measure of the thinness of the Italian Stock Exchange is given by figures on Non-cyclical services and Resources which, with only 2 and 3 firms respectively, show the highest mean coverage of the sample.

Table 2 provides evidence on yearly and monthly reports distribution. Research intensity steadily grow over the sampling horizon. Within each year, four accumulation points exist around the months of March, May, September and November which typically host major corporate events like shareholders' meetings, dividend distribution decisions or budget approval for future fiscal years. This pattern is consistent with the hypothesis that analysts update research with the arrival of new information.

TABLE 2 PANEL A HERE

TABLE 2 PANEL B HERE

Selected reports have been classified according to the original recommendation ranking adopted by each individual research firm. Since each firm adopts an individual scale, we re-classified recommendations on a standard five-point scale: "strong sell-sell-hold-buy-strong buy", in order to perform comparative analysis. Table 3 shows scales conversions.

TABLE 3 HERE

Table 4 provides a recommandations transition matrix. Recommendations considered are less than total recommendations because we have excluded the last recommendation issued by each firm and reports published only one time by a firm on a company.

TABLE 4 HERE

Most reports (*n*=3845) reiterate previous recommendation. Reiterations are represented in bold on the diagonal of the matrix in table 4. Strong buy and buy reiterated recommendations account for 56% of total unchanged report. Upgrade recommendations are defined as upward revisions of previous recommendations: they include all reports below the matrix diagonal. Similarly, downgrades are defined as downward revision of previous recommendations and include all report above the matrix diagonal.

The two table show that upgrades and downgrades are most often towards near recommendations: buy to hold (*n*=385), hold to buy (*n*=294), strong buy to buy (*n*=241) and buy to strong buy (*n*=182). The relative transition matrix indicates that across all recommendation classes, the most frequent update is a reiteration of the previous recommendation. When positive recommendations (strong buy/buy) change, they are often downgraded to the nearest-class recommendation (buy/hold) and, similarly, when negative recommendations change it is most often an upgrade to the nearest superior recommendation class.

4. Variables and research hypothesis

4.1 Assumptions and Variable description

Our analysis addresses the predictive power of analyst recommendations. Target prices should reflect - at or around the publishing date – the (individual) best estimate of the company "intrinsic value". Should the target price differ from the current market price, several explanations could be given: first the market is not yet discounting the full company's value emerging from the latest information available to analysts. In this case we'd expect the market price pattern to align to the analyst's target price in a reasonably short time.

Second, analysts are making assumptions on the company's future cash flows which differ from assumptions shared by investors and embedded in the current market price. If markets are sufficiently efficient, though, market prices should be a weighted average of all individual intrinsic value estimates. Therefore estimation errors should average out to zero.

In both cases – which can also jointly occur - if no market inefficiency exist, we can expect that: first, the expected prediction error should be, on average, around zero, given the fact that market prices should fully reflect all available information and investors' strategies. Secondly, the predicted target price should be matched by market movements in a relatively short time horizon thus reflecting the fact that the market price incorporates different individual value estimates at any given time. With regards to the last point, we observe that analysts generally do not make explicit assumptions on the time required by market prices to adjust towards the predicted target. Most of the time, when an explicit time is provided, it is equal to 12 months from the report's issuing date.

Given this sample's non-homogeneity, we make the following assumption in building our research variables:

Assumption 1A: If target prices are issued with an explicit time horizon we check whether the market price reaches the target price in any moment between the issuing date and the time-horizon final date, unless a new report is issued. In this case we consider the final prediction date to be the new report issuing date minus three days.[13]

Assumption 1B: if reports are issued without an explicit time horizon, we consider the time horizon to be the smaller between 12 months or the following report update publishing date.

A second issue in defining analysts' prediction effectiveness lies in the use of reports. It is reasonable to assume that, analyst recommendations can, to a certain extent, drive investment decisions: investor will buy (or sell) stocks according to the valuation expressed by each report and, in particular, by target prices. Such "recommendation-driven" investments should *ex-ante* yield a maximum expected return given by the algebraic difference between the target price and the current market price.

In an ideal world, investors would buy (or sell/short/sell) shares when a report is issued and liquidate the investment when the market price adjusts up to the predicted

[13] This last adjustment is made to take into account any possible information leakage around the new report publishing date. A second motivation is given by the fact that, as in Welch (2000) and Barucci et al. (2003), analyst tend to concentrate publishing reports around the same date. This last evidence is supported also by our data reported in Table, Panel A

target. Market prices, though, may not perfectly match the target,[14] therefore a utility-maximizer investor could adopt an investment strategy assuming the liquidation of outstanding positions whenever the price reaches its maximum level within the prediction time-horizon. To gauge the effectiveness of analyst prediction assuming this strategy we construct two "Ideal Strategy" (*IS*) variables:

$$\delta_1 = [P_m / P_{t0}]-1$$

$$\delta_2 = \left(\left(TP_{t0} / P_m\right) - 1 \middle| TP > P_{t0};\ 1 - \left(TP_{t0} / P_m\right) \middle| TP < P_{t0};\right)$$

where:

t_0: date of report issuing by firm γ on company η

t_1: date of report update publication (minus 3 days) by firm γ on company η

P_{t0}: stock market price at the research report publication date t0

TP_{t0}: target price given by analyst at the research report publication date t0

P_m: maximum/minimum price level within the prediction time horizon[15]

$\boldsymbol{\delta_2}$ measures the *IS* prediction error for any report as the difference between the issued target price at t_0 and the maximum(minimum) market price in the relevant prediction time-horizon. This variable expresses ex-post analyst prediction error compared to stock market price. To compute prediction errors we look at target prices at the report issuing date for each report: when at t_0 the target price is larger than market price we interpreted a positive(negative) difference between TP_{t0} and P_m as positive overshooting i.e. a prediction of greater increase(decrease) in the maximum(minimum) market price than eventually realized by each share. Conversely, when at t_0 the target price is smaller than the market price, a positive(negative) difference between TP_{t0} and P_m means that the analyst has predicted smaller(greater) downside than the real price downside observed ex-post on the stock market (negative overshooting).

[14] And indeed we show that this is not typically the case.

[15] Technical Note. Recommendation can be parted into two groups inferring the expected outcome: positive or neutral performance (Strong buy/buy and hold recommendations) and negative performance (sell and strong sell). Accordingly, when calculating all δ variables implicit returns, we use maximum price if, at t_0, $TP_{t0} > P_{t0}$. Viceversa, we use minimum price if , at t_0, $TP_{t0} < P_{t0}$.

$\boldsymbol{\delta_1}$ expresses the "theoretical" return earned by an investor who, according to an "ideal strategy" can perfectly identify when a maximum(minimum) price is reached and liquidate its position accordingly. It is a measure of the maximum potential return an investor could earn if she could perfectly foresee future prices along the investment time-horizon.

Unfortunately, though, investors cannot anticipate future market prices, and, consequently it is impossible to consistently implement this ideal optimal strategy.

We therefore model an alternative strategy as follows: we assume investors to engage in buy-and-hold investments, initiating each transaction the issuing day of each report and liquidating the position at the end of the relevant time horizon, i.e. either after 12 months or three days prior the issuing of a report update, whichever is smaller.

To measure the effectiveness of this strategy we construct the following "Feasible Strategy" (*FS*) variables:

$$\delta_3 = [\, P_{t1} / P_{t0}] - 1$$

$$\delta_4 = \left(\left(TP_{t0} / P_{t+1} \right) - 1 \middle| TP > P_{t0} \,;\; 1 - \left(TP_{t0} / P_{t+1} \right) \middle| TP < P_{t0} \,; \right)$$

t_0: date of report issuing by firm γ on company η

t_1: date of report update publication (minus 3 days) by firm γ on company η

P_{t0}: stock market price at the research report publication date (t_0)

TP_{t0}: target price issued by analyst at the research update publication

P_{t+1} stock market price at the research report releasing date t_1

$\boldsymbol{\delta_4}$ measures the *FS* prediction error for any report as the difference between the issued target price and the stock market price at the end of the investment time-horizon, i.e. 12 months after the investment or three days before the recommendation update on the same company by the same firm is published, whichever is smaller. Prediction error interpretation goes the same way as detailed for δ_2: when target price is larger than market price at t_0 we interpreted a positive(negative) difference between TP_{t0} and P_{t1} as positive overshooting i.e. a prediction of greater increase(decrease) in market price than eventually realized by each share at the end of the time horizon. Conversely, when the

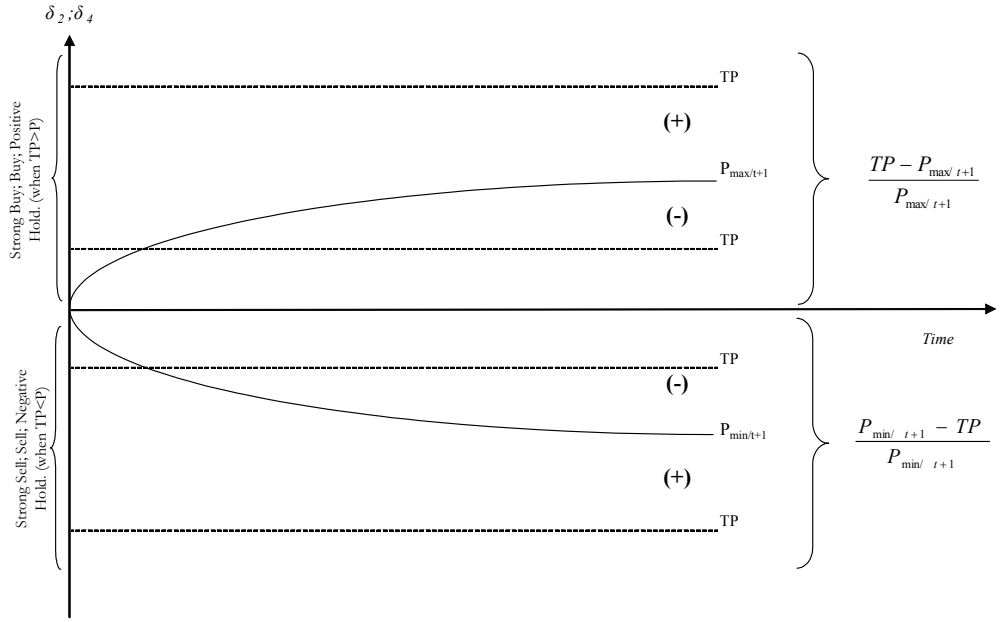
target price is smaller than the market price at t_0, a positive(negative) difference between TP_{t0} and P_m means that analyst has predicted smaller(greater) downside than the real price downside observed ex-post on the stock market (negative overshooting).

