Gender, Competition, and Performance: International Evidence*

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Abstract

This paper is the first in the literature to study whether and how gender differences in preference for competition and performance under competition vary across countries. Using a hand-collected sample of 18,300 equity analysts from 44 countries over the period 2003-2019, we first show that there is a negative and significant association between a country's level of gender equality and its female share of equity analysts, and that there is no significant association between a country's individualism score and its female share of equity analysts. Our first finding is consistent with the gender equality and competition hypothesis in which females' aversion to competition is elevated in countries with high levels of gender equality. Using firm times year fixed effects to account for time-varying unobservables that could potentially drive female analysts' coverage decision and their performance, we show that in highly individualistic countries, there is no significant difference in forecast accuracy between genders. This finding is consistent with the culture and performance hypothesis in which a country's individualism score mitigates the negative association between competition and women's on-the-job performance. In additional analysis, we show that in Nordic countries or in countries with the Communist ideology, there is no significant difference in forecast accuracy between genders. Finally, we find that female analysts are more overconfident as measured by absolute deviations from the consensus forecast in highly individualistic countries compared to their peers in less individualistic countries. We conclude that there are important cross-country variations in gender differences in preference for competition and performance under competition – gender differences in preferences and performance are shaped by a country's gender equality policies, individualistic culture, and social norms.

Keywords: gender; competition; equity analysts; forecast error; gender equality; individualism; international evidence

JEL classification: G14; G15; G24

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Abstract

This paper is the first in the literature to study whether and how gender differences in preference for competition and performance under competition vary across countries. Using a hand-collected sample of 18,300 equity analysts from 44 countries over the period 2003-2019, we first show that there is a negative and significant association between a country's level of gender equality and its female share of equity analysts, and that there is no significant association between a country's individualism score and its female share of equity analysts. Our first finding is consistent with the gender equality and competition hypothesis in which females' aversion to competition is elevated in countries with high levels of gender equality. Using firm times year fixed effects to account for time-varying unobservables that could potentially drive female analysts' coverage decision and their performance, we show that in highly individualistic countries, there is no significant difference in forecast accuracy between genders. This finding is consistent with the culture and performance hypothesis in which a country's individualism score mitigates the negative association between competition and women's on-the-job performance. In additional analysis, we show that in Nordic countries or in countries with the Communist ideology, there is no significant difference in forecast accuracy between genders. Finally, we find that female analysts are more overconfident as measured by absolute deviations from the consensus forecast in highly individualistic countries compared to their peers in less individualistic countries. We conclude that there are important cross-country variations in gender differences in preference for competition and performance under competition – gender differences in preferences and performance are shaped by a country's gender equality policies, individualistic culture, and social norms.

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1. Introduction

Although women comprise nearly half the global labor force, they are severely underrepresented in the most competitive and also the most powerful positions in business. In the U.S., women account for 6% of Chief Executive Officer (CEO) positions and 21% of board seats among the Standard and Poor's (S&P) 500 firms in 2020 (Catalyst 2021). Common explanations for the persistent gender gap are discrimination (Goldin and Rouse 2000; Black and Strahan 2001), and that men and women differ in their job preferences related to competition (Niederle and Vesterlund 2011). Supporting the latter explanation, Niederle and Vesterlund (2007) show that women are generally less keen on being exposed to competition. Gneezy, Niederle, and Rustichini (2003) further show that men's performance increases in competition whereas women's performance does not. If women are more reluctant to compete, then they may be less likely to enter competitive fields (e.g., the financial industry).

Much of our understanding of gender differences in preference for competition and performance under competition is based on laboratory studies, known to accentuate gender stereotypes (Niederle and Vesterlund 2011), and/or rely on participants and samples largely from western industrialized countries with high levels of gender equality and economic development (Booth 2009; Croson and Gneezy 2009; Reuben, Rey-Biel, Sapienza, and Zingales 2012; Reuben, Sapienza, and Zingales 2021). There is a scarcity of research on the role of gender differences in preference for competition in women's career choices and job performances in an international setting.

This paper fills a gap in current research related to our understanding of gender, competition, and performance by assembling an international sample of equity analysts with information on gender. We address three research questions: 1) are there cross-country differences in the relation between gender and preferences for competition? 2) does

competition hurt women's on-the-job performance? and 3) are there cross-country differences in the relation between competition and women's on-the-job performance?

In a *Science* article, Falk and Hermle (2018) find that higher levels of gender equality and economic development accentuate gender differences in preferences (e.g., risk-taking, patience, and trust) across countries. Our first measure of country-level differences is a composite index of gender equality that spans practices, policies, and resources that support gender equality.

National cultural values define what constitutes appropriate decisions and behaviors in a society (North 1990). Our second measure of country-level differences is the individualism dimension in Hofstede's (1980, 2001) national cultural framework, which is the most important driver of cultural differences across countries (Triandis 1995), and is associated with important economic outcomes (e.g., Gorodnichenko and Roland 2011).

Given that equity analysts are known to be a highly competitive profession (Hong and Kacperczyk 2010), we expect that in more gender equal countries, women will have greater freedom to express their gender-specific preferences – aversion to competition – than their counterparts in less gender equal countries, and thus the female share of equity analysts in a country is negatively associated with its level of gender equality – the gender equality and competition hypothesis.

Individualism emphasizes independence and equality among individuals, whereas collectivism emphasizes the group's interests and harmony (Trompenaars 1993; Hofstede 2001). On the one hand, individualistic societies emphasize personal freedom; gender differences in preference for competition will be accentuated, resulting in a negative association between a country's individualism score and its female share of equity analysts. On the other hand, individualistic societies promote personal achievements and overconfidence; gender differences in preference for competition will be attenuated, resulting

in a positive association between a country's individualism score and its female share of equity analysts. Ultimately, it is an empirical question. Our culture and competition hypothesis is thus that there is no significant association between a country's individualism score and its female share of equity analysts.

