

**Analysts' Characteristics, the Research Process and the Impact of Regulatory Changes:
An Empirical Analysis**

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Abstract

This study examines responses of 104 sell-side and buy-side security analysts to a survey sent out in order to understand how analysts conduct investment recommendations. Uncertainty about the quality of analysts' investment recommendations is a major concern for retail investors. Specifically, the information gathering, processing and transferring process appears to be a black box for retail investors. The findings of our study provide insight into analyst-specific characteristics and sources of information used by analysts to undertake firm-specific research. By examining the practitioners' responses we derive key factors which influence investment recommendations.

JEL Classification: G11, G24, G41

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1 Introduction

Analysts' activities appear to be a black box for retail investors (hereafter: investors). In particular, uncertainty about the quality of analysts' investment recommendations is a major concern for investors (Morgen and Stocken 2003, Barber et al. 2006, Ramnath et al. 2008). Generally, this quality uncertainty is determined by three core aspects. First, analyst-specific characteristics including experience, professional background, competences and motives affect investment recommendations. Second, the research process (information gathering, processing and transfer) is widely intransparent for investors. Third, conflicts of interest emerging in the context of analysts' activities have reduced the credibility of their recommendations (Fisch and Sale 2003, Choi 2007). It is unclear whether changes of the regulatory environment have mitigated conflicts of interest.

Prior research has primarily focused on understanding the stock valuation process including the applied methodological approaches at a broader level (Chugh and Meador 1984, Bouwman et al. 1987, Block 1999; Gleason et al. 2013). However, from the investors' perspective relevant information in the context of generating investment recommendations are still largely unknown. This is why we conducted a survey among sell-side and buy-side security analysts (hereafter: analysts) to explicitly address the three core aspects. In this paper we examine responses of 104 security analysts who completed our survey between January and September 2013. Our contribution to the literature is twofold. We directly survey analysts and obtain a unique data set. By examining the practitioners' responses we derive key factors which influence investment recommendations. Our results make analysts' activities more transparent for investors.

Based on our data set we attain an understanding of sources of information used by analysts to undertake firm-specific research, of analysts' self-perceived forecast accuracy, of the

influence of IT-based evaluation models as part of the forecast process and an understanding of the performance evaluation undertaken by analysts' employers. We find that analysts (strongly) rely on IT-based evaluation models when deriving investment recommendations. The average analyst in our sample graduated from university, has 10 years of professional experience and covers 12 firms on a regular basis. In addition, our results show that more than 50 percent of the analysts specify that their employers' objective to generate brokerage commission (by regularly producing research reports) is very/rather influential with respect to the determination of investment recommendations. This is why we thoroughly examine the recent regulatory efforts which attempt to mitigate conflicts of interest. Since our results have high practical relevance for the scientific and practitioner-oriented literature, we consider this paper to be of interest for academics, practitioners and regulators.

The structure of the paper is as follows. Section 2 provides an overview of the related literature. Section 3 explains the design of the questionnaire and formulates hypothesis. Section 4 presents characteristics of our unique dataset and discusses the findings, while Section 5 gives a conclusion of this paper.

2 Related Literature

2.1 The Role of Analyst-specific Characteristics

Investors can benefit by being aware of personal characteristics that help to identify accurate analysts. Prior research has identified numerous relevant characteristics. Specifically, Mikhail et al. (1997), Clement (1999), Jacob et al. (1999), Brown (2001); Clement et al. (2003), Clement and Tse (2003) and Höfer and Oehler (2013) examine empirically that prior forecast accuracy, frequency of forecasting, experience, forecast horizon, and number of firms covered

are relevant variables that affect the accuracy of either earnings or target price forecasts made by analysts.

It is also well established that the analysts' timing ability is a crucial factor. Empirical evidence of O'Brien (1988) suggests that "recent" forecasts have lower forecast errors than forecasts issued "earlier" (i.e. prior to a firm announces quarterly or annual earnings). By deferring the publication of the recommendation, analysts can gather and incorporate further information that is part of other analysts' forecasts and firm-specific disclosure issued earlier (Kim et al. 2011). In addition, Loh and Mian (2006) discuss the relevance of analysts' characteristics and find a positive relationship between the analyst-specific accuracy and the profitability of their contemporaneous stock recommendations. Given this finding, Loh and Stulz (2009) argue that accurate analysts have a larger impact on markets because their recommendations are accompanied by earnings forecasts with low expected forecast errors.