δ_3 measures the abnormal return earned by an investor who, according to a "feasible strategy" engage in a buy-and-hold strategy, opening the investment position when a report is issued and closing it when the report is updated.

$\boldsymbol{\delta_3}$ finally, measures the potential return for this strategy that assumes that investors cannot effectively predict when a maximum/minimum price is achieved on the market.

Variables' sign interpretation goes as follows: if TP is greater than market price at t_0 (top side of the graph), a positive sign for variables δ_2 and/or δ_4 means that the issued TP has proved to be greater than the realized market price at the end of the time horizon. We name this event as "overshooting" in prediction. A negative sign means that the realized market price has exceeded the issued TP: we define this recommendation to be "conservative". For the bottom part of the graph (when TP is lower than current market price at t_0), overshooting occurs when we obtain a positive sign i.e.when the issued TP has been lower than the realized market price.Figure 1 gives a graphical representation of variables' construction and sign interpretation.

FIGURE 1
Variables' construction and sign interpretation



Throughout this paper we are interested in trying to understand the predictive ability of each research firm. We therefore analyze every recommendation as a stand alone investment indication. We exclude, differently from other papers, investment strategies based on static portfolio diversification and *a fortiori* dynamic portfolio allocation.[16]

We believe this approach to be more consistent with small, uninformed investors' strategies which are more subject to sub-optimal diversification and to be driven in their allocation decisions by analyst recommendations. Moreover, results in terms of analyst individual performance are not affected by this assumption.

4.2 Research Hypotheses

In this paper we argument that target prices expressed in analyst recommendations are unreliable proxies for future market prices, i.e. predicted target prices differ significantly from realized market prices.

Several research firms have criticized the Italian law requirement saying that it penalizes more actively researching teams by forcing them to reveal their own private information, thus reducing the competitive advantage they have towards either less actively publishing firms or foreign firms which do not fall under the Italian law obligation. We believe this to be a significant potential source of sampling bias and we address it with the following two hypotheses:

Hypothesis.1

Because some of the major firms are not incorporated in Italy, or their research teams are not based in Italy, their research falls out of the law obligation. Therefore we expect under-representation of big firms' reports in our sample.

Hypothesis.2

Due to the characteristics of the Italian regulation, we expect prediction errors to be significantly greater for firms more actively publishing research.

[16] Clearly, any consensus-driven or deep-diversified investment strategy reduces the non-systematic risk for any investor but risk reduction actions are out of the scope of this research.

Revealing information is costly and target prices are a credible proxy of the information available to investors. Reports publication, as shown by Stickel (1995), Womack (1996) and Brav and Lehavy (2003), has a significant effect on security prices and volumes which is greater (in absolute value) the more optimistic (pessimistic) is each recommendation. Firms anticipate that and, since revealing their own private information is costly in terms of loss of competitive advantage, they will act strategically by publishing conservative research up to the very moment in which they want to exploit the expected market reaction. In this case they will try to exert the maximum influence by "overshooting" target prices. We therefore model the following hypothesis:

Hypothesis.3

Prediction errors are larger, the larger the expected change in market price.[17]

Institutional Investors equity portfolios composition is widely influenced by stocks characteristics (see Falkenstein (1996) and Eakins et al. (1998)): large, highly traded and high growth stocks tend to be highly represented. Since research activity is mainly focused on these stocks and equity research has a well-documented impact on security prices, it is arguable that recommendations may be used strategically to allow for allocation choices in the research firm's portfolios: by issuing highly favorable (or unfavorable) recommendation, research teams wish to exploit the expected market reaction for their own equity allocation strategies. This phenomenon is enhanced by market momentum: strongly rising/falling markets push investors to herd around the same investment strategies thus further concentrating portfolios. We therefore make the following:

Hypothesis.4

Shares highly represented in large investors portfolios show larger prediction errors.

[17] Where the change is given by: mod|Target price - current market price|

5. Results

5.1 Firms strategic under-representation

In Table 1 Panel B, we first document the effect of the law requirements on research diffusion on the market. At a first glance analysis, we observe the striking absence from the database of big, high standing firms like Morgan Stanley, HSBC or Barclays Bank. To further soft-test the hypothesis we need to compute a proxy for defining the geographical location of research teams. Given the European market composition, we classify firms into two groups: Domestic and Foreign assuming a firm to be foreign if its headquarter is not incorporated in Italy and it doesn't have a research team in Italy[18]. We then cross check the number of reports published by foreign firms with the same figure by Italian banks. Evidence in Table 1 Panel B, shows that only slightly more than one quarter of research has been published by foreign banks. Rankings data on underwriting and trading activity in Italy obtained from Bloomberg's "Equity Underwriting Ranklngs" for the period January 2000-December 2003, show that, the apparent lack of research activity has not prevented foreign banks to account for the first places. We have sorted banks according to the absolute value of underwriting activity. We have then imposed three cutoffs (Top50%; Top80%; Top90%) to measure the relative contribution to the relevant group. Looking at the "Top50%" cutoff, we have a striking evidence of the expected behavior: Foreign banks account for slightly less than 25% of the market, a figure very close to that of Domestic banks; their research activity though, accounts for only 1,35% of the total amount of publications, vis-à-vis a 17,68% figure for Domestic banks. Indeed, anecdotal evidence show that, for many firms, report figures are larger than available on our database, suggesting that a good deal of research has been published abroad and not transmitted to Italian authorities. The pattern is consistent across all three groupings.

TABLE 5 HERE

[18] In our sample, the only foreign firm which ends up being classified as "Domestic" although being foreign is Deutsche Bank, since its Italian research team is based in Italy where research is issued.

Prediction errors and research intensity

Table 6 Panel A and B provides evidence on the performance of research firms. We regressed δ_2 and δ_4 on the firms included in the database. The two test regressions take the form:

$$\delta_{2i} = \beta_1 \text{ Abaxbank} + \beta_2 \text{ Axia} + \ldots. + \beta_{47} \text{ Uniprof} + \varepsilon_i$$

$$\delta_{4i} = \beta_1 \text{Abaxbank} + \beta_2 \text{ABN AMRO} + \ldots. + \beta_{44} \text{ Uniprof} + \varepsilon_i$$[19]

Where β_1 takes value of 1 in case of report issued by Abaxbank and 0 otherwise.

TABLE 6 PANEL A HERE

TABLE 6 PANEL B HERE

Results shows that for δ_2, 26 regressors have positive and significant beta (at *t* lower than 0,05). The highest beta and the highest *t* are associated with Euromobiliare, UBM, Intermonte and Deutsche Bank, therefore prediction errors committed by these firms are the biggest contributors to the overall δ_2 prediction error. Panel B show regression details for δ_4 for which the number of significant regressors rise to 34. Results show that Euromobiliare, Intermonte, UBM and Intesa performed worse (larger prediction errors) relative to other firms. Conversely, looking only at significant parameters, Citigroup, Banca Mediosim and Banca Aletti, for δ_2 regression, and Fortis bank, Gestnord and Idea Global, for δ_4 regression, are the top-performers.

Confronting these results with descriptive statistics presented in Table 1 and 2, a correlation between research intensity and prediction errors seem to exist. To test if this hypothesis is confirmed by the available data, we run the following regression:

$$Y_i = \alpha + \beta_i \text{ N° report} + \varepsilon_i$$

$$Y_j = \alpha + \beta_j \text{ N° report} + \varepsilon_j$$

[19] Regression on δ_4 has lower number of regressors because 3 firms have never issued 2 reports on the same companies between 1/1/2000 and 31/12/2003.

where:

Y_i= standardized β coefficients of δ_2 firms regression

Y_j= standardized β coefficients of δ_4 firms regression

TABLE 7 PANEL A HERE

TABLE 7 PANEL B HERE

Results robustly show that the performance level decreases with increasing research intensity. *FS* errors (δ_{4i}) are greatly significant and slightly more significant than IS errors (δ_{2i}). Although significance is decreasing in the number of reports, regression results are highly reliable.[20]

Furthermore, Table 8 shows that a lower amount of reports is associated with a lower variance in Target Prices implicit returns. We compute volatility as follows:

$$Y_i = \alpha + \beta_i \, N° \text{ report} + \varepsilon_i$$

where Y_i= standard deviation of TP/P per firm

TABLE 8 HERE

Evidence then shows that when research is scarcely disseminated, analyses are more conservative, while, conversely, an increasing amount of reports is associated with larger prediction errors. These results seem to support the strategic use of reports hypothesis: scattered publication of few reports have, in fact, less chances to influence

[20] Intuitively, it is reasonable to expect that a deeper coverage of ONE specific company is negatively correlated with the size of prediction errors: the greater the knowledge of a company's activity the better the ability to correctly estimate value. This could yield to a double-signed relationship: positive correlation between errors and absolute coverage by each firm (due to a "skills dispersion" effect) and negative correlation between prediction errors and relative coverage by each firm (due to a "knowledge effect"). Unreported results show mixed evidence that a measure of relative coverage has a negative effect on the size of prediction error. Furthermore, results significance is extremely low.

market prices. On the contrary, continuous coverage and reiteration of extreme valuations can build more confidence on one firm's soundness and reliability.

Francis and Soffer (1997) and Brav and Lehavy (2003) showed that recommendation revisions have a non negligible effect on market abnormal. To test whether this effect is existing in our database we regress prediction errors on three dummy variables indicating whether a recommendation is a reiteration, an upgrade or a downgrade of previous research on the same company by the same firm.

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TABLE 9 PANEL A HERE

TABLE 9 PANEL B HERE

Results indicate that prediction errors are largely and consistently emphasized by the recommendation to be an improvement over the prior research issued. Not surprisingly also reiteration show large prediction errors but we interpret this phenomenon as the result of the large overshooting documented in the sample adopted: since an overwhelming majority of recommendations overshoots Target Prices with regards to the following market price, also reiterated recommendation show overshooting. Yet, signs and size of the parameters are as expected and significant.

Size of prediction errors

Previous results show that publication intensity is affected, among others, by two factors: willingness to reveal information and option not to disclose given by the existence of a parent company out of the scope of the rule obligations. When publication intensity is sufficiently high, information embedded in reports impact more strongly on market prices thus opening space for strategic behavior in compiling reports. *Coeteris paribus*, in a perfect information world, target prices prediction errors should be uniformly distributed across recommendations, once normalizing prediction errors for prices absolute values. If, differently, a certain degree of strategic behavior exists, target prices will be consistently overshooted (up or down according to the

recommendation class) in order to more strongly influence the actual market price pattern.

In Table 10, column 1 and 2, we calculate predicted implicit returns (positive and negative) computed as the difference between Target Price and the relevant market price at the issuing date.

