How Do Analysts Value Banks? An Empirical Analysis

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The literature examining target prices issued by equity research analysts is vast, and the role of the analytical process and valuation model used to determine target prices is receiving growing attention by scholars. However, the specific evidence about how banks are valued by professional analysts is scant at best. Due to their peculiar nature, banks are usually valued using approaches which may differ significantly from the ones applied to non-financial companies. By investigating a unique sample of equity researches covering the Italian listed companies (2005-2011), we explore which approach works best to provide accurate valuations and target prices. Fundamental valuation models appear to perform significantly better than relative valuation approaches.

Keywords: Equity Value; Target price; Banking; Financial Analysts; Fundamental Valuation; Relative Valuation

JEL: G21, G32, G24

1. Introduction

The financial literature examining the function of equity research analysts within capital markets is vast. Earnings forecasts have been profusely studied since the '60s, while the properties of target prices have been addressed only in the last decade but they are receiving growing attention by scholars. This work contributes to this strand of the literature through an investigation of the accuracy of target prices specifically in the banking industry. We analyze the impact of the valuation model choice made by sell–side financial analysts on the performance of the target prices, thus shedding light on the models employed by practitioners for the equity valuation of banks.

In particular, by studying 482 equity research reports covering the Italian listed banks in the period 2005 to 2011, we investigate the differential performance of "fundamental" and "relative" valuation models also controlling for several variables potentially affecting the difficulty of the valuation task. Three out of the four accuracy measures employed indicate a significant superior performance of fundamental valuation models. As this study also considers a period of several years after the beginning of the crisis still affecting international financial markets, the results we derive might be relevant both to academics and to practitioners interested in identifying the set of models more effective in the valuation of banks in extremely volatile market phases.

The remainder of this paper continues as follows. Section 1 contextualizes this work within the existing literature. Section 2 presents the set of criteria employed in the construction of the sample of data and briefly describes it. Section 3 introduces the research design of this study. Univariate and multivariate results are respectively presented in Section 4 and in Section 5. Concluding remarks are provided in Section 6.

2. Literature review

The financial analysts' research process is carried out examining a set of information related to a covered company and is finalized through the release of a valuation and of investment advice. Financial analysts are important players within capital markets and their function has been largely investigated across several decades. The literature currently available on this topic is therefore large and includes hundreds of papers (Brown, 2000) which are not only have a scholarly value but are of interest also to practitioners. There are several issues related to the equity research process, however, which have remained unexplored. Ramnath et al. (2008), for example, call for research to better understand the decision process of analysts. Bradshaw (2011) notices that while some of the analysts' information tools have been extensively studied research in other outputs still has to grow.

Target prices are, along with investment recommendations and earnings forecasts, one of the main information channels employed by financial analysts. While considering this characteristic, it is critical to quantify how important this channel actually is, both from the market and the analyst's point of view. Asquith et al. (2005), in one of the first papers extensively addressing this topic, conclude that financial operators pay unsurpassed attention to target prices. In particular, analyzing the excess returns following the release of 1126 equity reports on US companies, the authors observe that target prices revisions have a larger impact on securities prices than revisions related to others financial analysts' outputs. Furthermore the significance of the market reaction to revisions in target prices remains constant, unlike for recommendations and earnings forecasts, also controlling for the release of contemporaneous information on the part of the covered companies. The results of this study, supported by Brav et al. (2003), therefore verify that target prices are closely observed by the financial community and that they exercise a stronger impact on the market than other equity research tools. Equity analysts themselves seem to be aware of this and therefore adjust their analysis accordingly. Bradshaw (2002), for example, points out that target price releases are more frequently associated with the publication of more favourable reports. The potential appeal generated by target prices has also been tested with regard to their investment value. To this end both Bonini et al. (2008) and Da et al. (2011) simulate investment strategies based on implied returns of target prices. They derive performances in excess of the market, which persist also controlling for specific risk factors. This strand of the literature therefore uniformly indicates that target prices have significant value, both in economic and information terms.

As the significance of target prices became generally accepted, research focused on the examination of their properties and, in particular, on how precise these price forecasts are relative to the prices actually observed in the markets. At first this issue was investigated independently, with different authors (Asquith et al. (2005), Bonini et al. (2010), Kerl (2011), Bilinski et al. (2012), Bradshaw et al. (2012)) observing different levels of accuracy depending on the time of their study and on the market under consideration, but generally agreeing on the fact that target prices are only partially accurate. Subsequently a series of variables, related to the features of analysts, of equity reports, of covered companies, of brokers and of financial markets in general, potentially affecting the accuracy of the price forecasts, were examined with only a limited number of findings agreed upon by the different researchers.