2.2 Analysts' Stock Valuation Models

The stock valuation techniques used by analysts are generally categorized into two broad methodologies, namely discounted cash flow (DCF) models and relative valuation multiples (e.g. price-to-earnings ratio, book-to-market ratio, price-to-revenue ratio) (Bouwman et al. 1987, Gleason et al., 2013). Since analysts must state the applied methodologies used to derive recommendations in the research report, it is well documented that most analysts neglect DCF models and emphasize on earnings multiples. For instance, Asquith et al. (2005) find that in 99 percent of the examined research reports earnings multiples are mentioned. In only 13 percent of the reports DCF models are stated. In line with these findings, Demirakos et al. (2004) highlight that almost all reports in their sample mention valuation multiples;

about 50 percent state DCF models.¹ However, Bradshaw (2002, 2004) finds that advanced DCF models used by analysts during the research process yield more profitable recommendations for investors than, for instance, multiples. Using survey methodology, Block (1999) examines the techniques used by analysts who are members of the Association for Investment Management and Research (AIMR)². He finds that analysts do not pay much attention to the dividend policy of a company and that only half of the 297 respondents use present value analysis and future P/E ratios.

By and large, analysts tend to neglect the CAPM as well as the short-term quarterly earnings and put more weight on the EVA approach and the long-term prospects of a company. Chugh and Meador (1984) survey analysts and Block (1999) confirms their results in most aspects: First, the expected changes in dividends as well as the dividend yield are considered by analysts to be the most unimportant factors in deriving forecasts. Second, analysts emphasize on long-run instead of short-run observations including expected EPS changes, expected return on equity and industry-specific outlooks. In addition, firm-specific factors such as the quality and credibility of the management and the market position are crucial economic variables for analysts.

2.3 Conflicts of Interest

Another emphasis in the literature argues that analysts might have an eye on certain valuation techniques; however, the business interests of their employers influence the outcome of analysts' research. In general, analysts work for banks and investment companies which conduct investment banking and advisory services. Conflicts of interest arise when the investment bank wants to attract or retain companies as clients in order to offer consultancy

¹ For a detailed discussion on the models used by analysts see Gleason et al. (2013).

² AIMR is now known as the Chartered Financial Analyst (CFA) Institute.

services, e.g. in the context of mergers and acquisitions (M&A) or initial public offerings (IPO) (Lin and McNichols 1998, Michaely and Womack 1999, Dechow et al. 2000, Bradshaw et al. 2003). The investment bank has an interest in positive analyst coverage of the respective firms in order to stimulate business success. Hence, analysts face a trade-off between 1) compliance with the business interests of the investment bank and 2) forecast accuracy (Mikhail et al. 1997, Moloney 2008, Höfer and Oehler 2013). Further conflicts of interest arise when analysts are obliged to make positively biased investment recommendations in order to stimulate profits from brokerage commissions.

As a response to several analyst scandals, that uncovered misbehavior and malpractice, regulators around the world have introduced regulatory measures in order to mitigate conflicts of interest (Contoudis 2003, Fisch and Sale 2003, De Franco et al. 2007). Specifically, regulators have established measures to primarily mitigate conflicts of interests, to strengthen Chinese Walls (Kolasinski 2006) and to implement independent remuneration for analysts (Moloney 2008). For instance, in the US³ and in the EU⁴ banks must implement 1) effective processes that prevent and control information flows between analysts, other bank-internal divisions and employees of the evaluated firms, 2) measures that prevent and supervise analysts' actions and 3) measures that inhibit the inappropriate influence of a third party on analyst research reports (Fisch and Sale 2003, Choi 2007, Moloney 2008, Höfer and Oehler 2013).

³ In the United States regulators introduced regulations (Rule NASD 2711, Rule NYSE 472, and the "Global Analyst Research Settlement") to mitigate the potential interdependence between the research and the investment bank divisions (Fisch and Sale 2003, Choi 2007).

⁴ In the European Union regulators introduced the Market Abuse Directive (MAD) and the Markets in Financial Instruments Directive (MiFID). Generally, these directives were introduced to 1) establish a single market in financial services and 2) assure market integrity as well as investor protection (Frésard et al. 2011, Moloney 2008).

3 Design of the Questionnaire, Hypotheses Development and Methodology

In the survey we utilized a standardized questionnaire with both closed-ended and open-ended questions. The questionnaire is designed while considering the findings in the literature, such as introducing consistency and unambiguous questions (Sudman et al. 1996, Schwarz and Oyserman, 2001). In contrast to previous surveys (Baldwin and Rice 1996, Hunton and McEwen 1997, Boni and Womack 2002), we asked these analysts to provide detailed information on three core aspects namely 1) analyst-specific characteristics (e.g. age, educational background, competences, work experience, self-perceived accuracy), 2) the research process (e.g. information gathering, processing and transfer, the influence of computer-based evaluation models), and 3) conflicts of interest (e.g. success of regulatory guidelines, impact of employers' activities).

The questionnaire's response options range from 0 (No) to 1 (Yes) (e.g. "Do regulatory guidelines [...] have an impact upon your activities as an analyst?") and from 1 to 5 (e.g. "Do you consider yourself as an 'accurate' analyst (i.e. your target price forecasts exhibit low forecast errors)?: 1=very accurate, 2=rather accurate, 3=neutral, 4=rather less accurate, 5=less accurate)⁵.