TABLE 10 HERE

Figures indicate that decreasing recommendation levels are associated with decreasing implicit return, as one would expect. Yet, in particular for "strong buy" and "buy" recommendations, the mean change in Target price from one report to the following update is very small but positive, indicating upwards target price revisions. Intuitively, both implicit expected returns and Target Price changes should decrease in the unfavorableness of revisions. Indeed, that is confirmed by our data which also show that negative recommendations are associated with larger target price revisions.

Columns 3 and 4 report figures for the first two *IS* variables. Data show that, assuming a "hold" recommendation as pivotal point, an investment strategy driven by recommendations and Target prices yield a monotonically positive return in the level of recommendation with a maximum average yield offered of 14,43%.[21] Yet Overshooting[22] is statistically significant and large, ranging from slightly less than 0% for "hold" recommendations, to 22,39% and 9,77% respectively for "strong buy" and "strong sell".

Table 11 reports extended regression values for δ_2 and δ_4 only.

TABLE 11 HERE

IS variables assume that investments in stocks are undertaken at the report issuing date and liquidated once the price reaches its maximum level within the investment time-horizon. Most of the time, though, as shown by column 3 and 4, prices

[21] Which is generally less than annual. Unreported results indicate that annualized average returns for Strong Sell" recommendations are in the 20% region.
[22] In both directions: upwards and downwards according to the relevant recommendation.

never get reasonably close to the expected target price level,[23] making somehow questionable the hypothesis that, on average, investors can discriminate between market prices and understand which price represents a "real" maximum. Less informed investors in high recommendation level stocks (strong buy/strong sell), still observing a large deal of implicit return not yet reflected by market prices, are keener to wait for the price to change.

To test for predictive ability of market prices in a more realistic investment strategy we constructed the *FS* variables which assume an investor to open the position on any report issuing date and close it at the report update issuing date.[24]

FS data are reported in table 8 columns 5 and 6 and surprisingly, this strategy yields consistently negative average returns across all recommendation level classes. Overshooting is greatly increased with the same signs of *IS* variables. This result suggests that when reports are issued there's a significant effect on market prices which allow positive *IS* returns expressed by variable δ_1.[25] Eventually though, market prices reverse yielding a negative return on a buy-and-hold strategy position opened the report issuing date and closed at the first update or after 12 months, whichever come first.

Prediction errors drivers

Investors are generally more attracted by large, high growth, highly liquid stocks. To control whether this attention is reflected in a different degree of predictive power by analyst recommendation we run the following regressions:

$$\delta_{2i} = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDX + \varphi\, TP_{t0}/P_{t0} + \varepsilon_i$$

$$\delta_{4i} = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDX + \varphi\, TP_{t0}/P_{t0} + \varepsilon_i$$

where:

MV: company market value

[23] Furthermore, several times the maximum price empirically calculated ex-post, is exactly the issuing date market price That means that a particular share over the relevant time-horizon has shown a monotonically decreasing (or increasing) market price.

[24] Minus three days. See Section 4.1

[25] This evidence can be interpreted as an indirect corroboration of previous studies on the effect on market prices of research publication.

VOL: volume of share transaction in the recommendation issuing day

MIB_30: dummy variable with value of 1 if company is included in MIB30 index (index of 30 most capitalized Italian companies), 0 otherwise

COV.RATIO: number of reports issued on company *i* divided by total reports considered

MKT_INDEX: market momentum variable given by (relative level of the market index at any report issuing date, divided by the average index value between 2000 and 2003.

TP_{t0}/P_{t0}: target price issued on company divided by price at date issuing

TABLE 12 PANEL A HERE

TABLE 12 PANEL B HERE

Results, while being statistically extremely significant, confirm the predicted signs, but for the size variable which appears to be somehow inconclusive across the two regressions. Table 10 Panel A reports results for δ_2. As expected, higher trading volumes as well as inclusion in the stock market index (MIB_30) are associated with higher prediction errors.

Market momentum (MKT_INDEX) influences prediction errors with the expected sign but its magnitude is somehow small. Coverage ratio affects positively analyst performance, i.e. reduces prediction errors, suggesting that a learning effect exists and analyst seem to be increasingly accurate in the amount of research published on one firm. Alternative explanations could be also given by the "herding" behavior documented by Welch (2000) and Barucci (2003), which show that analyst concentrate not only on publication dates but also show increasingly converging estimates the larger the amount of research published.

Finally and expectedly, the size of the expect implicit return explains a large part of the prediction errors suggesting that overshooting is a consistent and repeated phenomenon in the research industry.

Not surprisingly, results reported in Table 12 Panel B, for the δ_4 variable are aligned with previous analysis. The greatest change in parameters is in the market index

level variable which is consistent with previous analysis on the magnitude of prediction errors.

We further check whether industry is a driver in determining prediction errors. Table 13 reports regression results.

TABLE 13 PANEL A

TABLE 13 PANEL B

Reports focused on firms belonging to less stable and predictable industries show larger errors: non-cyclical services report the largest error for δ_2 with a coefficient of 0,188, while financial companies are the highest δ_4 parameter with a value of 0,307. Industries parameters show a sound alignment conditional on their expected volatility. Yet, a surprising result is given by information technology industry representing the lowest parameter for δ_2 and the third lowest for δ_4, although its significance is the lowest in the whole sample. Analyzing the industry composition, though, it emerges that the grouping is made of only four firms, all telecommunication-related companies and two out of four being Telecom Italia Media, the incumbent telecom carrier media company, and Sirti which is a semi-monopolistic Telecommunication and Energy network hardware provider. The third one is Ericsson Italia, the local branch of the Swedish Giant which operates network and infrastructure activities in Italy. The fourth one is STM, an highly volatile company, which is the world's biggest producer of mobile phones chips. This suggest that a partial industry grouping bias may have occurred thus partially explaining this inconsistency. Financials represent the highest parameter industry. A possible interpretation of this result is that, due to market downturn and extraordinary events, financial stocks have been subject to wild speculative trade in the market. The intrinsic stability and predictability of this industry has thus been swept away by speculation that has increased volatility and, consequently, prediction errors.

Residual analysis for regressions is reported in Table 14. No clear patterns are evident from preliminary analysis, thus further confirming the conclusions drawn from previous results.

TABLE 14 HERE

5.5 Recommendation class breakdown

Data and analyses' results, seem to suggest that prediction errors are not uniformly distributed across recommendation classes. This hypothesis seem to fit quite well in our "strategic behavior" model: if a change is needed for, say, rebalancing portfolios, then it is reasonable to assume a recommendation to be issued as an upgrade (or downgrade) to higher(lower) classes and with increasing expected implicit returns.

To test this implication we have run the multivariate regressions and the industry and firms regression on two different sample groupings. We first sort recommendations into three classes (Strongbuy/buy), (Hold), (Sell, StrongSell) to understand whether positive, neutral or negative expectations have any differential effect on prediction errors. We have then constructed a second grouping criteria based on the prediction errors realized sign, i.e. $\delta_i>0$ and $\delta_i<0$: since a positive sign in prediction errors represents overshooting, we expect, consistently with our "strategic behavior" hypothesis, results to be more significant for positive prediction

TABLE 15 PANEL A, B, C, D, E, F HERE

Results presented in Table 15 clearly confirm our predictions: at any level of analysis if reports' prediction errors are increasing in the recommendation class and are strongly, positively correlated with the sign of the prediction errors. Regressions results are stronger and all parameters increase in significance thus supporting the hypothesis that some degree of opportunistic behavior may exist in the research industry.

6. Conclusions and future research agenda

Using a large and uniquely developed database of analyst recommendations issued on companies listed on the Italian Stock Exchange, we examined the effectiveness of target prices published in research reports to efficiently anticipate future market prices. We expected target prices to be consistently biased predictions for a

number of reasons: first, publishing research is costly and means disclosing information that is typically sold at hefty rates. Compulsory free publication, as mandated by the Italian law, results in a loss of value for firms which have incentive to either publish less or try to avoid compulsory publication by issuing research from foreign offices which fall out of the scope of the law. Secondly, target prices have been shown to have a consistent and significant short-term effect on market prices: since research issuers have also large equity stake invested and research need to be shared with the market, when a recommendation is issued, target prices effect on market prices is anticipated by analysts by overshooting extreme recommendations. Consistent with our predictions, we find that most important firms publish less research and that research intensity is associated with increasing prediction errors. Prediction errors are large and statistically significant, ranging from a minimum of 4% for "sell" recommendation class to 38,5% and 38,8% for "strong buy" and "buy" recommendation classes. We document also a significant positive relationship between prediction errors and the ex-ante implicit return expressed by target prices which suggest that strategic overshooting may be playing a role in target prices issuing.

We further argue that, since big investors have sizeable positions in large, highly traded, high growth stocks, strategic report publication will result in prediction errors to be positively related to some explanatory variables like: Market capitalization, Inclusion in the Stock Market Index, Trading Volume and Size. Regressions results confirm our hypotheses both in sign and significance suggesting that, indeed research activity outputs are largely flawed and uninformative. Given the uniqueness of the Italian regulation and the resulting database we have collected, we believe our analysis to be a starting point for future research addressing questions like: What is the cross-section of firms' predictive power? Are valuation techniques adopted by analysts a driver in minimizing prediction errors? What is the effectiveness of target prices issued by foreign firms and not disclosed according to the law requirement? What is the relationship between target price update and market price evolution: are target prices lagged, are they "chasing" stock market prices or are they effectively anticipating a price pattern? What is the relationship between prediction errors and firms' "affiliation"? We believe these to be interesting questions for future research.

