

# Gender Differences in Analyst Stock Recommendations and Market Reactions

Wenwen Wang\*

Guangxi University, School of Economics, No.100, University East Road, Nanning, Guangxi Province, P.R. China

\* Corresponding author: [wwwang@st.gxu.edu.cn](mailto:wwwang@st.gxu.edu.cn)

**Abstract:** This paper provides evidence of gender heterogeneity in stock recommendations issued by analysts in China. The study finds that compared to male analysts, female analysts tend to have more conservative stock recommendations and lower levels of optimism. Male analysts are more likely to issue "buy" and "hold" recommendations, while female analysts are more likely to issue more conservative "neutral," "sell," and "reduce" recommendations. In the short term, the market reacts strongly to the ratings of female analysts, but their optimistic recommendations receive a poor response from investors. Investors may hold stereotypical beliefs towards female analysts, expecting them to adopt conservative strategies, and thus underestimate them when they make relatively optimistic suggestions. However, in the long term, there is no evident bias against female analysts in the market.

**Keywords:** Analysts, Stock Recommendations, Gender Differences, Market Reactions.

## 1. Introduction

The existing sociological and psychological research results indicate that due to differences in the measurement, perception, and preferences for risk, women tend to be more cautious and conservative than men (Byrnes et al., 1999; Fang & Wang, 2015; Malmendier et al., 2011). Compared to men, women exhibit much less decision-making heterogeneity. Although psychological and sociological literature has demonstrated gender heterogeneity, evidence from economics suggests that once controlling for heterogeneity in profession and economic environments, gender does not influence the financial decision-making process (Niederle & Vesterlund, 2007). Taking analysts as an example, since being an analyst involves a preference for risk and competition, women who choose to become analysts have gone through a self-selection process. The empirical results of this study indicate that gender heterogeneity also exists in the professional work environment.

This paper primarily discusses whether there is gender heterogeneity in the process of analysts' stock recommendation publication. Kadan et al. (2009) and Green et al. (2009) examined gender differences in analyst earnings forecasts. This paper is the first to discuss analyst gender differences using data on Chinese stock recommendations. In contrast to earnings forecasts, regardless of the amount of information in analysts' research reports, stock recommendations directly convey analysts' investment advice and are used by individual investors for trading decisions (Mikhail et al., 2007). Furthermore, stock recommendations are not merely valuation actions but the result of a complex decision-making process that reflects individual opinions based on analysts' viewpoints and risk tolerance. Therefore, by studying stock recommendations, this paper can immediately observe the differences in decision outcomes between analysts of different genders. If female analysts do indeed dislike risk more, are less likely to engage in extreme behaviors, and avoid competition, they should provide more conservative recommendations compared to male analysts. Based on stock recommendation data released from January

2006 to January 2019, this paper found that the probability of female analysts issuing optimistic stock recommendations is 18.61% lower than that of male analysts. Although the proportion of women in the financial analyst profession is not low (approximately 30%), female analysts are more prevalent in smaller brokerage firms. Even within large brokerage firms, the likelihood of them issuing optimistic recommendations is 25.64% lower than their male counterparts.

The contribution of this paper lies in further expanding the relevant literature on gender differences. The study finds that women may be less efficient than men in competitive environments (Gneezy, Niederle & Rustichini, 2003), with women tending to avoid competition while men tend to embrace it (Niederle & Vesterlund, 2007). In various settings, women often bear less risk than men (Byrnes, Miller & Schafer, 1999). Female investors commonly exhibit a greater aversion to risk and less overconfidence compared to male investors (Sunden & Surette, 1998; Barber & Odean, 2001). Previous research suggests that due to workplace discrimination against women and their poor performance in competitive environments (Gneezy et al., 2003), women may face a "glass ceiling," indicating their underrepresentation in senior (and high-paying) positions within companies (Wennergren & Wold, 1997; Goldin & Rouse, 2000; Black & Strahan, 2001). This paper supplements and extends prior research by objectively measuring analysts' investment recommendations, controlling for other important features to determine the presence of any gender heterogeneity among analysts. Furthermore, market reactions to analysts' research reports provide objectivity. This method is effective because market participants can anonymously and rapidly react to analysts' research reports, making it more likely to reveal their true attitudes towards the reports.

## 2. Literature Review

Previous research has indicated that social norms play a significant role in shaping the behavior of market participants, both theoretically (Akerlof, 1980; Romer, 1984) and empirically (Levitt, 2004; Elliott et al., 2014; Hong &

Kacperczyk, 2009). Stereotypes, as an important social norm, can influence the way individuals perceive themselves within their respective social categories. Gender is one such social category. The psychological characteristics of men and women, gender socialization differences, and discrimination against women have a substantial impact on the market.