Personal background specifications influence the job performance of individuals (Wise 1975a, Wise 1975b). In particular, professional experience has been identified as a key element of analysts' self-development (Mikhail et al. 1997). When analysts accumulate experience they are expected to gain additional know-how on, e.g., the functioning of financial markets, corporate finance and IT-based evaluation models (Höfer and Oehler 2013). Hence, as analysts repeat certain tasks – particularly information gathering, processing and transfer – they are expected to regard themselves to become more proficient and to accomplish the assigned work in a superior manner over time (Sinha et al. 1997, Mikhail et al. 1997, Clement

⁵ The respective response options are provided in the table descriptions.

1999, Mikhail et al. 2003, Höfer and Oehler 2013). This leads us to hypothesize the following:

Hypothesis 1: Self-perceived forecast accuracy is positively related with analysts' experience.

Analysts should possess and develop professional competences (e.g. know-how, expertise), social competences (e.g. teamwork, interaction and co-operation with colleagues and clients), and personal competences (e.g. own initiative, self-dependence, goal orientation). When analysts become more competent over time they are expected to assess their individual ability to make accurate forecasts more positively. This is because they are better in assessing and reflecting their actions and the environment in which they are operating in. This leads us to hypothesize the following:

Hypothesis 2: Self-perceived forecast accuracy is positively related with analysts' competency.

Analysts who are affiliated with investment banks or brokerage houses tend to issue optimistic and positively biased recommendations (Laderman et al. 1990, Sultz 1990, Siconolfi 1992). This in-house access to private information should be particularly beneficial for less skilled analysts because it helps them to compensate their lack of ability to gathering, processing and transferring information. Since regulatory guidelines inhibit information flows between, e.g., the investment division and analysts it is expected that inaccurate analysts assess the regulators' undertakings less successful. On the other hand, accurate analysts are less dependent on information from insiders (e.g. colleagues who work for the bank's brokerage or investment division). Consequently, it is likely that analysts with greater forecast ability evaluate the regulatory guidelines which attempt to reduce conflicts of interest,

strengthen Chinese Walls and implement independent analyst remuneration more positively. This is because the stricter regulatory regime establishes an environment where 1) individual analysts must play by the same rules and 2) analysts' activities are monitored by regulatory authorities. This leads us to hypothesize the following:

Hypothesis 3: The lower the self-perceived forecast accuracy, the less successful are regulatory guidelines assessed by analysts.

In order to gain deeper insight into the analysts' response pattern, we report Spearman's rank correlation coefficients in Section 4. Spearman's correlation provides a measure of a monotonic relationship between two items and can be used with ordinal data and is – contrary to Pearson's correlation – robust to outliers. By following this approach, we can describe the relationship between the assessed items more thoroughly.

4 Results

4.1 Data and Descriptive Statistics

From January to September 2013, we contacted 936 practicing analysts via e-mail or mail with the request to fill-in our questionnaire.⁶ Analysts who have not responded were contacted by telephone and received a reminder to send back the filled-in questionnaire. By September 2013, 104 analysts sent back the completed questionnaire (response rate: 11 percent). Most analysts who were contacted work for larger European, US and Asian investment banks and brokerage houses. Analysts typically focus either on the buy-side or the sell-side. In our sample sell-side analysts represent 96 percent of all respondents and the remaining 4 percent

⁶ We contacted analysts who issued at least one investment recommendations within the last two years and whose contact details (full name, address, employer) were publicly available.

are buy-side analysts. Buy-side analysts rather focus on issuing recommendations for both institutional investors and large clients, while sell-side analysts emphasize on reports that are publicly available. Since buy-side analysts do not directly provide information that becomes part of the publicly available information pool, it is not surprising that sell-side analysts have a greater tendency to respond and to send back the completed questionnaire.

Table 1 illustrates that most analysts in the sample work for investment banks (43 percent) and brokerage houses (39 percent). Only 8 and 6 percent are employed at savings banks and cooperative banks, respectively. Independent analyst houses account for 4 percent. This emphasizes that analysts work in organizations that utilize analyst recommendations not only to trade and invest on own account but also to provide investment banking and brokerage services for clients.

[Please insert Table 1 here]

In our sample, analysts between 40 and 49 years of age and between 30 and 39 years of age account for 39 and 37 percent, respectively (Table 2). A minor fraction is above 50 years old (7 percent) and 17 percent are younger than 30 years. This is in line with the analyst-specific work experience they have acquired. 17 percent have up to 3 years of experience, whereas 26 percent work for 6-10 and 11-15 years as analysts. On average, subjects acquire 10 years of analyst-specific work experience and 13 years of general work experience. Analysts' experience is of relevance since Mikhail et al. (1997, 2003) and Höfer and Oehler (2013) find significant evidence that experienced analysts make more accurate forecasts. An accurate analyst is assumed to make earnings/target price forecasts with low forecast error.