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TABLE 1 PANEL A
Descriptive statistic of companies

The table shows the 98 companies included, the industry of this companies based on FTSE classification at level 3 and the number of report considered for all companies

Company	Industry	Report N°	Report N° %	Company	Industry	Report N°	Report N° %
AEDES	Financials	9	0,128%	DANIELI	General Industries	4	0,057%
ALITALIA	Cyclical services	26	0,370%	DUCATI MOTOR HOLD.	Cycl. cons. goods	92	1,308%
ALLEANZA	Financials	130	1,848%	EDISON	Utilities	39	0,554%
AMGA	Utilities	33	0,469%	ENEL	Utilities	210	2,985%
AUTOGRILL	Cyclical services	128	1,819%	ENERTAD	Cyclical services	7	0,099%
AUTOSTRADA TO-MI	Cyclical services	36	0,512%	ENI	Resources	225	3,198%
AUTOSTRADE	Cyclical services	170	2,416%	ERG	Resources	106	1,507%
BANCA CARIGE	Financials	6	0,085%	ERGO PREVID.	Financials	41	0,583%
BANCA FIDEURAM	Financials	107	1,521%	ERICSSON	Information Technology	10	0,142%
BANCA INTESA	Financials	184	2,615%	FIAT	Cycl. cons. goods	204	2,899%
BANCA LOMBARDA	Financials	37	0,526%	FIN PART	Cycl. cons. goods	5	0,071%
BANCA MPS	Financials	118	1,677%	FINECOGROUP	Financials	91	1,293%
BNL	Financials	143	2,032%	FINMECCANICA	General Industries	116	1,649%
BCA.PPO.ETRURIA	Financials	7	0,099%	FONDIARIA-SAI	Financials	57	0,810%
BCA.PPO.INTRA	Financials	14	0,199%	GABETTI	Financials	6	0,085%
BCA.PPO.LODI	Financials	23	0,327%	GENERALI	Financials	166	2,359%
BCA.PPO.MILANO	Financials	73	1,038%	GEWISS	General Industries	12	0,171%
BENETTON	Cycl. cons. goods	172	2,445%	GRUPPO COIN	Cyclical services	76	1,080%
BENI STABILI	Financials	58	0,824%	GR. E. L'ESPRESSO	Cyclical services	125	1,777%
BONIF.FERRARESI	Non-Cycl. cons. goods	4	0,057%	IFIL	General Industries	20	0,284%
BREMBO	Cycl. cons. goods	87	1,236%	IRCE	General Industries	13	0,185%
BULGARI	Cycl. cons. goods	218	3,098%	IT HOLDING	Cycl. cons. goods	33	0,469%
BUZZI UNICEM	Basic Industries	102	1,450%	ITALCEMENTI	Basic Industries	105	1,492%
CAPITALIA	Financials	109	1,549%	ITALMOBILIARE	Basic Industries	17	0,242%
CARRARO	Cycl. Cons. goods	18	0,256%	JOLLY HOTELS	Cyclical services	8	0,114%
CEMBRE	General Industries	13	0,185%	LA DORIA	Non-Cycl. cons. goods	23	0,327%
CEMENTIR	Basic Industries	26	0,370%	MARCOLIN	Cycl. cons. goods	10	0,142%
CLASS EDITORI	Cyclical services	50	0,711%	MARZOTTO	Cycl. cons. goods	127	1,805%
CREDITO EMILIANO	Financials	61	0,867%	MEDIASET	Cyclical services	219	3,113%
CDT.VALTELLINES	Financials	2	0,028%	MEDIOBANCA	Financials	13	0,185%
CREMONINI	Non-Cycl. cons. goods	57	0,810%	MEDIOLANUM	Financials	136	1,933%
CRESPI	Basic Industries	2	0,028%	MERLONI	Cycl. cons. goods	74	1,052%
CSP INTERN.	Cycl. cons. goods	13	0,185%	MILANO ASSIC.	Financials	20	0,284%

Company	Industry	Report N°	Report N° %	Company	Industry	Report N°	Report N° %
MIRATO	Non-Cycl. cons. goods	37	0,526%	SAIPEM	Resources	124	1,762%
MONDADORI ED	Cyclical services	141	2,004%	SAN PAOLO IMI	Financials	168	2,388%
NAVIG. MONTANARI	Cyclical services	18	0,256%	SIRTI	Information Technology	10	0,142%
PARMALAT	Non-Cycl. cons. goods	147	2,089%	SNAI	Cyclical services	10	0,142%
PERMASTEELISA	Basic Industries	55	0,782%	SNIA ORD	Non-Cycl. cons. goods	55	0,782%
PININFARINA	Cycl. cons. goods	43	0,611%	SOGEFI	Cycl. cons. goods	23	0,327%
PIRELLI	General Industries	146	2,075%	SOL	Basic Industries	10	0,142%
POLIGRAFICI ED.	Cyclical services	13	0,185%	STEFANEL	Cycl. cons. goods	12	0,171%
RAS	Financials	135	1,919%	STM	Information Technology	97	1,379%
RCS MEDIAGROUP	Cyclical services	68	0,966%	TARGETTI	General Industries	28	0,398%
RECORDATI	Non-Cycl. cons. goods	108	1,535%	TELECOM ITALIA	Non-cyclical services	219	3,113%
RENO DE MEDICI	Basic Industries	20	0,284%	TELECOM IT. M.	Information Technology	151	2,146%
RICH. GINORI	Basic Industries	12	0,171%	TIM	Non-cyclical services	233	3,312%
RISANAMENTO	Financials	3	0,043%	TREVI	General Industries	17	0,242%
SABAF	General Industries	42	0,597%	UNICREDITO	Financials	161	2,288%
SAES GETTERS	General Industries	53	0,753%	UNIPOL	Financials	31	0,441%

TABLE 1 PANEL B
Descriptive statistic of firm

This table shows summary statistics for the 47 firms included in the sample and the absolute and relative number of report issued by these firms

Firm	Nation.	Report N°	Report N° %	Firm	Nation.	Report N°	Report N° %
Abaxbank	D	24	0,3413%	DKW	F	124	1,7636%
ABN AMRO	F	95	1,3512%	Eptasim	D	135	1,9201%
Actinvest	D	263	3,7406%	Euromobiliare	D	614	8,7328%
Axia	D	1	0,0142%	Fortis bank	F	24	0,3413%
Banca Aletti	D	9	0,1280%	Gestnord	D	2	0,0284%
Banca Finnat	D	7	0,0996%	Goldman Sachs	F	72	1,0240%
Banca Leonardo	D	281	3,9966%	Ideaglobal	D	140	1,9912%
Banca Mediosim	D	5	0,0711%	IMI	D	405	5,7602%
Banca Sella	D	7	0,0996%	ING	F	39	0,5547%
Banknord	D	7	0,0996%	Intermonte	D	815	11,5915%
Bipielle/Santander	D	119	1,6925%	Intesa	D	338	4,8073%
BNP Paribas	F	121	1,7210%	JP Morgan	F	3	0,0427%
Borsaconsult	D	2	0,0284%	Julius Baer	F	187	2,6597%
BP Bari	D	6	0,0853%	Lehman brothers	F	92	1,3085%
BPM	D	258	3,6695%	M. Mortari	D	58	0,8249%
Cazenove	F	5	0,0711%	Mediobanca	D	229	3,2570%
Centrosim	D	198	2,8161%	Merrill Lynch	F	325	4,6224%
Cheuvreux	F	194	2,7592%	Metzler	F	19	0,2702%
Citigroup	F	19	0,2702%	Rasfin	D	171	2,4321%
Cofiri	D	41	0,5831%	SG	F	133	1,8916%
Consors	D	31	0,4409%	UBM	D	500	7,1114%
Credit Lyonnais	F	40	0,5689%	UBS	F	304	4,3237%
CSFB	F	90	1,2800%	Uniprof	D	29	0,4125%
Deutsche bank	D	455	6,4713%		F		
Total Domestic Firms		5150	73,19%				
Total Foreign Firms		1886	26,81%				

TABLE 1 PANEL C
Summary statistics of reports

This table first presents reports' descriptive statistics sorted by firms and by companies. Next, we provide results from reports and companies' distribution over ten industries and the reports' mean coverage

	Sorting by Firm	Sorting by Companies
Mean	149,702	71,795
Std. Dev.	178,89	66,08
Max	815	233
75^{th} perc.	213,5	122,5
Median	92	46,5
25^{th} perc.	19	13,25
Min	1	2

Industry	Reports	Companies	Mean coverage
Basic Industries	349	9	39
Cycl. Cons. Goods	1131	15	75
Cyclical services	1095	15	73
Financials	2109	29	73
General Industries	464	11	42
Information Technology	268	4	67
Non Cycl. cons. Goods	431	7	62
Non Cyclical services	452	2	226
Resources	455	3	152
Utilities	282	3	94
Average number of report per industry		703,6	
Average number of companies per industry		9,8	
Most represented Industry by number of report		Financials	
Most represented Industry by number of companies		Financials	

TABLE 2 PANEL A
Yearly and monthly report distribution

We report research distribution breakdown by years and months. In the first table we show monthly, quarterly and half-year distribution. Yearly distribution is documented in the second table

Month	Monthly		Quarterly		Semester	
January	322	4,58%				
February	565	8,03%				
March	706	10,03%	1593	22,64%		
April	406	5,77%				
May	864	12,28%				
June	328	4,66%	1598	22,71%	3191	45,35%
July	594	8,44%				
August	372	5,29%				
September	985	14,00%	1951	27,73%		
October	565	8,03%				
November	998	14,18%				
December	331	4,70%	1894	26,92%	3845	54,65%

Month	2000	2001	2002	2003
January	43	100	43	136
February	93	128	107	237
March	104	233	77	292
April	48	132	77	149
May	152	221	156	335
June	39	83	95	111
July	64	139	212	179
August	38	88	135	111
September	130	278	310	267
October	78	167	163	157
November	126	160	373	339
December	72	50	117	92
TOT	**987**	**1779**	**1865**	**2405**

TABLE 2 PANEL B
Reports annual distribution per recommendation class
This table shows total recommendations' distribution and yearly recommendations' distribution

	TOTAL		2000		2001		2002		2003	
Strong buy	1075	15,28%	254	25,73%	327	18,38%	255	13,67%	239	9,94%
Buy	2803	39,84%	421	42,65%	644	36,20%	740	39,68%	998	41,50%
Hold	2430	34,54%	259	26,24%	618	34,74%	662	35,50%	891	37,05%
Sell	694	9,86%	51	5,17%	173	9,72%	204	10,94%	266	11,06%
Strong sell	34	0,48%	2	0,20%	17	0,96%	4	0,21%	11	0,46%
TOTAL	**7036**		**987**		**1779**		**1865**		**2405**	

TABLE 3
Stock recommendation conversion scale

We illustrate conversion criteria adopted for the database. If a recommendation has been issued according to a five steps scale conversion has been performed by the upper table conversion rule. If recommendation adopted a three step scale, conversion followed the rule presented in the lower table

Original Scale			**Adopted Scale**
Buy	Buy	Strong buy	Strong buy
Outperform	Accumulate/Add	Buy	Buy
Market perform	Neutral/Hold	Hold	Hold
Underperform	Reduce	Sell	Sell
Sell	Sell	Strong Sell	Strong Sell

Original Scale	**Adopted Scale**
Buy → *(Tp-p)/p>0.2*	Strong buy
Buy → *(Tp-p)/p<0.2*	Buy
Hold	Hold
Sell → (Tp-p)/p<-0.2	Sell
Sell → *(Tp-p)/p>-0.2*	Strong Sell

TABLE 4
Stock recommendations transition matrix
Tables show stock absolute and relative stock recommendations transitions.