The issue of the impact of valuation models on target price accuracy has been only recently analyzed and the practical process by which analysts convert their information into price forecasts and value a company is still largely unexplored. Company valuation models can be classified, as for example in Gleason et al. (2012), in two main categories, which are fundamental (multi–period) valuation and

relative valuation (valuation multiples). Fundamental models derive the value of a firm discounting cash flows and earnings expected to be generated by the firm at a fair rate. Expected cash flows and earnings are estimated developing analytical forecasts which extensively consider a firm's expected operational and financial dynamics. On the other hand, relative valuation allows the appraisal of a company's value by comparing a set of balance sheet and income statement metrics to historical and comparable firms' figures. In this case, therefore, analytical forecasts of a company's future perspectives are not produced but several corporate economic variables are linked to a set of exogenous factors. As reported by Penman (2010:74): "*In valuation, as with most technologies, there is always a trade–off between simple approaches that ignore some pertinent features and more elaborate techniques that accommodate complexities*". It is therefore clear that the greater complexity of fundamental models is generally associated with superior valuation performances while the simplicity of relative techniques is related to more limited accuracy. This conclusion seems to be confirmed by several authors such as Copeland et al. (2000) and Palepu et al. (2000) who systematically favour fundamental valuation over multiples. The theoretical superiority of multi–period models, however, is in sharp contrast to professional practice, where relative valuation appears to be the norm. Barker (1999a), for example, reconsidering the existing literature on models implemented by financial professionals observes the predominance of valuation multiples. In particular, the author concludes that such tendency must be attributed to the inherent uncertainty of modelling future companies' developments and, therefore, to the onerous implementation of multi–period valuations. The literature which connects valuation models to target price accuracy, however, has not been able to find an explanation for the observed trade–off between professionals' preferences and theoretical superiority. In fact, while Demirakos et al. (2010) and Gleason et al. (2012) seem to verify the greater accuracy of price forecasts derived from fundamental valuations, Asquith et al. (2005) and Bonini et al. (2012) question their findings.

If the implication of valuation model choice by equity analysts on target price accuracy, and more generally on the empirical accuracy of company valuation, has been investigated and still remains a question calling for further research, there is a more detailed issue, pertaining to the valuation of banks, which so far has not been specifically addressed by academics. As indicated, among others, by Massari et al. (2009) and Bagna (2012), bank valuation presents a general framework common to the valuation of firms operating in different industries, but also displays certain other characteristics. Common traits between the valuation of banking and non–banking institutions allow, for example, the separation of fundamental and relative valuation techniques, as indicated above. On the other hand, there are unconventional features of banks, related to their operational, financial, accounting and regulatory aspects, which deeply impact the theoretical structure and the implementation of valuation

methodologies in the bank–specific context. With regard to operational differences it is interesting to note that banking institutions generally operate through several divisions (such as retail banking, investment banking and asset management) so that the sum of parts methodology prevails over the implementation of a unique valuation model. Financial peculiarities are generally associated with the specific role played by the debt of banks as opposed to the debt of other non–banking firms. With this regard bank debt can not be seen simply as an item on the liability side of the financial statement but also as a critical operational tool for value creation. This consideration precludes the use of asset–side valuation techniques and instead advocates the implementation of equity–side models. From an accounting point of view banks' balance sheets are generally characterized by a substantial stake of fair value assets, mainly related to their widespread trading activity. These assets produce volatile effects on income statement items which can not therefore be projected in perpetuity, recommending caution with the implementation of income valuation approaches. Finally, bank–specific regulatory traits are due to the strict capital requirements demanded by financial industry regulators, considerably limiting the free distribution of capital and cash flows. The set of theoretical considerations introduced above has a significant impact also on the practical adoption of valuation models by financial practitioners. Imam et al. (2008), for example, observe a greater diffusion of the *dividend discount* and of the *price to book ratio* methodologies in the case of analysts covering financial institutions as opposed to those covering non–financial sectors. Similarly, Barker (1999b) observes that this same group of analysts prefers the *dividend yield* valuation model over the *price earnings ratio*, in contrast to financial professionals covering other industries.

In the light of the theoretical and empirical specific traits presented, it is therefore clear that banks represent distinctive institutions which must be set apart from other sectors and that consequently the related valuation methods deserve a specific analysis, which we aim to provide in this contribution.

3. Sample selection and descriptive statistics

This section will describe the sample of collected data, before introducing the research methodology and the observed results. Firstly, the data collection process which was used to select the equity reports and to identify the valuation models implemented by financial analysts will be described. Secondly, some general features of the selected sample will be covered.

We downloaded selected reports from the web site of Borsa Italiana and from the data provider Thomson One. They were published in the period from 2005 to 2011 by Italian and international

investment houses and covered Italian banks listed on the FTSE Italia Banche index of the Milan Stock Exchange.