### 2.1. Gender Differences and Job Performance

The differences between women and men stem from two sources: inherent psychological characteristics and gender socialization. Firstly, women are inherently more risk-averse than men (Borghans et al., 2009). In the context of corporate management, companies led by female CEOs exhibit lower leverage, less volatility, and higher survival rates compared to those led by male CEOs (Faccio et al., 2016). Furthermore, companies led by female CEOs are less likely to engage in acquisitions, debt issuances, and stock offerings. The market tends to respond more positively to decisions made by female CEOs (Huang & Kisgen, 2013). Companies with a greater representation of women in senior management face fewer operation-related lawsuits, as female executives have lower risk tolerance and tend to avoid risky corporate policies (Adhikari et al., 2019). In addition to female CEOs, female CFOs also contribute to reducing the risk of stock price collapses (Li & Zeng, 2019). Female directors are more likely to reduce earnings management (Lara et al., 2017) because women are less likely to exhibit overconfidence, particularly in male-dominated regions (Dahlbom et al., 2011). Male investors are more prone to overconfidence and overtrading than female investors (Barber & Odean, 2001), make riskier investment choices (Felton et al., 2003), and tend to continue investing after experiencing losses, even when previous losses indicate adverse market conditions (Hibbert et al., 2018). In addition to being more risk-averse, women are less willing to engage in competitive activities compared to men (Croson & Gneezy, 2009), especially in patriarchal societies (Gneezy et al., 2009). Niederle & Vesterlund (2007) provided experimental evidence of women's aversion to competition, as men were twice as likely as women to choose competitive compensation schemes.

The second source of gender differences is gender socialization. This theory suggests that women and men have different social expectations and gender knowledge during their upbringing, making women more sensitive to ethical issues and more caring, diligent, and responsible compared to men. In various professions, women exhibit higher moral standards than men. Within the context of corporate management, companies led by female CEOs demonstrate better Corporate Social Responsibility (CSR) performance (McGuinness et al., 2017) and are less likely to engage in corrupt practices (Hanousek et al., 2019). This form of female socialization also has spillover effects on the parents of women. Cronqvist & Yu (2017) found that when a company's CEO has daughters, the company's CSR ratings are approximately 9.1% higher than those of average companies. Female board members have better attendance records and are more likely to join supervisory committees (Adams & Ferreira, 2009). In the field of auditing, female auditors tend to provide higher-quality audits (Cameran & Francis, 2017), exhibit more ethical behavior (Chung & Monroe, 2001), and are assigned to higher-risk clients (Hardies et al, 2016).

### 2.2. Social Biases Faced by Women

Empirical studies on the impact of social biases on women

are relatively limited. One category of literature focuses on women's barriers to job entry. Lennox & Wu (2018) found that female auditors must demonstrate superior abilities compared to their male counterparts to overcome potential discrimination from companies and be accepted as partners. Ewens & Townsend (2020) discovered that female entrepreneurs face discrimination from early-stage investors, even though the performance of male-led startups is not superior to that of female-led startups. Another category of literature examines inequalities faced by women in the workplace. Atkinson et al. (2003) found that the net asset flow of female fund managers is lower than that of male managers, with no differences in performance, risk, or other fund characteristics. Wolfers (2006) pointed out that companies led by female CEOs are systematically undervalued, but evidence shows no significant difference in returns between companies led by female and male leaders. Canil et al. (2019) revealed that female executives at the senior level face discrimination in terms of compensation.

### 2.3. Gender differences and biases among analysts.

First, regarding gender differences, although existing sociological and psychological literature suggests that women are more conservative than men, the conclusions in the financial literature are inconsistent, with no consistent agreement on whether there are differences in risk preferences between men and women. Some studies (Green et al., 2009; Bosquet et al., 2014) indicate that female analysts' profit forecasts and recommendations are less optimistic than those of males, as women are less overconfident and less inclined to take risks compared to men. However, other literature (Kumar, 2010) suggests that female analysts may issue bolder profit forecasts, which is explained by the self-selection behavior, meaning only the most enterprising and risk-seeking women choose to become analysts. Social biases against women can also have different effects on analysts and other stakeholders. Firstly, Kumar (2010) presents a self-selection hypothesis, which is caused by perceived discrimination in the analyst labor market, and demonstrates that only women analysts demonstrating superior predictive abilities compared to their male counterparts would enter this industry. Investors in the market are partially aware of this difference in abilities. Gu (2020) found through a study of forecast data from Chinese analyst teams that the predictive abilities of analyst teams led by or involving women analysts are underestimated, even though their predictive abilities are better than those of all-male analyst teams. Additionally, the market's response to the predictions of female analysts is weaker and slower compared to those of male analysts, even when the predictions of female analyst teams are more accurate and timely than those of male analyst teams. These two studies are relevant to the results of this paper and exhibit significant differences. The focus of Kumar (2010) is on the beliefs held by female analysts and their inhibitory effects. He finds that only the most capable women can overcome entry barriers and engage in analyst careers. This paper, like Gu (2020), focuses on whether investors exhibit social biases against female analysts. In contrast to Gu (2020), he finds an underestimation of the market for female analyst predictions, while the results of this paper find that the market responds positively to stock recommendations made by female analysts, but the market's response to optimistic recommendations made by female analysts is weaker and slower. Secondly,

female analysts benefit less from their work performance in social relationships. Social relationships, such as alumni networks, are important channels for analysts to gather information from company managers (Cohen et al., 2010). However, the influence of men is two to three times greater than that of women (Fang & Huang, 2017). Finally, the promotion of female analysts to star analysts is also influenced by gender bias. Li et al. (2020) discuss the gender discrimination and beauty bias faced by female analysts in the United States and China when being selected as star analysts, finding that female analysts are more likely (or less likely) to be selected as all-stars in the United States (China). Compared to male analysts, attractive Chinese female analysts can overcome gender discrimination and are likely to be selected as star analysts. However, attractive American female analysts will face beauty penalties, reducing their chances of being selected as star analysts."