In terms of educational background, a majority of 58 percent gained a university master's degree or diploma⁷. 22 percent (16 percent) hold a bachelor's (M.B.A.) degree. Merely 4 percent gained a PhD. This shows that all analysts completed an university education program successfully. This is of particular interest since there are no formal prerequisites for the analyst profession. Although there is no formal minimum qualification, investment banks or brokerage houses seem to recruit only university graduates for analyst positions. Besides, one-third of the analysts even attained additional qualifications in terms of CFA or CIIA certificates.

Previous studies indicate that analysts operate in a competitive work environment (Hong and Kubik 2003) in which employers are changed constantly. Generally speaking, changing employers might be the outcome of a positively or negatively perceived professional self-development. Hence, the reasons for changing one's employer are that analysts are either headhunted or fired. In our sample, 33 percent have never experienced a change of employer and 24 percent (15 percent) went through a change of employment once (twice).⁸

[Please insert Table 2 here]

Table 3 documents the analysts' areas of specialization and coverage. 90 percent state that they focus on certain sectors in their research. Most analysts emphasize on firms in the broader financial industry (financials, insurance, real estate) (21 percent), followed by the telecom, semiconductor and media sector (20 percent). 16 percent (14 percent) of the

⁷ In the German grading scheme a diploma is equivalent to a university master's degree.

⁸ Prior studies find heterogeneous evidence on the interrelation between analysts' accuracy and employment situation (Mikhail et al. 1997, Mikhail et al. 2003, Höfer and Oehler 2013). Hence, it remains unclear whether analysts change employers because, as a result of their profound professional competences, they get promoted/headhunted or because they are inaccurate and, therefore, made redundant.

respondents are specialists in utility, metal and mining (automotive, manufacturing, machinery, transportation) stocks. On average, a single analyst covers 12 firms; that is, he or she makes investment recommendations for these firms on a regular basis. 43 percent report that they cover between 11 and 15 firms, followed by 31 percent of the analysts who cover between 6 and 10 firms.

An issue that has been widely left unsought in the literature is whether analysts work in teams or on their own. This is of particular interest since the accuracy of earnings or price target forecasts might differ between recommendations made by a team of analysts and those made by an individual analyst. We find that nearly half (46 percent) of the analysts conduct recommendations on their own and the other 45 percent work in pairs. 7 percent state that three analysts are involved in the preparation of one research recommendation.

[Please insert Table 3 here]

4.2 Results Discussion and Correlation Analysis

Information gathering Process

According to the literature, we understand that analysts utilize, e.g., firm presentations, interviews and earnings forecasts of the management in order to derive firm-specific investment recommendations (Chugh and Meador 1984). However, it is unclear to what extent analysts use different sources of information. Based on our survey, we find that 90 percent of the respondents use news, ticker and ad-hoc news and market/industry data to do firm-specific research.⁹ Unsurprisingly, 98 percent (86 percent) gather information from

⁹ In this sub-section no table is provided. An overview of the results discussed in the text is available upon request.

companies' quarterly reports (decision-makers of the firm to be evaluated). In line with the discussion in Section 3 on whether analysts work in teams or on their own, we examine that only 22 percent utilize information of bank-internal colleagues in order to collect relevant information. While only 22 percent pay attention to other analyst reports, 88 percent consider analyst conferences as relevant sources of information. In sum, based on their own responses analysts mostly seem to neglect the activities of peer analysts which is insofar unexpected as findings in the literature indicate that analysts herd, i.e. mimic the activities of other analysts, (Welch 2000, Hong et al. 2000, Jegadeesh and Kim 2010), and come to a consensus of opinion (Conroy and Harris 1987, Hayes and Levine 2000, Jegadeesh and Kim 2006).

Performance Assessment and Forecast Accuracy

Stickel (1992) finds that analysts are evaluated by their employers on four criteria: stock-picking ability, earnings forecast accuracy, reports quality and overall service activities. However, based on our findings, Table 4 documents ambiguous results with respect to analysts' performance assessment. 69 percent of the surveyed analysts do not undergo a performance assessment undertaken by their employer. This is remarkable since nowadays many professional activities are regularly evaluated (Banner and Cooke 1984). Though, 16 analysts who argue that there is no performance assessment say that an appraisal is undertaken based on their forecast accuracy. In addition, 23 percent state that the number of forecasts is an element of the evaluation conducted by the employer. Consistent with findings in the literature, 47 percent of the analysts have, in fact, an incentive to make accurate forecasts since the employer judges analysts' activities based on this criterion (Hong et al. 2000, Hong and Kubik 2003).

[Please insert Table 4 here]

Analysts tend to put larger emphasis on private information when making firm-specific earnings forecasts (Chen and Jiang 2006). This is one relevant aspect that potentially leads analysts to become overconfident (Fuller 1998, Friesen and Weller 2006) because they believe to possess superior information in contrast to their colleague analysts. Table 5 indicates that a majority of 58 percent assumes to produce rather accurate (earnings/target price) forecasts. While 8 percent consider themselves as very accurate analysts, 4 percent believe that their forecast abilities are below average. Although, we cannot make clear-cut inferences on analysts' potential overconfidence, we find that a larger proportion of analysts assumes to belong to those with above average forecast skills.