To obtain the most significant and heterogeneous sample of equity reports from the available databases we employed a detailed set of selection criteria. First, reports shorter than five pages were omitted. This filter was applied to focus on reports containing an exhaustive and original valuation of the covered banks rather than incomplete or event–specific updates. Second, damaged reports, not providing necessary information to the implementation of this study were excluded. Finally, to avoid potential information inefficiency, two further rules were followed in the selection of equity reports. Whenever two or more consecutive reports on the same bank had been published by the same investment house within the same quarter of each year, we selected only the most recent report in chronological order. Likewise, whenever two or more consecutive reports on the same bank had been published by the same investment house with the same target price, even if in different quarters, we selected only the most recent report in chronological order.

An observation was only included in the final sample, furthermore, where it was possible to positively identify the valuation model employed by the financial analyst to derive the target price indicated in each equity report. In particular this stage of the selection process was carried out through a detailed analysis of the content of reports, paying attention to the following criteria. If the content of the report did not make any reference to any implemented valuation model, we excluded it. If one or more valuation methods were mentioned in the written part of the report, but were not analytically employed in the explicit derivation of the target price, the following strategy was adopted. If the text mentioned only one single model, we considered that model to be dominant. If, instead, the analyst made reference in his text to more than one model, we omitted the report to minimize the risk of misinterpretation. Finally, if the valuation implemented to derive the price forecast was presented analytically the following criteria were considered. Whenever the target price was calculated through a single valuation model, we considered that model to be dominant. Similarly, we also considered a model to be dominant when more than one model was analytically presented by the analyst for the derivation of the target price (such as in the case of a sum of parts valuation) but the principal model accounted for no less than 75% of the overall value of the target price. In any other case we omitted the report and the associated price forecasts.

Through the implementation of the aforementioned set of criteria we selected 482 research equity reports, of which 107 from Thomson One and the remainder from the web site of Borsa Italiana.

For each equity report included in the analyzed sample several variables were identified. The majority of these variables were extracted from the content of the reports themselves. The remainder were collected linking each observation of the sample to financial data from Bloomberg. For each equity

report, in particular, we gathered information about the issuing investment house, the covered bank, the date of release, the number of pages, the issuing analyst, the associated recommendation, target price and earnings forecasts as well as the valuation methodology used.

29 issuing investment houses were included in the sample, the majority of which were large financial institutions operating in international markets. There were 13 banks represented within the sample and each of them was characterized by a different degree of coverage intensity. While, for example, Unicredit was covered by 22 investment houses and 33 analysts during the observed years, two banks were covered only by one investment house and one analyst each.

With reference to the time distribution of the publications of the reports a progressive increase can be noted during the first phase of the period under consideration, with observations by year increasing from 59 in 2005 to 99 in 2008. This trend noticeably reverted from 2008 to 2011, reflecting a number of terminations of coverage following the beginning of the financial crisis. This tendency, however, does not seem to have had an impact on the informative content of equity reports, measured in terms of number of pages, as this variable remained roughly constant across the range of years examined.

44 financial analysts were included in the sample, each characterized by a different intensity of activity. In fact, while several analysts published at least one report for 8 of the 13 banks included in the sample, others covered no more than one institution each.

Considering the most significant outputs released by financial analysts, sampled data seem to confirm their generally optimistic bias, as already largely described in the literature. With this regard it is sufficient to note that out of 482 observations 232 included a positive investment recommendation while negative recommendations were only 47. In particular almost no negative recommendations were released from 2005 to 2007, before the beginning of the market downturn. Furthermore, 86% of the observations indicated implied returns larger than zero.

4. Research design

The steps followed in the univariate and multivariate analyses developed to address the research question introduced above are presented in the current section. The impact of the choice of the valuation model on the accuracy of target prices in the banking sector, in particular, will be investigated through the analysis of two different but related issues.

First, a univariate analysis will be implemented to consider the potential impact of a series of control factors both on the performance of the price forecasts and on the choice of the valuation model by financial analysts. The simultaneous relationship of a control variable with both the accuracy of target prices and the implementation of specific valuation methodologies could indicate a form of selection

bias, potentially weakening the results of this study. In particular, the existence of specific conditions which could have driven analysts to implement a given valuation model in circumstances characterized by a different degree of risk and uncertainty of the forecast was investigated. If, for example, some valuation models had been implemented more frequently to value banks characterized by a higher degree of risk and uncertainty, their hypothetical weaker performance should not be necessarily attributed to poorer intrinsic technical features but instead to the set of circumstances which made their implementation more common.

Second, in the light of the results derived from the univariate study, a multivariate analysis will be conducted to gain a deeper understanding of the interdependence of target prices accuracy, use of valuation models and control factors.

We indicate the valuation model employed for the derivation of each target price through a binary variable. If the bank was valued using a fundamental method, and in particular through the *discounted cash flow*, the *dividend discount model*, the *economic value added* or the *residual income model* framework, the variable takes the value zero while it takes the value one if a relative valuation, and in particular the *price to book ratio*, the *price earnings ratio* or the *value map* methodology, was used.