### 3. Data Sources and Variables

The sample period of this study ranges from 2006 to 2019. Analysts' stock ratings, gender, and related data, as well as company's stock trading data and financial data, are all sourced from the CSMAR database. When calculating forecast errors, this study only selects the last research report by the analyst team before the company's annual report is released. Additionally, the study takes the following steps: (1) excluding all observations for companies-years not covered by analysts; (2) excluding samples of listed companies in the financial industry and those with missing data. The final sample includes 432,906 stock recommendation data made by 3,805 analyst teams. The study applies a winsorization of 1% for continuous variables. Variable definitions are provided in Table 1.

**Table 1.** Variable definitions

| Variable           | Definitions   |
|--------------------|---|
| Female             | Dummy variable with value one if analyst is female; zero otherwise.   |
| Star               | Dummy variable with value one if the analyst is selected as a star analyst in the current year; zero otherwise.   |
| Master             | Dummy variable with value one if the analyst has a Master's degree; zero otherwise.   |
| FirmExperience     | Analyst-specific company experience is defined as the logarithm of the number of years from the date when an analyst first issued a stock rating for a listed company to the current rating date. |
| Experience         | Analyst work experience is defined as the logarithm of the number of years from the date when an analyst first issued a stock rating to the current rating date.                                  |
| Horizon            | The logarithm of the number of days between the date of analyst's stock rating publication and the rating termination date.   |
| Companies          | The logarithm of the number of listed companies tracked by the analyst.   |
| Brokersize         | The logarithm of the number of active analysts working for the brokerage firm in the current year.  |
| Anaattention       | The logarithm of the number of analysts tracking the company in the current year.   |
| Frequency          | The logarithm of the number of rating announcements made by analysts in the current year.   |
| Dayselapsd         | The logarithm of the number of days between the date of analyst rating announcements and the date of the previous rating announcement.  |
| Affiliated_Analyst | Dummy variable with value one if there is an underwriting relationship between the analyst's brokerage firm and the listed company; zero otherwise.   |
| Size               | The logarithm of the market value of a listed company.  |
| BM                 | Book-to-Market Ratio  |
| ROA                | Return on Assets.   |

## 4. Empirical Results

### 4.1. Sample Distribution

Table 2 shows the distribution of samples within the corresponding annual intervals. "NumFem" represents the number of female analysts, "NumAna" represents the total number of analysts, and "FemAnaRatio" represents the proportion of female analysts to the total number of analysts. "NumFemRec" represents the number of ratings issued by

female analysts, "NumRec" represents the total number of ratings issued by all analysts, and "FemRecRatio" represents the proportion of ratings issued by female analysts to the total number of ratings. As shown in Table 2, the proportion of female analysts to the total number of analysts has remained at around 30%, while the proportion of ratings issued by female analysts has shown a decreasing trend over time. Overall, female analysts constitute a significant proportion of the entire analyst population.

**Table 2.** Sample Distribution

|           | NumFem | NumAna | FemAnaRatio | NumFemRec | NumRec | FemRecRatio |
|-----------|--------|--------|-------------|-----------|--------|-------------|
| 2006-2009 | 520    | 1830   | 0.28        | 11536     | 40115  | 0.29        |
| 2010-2014 | 1376   | 4748   | 0.29        | 56329     | 203795 | 0.28        |
| 2015-2019 | 1165   | 4013   | 0.29        | 52872     | 206887 | 0.26        |

### 4.2. Main results

In order to better identify the stock and brokerage characteristics that influence the concentration of female analysts, this study employed a Logit model to examine the correlation between individual analyst characteristics and other factors. In the Logit regression model, analyst gender and whether they are star analysts were used as the dependent variables. Table 3 presents the results of the Logit regression

models, all of which utilized clustered standard errors at the firm level and controlled for year and industry fixed effects. Additionally, the study conducted 1% trimming before and after. From the first column of Table 3, it can be observed that female analysts are more likely to have graduate degrees and may have richer experience (both general and company-specific), but they tend to be associated with smaller brokerages. This is different from the situation among analysts in the United States, where female analysts are more

concentrated in larger brokerages because these big firms actively promote equal opportunities and strive to increase workplace diversity. Female analysts track relatively fewer listed companies, have lower forecast frequencies, and the time between rating releases is shorter compared to the date of the previous rating release.

Female analysts in China are less likely to become star analysts. While analysts with graduate degrees and richer experience are more likely to become star analysts, star analysts tend to track more listed companies, belong to larger brokerages, have a higher frequency of rating releases, and the time between rating releases is longer compared to the date of the previous rating release. The more listed companies

an analyst tracks and the higher the frequency of rating releases, the higher their understanding of the overall market. A longer time period between rating releases and the previous release date may indicate a lower herding tendency for the analyst in that rating, and there is a greater likelihood of incorporating new information into the stock rating. Furthermore, analysts with stronger overall capabilities are more likely to be recruited by large brokerages. Therefore, these data indicate that star analysts have higher overall business competency requirements, and female analysts show significant differences in capabilities compared to star analysts.