According to the gender equality and competition hypothesis, women in countries with greater gender equality are freer to express their aversion to competition, resulting in that only fewer and more capable women opt in a highly competitive profession such as equity analysts compared to their peers in countries with less gender equality. Consistent with this conjecture, in one of the first studies of female equity analysts in the U.S., a country scoring high on gender equality, Kumar (2010) finds that only females with superior abilities become equity analysts—female analysts are more accurate in their earnings forecasts than their male counterparts. In our international setting, we expect that the negative effect of competition on performance is attenuated for female analysts in more gender equal countries due to this self-selection – the gender equality and performance hypothesis.

The social psychology literature has established a link between individualism and overconfidence that fosters competition (Markus and Kitayama 1991; Heine, Lehman, Markus, and Kitayama 1999). Moreover, societies scoring high on collectivism (low on individualism) view employer-employee relationships like a family; poorly-performing analysts are more likely to be fired in highly individualistic countries compared to those in highly collectivistic societies (Clement, Rees, and Swanson 2003). To the extent that individualism fosters competition, potentially narrowing the gender gap in preferences for competition in highly individualistic countries, combined with the fact that only better-performing analysts survive in highly individualistic countries, we expect that a country's individualism score mitigates the negative association between competition and women's on-the-job performance – the culture and performance hypothesis.

Using a hand-collected sample of 18,300 equity analysts from 44 countries over the period 2003-2019, we examine whether and how gender differences in preference for competition and performance under competition vary across countries. We first show that there is a negative and significant association between a country's level of gender equality and its female share of equity analysts, and that there is no significant association between a country's individualism score and its female share of equity analysts. The former is consistent with the gender equality and competition hypothesis in which females' aversion to competition is elevated in countries with high levels of gender equality. The latter is consistent with the culture and competition hypothesis in which there is no clear prediction of the role of a country's individualism score in its female share of equity analysts.

Using firm times year fixed effects to account for time-varying unobservables that could potentially drive female analysts' coverage decision and their performance (Clement 1999; Hong and Kacperczyk 2010; Hilary and Shen 2013), we show that in highly individualistic countries, there is no significant difference in forecast accuracy between genders, whereas female equity analysts do not perform differently compared to their male counterparts across countries with different levels of gender equality. The former is consistent with the culture and performance hypothesis in which a country's individualism score mitigates the negative association between competition and women's on-the-job performance. The latter does not support the gender equality and performance hypothesis in which a country's gender equality policies mitigate the negative association between competition and women's on-the-job performance. In additional analysis, we show that in Nordic countries or in countries with the Communist ideology, there is no significant difference in forecast accuracy between genders. Finally, we find that female analysts are more overconfident as measured by absolute deviations from the consensus forecast in highly individualistic countries compared to their peers in less individualistic countries. We

conclude that there are important cross-country variations in gender differences in preference for competition and performance under competition – gender differences in preferences are shaped by a country's gender equality policies, individualism score, and social norms.

Our paper is among the first in the accounting and finance literature, as far as we are aware, to assemble an international data set on equity analysts with information on gender and to study the important role of country-level factors in moderating women's aversion to competition and the known negative association between competition and performance for women. We contribute to the literature in the following ways.

First and foremost, we offer new insights into the relationship between gender, competition, and performance by taking an international lens. Different from prior work that largely relies on participants in a laboratory setting and/or participants and samples from western industrialized countries, we establish large cross-country variations in gender differences in preference for competition and women's on-the-job performance under competition. We show that in the case of preferences for competition, cross-country differences trump gender differences.

Second, our evidence on the important roles of gender equality and national culture is new to the literature on gender and competition (see the review article by Niederle and Vesterlund 2011). Using a global sample of professionals with the same occupation, we highlight the role of self-selection in female analysts' on-the-job performance when facing competition. Prior work in a laboratory setting where participants of both genders are randomly chosen and typically from the same country/region, cannot incorporate country-level differences in resources supporting female labor market participation and cultural values that we show to be important, when evaluating gender performance differences under competition.

Third and finally, our paper contributes to the ongoing debate on whether nature or nurture determines preferences. We show that exposure to different social norms/ideologies significantly changes individuals' behavior including their preferences for competition, even among the most sophisticated labor market participants. We find that females growing up in countries with the Communist ideology are more competitively inclined than their counterparts in countries without such ideology. Moreover, there is no significant difference in performance between genders in countries with the Communist ideology.

Given the ongoing debate among regulators, policy makers, and media around the world on the role of female business leaders, female board members in particular, in creating shareholder value, the findings in our paper will inform and shape government policies and business practices involving recruitment, development, and deployment of diverse talents.

2. Literature Review and Hypothesis Development

2.1. Literature review on gender, competition, and performance

Economists have long observed gender differences in consumption, investment, and trading, and in the labor market (Croson and Gneezy 2009). In a survey of gender differences in economic experiments, Croson and Gneezy (2009) identify robust differences in risk preferences, altruism, and competitive preferences. Observing participants in a laboratory setting to solve a real task, Niederle and Vesterlund (2007) find that women are generally less keen on being exposed to competition. Gneezy, Niederle, and Rustichini (2003) further present experimental evidence that men's performance increases in competition whereas women's do not.