The accuracy of target prices, instead, was measured through two different variables and for each of them a statistical analysis was carried out. The first metric of accuracy considers the absolute percentage error of the price forecast and is defined as

$$TP\ percentage\ error\ = \frac{|Target\ Price\ -\ P_{+12m}\ |}{P_0} \tag{1}$$

where P_0 is the bank's closing price on the stock market on the publication date of the research report and P_{+12m} is the market price at the end of the forecast horizon, 12 months after publication. The choice to compare target prices with stock prices quoted on the market one year after the release of the equity report is due to the common professional practice of analysts who issue price forecast with a 12 month horizon, as it is often also explicitly indicated in the text of their reports. Furthermore, this time range is the one usually adopted in the literature.

The second measure of accuracy employed is a binary variable which indicates if the market price of the bank's stock achieves the price forecast by the financial analyst within 12 months of the publication date. The occurrence (non–occurrence) of this event, which clearly indicates a better (worse) performance of the target price, is denoted by assigning to the accuracy variable the value of one (zero).

The control variables considered to address the potential selection bias problem can be grouped into four categories related to the characteristics of the covered bank, of the report, of the analyst, and of the financial market in general and reported in Table 1.

Insert Table 1 about here

Size, risk, and comparability are the examined features of the covered banks. Size is the market capitalization (or its natural logarithm in the multivariate analysis) of the bank as of the report publication day. The market volatility of the bank's stock in the year before the release of the report is used to measure risk. The comparability of a bank with its competitors is assessed considering the correlation between the market price of the bank's stock and the banking sector index (including 600 European banks) SX7P of Bloomberg over the 12 months preceding the publication of the report.
The absolute value of the target price implied return, the investment recommendation and the number of pages are the characteristics of the report selected as control variables. In particular, the absolute value of the target price implied return is computed as

$$TP\ implied\ return = \frac{|Target\ Price\ -\ P_0|}{P_0} \tag{2}$$

where P_0 is the bank's closing price on the stock market on the publication date of the research report. With regard to the investment recommendation variable, it should be noted that it is not categorized considering the three standard ratings which it usually assumes (*sell*, *hold* and *buy*) but instead only the distinction between negative (*sell* and *hold*) and positive (*buy*) investment recommendations. Finally, the length of the report, measured as its page count, is adopted as a metric of the report's information thoroughness, as already proposed in other related papers (such as Bonini et al. (2012)).
We identify two analyst–specific control variables. They are the accuracy of the earnings forecasts associated with each report–target price observation and the number of banks covered by each analyst. The accuracy of the earnings forecasts is computed for every observation according to the following steps. First, the earnings forecasts for the three years following the publication (or for the shorter period alternatively available) are extracted from each report. Second, these earnings forecasts are compared to the actual earnings per share declared by the bank according to the formula

$$EPS_t\ forecast\ error\ =\ \frac{|EPS_t\ forecast\ -\ EPS_t\ actual|}{P_0} \tag{3}$$

Finally the average of the earnings per share forecast error across the three–year time range under consideration (or the shorter period available) is calculated

$$EPS\ forecast\ error\ = \sum_{t=1}^{n\leq 3} \frac{EPS_t\ forecast\ error}{n} \tag{4}$$

The second analyst – related variable measures the number of banks covered by each analyst out of the 13 banks represented in the sample and is considered as a proxy of the analyst's banking sector – specific coverage experience.

Finally we employ the FTSE Italia All–Share return in the 12 months before (after) the release of each report as the market control variable in the analysis related to the financial analysts' valuation model choice (related to the accuracy of the price forecasts).

We adopt the above set of control variables, as already mentioned, for the development of an univariate and a multivariate analysis. In particular in the univariate analysis, addressing both the issue of the valuation model choice and the accuracy of price forecasts, the overall sample is split into subgroups according to the distribution of each control variable. Differences in valuation model choices and into target price performances among the observations included in different subgroups are tested through the implementation of several statistics. The multivariate analysis, only investigating the target price accuracy issue, considers the potential interaction between the valuation methodology implemented and the selected control variables in the light of the selection bias problem introduced above. In particular, this part of the analysis is carried out through the following regression models

$$\begin{gathered} Accuracy\ measure\ = \beta_0 + \beta_1 valuation\ model + \beta_2 log(size) + \\ \beta_3 risk\ + \beta_4 comparability + \beta_5 TP\ implied\ return + \\ \beta_6 recommendation + \beta_7 length + \beta_8 EPS\ forecat\ error + \\ \beta_9 covered\ banks + \beta_{10} forward\ market\ return \end{gathered} \tag{5}$$

where we alternatively consider as accuracy measure the absolute percentage error of the price forecast (OLS regression) and as the binary variable indicating whether the target price is met by the market price of the stock (probit regression).