**Table 3.** Analysis of Analyst Gender and Other Characteristics

|                    | Model 1                  | Model 2               |
|--------------------|--------------------------|-----------------------|
|                    | dependent variable: Star |                       |
| Female             | -.3571***<br>(-23.41)    | -0.1353**<br>(-2.28)  |
| Master             |                          | 0.8532***<br>(7.29)   |
| FirmExperience     |                          | 0.1927***<br>(4.46)   |
| Experience         |                          | 0.1850***<br>(4.50)   |
| Horizon            |                          | -0.0196***<br>(-3.68) |
| Companies          |                          | 0.1848**<br>(2.51)    |
| Brokersize         |                          | 1.7636***<br>(34.44)  |
| Anaattention       |                          | 0.0864**<br>(2.13)    |
| Frequency          |                          | 1.1682***<br>(18.24)  |
| Dayselapsed        |                          | 0.0009<br>(0.19)      |
| Affiliated Analyst |                          | -0.0994<br>(-0.70)    |
| Size               |                          | -0.0014<br>(-0.06)    |
| BM                 |                          | 0.0524***<br>(2.60)   |
| ROA                |                          | -0.0202<br>(-0.04)    |
| Industry FE        | NO                       | YES                   |
| Year FE            | NO                       | YES                   |
| Cluster            | NO                       | Firm                  |
| N                  | 450,635                  | 395253                |
| Pseudo R2          | 0.0028                   | 0.0688                |

z statistics in parentheses

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

The present study employs a logit model to examine the relationship between analyst characteristics and the level of optimism in their stock recommendations, while controlling for year and industry fixed effects. Clustered standard errors at the firm level are also utilized. "Optimistic Recommendation" is a binary variable used to measure whether an analyst's stock rating is optimistic. If the rating is "Buy" or "Hold," the Optimistic Recommendation takes a value of 1. If the rating is "Neutral," "Sell," or "Reduce," it takes a value of 0. Table 4 presents the regression results for

the full sample in column (1) and sub-sample data divided by year in columns (2)-(4).

The findings of this study reveal that, compared to male analysts, female analysts are less likely to issue optimistic stock ratings. Furthermore, over time, the likelihood of female analysts making optimistic predictions decreases, indicating that female analysts become increasingly pessimistic. These results are consistent with previous literature (Bosquet et al., 2014).

**Table 4. Analyst characteristics and optimistic ratings (by period division)**

|                | Model 1                                       | Model 2               | Model 3               | Model 4               |
|----------------|---|-----------------------|-----------------------|-----------------------|
|                | 2006-2019                                     | 2006-2009             | 2010-2014             | 2015-2019             |
|                | dependent variable: Optimistic Recommendation |                       |                       |                       |
| Female         | -0.1861***<br>(-4.04)                         | -0.0570<br>(-0.73)    | -0.2155***<br>(-3.84) | -0.4057***<br>(-3.64) |
| Star           | 0.4938***<br>(5.14)                           | 0.4246***<br>(3.29)   | 0.3339**<br>(2.45)    | 1.3446***<br>(2.78)   |
| Master         | 0.2053***<br>(2.65)                           | 0.1281<br>(1.13)      | -0.0214<br>(-0.26)    | 0.9608***<br>(7.17)   |
| Firmexperience | -0.2218***<br>(-5.40)                         | -0.2701***<br>(-2.96) | -0.0758<br>(-1.37)    | -0.4017***<br>(-5.37) |
| Experience     | 0.0035<br>(0.10)                              | 0.0206<br>(0.28)      | 0.0706<br>(1.61)      | -0.2287***<br>(-2.88) |
| Horizon        | -0.0204***<br>(-2.98)                         | 0.0204*<br>(1.70)     | -0.0823***<br>(-9.66) | 0.0786***<br>(5.17)   |
| Controls       | YES   | YES                   | YES                   | YES                   |
| Industry       | YES   | YES                   | YES                   | YES                   |
| Year           | YES   | YES                   | YES                   | YES                   |
| Cluster        | Firm  | Firm                  | Firm                  | Firm                  |
| N              | 432429  | 33563                 | 196504                | 195137                |
| Pseudo R2      | 0.1914  | 0.1528                | 0.1181                | 0.1812                |

In addition, this study also found that star analysts or analysts with graduate degrees are more likely to issue optimistic ratings. The reason is that these analysts are more influenced by their reputation and are cautious about making pessimistic stock ratings. Analysts tend to be more optimistic about highly followed listed companies. Bosquet et al. (2014) found that in the United States, analysts with underwriting

relationships were twice as likely to issue optimistic recommendations compared to analysts without such relationships. However, this study, using data from Chinese analysts, did not find a significant relationship between underwriting relationships and optimistic ratings among Chinese analysts.