	TO					
FROM	**Strong buy**	**Buy**	**Hold**	**Sell**	**Strong sell**	**TOTAL**
Strong buy	**567**	241	96	18	0	**922**
Buy	182	**1574**	385	85	0	**2226**
Hold	56	294	**1371**	152	4	**1877**
Sell	7	46	115	**315**	6	**489**
Strong sell	0	0	1	8	**18**	**27**
TOTAL	**812**	**2155**	**1968**	**578**	**28**	**5541**

	TO					
FROM	**Strong buy**	**Buy**	**Hold**	**Sell**	**Strong sell**	**TOTAL**
Strong buy	**61,4967%**	26,1388%	10,4121%	1,9523%	0,0000%	100%
Buy	8,1761%	**70,7098%**	17,2956%	3,8185%	0,0000%	100%
Hold	2,9835%	15,6633%	**73,0421%**	8,0980%	0,2131%	100%
Sell	1,4315%	9,4070%	23,5174%	**64,4172%**	1,2270%	100%
Strong sell	0,0000%	0,0000%	3,7037%	29,6296%	**66,6667%**	100%

TABLE 5
Research intensity and nationality

This table reports for each bank the million dollar amount of underwritten securities (equity, debt, equity-linked) on the italian market between 1/1/2000 and 31/12/2003, and the relative frequency of research issued by the underwriter. Firms are sorted into Domestic and Foreign according to the nation of incoproration of the headquarter and the existance of a research team based in Italy.

	Firm	Amount	Frequency	Report frequency	Nationality
Top 50%	Unicredito Italiano	20172,61	10,62%	7,11%	D
	Gruppo Intesa	18014,68	9,48%	4,81%	D
	JP Morgan	17765,84	9,35%	0,04%	F
	Banca IMI	14724,33	7,75%	5,76%	D
	Morgan Stanley	14372,8	7,56%	0,00%	F
	Lehman Brothers	14090,46	7,42%	1,31%	F
Cumulated		**99140,72**	**52,18%**	**19,03%**	
Cumulated Domestic			*27,85%*	*17,68%*	
Cumulated Foreign			*24,33%*	*1,35%*	
Top 80%	Mediobanca	11320,24	5,96%	3,26%	D
	Merrill Lynch & Co	10490,79	5,52%	4,62%	F
	Citigroup	8048,09	4,24%	0,27%	F
	Deutsche Bank AG	6909,38	3,64%	6,47%	D
	Goldman Sachs & Co	5542,97	2,92%	1,02%	F
	UBS	5383,58	2,83%	4,32%	F
	BNP Paribas Group	4852,11	2,55%	1,72%	F
Cumulated		**151687,88**	**79,83%**	**40,71%**	
Cumulated Domestic			*41,68%*	*27,41%*	
Cumulated Foreign			*38,15%*	*13,30%*	
Top 90%	Credit Suisse First Boston	4219,29	2,22%	1,28%	F
	ABN Amro Bank NV	4010,13	2,11%	1,35%	F
	MPS Finance BM	2566,49	1,35%	11,91%	D
	Banca di Roma	2103,64	1,11%	0,58%	D
	Abaxbank	1779,39	0,94%	0,34%	D
	HSBC	1755,21	0,92%	0,00%	F
	Banca Nazionale del Lavoro	1569,65	0,83%	0,00%	D
	Credit Agricole Indosuez	1535,78	0,81%	2,76%	F
Cumulated		**171227,46**	**90,11%**	**58,93%**	
Cumulated Domestic			*45,90%*	*40,25%*	
Cumulated Foreign			*44,22%*	*17,34%*	

TABLE 6 PANEL A
δ_2 Firms regression

This table provides results from regressing δ_2 errors on 47 dummy variables representing 47 firms that have published at least one report over the sampling time interval.

$$\delta_{2i} = \beta_1 \text{ Abaxbank} + \beta_2 \text{ Axia} + \ldots. + \beta_{47} \text{ Uniprof} + \varepsilon_i$$

OLS Standardized Coefficient Estimate					
	Std. β	t		Std. β	t
Abaxbank	-,001	-,114	DKW	,022**	1,855
ABN AMRO	,002	,174	Eptasim	,013	1,095
Actinvest	,021	1,741	Euromobiliare	,167**	13,899
Axia	,011	,892	Fortis bank	,013**	1,113
Banca Aletti	,029**	2,458	Gestnord	,003	,260
Banca Finnat	,020	1,648	Goldman Sachs	-,005	-,428
Banca Leonardo	,057**	4,762	Ideaglobal	-,015	-1,249
Banca Mediosim	,027**	2,271	IMI	,05**	4,208
Banca Sella	-,008	-,651	ING	,032**	2,667
Banknord	,033**	2,753	Intermonte	,093**	7,761
Bipielle/Santander	,031**	2,592	Intesa	,061**	5,076
BNP Paribas	,035**	2,905	JP Morgan	,005	,379
BP Bari	-,005	-,451	Julius Baer	,060**	5,026
BPM	,053**	4,420	Lehman brothers	,008	,672
Cazenove	,013	1,069	Massimo Mortari	,054**	4,524
Centrosim	,060**	4,979	Mediobanca	,045**	3,786
Cheuvreux	-,010	-,847	Merrill Lynch	,074**	6,197
Citigroup	,025**	2,076	Metzler	,019	1,548
Cofiri	,019	1,559	Rasfin/Rasbank	,073**	6,106
Consors	-,016	-1,301	SG	,037**	3,072
Credit Lyonnais	-0,011	-,951	UBM	,118**	9,859
CSFB	,032**	2,628	UBS	,037**	3,119
Deutsche bank	,085**	7,100	Uniprof	,005	,434

Adj R^2	,101
Std. Error of Estimate	,2228
F-Statistic (Significance Level)	16,165(,000)

** Significance at the 5% level

TABLE 6 PANEL B
δ_4 Firms regression

We calculate individual firm's performance by regressing δ_4 error on 44 dummy variables representing 44 firms that have published more than one report on the companies analyzed

$$\delta_{4i} = \beta_1 \text{Abaxbank} + \beta_2 \text{ABN AMRO} + \ldots. + \beta_{44} \text{Uniprof} + \varepsilon_i$$

OLS Standardized Coefficient Estimate					
	Std. β	T		Std. β	t
Abaxbank	,008	,636	Eptasim	,050**	4,156
ABN AMRO	,043**	3,605	Euromobiliare	,202**	16,771
Actinvest	,114**	9,477	Fortis bank	,029**	2,374
Banca Aletti	,018	1,480	Gestnord	,027**	2,243
Banca Finnat	,012	,983	Goldman Sachs	-,006	,482
Banca Leonardo	,096**	8,006	Ideaglobal	,029**	2,447
Banca Sella	,013	1,115	IMI	,137**	11,402
Banknord	,020	1,637	ING	,043**	3,599
Bipielle/Santander	,067**	5,610	Intermonte	,163**	13,584
BNP Paribas	,041**	3,446	Intesa	,139**	11,593
BP Bari	,012	1,009	Julius Baer	,100**	8,321
BPM	,123**	10,263	Lehman brothers	,041**	3,403
Centrosim	,090**	7,478	Massimo Mortari	,056**	4,682
Cheuvreux	,088**	7,281	Mediobanca	,070**	5,790
Citigroup	,039**	3,272	Merrill Lynch	,128**	10,611
Cofiri	,035**	2,933	Metzler	,035**	2,910
Consors	,041**	3,404	Rasfin/Rasbank	,101**	8,412
Credit Lyonnais	,038**	3,160	SG	,082**	6,792
CSFB	,052**	4,356	UBM	,157**	13,033
Deutsche bank	,139**	11,568	UBS	,107**	8,887
DKW	,090**	7,455	Uniprof	,001	,060

Adj R^2	,295
Std. Error of Estimate	,44226
F-Statistic (Significance Level)	49588(,000)

** Significance at the 5% level

TABLE 7 PANEL A
Prediction errors and research intensity regressions

We test the effect of research intensity on prediction errors by first regressing δ_2 's firms regression beta on the number of reports issued by the 47 firms considered and eventually performing the same analysis for δ_4

$$Y_i = \alpha + \beta_i \text{ N° report} + \varepsilon_i$$

	OLS Standardized Coefficient Estimate	
	Std. β	T
Intercept	-,005 †	-,573
N° report	,579 **	4,711

Adj R^2	,320
Std. Error of Estimate	,0468
F-Statistic (Significance Level)	22,192(,000)

†unstandardized coefficient
** Significance at the 5% level

TABLE 7 PANEL B
Prediction errors and research intensity regressions

$$Y_j = \alpha + \beta_j \text{ N° report} + \varepsilon_j$$

	OLS Standardized Coefficient Estimate	
	Std. β	T
Intercept	,027†	5,975
N° report	,910 **	13,854

Adj R^2	,823
Std. Error of Estimate	,021104
F-Statistic (Significance Level)	191,922 (,000)

†unstandardized coefficient
** Significance at the 5% level

TABLE 8

Prediction error volatility and research intensity regression

We analyze whether research volatility impacts on prediction errors by regressing standard deviation of the TP_{t0}/P_{t0} ratio on the number of reports issued by each firm

$$Y_i^{1} = \alpha + \beta_i \, N° \text{ report} + \varepsilon_i$$

	OLS Standardized Coefficient Estimate	
	Std. β	T
Intercept	,167†	12,974
N° report	,320**	2,192
Adj R^2	,081	
Std. Error of Estimate	,063798	
F-Statistic (Significance Level)	4,807(,034)	

1 $Y_i = TP_{t0}/P_{t0}$ std. dev.