Much of our understanding of gender differences in preferences for competition and performance under competition is based on laboratory studies, which are known to accentuate gender stereotype (Niederle and Vesterlund 2011), and/or rely on participants and samples

largely from western industrialized countries with high levels of gender equality and economic development (see the review article by Croson and Gneezy 2009).

In a *Science* article, Falk and Hermle (2018) test two hypotheses that make opposite predictions concerning the cross-country association of gender differences in preferences with gender equality and economic development. Under the social role hypothesis, gender differences in preferences are negatively associated with higher levels of gender equality and economic development because the attenuation of gender-specific social roles that arises in more developed and gender-egalitarian countries may alleviate gender differences in preferences. Under the resource hypothesis, gender differences in preferences are positively associated with higher levels of gender equality and economic development because greater availability of economic and social resources removes the gender-neutral goal of subsistence and creates the scope for gender-specific ambitions and desires. Using a sample of 80,000 individuals in 76 countries representing about 90% of both the world population and global income, and measures of willingness to take risks, patience, altruism, positive and negative reciprocity, and trust, the authors find higher levels of gender equality and economic development *accentuate* gender differences in preferences across countries, supporting their resource hypothesis.

National culture—the "beliefs and values that ethnic, religious, and social groups transmit fairly unchanged from generation to generation" (Guiso, Sapienza, and Zingales 2006, p. 23)—has been shown to affect a wide range of individual behaviors. A number of studies provide evidence suggesting that culture and social norms/behaviors affect individuals' preferences for competition. In a highly cited study, Gneezy, Leonard, and List (2009) compare gender differences in preference for competition between a patriarchal society and a matrilineal society. They find that, while women in the patriarchal society are less competitively inclined than men, their counterparts in the matrilineal society are more

competitive than men. They conclude that culture matters and that women can be nurtured to be more competitive. Booth and Nolen (2012) compare gender gaps in competitive behavior between girls and boys aged 14 and 15 from single-sex and co-educational environments in the U.K., and find robust differences between the competitive choices of girls from single-sex and co-educational schools – girls from single-sex schools behave more like boys in their preferences for competition. Booth, Fan, Meng, and Zhang (2019) examine whether or not the gender difference in preference for competition can be altered due to changing social norms such as a country's adoption of the Communist ideology. From 1949 onwards, Mainland China experienced a series of dramatic changes in its social and economic institutions: traditional Confucian culture in which women are subordinate to men was denounced, and gender equality was promoted. A widely known political slogan in Mainland China promoting women's status in the society was 'women hold up half of the sky.' As a result of such indoctrination, women's labor force participation rate in Mainland China was at similar level as their male counterparts and there was little gender gap in pay (Booth et al. 2019). Using females and males in Taipei as the benchmark where the traditional Confucian values remain intact, Booth et al. (2019) show that females in Beijing are more competitively inclined than their male counterparts.

2.2. Hypothesis development

Motivated by the international evidence in Falk and Hermle (2018) that high country-level gender equality accentuates gender differences in preferences, and the known fact that women are less competitively inclined than men, our first hypothesis regarding gender differences in preference for competition across countries is as follows:

H1 (the gender equality and competition hypothesis): The female share of equity analysts in a country is negatively associated with its level of gender equality.

National culture is another important attribute of cross-country differences that could potentially shape or even alter gender differences in preferences. Individualism emphasizes independence and equality among individuals, whereas collectivism emphasizes the group's interests and harmony (Trompenaars 1993; Hofstede 2001). On the one hand, individualistic societies emphasize personal freedom; gender differences in preference for competition will be accentuated in highly individualistic societies, resulting in a negative association between a country's individualism score and its female share of equity analysts.

On the other hand, the social psychology literature establishes that individuals in highly individualistic societies are more overconfident than their counterparts in less individualistic societies. Markus and Kitayama (1991) argue that in individualistic cultures people think positively about themselves and focus on their own internal attributes, such as their abilities. Heine et al. (1999, pp. 769–770) further note that children in individualistic cultures "are encouraged to think about themselves positively as stars, as winners, as above average and as the repositories of special qualities," which tend to make them overestimate their abilities, i.e., they are overconfident. We thus expect that gender differences in preference for competition will be attenuated in highly individualistic societies, resulting in a positive association between a country's individualism score and its female share of equity analysts. Ultimately, it is an empirical question. Our culture and competition hypothesis is thus as follows:

H2 (the culture and competition hypothesis): There is no significant association between a country's individualism score and its female share of equity analysts.

In one of the first studies of female equity analysts in the U.S., a country scoring high on gender equality, Kumar (2010, p. 394) posits that female equity analysts "…are more likely to represent a special group of competitive women who choose to pursue a career in the male-dominated financial services industry." Under his self-selection hypothesis, only

women with above average abilities would choose the analyst profession and, consequently, female analysts on average are likely to be more skillful than male analysts as measured by forecast performance, and upward career trajectories. Fang and Huang (2017, p. 3306) motivate their study of gender and connection among Wall Street equity analysts by saying, "…because it is a highly demanding work environment, only the most competitive women will enter this work force (Kumar 2010). This self-selection removes the large gender difference in risk aversion and competitiveness that the literature has documented in the general population." Both studies find strong supporting evidence for highly competitive and capable women self-select into becoming equity analysts in the U.S.

Outside the U.S., using a survey of directors in Sweden, Adams and Funk (2012) show that female directors are more risk loving than their male counterparts. It is worth noting that at the time of the study in 2006, Sweden was ranked number one out of 115 countries in the World Economic Forum's (WEF) Global Gender Gap Index, which benchmarks national gender gaps on economic, political, education- and health-based criteria. Adams and Funk (2012) interpret their findings due to women's self-selection caused by low career choice costs: when these costs are low or absent as in Sweden, female directors will behave more similar to male directors.