**Table 5. Female analysts' characteristics and optimistic ratings**

|                            | Model 1                                       | Model 2               | Model 3              | Model 4              |
|----------------------------|---|-----------------------|----------------------|----------------------|
|                            | 2006-2019                                     | 2006-2009             | 2010-2014            | 2015-2019            |
|                            | dependent variable: Optimistic Recommendation |                       |                      |                      |
| Female                     | 1.5841*<br>(1.69)                             | 0.9229<br>(0.54)      | 1.7650<br>(1.25)     | -3.0288<br>(-1.21)   |
| Female*Firmexperience      | 0.1390*<br>(1.65)                             | 0.3257*<br>(1.71)     | 0.1983*<br>(1.78)    | -0.3391**<br>(-2.21) |
| Female*Experience          | -0.0868<br>(-1.14)                            | -0.2410<br>(-1.44)    | -0.0180<br>(-0.17)   | -0.1139<br>(-0.78)   |
| Female*Horizon             | -0.0293*<br>(-1.92)                           | -0.0443*<br>(-1.73)   | -0.0129<br>(-0.67)   | -0.0499<br>(-1.57)   |
| Female*Companies           | -0.0317<br>(-0.20)                            | 0.3754<br>(1.36)      | 0.1037<br>(0.50)     | -0.3955<br>(-1.48)   |
| Female*Brokersize          | -0.2564***<br>(-3.19)                         | -0.1080<br>(-0.65)    | -0.1952**<br>(-2.08) | -0.3930**<br>(-2.07) |
| Female*Anaattention        | 0.1291**<br>(2.08)                            | -0.0758<br>(-0.58)    | 0.1718*<br>(1.93)    | 0.1076<br>(0.78)     |
| Female*Master              | -0.3507**<br>(-2.17)                          | -0.8821***<br>(-3.18) | -0.0900<br>(-0.45)   | -0.2589<br>(-0.94)   |
| Female*Star                | 0.0602<br>(0.29)                              | 0.1732<br>(0.51)      | -0.2034<br>(-0.75)   | 0.7570<br>(0.83)     |
| Female*frequency           | -0.0549<br>(-0.48)                            | -0.2473<br>(-1.40)    | -0.2479<br>(-1.58)   | 0.4957**<br>(2.36)   |
| Female*Dayselapsed         | 0.0144<br>(1.52)                              | 0.0414**<br>(2.20)    | 0.0074<br>(0.57)     | 0.0008<br>(0.04)     |
| Female* Affiliated Analyst | 0.0457<br>(0.18)                              | 0.1261<br>(0.32)      | -0.1158<br>(-0.34)   | 0.4052<br>(0.72)     |
| Female*Size                | -0.0188<br>(-0.46)                            | 0.0333<br>(0.49)      | -0.0416<br>(-0.66)   | 0.1547<br>(1.44)     |
| Female*ROA                 | 1.3714<br>(1.30)                              | 0.8278<br>(0.55)      | 2.6618*<br>(1.75)    | -2.6327<br>(-1.08)   |
| Female*BM                  | -0.0110<br>(-0.75)                            | -0.0396<br>(-0.81)    | -0.0217<br>(-1.06)   | 0.0055<br>(0.15)     |
| Controls                   | YES   | YES                   | YES                  | YES                  |
| Industry                   | YES   | YES                   | YES                  | YES                  |
| Year                       | YES   | YES                   | YES                  | YES                  |
| Cluster                    | Firm  | Firm                  | Firm                 | Firm                 |
| N                          | 432429  | 33563                 | 196504               | 195137               |
| Pseudo R2                  | 0.1927  | 0.1555                | 0.1202               | 0.1857               |

Table 5 discusses the relationship between female analyst characteristics and optimistic ratings. Although the likelihood

of female analysts working in large securities firms is low, female analysts affiliated with larger securities firms are more likely to offer conservative recommendations. Analysts with graduate degrees generally exhibit higher optimism levels, yet this study found that, compared to male analysts, female analysts with graduate degrees tend to be more pessimistic. Female celebrity analysts do not show a clear pessimistic or optimistic tendency. Building on previous discussions, celebrity analysts or analysts with graduate degrees are expected to be more inclined to issue optimistic ratings, as they are more susceptible to reputation influences. However, female celebrity analysts or female analysts with graduate degrees tend to be pessimistic, indicating that, regardless of their competence, female analysts are relatively more

conservative than their male counterparts. Therefore, the difference in analyst optimism may be due to gender itself rather than external factors such as reputation.

Existing psychological literature indicates significant gender differences between men and women, with women being more conservative than men. This conclusion is supported by evidence from analysts, as this study found that stock recommendations are influenced by one's gender, with women being less likely to provide optimistic ratings. Subsequently, this paper will discuss the stock market's response to female analysts and their optimistic ratings, exploring whether investors harbor biases against female analysts.

**Table 6.** Optimistic ratings by female analysts and short-term market reactions

|                                  | Model 1   | Model 2   | Model 3   |
|----------------------------------|-----------|-----------|-----------|
|                                  | CAR[-1,1] | CAR[-2,2] | CAR[-3,3] |
| Optimistic Recommendation        | 0.0106*** | 0.0154*** | 0.0167*** |
|                                  | (14.39)   | (14.32)   | (13.73)   |
| Female                           | 0.0027**  | 0.0049*** | 0.0053*** |
|                                  | (2.31)    | (2.97)    | (2.63)    |
| Female*Optimistic Recommendation | -0.0025** | -0.0042** | -0.0047** |
|                                  | (-2.09)   | (-2.42)   | (-2.26)   |
| Controls                         | YES       | YES       | YES       |
| Industry                         | YES       | YES       | YES       |
| Year                             | YES       | YES       | YES       |
| Cluster                          | Firm      | Firm      | Firm      |
| N                                | 432779    | 432779    | 432779    |
| adj. R2                          | 0.01042   | 0.00494   | 0.00540   |

This paper employs a regression model to estimate the short-term market response to female analysts and the optimistic recommendations made by female analysts. The dependent variables are cumulative abnormal returns (CAR) over windows of [-1,1], [-2,2], and [-3,3] days, with the independent variables including female analyst, optimistic recommendation as defined earlier, and the interaction term between female analyst and optimistic recommendation. The model controls for analyst-level and firm-level control variables, incorporates time and industry fixed effects, and utilizes clustered standard errors at the firm level. Table 6 reports the main results. The study finds a strong market response to the ratings by female analysts but a weak response to the optimistic recommendations made by female analysts. The coefficients for Female and Optimistic Recommendation are both significantly positive, indicating that when the recommendation is made by a female analyst or is an optimistic recommendation, the market exhibits stronger reactions compared to subsequent responses following a

three-day, five-day, and seven-day window period, showing higher responses than those for male analysts or pessimistic recommendations. While investors may not exhibit biases against women in the short term, the significant negative coefficient for Female\*Optimistic Recommendation suggests that the market does not respond favorably to optimistic recommendations made by female analysts in the short term. Investors may hold stereotypical views towards women, expecting female analysts to adopt conservative strategies; hence, when a female analyst provides a relatively optimistic suggestion, investors tend to undervalue it.