†unstandardized coefficient

** Significance at the 5% level

TABLE 9 PANEL A
δ_2 upgrade,reiteration, downgrade recommendation

In this table we test self-correlation between reports recommendation. We regress regress δ_2 and δ_4 on 3 dummy variables representing whether each analyst recommendation is an upgrade, a reiteration or a downgrade.

$$\delta_{2i} = \beta_1 \text{ Upgrade} + \beta_2 \text{ Reiteration} + \beta_3 \text{ Downgrade} + \varepsilon_i$$

OLS Standardized Coefficients Estimate		
	Std. β	t
Upgrade	,195**	15,52
Reiteration	,222**	25,21
Downgrade	,041**	3,26

Adj R^2	,152
Std. Error of Estimate	,2120
F-Statistic (Significance Level)	295,56 (,000)

** Significance at the 5% level

TABLE 9 PANEL B
δ_4 upgrade,reiteration, downgrade recommendation

$$\delta_{4i} = \beta_1 \text{ Upgrade} + \beta_2 \text{ Reiteration} + \beta_3 \text{ Downgrade} + \varepsilon_i$$

OLS Standardized Coefficients Estimate		
	Std. β	t
Upgrade	,359**	25,13
Reiteration	,319**	32,35
Downgrade	,170**	11,83

Adj R^2	,321
Std. Error of Estimate	,4464
F-Statistic (Significance Level)	606,09 (,000)

** Significance at the 5% level

TABLE 10
$[TP_{t0}/P_{t0}]-1$, $[TP_{t1}/TP_{t0}]-1$, δ_1, δ_2, δ_3, δ_4 descriptive statistics

	$[TP_{t0}/P_{t0}]-1$	$[TP_{t1}/TP_{t0}]-1$	δ_1	δ_2	δ_3	δ_4
Strong buy						
Mean	38,18%	1,23%	14,43%	22,39%	-0,26%	46,81%
Std. Dev.	22,03%	20,92%	17,63%	20,89%	22,89%	46,55%
Max	247,49%	127,27%	156,92%	115,38%	132,43%	488,52%
75th perc.	33,33%	5,26%	9,06%	21,13%	10,22%	61,29%
Median	46,25%	0,00%	19,52%	32,68%	-0,71%	37,42%
25th perc.	24,37%	-5,79%	3,05%	9,76%	-11,73%	19,13%
Min	-1,11%	-89,29%	0,00%	-51,46%	-79,51%	-46,34%
N° of obser.	1064	798	1064		913	
Buy						
Mean	22,63%	-0,70%	12,65%	10,09%	-1,61%	31,98%
Std. Dev.	15,05%	19,76%	15,91%	15,93%	21,13%	42,59%
Max	236,08%	166,67%	233,00%	198,53%	142,46%	462,43%
75th perc.	19,92%	4,03%	8,24%	9,66%	9,00%	40,14%
Median	28,45%	0,00%	16,30%	18,18%	-0,36%	22,68%
25th perc	13,34%	-7,06%	2,98%	1,51%	-10,96%	9,81%
Min	-38,27%	-77,54%	-36,47%	-97,99%	-77,32%	-49,24%
N° of obser.	2595	1980	2595		1990	
Hold						
Mean	7,52%	-6,31%	9,69%	-0,63%	-4,53%	18,67%
Std. Dev.	15,64%	22,36%	15,97%	17,50%	21,72%	43,26%
Max	180,00%	179,17%	98,34%	146,36%	96,52%	460,98%
75th perc.	13,37%	1,57%	15,67%	7,19%	7,47%	28,46%
Median	6,25%	0,00%	6,43%	-0,53%	-2,18%	11,34%
25th perc.	0,00%	-16,67%	1,08%	-9,88%	-16,35%	-0,70%
Min	-48,85%	-85,78%	-59,93%	-99,51%	-79,62%	-173,9%
N° of obser.	2050	1618	2050		1547	
Sell						
Mean	-10,21%	-13,50%	-15,62%	-12,78%	-5,09%	4,08%
Std. Dev.	14,93%	26,53%	18,28%	36,74%	21,72%	32,69%
Max	52,49%	126,67%	57,61%	48,05%	83,45%	79,42%
75th perc.	-9,39%	0,00%	-9,96%	8,37%	7,07%	21,22%
Median	-1,91%	-8,24%	-3,32%	-2,28%	-4,17%	9,20%
25th perc.	-18,05%	-29,91%	-25,79%	-21,53%	-16,13%	-5,93%
Min	-63,33%	-87,83%	-84,02%	-218,58%	-74,49%	-178,4%
N° of obser.	568	463	568		391	
Strong Sell						
Mean	-31,22%	-17,17%	-16,85%	9,77%	-8,88%	17,06%
Std. Dev.	20,69%	31,59%	18,91%	41,93%	19,92%	33,07%
Max	1,15%	76,00%	0,00%	61,31%	14,05%	66,91%
75th perc.	-31,22%	0,00%	-11,30%	43,79%	5,18%	46,63%
Median	-11,37%	-11,35%	-4,93%	18,77%	-1,48%	17,31%
25th perc.	-47,17%	-43,84%	-19,33%	-6,30%	-16,60%	1,78%
Min	-67,06%	-71,88%	-75,59%	-123,21%	-71,61%	-57,62%
N° of obser.	32	28	32		26	

TABLE 11 PANEL A

δ_2 Recommendation analysis

This table provides eveidence on the effect on prediction errors of each recommendation class. We regress δ_2 and δ_4 on 5 dummy variables representing the 5 recommendations issued by analysts

$$\delta_{2i} = \beta_1 \text{ Strong buy} + \beta_2 \text{ Buy} + \beta_3 \text{ Hold} + \beta_4 \text{ Sell} + \beta_5 \text{ Strong sell} + \varepsilon_i$$

OLS Standardized Coefficients Estimate		
	Std. β	t
strong buy	,393**	36,022
Buy	,274**	25,135
Hold	-,015	-1,402
Sell	-,164**	-15,061
strong sell	,030**	2,730

Adj R^2	,257
Std. Error of Estimate	,2024
F-Statistic (Significance Level)	433,116(,000)

** Significance at the 5% level

TABLE 11 PANEL B

δ_4 Stock recommendation regression

$$\delta_{4i} = \beta_1 \text{ Strong buy} + \beta_2 \text{ Buy} + \beta_3 \text{ Hold} + \beta_4 \text{ Sell} + \beta_5 \text{ Strong sell} + \varepsilon_i$$

OLS Standardized Coefficients Estimate		
	Std. β	t
strong buy	,385**	33,019
Buy	,388**	33,300
Hold	,200**	17,141
Sell	,022	1,882
strong sell	,024**	2,030

Adj R^2	,339
Std. Error of Estimate	,4284
F-Statistic (Significance Level)	500,123(,000)

** Significance at the 5% level

TABLE 12 PANEL A
δ_2 prediction error regression

These tables provide results from regressing δ_2 and δ_4 errors on 6 variables related to company status, market momentum and research intensity: company market value is measured at each report issuing date (MV),volume of share transaction is calculated at each recommendation issuing day (VOL), inclusion/exclusion in MIB 30 index (MIB30) is treated as a dummy variable, researcjh intensity is measured by company coverage ratio (COV: RATIO) given by number of reports issued on company *i* divided by total reports considered, market momentum (MKT_INDEX) is measured as the relative level of the market index at any report issuing date, divided by the average index value between 2000 and 2003; expected implicit return is measured as the ratio between target price and market price at t_0 (TP_{t0}/P_{t0}).

$$\delta_{2i} = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDEX + \varphi\ TP_{t0}/P_{t0} + \varepsilon_i$$

OLS Standardized Coefficient Estimate		
	Std. β	T
Intercept	-,640†	-36,042
MV	,070**	4,877
VOL	,004	,302
MIB30	,025	1,751
COV: RATIO	-,047**	-3,169
MKT_INDEX	,006	,559
TP_{t0}/P_{t0}	,580**	55,681

Adj R^2	,342
Std. Error of Estimate	,1834
F-Statistic (Significance Level)	533,032(,000)

†unstandardized coefficient
** Significance at the 5% level

TABLE 12 PANEL B
δ_4 prediction error regression

$$\delta_{4i} = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDEX + \varphi\ TP_{t0}/P_{t0} + \varepsilon_i$$

OLS Standardized Coefficient Estimate		
	Std. β	t
Intercept	-,858†	-18,886
MV	-,060**	-3,238
VOL	,039**	2,456
MIB30	,090**	5,024
COV. RATIO	-,034	-1,810
MKT_INDEX	,122**	8,982
TP_{t0}/P_{t0}	,380**	28,381

Adj R^2	,157
Std. Error of Estimate	,4099
F-Statistic (Significance Level)	149,731(,000)

†unstandardized coefficient
** Significance at the 5% level

TABLE 13 PANEL A

δ_2 Industry regression

We estimate Industry effects on prediction errors by regressing δ_2 and δ_4 on 10 dummy variables representing the 10 industries of considered companies

$$\delta_{2i} = \beta_1 \text{ Basic Industries} + \beta_2 \text{ Financials} + \ldots + \beta_{10} \text{ Utilities} + \varepsilon_i$$

OLS Standardized Coefficient Estimate		
	Std. β	t
Basic Industries	,124**	10,353
Cyclical consumer goods	,057**	4,780
Cyclical services	,048**	4,032
Financials	,116**	9,727
General Industries	,100**	8,353
Information Technology	,013	1,070
Non-cyclical consumer goods	,126**	10,535
Non-cyclical services	,188**	15,698
Resources	,093**	7,792
Utilities	,085**	7,099

Adj R^2	,110
Std. Error of Estimate	,2210
F-Statistic (Significance Level)	78,085 (,000)

** Significance at the 5% level

TABLE 13 PANEL B

δ_4 Industry regression

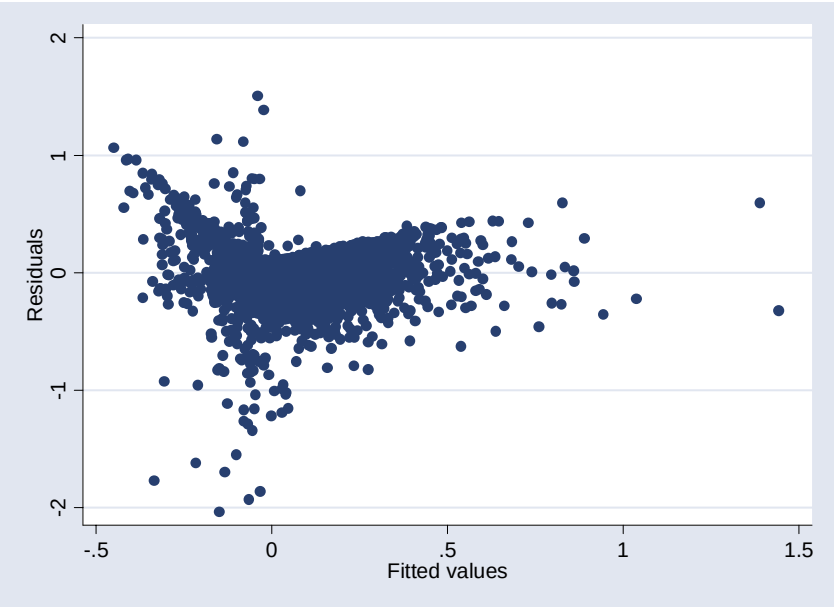
$$\delta_{4i} = \beta_1 \text{ Basic Industries} + \beta_2 \text{ Financials} + \ldots + \beta_{10} \text{ Utilities} + \varepsilon_i$$

OLS Standardized Coefficient Estimate		
	Std. β	t
Basic Industries	,137**	11,448
Cyclical consumer goods	,185**	15,405
Cyclical services	,181**	15,084
Financials	,307**	25,551
General Industries	,172**	14,328
Information Technology	,098**	8,171
Non-cyclical consumer goods	,146**	12,204
Non-cyclical services	,221**	18,407
Resources	,091**	7,549
Utilities	,063**	5,281