[Please insert Table 5 here]

Table 6 provides a correlation analysis in order to examine the relationship between analysts' forecast accuracy and analyst-specific characteristics including age, analyst-related work experience, general work experience, firm coverage, and employer changes. Since the response option in the questionnaire with respect to the item accuracy ranges from 1 ("very accurate") to 5 ("less accurate") the negative correlation coefficients with respect to accuracy and age-related items indicate that, e.g., age and accuracy are positively related. For instance, this documents that older analysts tend to assess themselves as accurate forecasters. Thus, we find considerable evidence that supports our Hypothesis 1. Since the items age, analyst-related experience, general experience are inherently highly correlated we obtain similar

findings between the last-mentioned items and accuracy. In addition, analysts' self-perceived accuracy corresponds positively with the number of employer changes. Given these empirical findings, analysts who have experienced employer changes tend to evaluate themselves as more accurate. In Section 3 we discussed that up to four analysts are involved in the preparation of one investment recommendation. The findings in Table 6 document that number of analysts generating an investment recommendation corresponds negatively with accuracy. This shows that more analysts being involved in the preparation process leads analysts to assess themselves as rather inaccurate.

[Please insert Table 6 here]

Table 7 shows that the advancement of professional, social and personal competences correlates positively with the self-perceived forecast accuracy. In particular, it is not surprising that both professional and personal competences are more related with accuracy than social competences. This is because analysts' self-initiative as well as knowledge and expertise in terms of financial markets, IT-based evaluation models, corporate finance, regulatory framework and professional competences are not only relevant elements of professional competences but also determinants of forecast ability. Given these findings, there is evidence that supports our Hypothesis 2. In addition, the results in Table 7 document that professional and social competences tend to be not related whereas personal and social as well as personal and professional competences are highly positively correlated.

[Please insert Table 7 here]

Factors influencing Analysts' Investment Recommendations

Computer-based IT models have become significantly relevant across industries over the last decade. Therefore, we asked analysts to assess the influence of computer-based IT evaluation models during the development of investment recommendations (Table 8). In our sample, one-third categorizes the role of IT models as rather influential and another 13 percent believe the computer programs to be very influential. This leads to the question whether it is solely the analyst who derives investment recommendations or the computer program which determines the outcome of the research report. In contrast, one-third of the surveyed analysts states that computer-based IT models play no significant role in order to determine recommendations for investors.

[Please insert Table 8 here]

Table 9 provides an overview of factors influencing analysts' firm-specific research reports. By and large, analysts consider key financial data/ratios (including earnings, cash flows, P/E ratio, book-to-market ratio), the long-term outlook of a firm and the quality of a firm's management staff to be rather influential or very influential factors. Less relevant aspects include technical analysis indicators and analysts' consensus recommendations. Specifically, the low influence of technical analysis indicators seems to be surprising since practice-orientated studies in the literature regard technical and fundamental analysis as complementary designs of analysis; it is well documented that technical advice may be self-fulfilling (Taylor and Allen 1992, Blume et al. 1994). When analysts make forecasts, especially target price forecasts, they should take into account not only the overall economic outlook but also regulatory issues. On the one hand, besides firm-specific and industry-

specific information analysts should incorporate the expected overall economic changes because the latter aspect also potentially determines future stock prices. On the other hand, the regulatory environment has been constantly changing during the last decade. This is why analysts should ensure to take, e.g., the recent disclosure requirements into account. In this context, 41 percent (14 percent) assume the overall economic outlook to be a rather influential factor (very influential factor), while 32 percent (12 percent) regard regulatory measures to be rather influential (very influential). About one-third of the surveyed analysts finds these two factors to be neither influential nor less influential.

[Please insert Table 9 here]

The Effect of Employer Activities and Regulatory Guidelines

Table 10 presents the respondents assessment of their employers' activities which potentially affect firm-specific research reports. In particular during the late 1990s and early 2000, numerous conflicts of interest became crucial. The three core aspects causing these conflicts of interest are the objectives of analysts' employers to promote investment activities, underwriting services and brokerage commissions. By and large, most analysts assess their employers underwriting and investment activities to be less influential. However, about half of the analysts state that they assist their employer to generate brokerage commission by means of regular research reports. Hence, it is not surprising that the majority of most research reports include "buy" recommendations (Michaely and Womack 1999, Agrawal and Chen 2005, Boni and Womack 2006). Specifically, 20 percent and 32 percent of the analysts regard the task to produce research reports on a regularly basis in order to generate brokerage commission as very influential and rather influential, respectively. A lower proportion of 7

percent (21 percent) find the aforementioned objective of the employer to be less influential (very influential).