Under our gender equality and competition hypothesis (H1), women in countries with greater gender equality are freer to express their preferences including aversion to competition, resulting in that only the more competitive/capable women choose to work in highly competitive profession such as equity analysis compared to their counterparts in countries with less gender equality. The single-country evidence in Kumar (2010) and Adams and Funk (2012) is consistent with our gender equality and competition hypothesis. Given the known gender differences in performance under competition (Gneezy, Niederle, and

Rustichini 2003), and our hypothesized elevated females' aversion to competition in more gender equal countries, resulting in self-selection, we thus expect that:

H3 (the gender equality and performance hypothesis): The negative effect of competition on performance is attenuated for female analysts in more gender equal countries.

The social psychology literature has established a link between individualism and overconfidence that fosters competition (Markus and Kitayama 1991; Heine et al. 1999). Moreover, collectivistic societies (i.e., low on individualism) view employer-employee relationships like a family link; once an analyst is hired, he or she does not need to provide accurate forecasts in order to survive. Clement, Rees, and Swanson (2003) find that poorly-performing analysts are more likely to be fired in highly individualistic countries compared to those in highly collectivistic societies. To the extent that individualism fosters competition, potentially narrowing the gender gap in preferences for competition in highly individualistic countries, combined with the fact that only better-performing analysts survives in highly individualistic countries, we expect that a country's individualism score attenuates the negative association between competition and women's on-the-job performance. Our final hypothesis is thus as follows:

H4 (the culture and performance hypothesis): The negative effect of competition on performance is attenuated for female analysts in highly individualistic countries.

3. Sample Formation and Overview

3.1. Sample formation

To test our hypotheses, we need to assemble a global sample of equity analysts with information on gender, employment location, and performance as measured by earnings forecast errors using data from the Institutional Brokers Estimates System (I/B/E/S) international files.

One way to determine an analyst's gender is to use their full name (see, for example, Kumar (2010) in a U.S. study).[1] However, I/B/E/S does not report an analyst's full name but only their last name and first name initial. Regarding an analyst's employment location, one may infer such information from where their brokerage house operates. However, I/B/E/S only provides abbreviated brokerage names.[2] As a result, we cannot determine who the analysts are, for which brokerage house they work, and their gender and employment location from I/B/E/S.

To form an international sample of equity analysts for our study, we start with a list of brokerages (with abbreviated names) that provided stock recommendations on global equities in I/B/E/S over the period 2003–2019. We start our sample period in 2003 because our key data source – Capital IQ's coverage of analyst biographies became more comprehensive since 2003.[3] We then conduct manual search in Capital IQ to obtain full names of brokerages and their analysts, analyst gender, and analyst employment location.[4] Appendix A provides a detailed desription of our matching process.

Next, we merge the analyst-firm-year sample to the Worldscope database from which basic firm-level financial data are collected. We remove firms with stock price less than USD $1 and market capitalization less than USD $10 millions at the end of the fiscal year. We also remove countries with fewer than ten firms, and countries with fewer than ten analysts over

[1] Kumar (2010) relies on a number of sources to obtain the full names of analysts: the Institutional Investor magazine, Nelson' s directory of investment research and analyst directories available at Yahoo Finance, and other financial Web sites, supplemented with searches of news articles on Factiva and Google.
[2] Before 2006, researchers could get brokerages' full names using the I/B/E/S broker translation file; this translation file is no longer available.
[3] Capital IQ is a market intelligence platform developed by Standard & Poor's Global. It provides detailed business history for brokerages and personal information on analysts including employment history, employment location, and gender. Capital IQ obtains such information directly from Thomson Reuters (Lourie 2019).
[4] Forecasts made by foreign analysts are those made to a firm whose country of primary listing (based on the nation code in Worldscope) differs from the country of employment of the covering analyst.

the sample period. Finally, we also remove country and firm observations with missing values of country- and/or firm-level control variables.

Table 1 reports the impact of various matching steps and data filters to arrive at the final sample of 18,300 equity analysts affiliated with 1,185 brokerages located in 44 countries/regions. As far as we are aware, this is one of the largest global sample of equity analysts in the literature (see, for example, Bae, Stulz, and Tan 2008; Bradshaw, Huang, and Tan 2019).

3.2. Key variables

At the country-year level, our key variable of interest is the female share of equity analysts, *Female ratio*, constructed as the number of unique female analysts divided by the total number of unique analysts in a country-year.[5]

At the analyst-firm-year level, our key variable of interest is forecast performance, *Average forecast error*, constructed as the average of absolute forecast errors that an analyst makes in a year. We use analysts' annual earnings per share (EPS) forecasts following the extant literature (see, for example, Clement 1999; Hong and Kacperczyk 2010; Kumar 2010) as well as due to the fact that annual EPS forecasts have the widest coverage, which is important given our international sample. We merge analysts in the I/B/E/S recommendation file to those in the I/B/E/S unadjusted detail EPS file, and only retain forecasts with the forecast period indicator FPI = 1. Absolute forecast error is the absolute value of the difference between an analyst's annual EPS forecast and actual EPS normalized by the stock price at the end of the prior fiscal year after accounting for stock splits (i.e., using the split factor provided in I/B/E/S to account for the effect on the number of shares outstanding).

[5] One caveat to our sample formation and variable construction is that we only keep analysts whose gender information is available.