Adj R^2	,300
Std. Error of Estimate	,44096
F-Statistic (Significance Level)	209,344 (,000)

** Significance at the 5% level

TABLE 14
Residuals analysis for δ_2 and δ_4 prediction error regressions



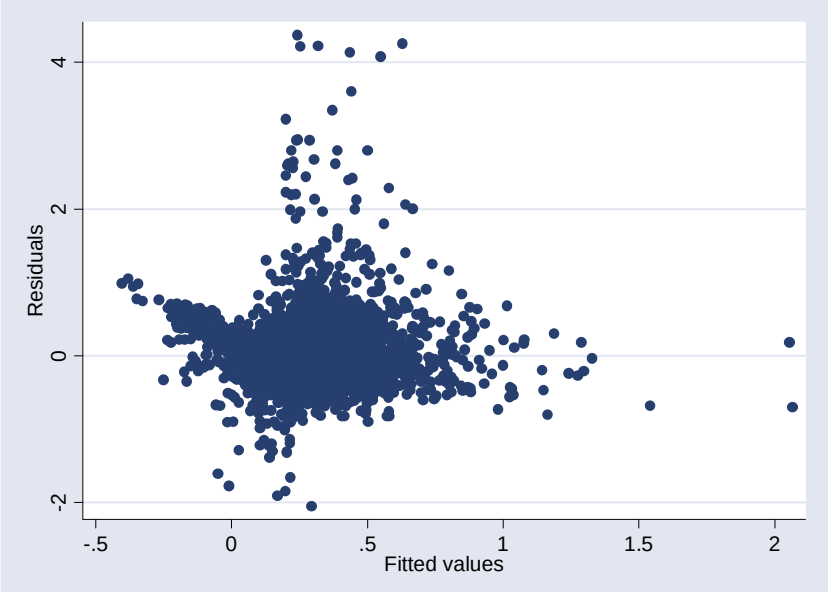


TABLE 15 PANEL A

Partial δ_2 prediction error regression

These tables provide results from regressing δ_2 partial errors (Y_i) obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_2 and negative δ_2) on 6 variables related to company status, market momentum and research intensity: company market value is measured at each report issuing date (MV),volume of share transaction is calculated at each recommendation issuing day (VOL), inclusion/exclusion in MIB 30 index (MIB30) is treated as a dummy variable, research intensity is measured by company coverage ratio (COV: RATIO) given by number of reports issued on company *i* divided by total reports considered, market momentum (MKT_INDEX) is measured as the relative level of the market index at any report issuing date, divided by the average index value between 2000 and 2003; expected implicit return is measured as the ratio between target price and market price at t_0 (TP_{t0}/P_{t0})

$$Y_i = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDEX + \varphi\ TP_{t0}/P_{t0} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy - Buy		Hold		Strong Sell – Sell		$\delta_2 > 0$		$\delta_2 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Costant	-,754†**	-38,358	-,227†**	-6,589	,900†**	7,863	-,272†**	-20,451	-,491†**	-10,164
MV	,119**	7,188	,014	,468	,062	1,061	,039**	2,265	,109**	3,430
VOL	,006	,421	-,009	-,311	-,033	-,616	,016	1,195	,008	,285
MIB_30	,047**	2,822	,034	1,215	-,153**	2,914	,060**	3,642	-,073**	-2,335
COV. RATIO	-,068**	-3,900	-,016	-,536	,125**	2,362	-,080**	-4,501	,050	1,654
MKT_INDEX	,005	,393	-,024	-1,048	-,212**	-5,403	-,011	-,866	-,079**	-3,245
TP_{t0}/P_{t0}	,711**	59,399	,232**	10,478	-,326**	-8,221	,593**	49,215	,233**	9,774
Adj R^2	,506		,053		,141		,359		,073	
Std. Error of Est.	,1298		,1679		,3459		,1192		,211	
F-Statistic (Sign. Level)	610,566 (,000)		19,639 (,000)		17,285 (,000)		418,524 (,000)		22,881 (,000)	
** Significance at the 5% level			†unstandardized coefficient							

TABLE 15 PANEL B

Partial δ_4 prediction error regression

These tables provide results from regressing δ_4 (Y_i) partial errors obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_4 and negative δ_4) on 6 variables related to company status, market momentum and research intensity: company market value is measured at each report issuing date (MV),volume of share transaction is calculated at each recommendation issuing day (VOL), inclusion/exclusion in MIB 30 index (MIB30) is treated as a dummy variable, research intensity is measured by company coverage ratio (COV: RATIO) given by number of reports issued on company *i* divided by total reports considered, market momentum (MKT_INDEX) is measured as the relative level of the market index at any report issuing date, divided by the average index value between 2000 and 2003; expected implicit return is measured as the ratio between target price and market price at t_0 (TP_{t0}/P_{t0})

$$Y_i = \alpha + \beta MV + \gamma VOL + \delta MIB\_30 + \eta COV.RATIO + \theta MKT\_INDEX + \varphi\ TP_{t0}/P_{t0} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy - Buy		Hold		Strong Sell - Sell		$\delta_4 > 0$		$\delta_4 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Costant	-,938†**	-13,386	-,966†**	10,075	,707†**	5,749	-,628†**	-13,021	-,419†**	-5,599
MV	-,053**	-2,160	-,062**	-1,811	-,016	-,226	-,099**	-4,786	,064	1,369
Vol	,072**	3,497	-,023	-,762	-,034	-,515	,047**	2,634	-,029	-,726
MIB30	,095**	3,962	,110**	3,495	-,011	-,167	,097**	4,803	,024	,535
COV. RATIO	-,062**	-2,424	-,006	-,177	,080	1,208	-,043**	-2,026	,049	1,131
MKT_INDEX	,169**	9,594	,108**	4,265	-,277**	-5,668	,181**	12,062	-,246**	-6,871
TP_{t0}/P_{t0}	,338**	19,158	,319**	12,923	-,154**	-3,171	,300**	20,166	,255**	7,379
Adj R^2	,144		,104		,096		,124		,126	
Std. Error of Est.	,4117		,4120		,3125		,3971		,2193	
F-Statistic (Sign. Level)	80,973 (,000)		30,361 (,000)		8,305 (,000)		95,834 (,000)		19,425 (,000)	
** Significance at the 5% level			†unstandardized coefficient							

TABLE 15 PANEL C
Partial δ_2 industry regression

These tables provide results from regressing δ_2 (Y_i) partial errors obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_2 and negative δ_2) on 10 dummy variables representing the 10 industries considered

$$Y_i = \beta_1 \text{ Basic Industries} + \beta_2 \text{ Financials} + \ldots + \beta_{10} \text{ Utilities} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy - Buy		Hold		Strong Sell – Sell		$\delta_2 > 0$		$\delta_2 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Basic Industries	,200**	15,249	,014	,646	-,017	-,447	,214**	21,926	-,098**	-4,950
Cycl. Cons. goods	,189**	14,422	,104**	4,779	-,120**	-3,097	,275**	28,158	-,237**	-12,019
Cyclical services	,158**	12,017	,003	,150	-,190**	-4,894	,238**	24,364	-,282**	-14,291
Financials	,307**	23,409	,090**	4,138	-,207**	-5,339	,391**	39,980	-,332**	-16,837
General Ind.	,200**	15,253	,075**	3,432	,030	,784	,237**	24,300	-,128**	-6,506
Inform.Tech	,050**	3,849	,018	,821	-,102**	-2,633	,132**	13,492	-,192**	-9,754
Non-cyclical consumer goods	,185**	14,130	,051**	2,315	-,047	-1,211	,234**	23,976	-,147**	-7,456
Non-cycl. Services	,268**	20,436	,090**	4,105	-,022	-,568	,261**	26,719	-,051**	-2,600
Resources	,142**	10,829	,014	,639	-,037	-,946	,155**	15,917	-,068**	-3,443
Utilities	,128**	9,791	,077**	3,537	-,038	-,992	,132**	13,534	-,045**	-2,287
Adj R^2	,378		,037		,096		,568		,335	
Std. Error of Est.	,1801		,1717		,3716		,1453		,2168	
F-Statistic (Sign. Level)	221,079 (,000)		8,798(,000)		7,347 (,000)		596,346 (,000)		50,992 (,000)	
** Significance at the 5% level										

TABLE 15 PANEL D
Partial δ_4 industry regression

These tables provide results from regressing δ_4 (Y_i) partial errors obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_4 and negative δ_4) on10 dummy variables representing the 10 industries considered.

$$Y_i = \beta_1 \text{ Basic Industries} + \beta_2 \text{ Financials} + \ldots + \beta_{10} \text{ Utilities} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy - Buy		Hold		Strong Sell – Sell		$\delta_4 > 0$		$\delta_4 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Basic Industries	,156**	11,064	,090**	3,844	,104**	2,152	,154**	13,173	-,095**	-3,299
Cycl. Cons. goods	,211**	15,011	,176**	7,541	,073	1,521	,238**	20,374	-,244**	-8,464
Cyclical services	,226**	16,064	,129**	5,551	-,045	-,932	,242**	20,720	-,334**	-11,611
Financials	,357**	25,331	,252**	10,833	,079	1,648	,373**	31,936	-,284**	-9,862
General Ind.	,208**	14,799	,104**	4,460	,169**	3,512	,202**	17,283	-,127**	-4,393
Inform.Tech	,152**	10,771	,087**	3,740	,038	,783	,139**	11,914	-,169**	-5,868
Non-cyclical consumer goods	,174**	12,385	,084**	3,616	,023	,482	,180**	15,434	-,142**	-4,919
Non-cycl. Services	,256**	18,203	,142**	6,079	,006	,120	,233**	19,962	-,049**	-1,687
Resources	,110**	7,482	,029	1,263	-,002	-,048	,107**	9,167	-,111**	-3,849
Utilities	,076**	5,394	,046	1957	,022	,448	,084**	7,198	-,128**	-4,452
Adj R^2	,425		,162		,032		,443		,348	
Std. Error of Est.	,4365		,4314		,3261		,4191		,2326	
F-Statistic (Sign. Level)	215,783 (,000)		30,915 (,000)		2,392 (,009)		325,102 (,000)		43,001 (,000)	
** Significance at the 5% level										