5. Evidences on the valuation model choice

The most important results derived from the univariate analysis as well as the set of considerations about the interdependence between the valuation models used and the other control variables in the derivation of accurate target prices are discussed in the current section.

First, the univariate outputs relative to the frequency of use of different valuation models and to the two measures of accuracy are presented separately. With reference to the first issue, we observe that 70% of sampled data are associated with the implementation of valuation multiples and that the remaining 30% with fundamental valuation techniques. These results seem therefore to suggest that financial analysts do not focus almost exclusively on relative valuation methodologies but rely also on multi–period valuations, contrary to what had been generally observed by the literature before the *new–economy bubble* (such as Block (1999) and Barker (1999a and 1999b)) and in accordance with what has been proposed by more recent contributions (such as Demirakos et al. (2004), Ambrosetti Stern Steward Italia (2002) and Bertinetti et al. (2009)). This trend should probably be ascribed to the changed attitude of financial professionals implementing valuation models based on a more solid theoretical framework after the excesses of the financial crisis in the early 2000s.

Addressing the target price performance issue we first consider the former of the two accuracy metrics presented above. With this regard the overall sample of collected observations is split into two subgroups, according to the dominant implementation of a fundamental or a relative valuation technique. The difference in the average target price percentage error between the two subsamples is tested through a Student's t statistic. We observe that target prices derived through multi–period valuation models are associated with an average error equal to 34%, significantly lower (*pvalue* 0.000) than the 48% average error associated with target prices derived from relative models.

The seemingly superior performance of multi–period models is also confirmed by the univariate analysis focused on the latter accuracy measure. As with regard to the target price percentage error, the overall sample has been divided into two subsets on the basis of the valuation model choice made by financial analysts. The difference in the likelihood of the positive event occurring (target price met by market price) has been studied through the z statistic for the difference in two proportions. We observe that market prices meet price forecasts in 39% of observations when multiples are used and in 51% of observations when fundamental models are implemented. Therefore, also with reference to the latter accuracy metric, results indicate with statistical significance (*pvalue* 0.015) that relative models are less accurate in the valuation of banking institutions.

Having considered the preliminary results on the valuation model choice made by financial analysts and the target price performance measures, we focus our research on the interaction between these

variables and the set of control factors presented in the previous section to investigate the potential selection bias problem. With this regard we split the sample of observations into quartiles[1] on the basis of each of the control variables selected and compare the difference in the frequency of use of fundamental and relative models, in the target price percentage average error and in the proportion of price forecasts met by market prices between the upper and the lower quartiles. Differences in frequency of use, average target price percentage error and proportion of price forecasts actually met are respectively tested through a series of chi–square, Student's t and z tests. The sign and the significance of the relation between the model choice and the accuracy variables and each of the selected control factors are illustrated in each column of Table 2.

Insert Table 2 about here

We observe six control variables which are significantly related to the frequency of use of different categories of valuation models. In particular, the size of a bank, the comparability of a bank with other similar institutions, the implied return of a target price, the information thoroughness of each report (expressed in terms of its page count) and the analyst's earnings forecast error are all positively associated with a more frequent implementation of valuation multiples. Instead, higher past market returns are associated with a lower frequency of use of relative models.

Focusing on the two accuracy metrics proposed we observe that they never assume an opposite relation with regard to each of the examined control factors even though, in a few circumstances, the significance of the relation between an accuracy measure and a control variable does not remain the same with regard to the other accuracy metric. In particular there are five factors which are commonly related to the performance of the price forecast. A lower forecast accuracy is associated with a more frequent implementation of valuation multiples, as noted above, to a higher comparability of the bank with the industry, to a higher target price implied return, to less precise analyst's earnings forecasts and to a weaker market performance in the period following the release of the report.

A more general analysis considers the control factors which concurrently display a significant relation both with the valuation model choice variable and target prices accuracy metrics. The comparability of a bank, the target price implied return, and the accuracy of the earnings forecasts are all relevant with this regard. In particular a stronger correlation of the bank with the industry, a higher absolute implied return of the target price and less accurate forecasts of future earnings are all associated both with a lower target price forecast accuracy and with a more common implementation of relative valuation techniques. This conclusion becomes particularly important when it is noted that relative valuation models are characterized, as described above, by a worse performance in the production of accurate

target prices. Indeed, if jointly considered, the described results may indicate that a potential selection bias problem of the type presented above exists. In fact, the limited accuracy of target prices derived from valuation multiples might be ascribable not to their less adequate intrinsic technicalities but instead to a more frequent implementation of this methodology in circumstances characterized by a more difficult valuation task.

6. Evidences on the target price accuracy

The current section of this study presents the results of the multivariate analysis investigating the accuracy of target prices. Addressing the selection bias issue introduced above, partially scrutinized through the development of univariate statistics, we test if fundamental valuation models produce more accurate target prices in the banking industry also controlling for a series of variables which may affect the difficulty of the valuation task. We do this employing two regression models[2], respectively in the OLS and probit form, as presented in Formula 5. As accuracy measure we firstly consider the target price absolute percentage error and subsequently the binary variable indicating if the market price meets the price forecast produced by the analyst.