In terms of key explanatory variables at the country-level, we estimate an overall gender equality index (GEI) as the first principal component of three country-level gender equality-related variables including the Global Gender Gap Index of the World Economic Forum (WEF), the Gender Inequality Index of the United Nations (UN), and GDP per capita from the World Bank, following prior literature (Adam and Kirchmaier 2015; Falk and Hermle 2018). The principal component analysis is performed annually on our sample countries. The first principal component is scaled to lie between 0 and 1. The higher the value of the GEI, the more gender equal a country is.

The cultural dimension of individualism is related to the preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families (Hofstede 2011). A higher value indicates higher individualism. The data is obtained from the Hofstede Culture Dimension website.[6] Appendix B provides detailed variable definitions.

3.3. Sample overview

Table 2 Panel A presents an overview of our global analyst sample by country. We show that across 44 sample countries, the average share of female analysts is 18.8%. The top three countries with the highest female analyst share (in descending order) are: Vietnam (43.1%), Thailand (37.9%), and Portugal (36.8%), and the top three countries with the lowest female analyst share are: Peru (0%), Norway (4.2%), and Czech Republic (4.8%). The top three countries with the largest number of earnings forecasts are: the U.S. (1,276,283 observations, representing 48.5% of the sample), the U.K. (243,251 observations; 9.2%), and Canada (194,929 observations; 7.4%).

[6] https://geerthofstede.com/research-and-vsm/dimension-data-matrix/.

Table 2 Panel B presents an overview of country-level variables. Using our composite GEI as a marker for gender equality, we show that the top three countries in terms of gender equality are: Norway, Sweden, and Finland, and the bottom three countries are: Pakistan, India, and Indonesia. The top three countries in terms of economic development as measured by GDP per capita are: Norway, Switzerland, and Denmark, and the bottom three countries are: India, Vietnam, and Pakistan. It is well established that country-level gender equality and economic development go hand-in-hand (see, for example, Falk ad Hermle 2018), which is the reason we construct our GEI index with GDP per capita as an input factor. The top three countries in terms of individualism (IDV) are: the U.S., Australia, and the U.K., and the bottom three countries are: Peru, Indonesia, and Pakistan. The top three countries in terms of masculinity (MAS) are: Japan, Hungary, and Austria, and the bottom three countries are: the Netherlands, Norway, and Sweden.

Figure 1 Panel A plots the average female share of equity analysts in a country in relation to its gender equality index (GEI). We observe a negative association between a country's level of gender equality and its female share of equity analysts. Given that equity analysts are known to be a highly competitive profession, the plot in Panel A is consistent with the gender equality and competition hypothesis whereby women's aversion to competition is elevated in countries with greater gender equality.

Figure 1 Panel B plots the average female share of equity analysts in a country in relation to its cultural value of individualism (IDV). We do not discern a clear direction of the association between a country's individualism score and its female share of equity analysts.

Table 3 Panel A presents the summary statistics for key country-level variables. Given that we are one of the first studies with a focus on gender differences across countries, it is informative to compare our international sample to the U.S. sample used in prior studies (see, for example, Kumar 2010; Fang and Huang 2017). We show that the average female

share of equity analysts across the 44 sample countries is 17%, whereas in the U.S., the female share of equity analysts is 10% over the sample period 2003-2019. Based on a sample of 12,812 unique analysts over the period 1983-2005, Kumar (2010) shows that the female share of equity analysts is 16% in the U.S. We attribute the difference to different sample periods and ways of identifying female analysts. We further show that the sample average gender equality index is 0.69, whereas the U.S.'s average gender equality index is 0.76. The sample average individualism score is 0.50, and the U.S. scores the highest in individualism at 0.91. In terms of other country-level control variables, we show that the across-country average of stock market capitalization normalized by GDP is 0.93, the U.S. average is 1.28. The U.S. firms also have a higher average M/B ratio at 1.71 than that for firms in the international sample at 1.28, a negative average net income normalized by total assets compand a positve average for firms in the international sample, a much higher average institutional ownereship at 0.48 than that for firms in the international sample at 0.10.

Table IA1 Panel A in the Internet Appendix presents the correlation matrix of country-level variables. We show that there is a negative and significant association between the female share of equity analysts and the indicator variable for high gender equality, and between the female share of equity analysts and the indicator variable for high individualism. Given that omitted variable bias in univariate correlations can mask the true relations between the variables, we will employ multiple regressions to examine the factors associated with the female share of equity analysts in a country.

Table 3 Panel B presents the summary statistics for key analyst-firm-level variables. Again, it is informative to compare our international sample to the U.S. sample, which is well studied in the analyst literature (see, for example, Clement 1999; Hong and Kacperczyk 2010; Clement and Tse 2005). We show that the mean (median) *Average forecast error* (in percentage points) across the 44 sample countries is 2.90% (0.74%), whereas in the U.S., the

mean (median) *Average forecast error* is 2.24% (0.54%). Using a sample of stocks covered by I/B/E/S over the period 1980-2005, Hong and Kacperczyk (2010) show that the mean absolute forecast error is 3.31%. Our summary statistics for *Average forecast error* are largely consistent with theirs. As alternative measures of analyst performance, we also introduce the absolute first/last forecast error made by an analyst in her first/last annual EPS forecast, as well as the absolute same day forecast error made by an analyst in her forecast that is within the five days after prior year's annual earnings announcement. We show that for all these three measures, the U.S. sample exhibit smaller values than those in the international sample, consistent with our conjecture that U.S. firms' information environment is more transparent than that outside the U.S.