[Please insert Table 10 here]

The presented findings emphasize the existence of conflicts of interest that regulatory authorities primarily attempted to tackle.¹⁰ The findings in Table 11 indicate that regulatory guidelines have no impact upon 62 percent of the surveyed analysts. Furthermore, 44 percent (23 percent) assess the recent regulatory effort to reduce conflicts of interest to be less successful (rather less successful). A crucial element to mitigate potential conflicts of interest is to install an independent remuneration for analysts. For instance, the MiFID directive developed by the European Union specifies such a measure must be implemented in banks which communicate analyst recommendations. In this respect, two-third assesses the implementation of an independent remuneration for analysts as less successful. Another important aspect on the regulator's agenda is to strengthen Chinese Walls (Kolasinski 2006). 24 percent (28 percent) evaluate the regulatory measures to enhance Chinese Walls as very successful (rather successful). However, 22 percent still find need for improvement and state that the regulator was less successful in strengthening Chinese Walls. Thus far, our findings indicate that analysts are rather divided on interpreting the success of regulatory guidelines.

[Please insert Table 11 here]

The aforementioned results document that large proportion of the surveyed analysts evaluates

¹⁰ See the discussion on Rule NASD 2711, Rule NYSE 472, and the "Global Analyst Research Settlement", MAD, and MiFID in Section 3.

the recent regulatory guidelines in order to reduce conflicts of interest as less successful. As Table 12 shows, the self-perceived forecast accuracy correlates positively with the assessment of the success of regulatory guidelines. This suggests that analysts who, for instance, assess themselves as less accurate also evaluate the imposed regulations as less successful. Hence, we find evidence that supports our Hypothesis 3. In addition, since the reduction of conflicts of interest is strongly related with the introduction of Chinese Walls the high correlation coefficient of 0.7677 is not surprising.

[Please insert Table 12 here]

5 Conclusion

Analysts' activities appear to be a black box for investors. This is why we surveyed both sell-side and buy-side security analysts. Uncertainty about the quality of analysts' investment recommendations is a major concern for retail investors. This quality uncertainty is determined by three core aspects including analyst-specific characteristics, the intransparent research process and conflicts of interest emerging in the context of analysts' activities.

Based on our unique data set we attain an understanding of sources of information used by analysts to undertake firm-specific research, of analysts' self-perceived forecast accuracy, of the influence of IT-based evaluation models as part of the forecast process and an understanding of the performance evaluation undertaken by analysts' employers. We find that analysts (strongly) rely on IT-based evaluation models when deriving investment recommendations. The average analyst in our sample graduated from university, has 10 years of professional experience and covers 12 firms on a regular basis. In addition, our results show that more than 50 percent of the analysts specify that their employers' objective to

generate brokerage commission (by regularly producing research reports) is very/rather influential with respect to the determination of investment recommendations. This is why we thoroughly examine the recent regulatory efforts to mitigate conflicts of interest. By and large, we find that analysts assess the regulatory guidelines rather less successful.

This paper has some limitations which should not be unmentioned. In order to gain a deeper insight into analysts' activities it might be of interest to compare the self-perceived forecast accuracy with the actual earnings or target price forecast accuracy. Such a procedure would require that the analysts who participated in the survey are also included in the usual data bases (i.e. I/B/E/S or Zacks Investment Research). Hence, it would be possible to examine empirically, e.g., overconfident or herd behavior among analysts in a different fashion.

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Table 1: Analyst employer

	Number	Percentage
Investment bank	44	43
Brokerage house	40	39
Savings bank	8	8
Cooperative bank	6	6
Independent analyst house	4	4
Total	102	100

Note: This table provides a distribution of the categories of analysts employers in the sample. The categories include investment banks, brokerage houses, savings banks, cooperative banks and independent analyst houses. The number of responses and the respective percentages are provided.

Table 2: Analyst-specific characteristics

	Number	Percentage
<i>A. Age (in years)</i>		
<30	17	17
30-39	37	37
40-49	40	39
>50	7	7
Total	101	100
Median	38 years	
<i>B. Highest degree</i>		
Bachelor	22	22
Master/Diploma	57	58
M.B.A.	16	16
Doctoral Degree	4	4
Total	99	100
<i>C. Certification</i>		
Charterholder	32	31
Noncharterholder	72	69
Total	104	100
<i>D. Experience as analyst (years)</i>		
0-3	17	17
4-5	10	10
6-10	27	26
11-15	27	26
16-20	15	15
More than 21	6	6
Total	102	100
Median	10 years	
<i>E. General work experience (years)</i>		
0-3	7	7
4-5	8	8
6-10	23	22
11-15	26	25
16-20	23	23
21-25	12	12
More than 26	3	3
Total	102	100
Median	13 years	

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Table 2: Analyst-specific characteristics

	Number	Percentage
<i>F. Number of employer changes</i>		
0	32	33
1	24	25
2	14	15
3	13	13
4	7	7
5	3	3
6	2	2
More than 6	2	2
Total	97	100
Median	1	

Note: This table provides an overview of analysts' responses with respect to questions on age, university education, certification and experience (analyst-specific experience and work experience in general) (Panel A-F). For each response option the number of analysts responded and the respective percentages are specified. If meaningful, median values are provided.