OLS regression results, relative to the former accuracy measure, are presented in Table 3 and commented below. At first, the dependent variable is regressed only on the dummy for the valuation model choice, taking the value of 1 (0) when relative (fundamental) techniques are used, and on the intercept. The output of this partial regression indicates that the model variable is significant (*pvalue* 0.000) and positive (+0.145) therefore supporting the results of the univariate analysis about the more limited accuracy of valuation multiples.

Secondly we consider as regressors also the set control variables concerning the characteristics of the covered bank, of the report, of the analyst and of the market to examine their interaction with the dummy for the valuation model used. It is crucial to note, at first, that also in this case the coefficient for the valuation model variable remains positive (+0.051) and significant (*pvalue* 0.007). This result indicates that, also controlling for the set of variables selected, the choice of the valuation model preserves a critical influence on the accuracy of target prices and that fundamental valuation of banks performs more effectively.

Considering the coefficients related to the other control factors it is interesting to observe that the regression results for the target price implied return, the earnings forecast percentage error and the market performance following the target price release are in line with the outputs of the univariate analysis. The target price absolute forecast error decreases as the boldness of the price forecast and the

earnings forecast error decrease. The target price absolute forecast error also decreases as the forward market return increases.

The findings concerning the investment recommendation, the number of pages of the reports and the intensity of the activity of each analyst, measured considering the number of covered banks, are not significant. This lack of significance, indeed, was also indicated by the univariate analysis.

The regression output is more controversial with reference to the variables representing banks' characteristics. While the univariate analysis did not denote any significant relation between the size of a bank and the accuracy of target prices, the multivariate regression indicates that more accurate target prices are produced for larger banks. This result, even if different from the one derived in the univariate setting, does not seem to be unlikely being for example in line with the findings of Demirakos et al. (2010) concerning non–financial institutions. The one year standard deviation of the market return of a bank's stock, the variable employed for risk, displays a positive relation with the target price forecast error in the univariate analysis while it loses significance in the multivariate model. We believe that this peculiar behaviour is due, as reported in Table 4, to the correlation of the standard deviation variable with both the target price absolute implied return (+0.224) and the earnings forecast error (+0.311), which therefore partially capture the impact of risk on target price accuracy.

The *pvalue* of the F–statistic, equal to 0.000, denotes the overall significance of the model and the R^2 of the regression, equal to 63%, indicates its goodness of fit. Demirakos et al. (2010), who conducted a similar study in a different context, observed a lower R^2 of 34%.

Insert Table 3 about here

Insert Table 4 about here

The final part of the analysis developed in this study considers the results of a probit regression having as dependent variable a dummy indicating whether the analyst's target price is met by the market price within 12 months of the publication. In case of success (failure) the binary variable takes value 1 (0). The approach and the regressors employed in this part of the analysis correspond to the ones of the OLS regression presented above.

Also with regard to the probit model, the dependent variable is initially regressed only on the dummy for the valuation model and on the intercept. As reported in Table 5 the regression coefficient is negative (-0.305) and significant at 5%, supporting the univariate findings about the superior performance of fundamental models. Subsequently we consider a more complete framework, where both the valuation model variable and the control factors are employed as regressors. The output of the

model, interestingly, displays that the dummy for the valuation technique remains negative (-0.131) but loses its statistical significance. This finding, which does not fully support the results derived from the analysis of the target price percentage error, might indicate that the technical features of the different categories of valuation models here investigated do not have a differential significant impact on the production of accurate target prices in the banking industry.

The probit regression results relative to the set of selected control variables confirm the evidences observed in the univariate setting, with the only exception of the earnings forecast error variable. In particular, the coefficients for the target price implied return, the investment recommendation and the market return following the release of the target price are significant and indicate that more accurate price forecasts are more frequently associated with target prices close to current market prices, with negative and neural investment recommendations and with positive forward market returns. Instead, the variables concerning the characteristics of banks, the page count per report and the number of banks followed by each analyst do not seem to significantly affect the latter measure of accuracy.

The earnings forecast error is the only variable which in this setting displays an instable behaviour with respect to the univariate analysis. Also in this case, similarly to the multivariate model developed with regard to the former measure of accuracy, we believe that the loss of significance might be explained considering the correlation among control variables. In particular, the impact of analysts' ability to forecast earnings precisely on the accuracy of target prices would be captured by the variables for the target price implied returns and for the forward performance of the market, respectively displaying a correlation of +0.269 and of -0.231 with the earnings forecast error factor.