However, the results from Table 7 indicate that in the long term, there is no significant market response to female analysts or their optimistic recommendations. This suggests that although the market does not promptly react to the optimistic recommendations made by female analysts, the response to the information contained in the optimistic recommendations of female analysts does not significantly diminish in the long run.

**Table 7.** Optimistic ratings by female analysts and long-term market reactions

|                                  | Model 1   | Model 2   | Model 3   |
|----------------------------------|-----------|-----------|-----------|
|                                  | CAR[-1,1] | CAR[-2,2] | CAR[-3,3] |
| Optimistic Recommendation        | 0.0060**  | 0.0058**  | 0.0060**  |
|                                  | (2.40)    | (2.33)    | (2.40)    |
| Female                           | 0.0038    | 0.0036    | 0.0038    |
|                                  | (1.01)    | (0.93)    | (1.01)    |
| Female*Optimistic Recommendation | -0.0045   | -0.0042   | -0.0045   |
|                                  | (-1.16)   | (-1.07)   | (-1.16)   |
| Controls                         | YES       | YES       | YES       |
| Industry                         | YES       | YES       | YES       |
| Year                             | YES       | YES       | YES       |
| Cluster                          | Firm      | Firm      | Firm      |
| N                                | 432779    | 432779    | 432779    |
| adj. R2                          | 0.00829   | 0.00861   | 0.00829   |

## 5. Conclusion

This study aims to investigate the impact of analyst gender heterogeneity on stock recommendations in the Chinese stock market and provides supporting evidence. The research reveals that, compared to male analysts, female analysts are more inclined to offer conservative stock recommendations with lower optimism. Specifically, male analysts are more likely to suggest "buy" and "hold" recommendations, while female analysts more frequently provide "neutral," "sell," and "reduce" recommendations.

Further examination of short-term market reactions shows that the market strongly responds to ratings by female analysts but exhibits a more subdued response to their optimistic recommendations. This suggests that investors may hold stereotypical beliefs about female analysts, assuming they should adopt conservative strategies. When female analysts provide more optimistic suggestions, investors tend to undervalue their value. However, in the long term, the market's response to the information contained in optimistic recommendations by female analysts does not significantly diminish, indicating that there is no apparent bias against female analysts in the long run.

Investors should avoid applying gender stereotypes to evaluating female analysts and should not underestimate the value of their recommendations based on gender. Additionally, market participants should recognize the existence of gender role cognitive biases and strive to promote gender equality, avoiding gender discrimination.