At the analyst-firm-year level, the average female share of equity analysts in the international sample is 11.0%, whereas the average female share of equity analysts in the U.S. is 8.0%. Compared to the statistics at the country-year level in Panel A, the lower shares at the analyst-firm-year level suggest that female analysts cover fewer firms and/or make fewer forecasts than their male counterparts. Interestingly, we show that in the international sample, the share of foreign analysts whose country of residence differs from the incorporation location of a firm they cover, is much higher at 18.5% compared to the share at 11.5% in the U.S., suggesting that analysts residing in developed countries such as the U.S. are more likely to cover stocks in developing countries (and not the other way around). Other summary statistics about the U.S. sample are largely consistent with prior work (see, for example, Clement 1999).

Table IA1 Panel B in the Internet Appendix presents the correlation matrix of analyst-firm-level variables. We show that there is no significant association between the indicator variable *Female* and three of the four performance measures: *Average forecast error*, *First forecast error*, and *Same day forecast error*, whereas a positive and significant association

between the indicator variable *Female* and *Last forecast error*. We further show that the indicator variable *High GEI* is largely positively, whereas the indicator variable *High IDV* is largely negatively, correlated with different measures of analyst performance.

4. Main Findings

4.1. Cross-country differences in the female share of equity analysts

In this section, we examine whether and how country-level characteristics are associated with women pursuing a competitive career as equity analysts. We employ the following panel data regression specification:

$$Female\ ratio_{c,t} = \alpha + \beta_1 High\ GEI_{c,t-1} + \beta_2 High\ IDV_{c,t-1} + \beta_3 Other\ country\ characteristics_{c,t-1} + Year\ FE + e_{c,t}, \quad (1)$$

where the dependent variable is *Female ratio,* measured as the female share of equity analysts in country *c* in year *t. High GEI* is an indicator variable that takes the value of one if country *c's* composite GEI is in the top quartile among sample countries in that year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if country *c*'s individualism score is in the top quartile among sample countries, and zero otherwise. Our country-level control variables largely follow prior literature, such as Adams and Kirchmaier (2015), and Griffin, Li, and Xu (2021). Year fixed effects are included to control for time-varying unobservables that might drive women's labor market participation in the financial industry. The sample consists of country-year observations.

Table 4 Panel A presents the regression results when the dependent variable is the female share of equity analysts in a country. Our variables of interest are the country-level indicator variables: *High GEI* and *High IDV*. Column (1) presents the results including all countries, and column (2) presents the results removing the U.S. We show that across both columns, there is a negative and significant association between a country's gender equality index and its female share of equity analysts, consistent with the gender equality and

competition hypothesis (H1) whereby greater availability of economic and social resources accentuate gender-specific ambitions and desires including women's aversion to competition. In terms of the economic significance, the difference between a country scoring high on the gender equality index and a country not scoring high on the same index is a 6.7 percentage points drop in its female share of equity analysts. With the sample average female share of equity analyst at 16.9%, this is a sizable effect. We further show that there is no significant association between a country's individualism score and its female share of equity analysts, consistent with the culture and competition hypothesis (H2).[7] Finally, we show that there is a positive and significant association between a country's stock market development as measured by the ratio of aggregate market capitalization to GDP and its female share of equity analysts, and a positive and significant association between a country's listed firms' aggregate profitability (net income normalized by book assets) and its female share of equity analysts,

Table 4 Panel B presents the regression results when we explore other ways of grouping countries with a focus on gender equality or ideology. Column (1) presents the results when the variable of interest is the indicator variable, *Nordic*, that takes the value of one for any of the four Nordic countries – Denmark, Finland, Norway, and Sweden, and zero otherwise. We show that the female share of equity analysts in a Nordic country is significantly lower than that in a non-Nordic country. In terms of the economic significance, the gap in the female share between Nordic countries and non-Nordic countries is 9.5 percentage points. Given that the Nordic countries are known to have the highest level of gender equality, our finding provides further support for the gender equality and competition hypothesis (H1).

[7] Table IA2 in the Internet Appendix presents the regression results when we include another national cultural value – masculinity. We show that our main findings in Table 4 Panel A remain. In addition, there is no significant association between a country's masculinity score and its female share of equity analysts.

Column (2) presents the results when the variable of interest is the indicator variable, *Communist*, that takes the value of one for three practicing countries/regions – China, Hong Kong, and Vietnam, and zero otherwise. We show that the female share of equity analysts in a Communist country is significantly higher than that in a non-Communist country. In terms of the economic significance, the gap in the female share between Communist countries and non-Communist countries is 9.6 percentage points. These findings suggest that ideology or social norm also shapes preferences, and as ideology shifts so as preferences.[8]

In summary, our results in Table 4 highlight the importance of social and economic resources that accentuate gender differences in preference, leading to a negative and significant association between a country's level of gender equality and its share of females pursuing a highly competitive profession – equity analysts. Our evidence is in support of the gender equality and competition hypothesis. Moreover, Table 4 adds new evidence to the ongoing debate on whether nature or nurture determines preferences.

4.2. Gender, competition, and performance under competition

In this section, we examine whether there is any cross-country difference in female analysts' performance under competition. We employ the following panel data regression specification:

$$Forecast\ performance_{c,i,j,t} = \alpha + \beta_1 Female_j + \beta_2 Female_{j,t} \times High\ GEI_{c,t} + \beta_3 Female_{j,t} \times High\ IDV_c + \beta_4 Analyst\ characteristics_{j,t} + \beta_5 Brokerage\ characteristics_{j,t} + Firm \times Year\ FE + e_{c,i,j,t}, \quad (2)$$

where the dependent variable is analyst forecast performance. Our main measure, *Average forecast error*, is the average of absolute forecast errors made by analyst *j* residing in country *c* on firm *i* when making the current year *t* EPS forecasts. For robustness checks, we also use two other performance measures: *First forecast error* and *Last forecast error*. *Female* is an

[8] It is worth noting that our main findings remain if we remove analysts located in Hong Kong from the analysis.

indicator variable that takes the value of one if analyst *j* is a female, and zero otherwise. Our control variables largely follow prior literature, such as Clement (1999), Hong and Kacperczyk (2010), and Kumar (2010). Firm times year fixed effects are included to control for time-varying unobservables that might drive an analyst' coverage decision as well as her performance (Clement 1999; Hong and Kacperczyk 2010; Hilary and Shen 2013). The sample consists of analyst-firm-year observations.