Finally, considering the overall performance of this multivariate model we note that it is statistically significant (*pvalue* 0.000) and characterized by a goodness of fit (*pseudo–*R^2 equal to 31%) greater than the one observed for similar regressions not addressing the banking industry.

Insert Table 5 about here

7. Concluding remarks

In this study we analyze the impact of the valuation model choice on the accuracy of target prices and valuations in the banking industry. Several papers had already investigated the price forecast accuracy of financial analysts without focusing, however, on the specific area of research of this work. In particular, the specific traits characterizing the structure of banks and the models used to value them justifies the interest for our investigation.

The research question has been unfolded in two different but related issues. First, an univariate analysis was developed to examine the frequency of use of different valuation methodologies, the impact of valuation models on target price accuracy and the existence of a selection bias problem, induced by factors affecting the difficulty of the valuation task, potentially weakening the results of our study. Second, we employed a multivariate framework to control for the interdependence between the valuation model variable and the selected control factors and to observe their simultaneous impact on the accuracy of price forecasts.

Price forecast accuracy, in particular, has been measured through two different metrics which are the target price percentage forecast error and the proportion of target prices met by market prices within a fixed time horizon. Four out of the four accuracy variable considered – two in the univariate and two in the multivariate setting – indicate that target prices derived from fundamental valuation models have a superior performance relative to valuation multiples in the forecast of future market prices of banks' stocks. In the case of the target price percentage forecast error this result has statistical significance both when it is derived from univariate statistics and when we control for other variables affecting the difficulty of the valuation task. When the latter accuracy measure is examined, investigating the proportion of target prices met by market prices, our findings confirm the nature of the impact of the valuation model choice on target price performances but are statistically significant only in the univariate setting. Overall we believe that our results corroborate, in the specific context of banks, the findings of those studies supporting the superior accuracy of multi–period valuation models analyzing more general scenarios.

By developing our research we also explore the impact of several factors related to covered firms, analysts, reports and financial markets which potentially affect the accuracy of target prices in the banking industry. The target price implied return and the market performance following the release of the target price are the control variables which, independently from the accuracy metric and the step of the analysis considered, have a significant relation with the performance of price forecasts. The target price absolute implied return, in particular, had already been identified as a relevant variable in other papers focusing on different industries (such as Bonini et al. (2010)). With regard to the market performance variable, we believe that the relation detected should be ascribed to the general tendency of analysts to release optimistic forecasts. This, in particular, would make upward biased target prices appear more accurate in situations characterized by a general increase of stocks' market prices. The findings about the investment recommendation variable indicate, with reference to the latter accuracy metric, that *sell* and *hold* ratings are associated with superior target price performances. We motivate this result considering that more cautious recommendations are generally associated with price forecasts closer to current market prices. The evidence we observe about each analyst's bank –specific

experience indicates that this variable does not have a significant impact on the accuracy of target prices, supporting the results of other studies already signalling this occurrence with regard to different contexts. The results we derive concerning the number of pages per report, employed as a proxy of the extent of the information conveyed, do not denote any significant impact on target price accuracy so that we do not confirm, with regard to the banking industry, what reported by other authors analyzing more general samples (such as Kerl (2011) and Bonini et al. (2012)). Our conclusion concerning the accuracy of price and earnings forecasts prove the existence of a positive relation between the two variables. This is not surprising as analysts generally use their earnings estimates to derive target prices. Neither the size nor the risk of banks has a significant impact on the performance of target prices uniformly verified by every step of our analysis. On the other hand, the greater comparability of a bank with other players of the industry tends to determine a worse performance of the related price forecasts. We believe that this set of considerations should be linked to the general trend observed in financial markets over the years included in this study. In particular, the widespread fall in prices of banks' securities and the heightened correlation among their market returns has probably limited the influence of the specific characteristics of each single bank on the accuracy of target prices, emphasising instead the common traits among the players of this industry.

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Notes

1)We split the sample between negative and positive observations with regard to the variable *recommendation* and apply the test statistics to this two subgroups

2)To avoid potential multicollinearity issues that we observe in unreported results we drop the variable *comparability* in the development of the multivariate analysis

Tables

Table 1: Definition of the variables used

	Variable	Definition
Dependent variables	Valuation model	Dominant valuation model employed in the calculation of each target price. It takes the value 1 (0) when a relative (fundamental) valuation is used
	TP percentage error	Absolute difference between the target price and the stock's price 12 months after the report publication scaled by the current price (as of the report publication)
	TP met	Dummy taking the value 1 (0) if the target price is met by the stock's market price within 12 months of the report publication
Banks' characteristics	Size	Market capitalization in Euro (its natural logarithm in the multivariate analysis) as of the report publication day
	Risk	Bank stock's market volatility in the year before the report publication
	Comparability	Correlation between the return of the bank's stock and a banking sector index (SX7P of Bloomberg) in the year before the report publication
Reports' characteristics	TP implied return	Absolute difference between the target price and the current price (as of the report publication) scaled by the current price
	Recommendation	Investment recommendation alternatively categorized as negative (*sell* and *hold* ratings) or positive (*buy* ratings). Negative (positive) recommendations are indicated through a binary variable taking the value 0 (1)
	Length	Number of pages per report. Proxy of the report information thoroughness
Analysts' characteristics	EPS forecast error	Earnings forecast error associated with every observation over a time horizon of three years (or the shorter period available) as indicated in Formulas 3 and 4
	Covered banks	Banks covered by each analysts among the 13 institutions included in the sample
Market char.	Past (Forward) market return	Market return in the 12 months before (after) the report publication