## References

- [1] Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of financial economics*, 94(2), 291-309.
- [2] Adhikari, B. K., Agrawal, A., & Malm, J. (2019). Do women managers keep firms out of trouble? Evidence from corporate litigation and policies. *Journal of Accounting and Economics*, 67(1), 202-225.
- [3] Akerlof, G. A. (1980). A theory of social custom, of which unemployment may be one consequence. *The quarterly journal of economics*, 94(4), 749-775.
- [4] Alford, A., Jones, J., Leftwich, R., & Zmijewski, M. (1993). The relative informativeness of accounting disclosures in different countries. *Journal of accounting research*, 31, 183-223.
- [5] Anderson, C., & Kilduff, G. J. (2009). Why do dominant personalities attain influence in face-to-face groups? The competence-signaling effects of trait dominance. *Journal of personality and social psychology*, 96(2), 491.
- [6] Atkinson, S. M., Baird, S. B., & Frye, M. B. (2003). Do female mutual fund managers manage differently?. *Journal of Financial Research*, 26(1), 1-18.
- [7] Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of accounting research*, 159-178.
- [8] Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The quarterly journal of economics*, 116(1), 261-292.
- [9] Biddle, J. E., & Hamermesh, D. S. (1998). Beauty, productivity, and discrimination: Lawyers' looks and lucre. *Journal of labor Economics*, 16(1), 172-201.
- [10] Bøhren, Ø., & Staubo, S. (2014). Does mandatory gender balance work? Changing organizational form to avoid board upheaval. *Journal of Corporate Finance*, 28, 152-168.
- [11] Borghans, L., Heckman, J. J., Golsteyn, B. H., & Meijers, H. (2009). Gender differences in risk aversion and ambiguity aversion. *Journal of the European Economic Association*, 7(2-3), 649-658.
- [12] Bosquet, K., de Goeij, P., & Smedts, K. (2014). Gender heterogeneity in the sell-side analyst recommendation issuing process. *Finance Research Letters*, 11(2), 104-111.
- [13] Butler, M., Kraft, A., & Weiss, I. S. (2007). The effect of reporting frequency on the timeliness of earnings: The cases of voluntary and mandatory interim reports. *Journal of Accounting and Economics*, 43(2-3), 181-217.
- [14] Black, S. E., & Strahan, P. E. (2001). The division of spoils: rent-sharing and discrimination in a regulated industry. *American Economic Review*, 91(4), 814-831.
- [15] Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological bulletin*, 125(3), 367.
- [16] Canil, J., Karpavičius, S., & Yu, C. F. (2019). Are shareholders gender neutral? Evidence from say on pay. *Journal of Corporate Finance*, 58, 169-186.
- [17] Cao, Y., Guan, F., Li, Z., & Yang, Y. G. (2020). Analysts' beauty and performance. *Management Science*, 66(9), 4315-4335.
- [18] Chung, J., & Monroe, G. S. (2001). A research note on the effects of gender and task complexity on an audit judgment. *Behavioral Research in Accounting*, 13(1), 111-125.
- [19] Cohen, L., Frazzini, A., & Malloy, C. (2010). Sell-side school ties. *The Journal of Finance*, 65(4), 1409-1437.
- [20] Conger, J. A., & Kanungo, R. N. (1987). Toward a behavioral theory of charismatic leadership in organizational settings. *Academy of management review*, 12(4), 637-647.
- [21] Cooper, R. A., Day, T. E., & Lewis, C. M. (2001). Following the leader: a study of individual analysts' earnings forecasts. *Journal of Financial Economics*, 61(3), 383-416.
- [22] Cronqvist, H., & Yu, F. (2017). Shaped by their daughters: Executives, female socialization, and corporate social responsibility. *Journal of Financial Economics*, 126(3), 543-562.
- [23] Dahlbom, L., Jakobsson, A., Jakobsson, N., & Kotsadam, A. (2011). Gender and overconfidence: are girls really overconfident?. *Applied Economics Letters*, 18(4), 325-327.
- [24] Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological review*, 109(3), 573.
- [25] Elliott, W. B., Jackson, K. E., Peecher, M. E., & White, B. J. (2014). The unintended effect of corporate social responsibility performance on investors' estimates of fundamental value. *The Accounting Review*, 89(1), 275-302.
- [26] Ewens, M., & Townsend, R. R. (2020). Are early stage investors biased against women?. *Journal of Financial Economics*, 135(3), 653-677.
- [27] Faccio, M., Marchica, M. T., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of corporate finance*, 39, 193-209.
- [28] Fang, Y., & Wang, H. (2015). Fund manager characteristics and performance. *Investment Analysts Journal*, 44(1), 102-116.