Table 5 Panel A presents the regression results when the dependent variables are different measures of analyst forecast performance. Our variables of interest are the indicator variable, *Female*, and two interaction terms: *Female× High GEI* and *Female× High IDV*. Column (1) presents the results when the dependent variable is *Average forecast error.* We show that female analysts are positively and significantly associated with *Average forecast error*, consistent with findings in controlled experiments that females perform worse under competition than their male counterparts. Importantly, we show that the coefficient on the interaction term *Female× High IDV* is negative and significant, suggesting that females in highly individualistic countries tend to perform better than their male counterparts compared to their peers in less individualistic countries – a difference-in-differences interpretation. The F-test of the null that the sum of the coefficients on *Female* and *Female× High IDV* is zero fails to reject the null, suggesting that female analysts in highly individualistic countries perform the same as their male counterparts.

In addition to the main findings above, we show that the coefficient on *High GEI* is positive and significant, whereas the coefficient on *High IDV* is negative and significant, suggesting that *Average forecast error* is on average smaller in highly individualistic countries than that in less individualistic countries. Individualism emphasizes independence and equality among individuals, whereas collectivism emphasizes the group's interests and harmony (Trompenaars 1993; Hofstede 2001). In a corporate setting, firms in individualist

countries value accountability and transparency, resulting in better disclosures and transparency (Gray 1988; Hofstede 2011). Moreover, Clement, Rees, and Swanson (2003) show that in high individualist countries, only better performing analysts are retained, resulting in better forecast performance. The negative coefficient on *High IDV* in column (1) are consistent with these interpretations. Finally, we show that the indicator variable *Foreign analyst* and *Forecast horizon* (i.e., the number of months between a forecast and annual earnings announcement) are positively and significantly, whereas firm-specific and general experiences, and brokerage size (proxying for resources) are negatively and significantly, associated with *Average forecast error*. All these findings are consistent with prior work (see, for example, Clement 1999; Clement and Tse 2005; Bae, Stulz, and Tan 2008).

It is well established that the timing of forecasts matters for assessing analyst performance (Hong, Kubik, and Solomon 2000; Clement and Tse 2005). For example, when an analyst is making her very first forecast, the role of her private information generated by effort and skills is more prominent than when she is making subsequent forecasts. When an analyst is making her last forecast, there is more information available, and the role of her private information is diminished, likely resulting in herding among analysts. We thus expect that if there is ever gender difference in performance, the gender effect will be more likely to show up in the first not last forecasts.

In columns (2)-(3), we employ two alternative measures of performance: *First forecast error* and *Last forecast error.* Interestingly, we show that when the performance measure is *First forecast error,* the F-test of the null that the sum of the coefficients on *Female* and *Female× High IDV* is zero rejects the null, suggesting that female analysts in highly individualistic countries significantly outperform their male counterparts when making their first forecasts. When the performance measure is *Last forecast error,* the F-test of the null fails to reject the null, suggesting that female analysts in highly individualistic countries

perform the same as their male counterparts when making their last forecasts. The difference in findings using different measures of forecast performance is consistent with the intuition that the timing of forecasts matters in assessing the gender difference in performance under competition by focusing on innate abilities (and/or effort) instead of information available and/or herding due to career concerns (Hong, Kubik, and Solomon 2000).

Although the above analysis is helpful and we also control *Forecast horizon* in the regressions, the first/last forecasts do not properly control for the exact timing of those forecasts made, especially if due to gender differences in overconfidence, female analysts might consistently make their forecasts later than their male counterparts do, resulting in our findings above. To level the playing field when assessing gender difference in performance, we focus on a subsample of forecasts that are made within the five days after prior year's earnings announcement. Let's illustrate our empirical setup with an example. Suppose that firm A's earnings announcement date for fiscal year 2010 is February 16, 2011 and for fiscal year 2011 is February 4, 2012. Then analyst forecasts with FPI = 1 (i.e., limiting to the current year EPS forecasts) for fiscal year 2011 include all forecasts issued between February 16, 2011 and February 4, 2012. The subsample of same date forecasts for our analysis comprises analyst forecasts of fiscal year 2011's earnings issued between February 16 to 21, 2011. We expect that this subsample analysis will give us the cleanest test of gender difference in performance after requiring the same timing of those forecasts.

Column (4) presents the results when the dependent variable is *Absolute forecast error* and we require all forecasts are made within the five days after prior year's annual earnings announcement. We show that female analysts are positively and significantly associated with *Absolute forecast error*, consistent with findings in controlled experiments that females perform worse under competition than their male counterparts. Importantly, we show that the coefficient on the interaction term *Female× High IDV* is negative and

significant, suggesting that female analysts in highly individualistic countries tend to outperform their male peers compared to female analysts in less individualistic countries. The F-test of the null that the sum of the coefficients on *Female* and *Female× High IDV* is zero fails to reject the null, suggesting that female analysts in highly individualistic countries perform the same as their male counterparts. This is the strongest evidence in support of our culture and performance hypothesis whereby a country's individualism score mitigates gender differences in performance under competition.[9]

Across all three alternative measures of analyst performance in columns (2)-(4), we show that *High GEI* and *Forecast horizon* are positively and significantly associated with forecast errors.