Table 2: Summary results of the univariate analysis. Each cell reports the sign and the significance of the relation between the variables indicated in the relative column and row header. The sign + denotes a positive relation. The sign - denotes a negative relation. The sign ~ is used when no significant relation is identified. *** / ** / * indicate significance at the 1%, 5% and 10% level. NA indicates that the relation has not been studied

	Val. model (multiples used)	***χ2***	**TP percentage error**	***t***	**TP met**	***z***
Valuation model (multiples used)			+	***	-	**
Size	+	**	~		~	
Risk	~		+	***	~	
Comparability	+	***	+	***	-	***
TP implied return	+	***	+	***	-	***
Recommendation	~		~		-	***
Length	+	**	~		~	
EPS forecast error	+	***	+	***	-	***
Covered banks	~		~		~	
Past market return	-	***	NA		NA	
Forward market return	NA		-	***	+	***

Table 3: OLS regressions output having as dependent variable the TP percentage error. The Partial regression includes as regressors only the dummy for the valuation model choice and the intercept. The Complete regression considers also the set of control factors

	Partial OLS regression		**Complete OLS regression**	
Regressors	**Coefficients**	***pvalue***	**Coefficients**	***pvalue***
Valuation model	0,145	0,000	0,051	0,007
Size			-0,014	0,069
Risk			0,455	0,604
TP implied return			0,728	0,000
Recommendation			-0,007	0,735
Length			0,000	0,972
EPS forecast error			1,301	0,000
Covered banks			-0,003	0,486
Forward market return			-0,659	0,000
Intercept	0,333	0,000	0,274	0,001
Observations	482		482	
Pvalue F test	0,000		0,000	
R – square	0,050		0,633	

Table 4: Correlations among valuation model choice, accuracy measure and control variables

	TP percentage error	TP met	Valuation model	Size	Risk	Comparability	TP implied return	Recommendation	Length	EPS forecast error	Covered banks	Past market return	Future market return
TP percentage error	1												
TP met	- 0,521**	1,000											
Valuation model	0,223***	- 0,111**	1,000										
Size	- 0,027	- 0,048	0,077*	1,000									
Risk	0,095**	0,021	0,086*	- 0,098**	1,000								
Comparability	0,507***	- 0,287***	0,250***	0,326***	0,481***	1,000							
TP implied return	0,471***	- 0,395***	0,150***	0,092**	0,224***	0,360***	1,000						
Recommendation	0,073	- 0,148***	0,030	0,322***	- 0,131***	0,055	0,353***	1,000					
Length	- 0,006	- 0,003	0,106**	0,178***	- 0,028	0,010	0,052	0,211***	1,000				
EPS forecast error	0,497***	- 0,206***	0,164***	- 0,269***	0,311***	0,384***	0,269***	- 0,162***	- 0,094*	1,000			
Covered banks	0,024	0,005	0,057	- 0,237***	0,125***	- 0,017	0,050	- 0,163***	- 0,119***	0,069	1,000		
Past market return	- 0,160***	0,012	- 0,161***	0,078*	- 0,499***	- 0,444***	- 0,232***	0,139***	0,084*	- 0,361***	- 0,048	1,000	
Forward market return	- 0,600***	0,456***	- 0,101**	- 0,105**	0,173***	- 0,337***	- 0,045	- 0,009	- 0,000	- 0,231***	0,025	- 0,036	1,000

Table 5: Probit regressions output having as dependent variable the *TP met* dummy. The Partial regression includes as regressors only the dummy for the valuation model choice and the intercept. The Complete regression considers also the set of control factors

	Partial probit regression		**Complete probit regression**	
Regressors	**Coefficients**	***pvalue***	**Coefficients**	***pvalue***
Valuation model	-0,305	0,015	-0,131	0,382
Size			0,089	0,170
Risk			8,368	0,229
TP implied return			-4,696	0,000
Recommendation			-0,073	0,646
Length			0,006	0,403
EPS forecast error			0,742	0,616
Covered banks			0,017	0,662
Forward market return			3,051	0,000
Intercept	0,035	0,739	-0,301	0,669
Observations	482		482	
Pvalue LR test	0,015		0,000	
Pseudo R – square	0,001		0,311	