Table 3: Specialization and Coverage

	Number	Percentage
<i>A. Sector-specific specialization</i>		
yes	94	90
no	10	10
Total	104	100
<i>B. Sector distribution</i>		
Financials, Insurance, Real Estate	20	21
Automotive, Manufacturing, Machinery, Transport	14	14
Telecom, Semiconductor, Media	19	20
Utility, Metals, Mining	15	16
Pharmaceutical Industry, Health Care, Biotechnology	10	11
Chemicals	7	7
Consumer Goods, Retail	10	11
Total	95	100
<i>C. Number of firms covered</i>		
0-3	3	3
4-5	5	5
6-10	32	31
11-15	45	43
16-20	11	11
21-25	2	2
More than 26	5	5
Total	103	100
Median	12	
<i>D. Number of analysts involved in the preparation of one report</i>		
1	47	46
2	46	45
3	7	7
4	2	2
Total	102	100
Median	2	

Note: This table provides an overview of analysts' responses with respect to areas of specialization and coverage. Panel A, B, C and D provides the results for sector-specific specialization, sector distribution, number of firms covered, number of employer changes and number of analysts involved in the preparation of one research report, respectively. The number of responses and the respective percentages are provided.

Table 4: Performance Assessment

	Number	Percentage
<i>A. There is no performance assessment</i>		
yes	70	69
no	32	31
Total	102	100
<i>B. Number of forecasts</i>		
yes	23	23
no	79	77
Total	102	100
<i>C. Forecast Accuracy</i>		
yes	48	47
no	54	53
Total	102	100

Note: This table provides an overview of analysts' responses with respect to their performance assessment. Panel A, B and C provides the results for the answer categories "There is no performance assessment", "Number of forecasts" and "Forecast Accuracy", respectively. The number of responses and the respective percentages are provided.

Table 5: Self-perceived forecast accuracy

	Number	Percentage
very accurate	8	8
rather accurate	61	58
average	31	30
rather less accurate	3	3
less accurate	1	1
Total	104	100

Note: This table provides an overview of analysts' responses with respect to questions on their self-perceived forecast accuracy. The response option for this question ranges from very accurate, rather accurate, neutral, rather less accurate to less accurate. The number of responses and the respective percentages are provided.

Table 6: Correlation analysis of analysts' accuracy and analyst-specific characteristics

	Accuracy	Age	Analyst-specific Work Experience	General Work Experience	Firm Coverage	Employer Changes
Age	-0.156* 101					
Analyst-specific Work Experience	-0.242** 102	0.875*** 101				
General Work Experience	-0.173** 102	0.929*** 101	0.867*** 102			
Firm Coverage	-0.004* 103	-0.132* 101	-0.012* 102	-0.080* 102		
Employer Changes	-0.163* 99	0.488*** 98	0.609*** 98	0.472*** 98	-0.073* 99	
Involvement of other Analysts	0.123* 103	-0.029* 101	-0.032* 102	-0.620* 102	0.194** 103	-0.136* 99

Note: This table provides an overview of the correlation analysis of analysts' self-perceived forecast accuracy and their individual characteristics. The latter are separated into age (in years), work experience as analysts, general work experience, the number of firms they cover, the number of employer changes, and the number of analysts involved in the preparation of one research report. With respect to the item accuracy the response options range from 1 to 5 (1=very accurate, 2=rather accurate, 3=neutral, 4=rather less accurate, 5=less accurate). The correlation coefficients, the respective significance levels, and the numbers of observations are provided. The symbols ***, **, and * denote significance at the one, five, and ten percent level, respectively.

Table 7: Correlation analysis of analysts' accuracy and competence assessment

	Accuracy	Professional Competences	Social Competences
Professional Competences	0.241** 103		
Social Competences	0.166* 103	0.111 103	
Personal Competences	0.221** 103	0.426*** 103	0.455*** 103

Note: This table provides an overview of the correlation analysis of analysts' self-perceived forecast accuracy and the assessment of own competences including professional competences (know-how, expertise), social competences (teamwork, motivation etc.), and personal competences (own initiative, self-dependence, goal orientation etc.). With respect to the item accuracy the response options range from 1 to 5 (1=very accurate, 2=rather accurate, 3=neutral, 4=rather less accurate, 5=less accurate). With respect to the questions on competences the response options also range from 1 to 5 (1=excellent, 2=rather excellent, 3=neutral, 4=rather less good, 5=less good). The correlation coefficients, the respective significance levels, and the numbers of observations are provided. The symbols ***, **, and * denote significance at the one, five, and ten percent level, respectively.

Table 8: Influence of computer-based IT evaluation models

	Number	Percentage
very influential	14	13
rather influential	33	32
neutral	25	24
rather less influential	21	20
less influential	11	11
Total	104	100

Note: This table provides an overview of analysts' responses with respect to questions on the influence of computer-based IT evaluation models. The response option for this question ranges from very influential, rather influential, neutral, rather less influential to less influential. The number of responses and the respective percentages are provided.