- [29] Farrell, K. A., & Hersch, P. L. (2005). Additions to corporate boards: The effect of gender. *Journal of Corporate Finance*, 11(1-2), 85-106.
- [30] Felton, J., Gibson, B., & Sanbonmatsu, D. M. (2003). Preference for risk in investing as a function of trait optimism and gender. *The journal of behavioral finance*, 4(1), 33-40.
- [31] Gao, Y., Kim, J. B., Tsang, D., & Wu, H. (2017). Go before the whistle blows: An empirical analysis of director turnover and financial fraud. *Review of Accounting Studies*, 22(1), 320-360.
- [32] Goldin, C., & Rouse, C. (2000). Orchestrating impartiality: The impact of "blind" auditions on female musicians. *American economic review*, 90(4), 715-741.
- [33] Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments: Gender differences. *The quarterly journal of economics*, 118(3), 1049-1074.
- [34] Green, C., Jegadeesh, N., & Tang, Y. (2009). Gender and job performance: Evidence from Wall Street. *Financial Analysts Journal*, 65(6), 65-78.
- [35] Greenhaus, J. H., & Parasuraman, S. (1993). Job performance attributions and career advancement prospects: An examination of gender and race effects. *Organizational Behavior and Human Decision Processes*, 55(2), 273-297.
- [36] Gu, P. (2020). The effects of social bias against female analysts on markets. *Journal of Corporate Finance*, 64, 101681.
- [37] Guillén, L., Mayo, M., & Karelaia, N. (2018). Appearing self-confident and getting credit for it: Why it may be easier for men than women to gain influence at work. *Human Resource Management*, 57(4), 839-854.
- [38] Hanousek, J., Shamshur, A., & Trel, J. (2019). Firm efficiency, foreign ownership and CEO gender in corrupt environments. *Journal of Corporate Finance*, 59, 344-360.
- [39] Hardies, K., Lennox, C., & Li, B. (2016). Gender discrimination? Evidence from the public accounting profession. Working Paper.
- [40] Heilman, M. E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of social issues*.
- [41] Hibbert, A. M., Lawrence, E. R., & Prakash, A. J.. The effect of prior investment outcomes on future investment decisions: is there a gender difference?. *Review of Finance*, 2018, 22(3), 1195-1212.
- [42] Hong, H., & Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets. *Journal of financial economics*, 93(1), 15-36.
- [43] Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives?. *Journal of financial Economics*, 108(3), 822-839.
- [44] Huang, A. H., Zang, A. Y., & Zheng, R. (2014). Evidence on the information content of text in analyst reports. *The Accounting Review*, 89(6), 2151-2180.
- [45] Jannati, S., Kumar, A., Niessen-Ruenzi, A., & Wolfers, J. (2020). In-group bias in financial markets. Available at SSRN 2884218.
- [46] Joshi, A., Neely, B., Emrich, C., Griffiths, D., & George, G. (2015). Gender research in AMJ: an overview of five decades of empirical research and calls to action: thematic issue on gender in management research. *Academy of Management Journal*, 58(5), 1459-1475.
- [47] Kadan, O., Madureira, L., Wang, R., & Zach, T. (2008). Conflicts of interest and stock recommendations: The effects of the global settlement and related regulations. *The Review of Financial Studies*, 22(10), 4189-4217.
- [48] Kumar, A. (2010). Self-selection and the forecasting abilities of female equity analysts. *Journal of Accounting Research*, 48(2), 393-435.
- [49] Lara, J. M. G., Osma, B. G., Mora, A., & Scapin, M. (2017). The monitoring role of female directors over accounting quality. *Journal of Corporate Finance*, 45, 651-668.
- [50] Lennox, C. S., & Wu, X. (2018). A review of the archival literature on audit partners. *Accounting Horizons*.
- [51] Levitt, S. D. (2004). Testing theories of discrimination: evidence from Weakest Link. *The Journal of Law and Economics*, 47(2), 431-452.
- [52] Li, K. K., & You, H. (2015). What is the value of sell-side analysts? Evidence from coverage initiations and terminations. *Journal of Accounting and Economics*, 60(2-3), 141-160.
- [53] Li, Y., & Zeng, Y. (2019). The impact of top executive gender on asset prices: Evidence from stock price crash risk. *Journal of Corporate Finance*, 58, 528-550.
- [54] Li, X., Sullivan, R. N., Xu, D., & Gao, G. (2013). Sell-side analysts and gender: A comparison of performance, behavior, and career outcomes. *Financial Analysts Journal*, 69(2), 83-94.
- [55] Loh, R. K., & Mian, G. M. (2006). Do accurate earnings forecasts facilitate superior investment recommendations?. *Journal of Financial Economics*, 80(2), 455-483.
- [56] Malmendier, U., Tate, G., & Yan, J. (2011). Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies. *The Journal of finance*, 66(5), 1687-1733.
- [57] McDonald, M. L., Keeves, G. D., & Westphal, J. D. (2018). One step forward, one step back: White male top manager organizational identification and helping behavior toward other executives following the appointment of a female or racial minority CEO. *Academy of Management Journal*, 61(2), 405-439.
- [58] McGuinness, P. B., Vieito, J. P., & Wang, M. (2017). The role of board gender and foreign ownership in the CSR performance of Chinese listed firms. *Journal of Corporate Finance*, 42, 75-99.
- [59] Mikhail, M. B., Walther, B. R., & Willis, R. H. (2007). When security analysts talk, who listens?. *The Accounting Review*, 82(5), 1227-1253.
- [60] Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much?. *The quarterly journal of economics*, 122(3), 1067-1101.
- [61] Nevicka, B., Ten Velden, F. S., De Hoogh, A. H., & Van Vianen, A. E. (2011). Reality at odds with perceptions: Narcissistic leaders and group performance. *Psychological Science*, 22(10), 1259-1264.
- [62] Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much?. *The quarterly journal of economics*, 122(3), 1067-1101.
- [63] Pierce, C. A., Aguinis, H., & Adams, S. K. (2000). Effects of a dissolved workplace romance and rater characteristics on responses to a sexual harassment accusation. *Academy of Management Journal*, 43(5), 869-880.
- [64] Pyszczynski, T. A., & Greenberg, J. (1981). Role of disconfirmed expectancies in the instigation of attributional processing. *Journal of Personality and Social Psychology*, 40(1), 31.
- [65] Rao, H., Greve, H. R., & Davis, G. F. (2001). Fool's gold: Social proof in the initiation and abandonment of coverage by Wall Street analysts. *Administrative science quarterly*, 46(3), 502-526.

- [66] Raver, J. L., & Gelfand, M. J. (2005). Beyond the individual victim: Linking sexual harassment, team processes, and team performance. *Academy of Management Journal*, 48(3), 387-400.
- [67] Romer, D. (1984). The theory of social custom: A modification and some extensions. *The Quarterly Journal of Economics*, 99(4), 717-727.
- [68] Stickel, S. E. (1995). The anatomy of the performance of buy and sell recommendations. *Financial Analysts Journal*, 51(5), 25-39.
- [69] Sunden, A. E., & Surette, B. J. (1998). Gender differences in the allocation of assets in retirement savings plans. *The American Economic Review*, 88(2), 207-211.
- [70] Twedt, B. (2016). Spreading the word: Price discovery and newswire dissemination of management earnings guidance. *The Accounting Review*, 91(1), 317-346.
- [71] Vernon, R. J., Sutherland, C. A., Young, A. W., & Hartley, T. (2014). Modeling first impressions from highly variable facial images. *Proceedings of the National Academy of Sciences*, 111(32), E3353-E3361.
- [72] Wayne, S. J., & Kacmar, K. M. (1991). The effects of impression management on the performance appraisal process. *Organizational behavior and human decision processes*, 48(1), 70-88.
- [73] Wennerås, C., & Wold, A. (1997). Nepotism and sexism in peer-review. *nature*, 387(6631), 341.
- [74] Wolfers, J. (2006). Diagnosing discrimination: Stock returns and CEO gender. *Journal of the European Economic Association*, 4(2-3), 531-541.
- [75] Zhang, Y. (2008). Analyst responsiveness and the post-earnings-announcement drift. *Journal of Accounting and Economics*, 46(1), 201-215.