TABLE 15 PANEL E
Partial δ_2 Firms regression

These tables provide results from regressing $\delta_2(Y_i)$ partial errors obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_2 and negative δ_2)on 47 dummy variables representing 47 firms that have published at least one report on four years considered. Blank cells indicate variables excluded by the model or absence of observations for that specific firms

$$Y_i = \beta_1 \text{Abaxbank} + \beta_2 \text{ABN AMRO} + \ldots + \beta_{47} \text{Uniprof} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy – Buy		Hold		Strong Sell – Sell		$\delta_2 > 0$		$\delta_2 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Abaxbank	,012	,374	-,013	-,591			,026**	2,717	-,030	-1,556
ABN AMRO	,022	,094	-,006	-,263	-,032	-,854	,059**	6,027	-,081**	-4,164
Actinvest	,108**	8,266	,033	1,500	-,161**	-4,312	,130**	13,325	-,162**	-8,304
Axia	,014	1,099					,013	1,363		
Banca Aletti	,040**	3,073	,013	,577			,041**	4,154	-,001	-,061
Banca Finnat	,025	1,874	,019	,883			,025**	2,519		
Banca Leonardo	,120**	9,202	,088**	4,040	-,028	-,753	,157**	16,080	-,085**	-4,356
Banca Mediosim	,037**	2,798					,034**	3,471		
Banca Sella	,007	,567	,013	,580			,016	1,633		
Banknord	,044**	3,393					,041**	4,208		
Bipielle/Santander	,095**	7,242	,000	-,003	-,100**	-2,684	,106**	10,856	-,114**	-5,814
BNP Paribas	,050**	3,789	,028	1,283	-,037	-,989	,078**	7,956	-,082**	-4,189
Borsaconsult										
Bp Bari	-,007	-,556					,001	,084	-,014	-,718
BPM	,100**	7,664	,006	,267	-,050	-1,343	,132**	13,530	-,108**	-5,504

Cazenove	,014	1,053	,019	,855			,016	1,634		
Centrosim	,093**	7,129	,024	1,115	-,017	-,460	,128**	13,117	-,081**	-4,159
Cheuvreux	,062**	4,751	-,006	-,286	-,206**	-5,522	,103**	10,529	-,200**	-10,221
Citigroup	,037**	2,842	,024	1,102	,002	,050	,039**	4,001	-,015	-,750
Cofiri	,033**	2,521	,009	,427			,043**	4,460	-,025	-1,284
Consors	,029**	2,226			-,142**	-3,785	,031**	3,185	-,108**	-5,504
Credit Lyonnais	,021	1,582			-,111**	-2,968	,042**	4,326	-,093**	-4,759
CSFB	,055**	4,176	,028	1,264	,009	,253	,071**	7,320	-,037	-1,885
Deutsche bank	,166**	12,708	,003	,122	,011	,307	,190**	19,517	-,131**	-6,703
DKW	,052**	3,938	,002	,076	-,013	-,335	,084**	8,658	-,067**	-3,414
Eptasim	,059**	4,504	-,004	-,205	-,130**	-3,489	,096**	9,866	-,148**	-7,592
Euromobiliare	,302**	23,098	,076**	3,514	-,131**	-3,513	,306**	31,348	-,161**	-8,216
Fortis bank	,041**	3,109			-,044	-1,164	,042**	4,257	-,041**	-2,085
Gestnord	,004	,320					,006	,616	-,001	-,037
Goldman Sachs	,004	,292	,022	1,018	-,024	-,632	,035**	3,591	-,049**	-2,508
Ideaglobal	,020	1,525	-,009	-,417	-,074**	-1,973	,052**	5,319	-,130**	-6,665
IMI	,112**	8,559	,015	-,672	,010	,263	,148**	15,158	-,116**	-5,922
ING	,045**	3,464	,047**	2,159	-,017	-,465	,059**	6,014	,026	-1,336
Intermonte	,210**	16,066	,048**	2,226	-,026	-,701	,248**	25,380	-,152**	-7,794
Intesa	,120**	9,193	,043**	1,963	-,031	-,826	,152**	15,620	-,109**	-5,567
Jp Morgan	-,002	-,175	,019	,882			,010	1,036	-,003	-,147

Julius Baer	,100**	7,640	,056**	2,588	,008	,217	,133**	13,629	-,066**	-3,384
Lehamn brothers	,047**	3,625	,056**	2,552	-,077	-2,070	,074**	7,544	-,085**	-4,326
Massimo Mortari	,096**	7,299	,048**	2,226			,135**	13,829	-,043**	-2,209
Mediobanca	,094**	7,204	,010	,466	-,041	-1,104	,112**	11,503	-,073**	-3,744
Merrill Lynch	,128**	9,787	,036	1,664	,013	,350	,145**	14,881	-,065**	-3,343
Metzler	,021	1,622	-,030	-1,359			,031**	3,143	-,028	-1,451
Rasfin/Rasbank	,148**	11,313	-,010	-,445	-,093**	-2,487	,163**	16,775	-,095**	-4,885
SG	,076**	5,826	-,051**	-2,330	-,160**	-4,271	,099**	10,147	-,133**	-6,803
UBM	,163**	12,463	,127**	5,840	,021	,565	,223**	22,886	-,112**	-5,727
UBS	,110**	8,382	,058**	2,685	-,022	-,577	,159**	16,313	-,131**	-6,710
Uniprof	,014	1,088	-,014	-,661	,005	,130	,019	1,976	-,012	-,594
Adj R2	,380		,042		,160		,569		,346	
Std. Error of Est.	,1808		,1712		,3581		,1458		,215	
F-Statistic (Sign. Level)	49,235 (,000)		3,313 (,000)		4,574 (,000)		131,122 (,000)		23,090 (,000)	
** Significance at the 5% level										

TABLE 15 PANEL F
Partial δ_4 Firms regression

These tables provide results from regressing $\delta_4(Y_i)$ partial errors obtained by dividing errors for stock recommendations (3 groups: Strong buy-Buy, Hold, Sell-Strong Sell) and for sign of errors (2 groups: positive δ_4 and negative δ_4)on 44 dummy variables representing 44 firms that have published more than one report on the companies analyzed. Blank cells indicate variables excluded by the model or absence of observations for that specific firms

$$Y_i = \beta_1 \text{Abaxbank} + \beta_2 \text{ABN AMRO} + \ldots + \beta_{44} \text{Uniprof} + \varepsilon_i$$

OLS Standardized Coefficient Estimate										
	Strong Buy – Buy		Hold		Strong Sell – Sell		$\delta_4 > 0$		$\delta_4 < 0$	
	Std. β	t	Std. β	t	Std. β	t	Std. β	t	Std. β	t
Abaxbank	,012	,857	-,001	-,058			,015	1,312	-,039	-1,397
ABN AMRO	,038**	2,645	,064**	2,740	,025	,524	,056**	4,747	-,066**	-2,332
Actinvest	,143**	10,011	,107**	4,565	-,084	-1,778	,152**	12,978	-,192**	-6,816
Banca Aletti	,021	1,480					,018	1,560		
Banca Finnat	,014	,983					,012	1,036		
Banca Leonardo	,104**	7,310	,106**	4,560	-,017	-,355	,122**	10,399	-,111**	-3,949
Banca Sella	,027	1,141	,027	1,141			,014	1,176		
Banknord	,023	1,638					,020	1,725		
Bipielle/Santander	,073**	5,108	,064**	2,753	,073	1,530	,079**	6,724	-,035	-1,236
BNP Paribas	,048**	3,376	,034	1,473	,042	,889	,060**	5,095	-,098**	-3,468
Bp Bari	,014	1,009					,012	1,063		
BPM	,140**	9,823	,088**	3,755	,119**	2,500	,144**	12,342	-,067**	-2,365

Centrosim	,104**	7,304	,074**	3,152	-,030	-,634	,108**	9,235	-,064**	-2,285
Cheuvreux	,123**	8,603			-,042	-,883	,122**	10,429	-,176**	-6,243
Citigroup	,047**	3,273					,040**	3,448		
Cofiri	,042**	2,929	,017	,719			,039**	3,362	-,009	-,329
Consors	,054**	3,785			-,003	-,059	,046**	3,914	-,025	-,878
Credit Lyonnais	,041**	2,897			,093**	1,956	,043**	3,681	-,017	-,590
CSFB	,060**	4,219	,049**	2,098	-,035	,732	,066**	5,620	,053	-1,865
Deutsche bank	,158**	11,081	,105**	4,520	,131**	2,766	,166**	14,165	-,122**	-4,343
DKW	,092**	6,425	,089**	3,795	,050	1,058	,111**	9,500	-,079**	-2,806
Eptasim	,074**	5,161	,031	1,309	-,054	-1,139	,084**	7,140	-,178**	-6,326
Euromobiliare	,247**	17,324	,127**	5,422	,011	,223	,234**	19,963	-,156**	-5,518
Fortis bank	,039**	2,737			,011	,241	,031**	2,640	-,006	-,227
Gestnord	,032**	2,244					,028**	2,364		
Goldman Sachs	,003	,229	,013	,547	-,002	-,034	,015	1,300	-,039	-1,381
Ideaglobal	,030**	2,082	,023	,977	,075	1,578	,042**	3,612	-,063**	-2,223
IMI	,148**	10,414	,133**	5,716	,080	1,689	,163**	13,942	-,137**	-4,861
ING	,039**	2,760	,061**	2,601	-,011	-,227	,051**	4,379	-,030	-1,068
Intermonte	,207**	14,509	,098**	4,181	,029	,605	,206**	17,588	-,198**	-7,019
Intesa	,160**	11,214	,107**	4,574	-,013	-,270	,169**	14,432	-,160**	-5,672
Julius Baer	,125**	8,782	,040	1,710	,052	1,092	,120**	10,269	-,088**	-3,125

Lehamn brothers	,031**	2,151	,064**	2,743	,050	1,046	,052**	4,447	-,035	-1,229
Massimo Mortari	,069**	4,820	,036	1,521			,067**	5,698	-,036	-1,271
Mediobanca	,086**	6,017	,041	1,768	-,025	-,518	,084**	7,174	-,071	-2,523
Merrill Lynch	,140**	9,840	,095**	4,079	,121**	2,551	,141**	12,036	-,060**	-2,111
Metzler	,041**	2,911					,036**	3,067		
Rasfin/Rasbank	,134**	9,408	,023	,979	-,125**	-2,627	,122**	10,408	-,205**	-7,270
SG	,092**	6,488	,059**	2,542			,109**	9,330	-,121**	-4,284
UBM	,185**	12,952	,116**	4,977	,052	1,105	,188**	16,073	-,177**	-6,266
UBS	,116**	8,136	,106**	4,523	,092**	1,940	,138**	11,770	-,132**	-4,683
Uniprof	,002	,165	-,002	-,082			,002	,174	-,156	,876
Adj R2	,410		,157		,060		,441		,374	
Std. Error of Est.	,4421		,4325		,3214		,4196		,2278	
F-Statistic (Sign. Level)	50,256 (,000)		10,302 (,000)		1,912 (,004)		77,753 (,000)		14,822(,000)	
** Significance at the 5% level										