Table 9: Assessment of the influence of factors affecting analysts' firm-specific research reports

	Key financial data		Long-term outlook of firm		Quality of firm's management		Technical analysis indicators		Overall economic outlook		Regulatory specifications		Financial ratios		Analysts' consensus recommendations	
	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P
very influential	73	70	59	57	34	33	0	0	14	14	13	12	40	39	1	1
rather influential	30	29	30	29	50	49	2	2	43	41	33	32	42	40	18	7
neutral	1	1	13	12	18	17	20	19	32	31	45	44	15	14	34	33
rather less influential	0	0	2	2	1	1	38	37	15	14	9	9	6	6	29	28
less influential	0	0	0	0	0	0	44	42	0	0	3	3	1	1	22	21
Total	104	100	104	100	103	100	104	100	104	100	103	100	104	100	104	100

Note: This table provides an overview of the results of factors influencing analysts' firm specific research reports. The factors are key financial data (earnings, cash flows, dividends, book value), long-term outlook of the firm, quality of firm's management staff, technical analysis indicators, overall economic outlook, regulatory specifications, financial ratios (P/E ratio, book-to-market ratio), analysts' consensus recommendations. Given these factors, analysts were asked to assess the degree of influence regarding the outcome of firm-specific research reports. The response option for this question ranges from very influential, rather influential, neutral, rather less influential to less influential. N is the number of responses and P indicates the respective percentages.

Table 10: Assessment of employers' activities affecting analysts' firm-specific research reports

	Underwriting activities (i.e. analysts' employer conducts IPO or other services for evaluated firm)		Generating brokerage commission		Investment activities (i.e. analysts' employer holds shares in the evaluated firm)	
	N	P	N	P	N	P
very influential	3	3	20	20	1	1
rather influential	12	12	32	31	6	6
neutral	20	20	22	21	12	12
rather less influential	19	19	7	7	16	15
less influential	46	46	21	21	67	66
Total	100	100	102	100	102	100

Note: This table provides an overview of the results of factors influencing analysts' firm specific research reports due to employers' activities. The factors are underwriting activities (i.e. analysts' employer conducts IPO or other services for evaluated firm), generating brokerage commission by regularly producing research reports and investment activities (i.e. analysts' employer holds shares in the evaluated firm). Given these factors, analysts were asked to assess the degree of influence regarding the outcome of firm-specific research reports. The response option for this question ranges from very influential, rather influential, neutral, rather less influential to less influential. N is the number of responses and P indicates the respective percentages.

Table 11: Assessment of regulatory guidelines

A. Do regulatory guidelines (i.e. MAD or MiFID) have an impact upon your activities as an analyst?

	Number	Percentage
yes	35	38
no	57	62
Total	92	100

B. Assessment of the success of regulatory guidelines

	Reducing conflicts of interest in the context of the production of analysts' research reports		Strengthening Chinese Walls (between analyst and, e.g., the investment banking division)		Implementing independent remuneration for analysts	
	N	P	N	P	N	P
very successful	1	1	19	24	0	0
rather successful	11	14	22	28	6	8
neutral	14	18	14	18	11	14
rather less successful	18	23	6	8	9	12
less successful	34	44	17	22	51	66
Total	78	100	78	100	77	100

Note: This table provides an overview of the results of the assessment of regulatory guidelines. In particular, analysts were asked to state whether the regulatory guidelines (i.e. MAD or MiFID) have an impact upon their activities as analysts (Panel A). In addition, in Panel B analysts were asked to assess the success of regulatory guidelines with respect to the reduction of conflicts of interest, strengthening Chinese Walls and implementing an independent remuneration for analysts. The response option for this question ranges from very successful, rather successful, neutral, rather less successful to less successful. N is the number of responses and P indicates the respective percentages.

Table 12: Correlation analysis of analysts' accuracy and the success of regulation

	Accuracy	Reducing Conflicts of Interest	Strengthening Chinese Walls
Reducing Conflicts of Interest	0.229** 79		
Strengthening Chinese Walls	0.240** 79	0.767*** 79	
Implementing Independent Remuneration for Analysts	0.242** 77	0.581*** 77	0.584*** 77

Note: This table provides an overview of the correlation analysis of analysts' self-perceived forecast accuracy and the success of regulatory guidelines with regard to reducing conflicts of interest, strengthening Chinese Walls, and implementing an independent remuneration for analysts. With respect to the item accuracy the response options range from 1 to 5 (1=very accurate, 2=rather accurate, 3=neutral, 4=rather less accurate, 5=less accurate). The response option for question on the success of regulatory guidelines ranges from 1 to 5 (1=very successful, 2=rather successful, 3=neutral, 4=rather less successful, 5=less successful). The correlation coefficients, the respective significance levels, and the numbers of observations are provided. The symbols ***, **, and * denote significance at the one, five, and ten percent level, respectively.