Table 5 Panel B presents the regression results when the dependent variables are different measures of analyst performance after removing analysts based in the U.S. In both columns (1) and (2), we show that the F-test of the null that the sum of the coefficients on *Female* and *Female× High IDV* is zero rejects the null, suggesting that female analysts in highly individualistic countries outperform their male counterparts when making their first forecasts or across all their forecasts compared to female analysts in less individualistic countries.[10]

In summary, our results in Table 5 highlight the importance of national culture that attenuates gender differences in performance under competition, supporting our culture and performance hypothesis.

4.3. Subsample analysis

[9] Table IA3 Panel A in the Internet Appendix presents the regression results when we include another national cultural value – masculinity. We show that our main findings in Table 5 Panel A remain. In addition, masculinity does not play any role in moderating female analyst performance.

[10] Table IA3 Panel B in the Internet Appendix presents the regression results when we include another national cultural value – masculinity. We show that our main findings in Table 5 Panel B remain. In addition, masculinity does not play any role in moderating female analyst performance.

In this section, we examine whether there is any cross-country difference in female analysts' performance under competition focusing on different subsamples. We employ the following panel data regression specification:

$$Forecast\ performance_{i,j,t} = \alpha + \beta_1 Female_{j,t} + \beta_2 Analyst\ characteristics_{j,t} + \beta_3 Brokerage\ characteristics_{j,t} + Firm \times Year\ FE + e_{i,j,t}, \quad (3)$$

where the dependent variables are different measures of analyst performance. The variable of interest is the indicator variable *Female*. Firm times year fixed effects are included to control for time-varying unobservables that might drive an analyst' coverage decision as well as her performance. The sample consists of analyst-firm-year observations.

Table 6 Panel A presents the regression results when we limit the sample to analysts based in the U.S. Across all different measures of analyst performance, we show that in the country with the highest individualism score, there is no significant difference in performance between genders. Moreover, consistent with prior literature (see, for example, Clement and Tse 2005), we show that the number of months between an analyst's forecast and annual earnings announcement is negatively and significantly associated with all different measures of performance, whereas forecasting frequency is positively and significantly associated with *First forecast error*, but is negatively and significantly associated with *Last forecast error*. We further show that firm-specific experience is negatively and significantly associated with *First forecast error*, and that general experience is negatively and significantly associated with *Average forecast error* and *Last forecast error*. Finally, *Brokerage size* is positively and significantly associated with *Last forecast error*.[11]

[11] In one of the first studies on female analysts in the U.S., Kumar (2010) finds the female analysts outperform their male counterparts. We attribute the difference in findings to very different sample periods and empirical methodologies employed by his paper and ours. First, there is little overlap in sample periods between Kumar's and our study. The presence of workplace discrimination, as posited by Kumar as one possible explanation for his findings, becomes weaker in recent years. Second, when employing Kumar's Fama-Macbeth regression specification and a subsample period of 2003-2010, we find the coefficient on the indicator variable *Female* is negative and marginally significant. However, after including firm times year fixed effects that address endogeneity, we find the coefficient on the indicator variable *Female* is no longer significant.

Table 6 Panel B presents the regression results when we limit the sample to analysts based in Nordic countries or analysts based in countries that possess the Communist ideology. Columns (1)-(4) present the results using the Nordic country sample. We show that there is no gender difference in performance for analysts located in Nordic countries. Recall that in Table 4 Panel B we show that women in Nordic countries are less likely to work as equity analysts compared to their peers in non-Nordic countries. Taken together, our results suggest that due to women's accentuated aversion to competition in the most gender equal countries, only the most capable women choose to work as equity analysts, resulting in their equal performance as their male counterparts. Our findings provide indirect evidence on the importance of underlying beliefs (about abilities) in women's career choices and on-the-job performance (Niederle and Vesterlund 2011), a fruitful area for future research.

Columns (5)-(8) present the results using the Communist country sample. We show that there is no gender difference in performance for analysts located in countries that possess the Communist ideology. Recall that in Table 4 Panel B we show that women in Communist countries are more likely to work as equity analysts compared to their peers in non-Communist countries. Taken together, our results suggest that due to social norms in Communist countries that promote gender equality, women's aversion to competition is attenuated in Communist countries, resulting in their equal performance as their male counterparts. We conclude that cross-country differences in gender equality, cultural values, and/or social norms moderate gender differences in preferences and performance under competition.[12]

[12] We conduct additional robustness checks using forecast-analyst-firm-level observations. Table IA4 in the Internet Appendix presents the results. We also control for differences in the timing of each forecast by including firm times year times month fixed effects. Importantly, we show that our main findings remain unchanged when including different fixed effects, masculinity, or employing different country subsamples: female analysts in highly individualistic countries (Nordic countries, or countries with the Communist ideology) have the same performance as their male counterparts.

5. Possible explanations

There are a number of possible explanations for female labor market outcome (compared to males) in the existing literature: 1) difference in preferences (for example, aversion to competition in the western world as shown largely in controlled experiments); 2) difference in abilities; and 3) discrimination in workplace (see the review article by Vesterlund (2011)). In this section, we conduct some analysis focusing on the supply side in explaining female labor market outcome.

So far we have shown that female analysts only in highly individualistic countries exhibit similar forecast performance as their male counterparts. Put differently, a country's individualism score mitigates the negative effect of competition on female performance. It is worth pointing out that there is no significant association between a country's individualism score and its female share of equity analysts. Thus, self-selection, as posited by Kumar (2010) does not explain our findings on female analysts' performance in highly individualistic countries. Then the natural question is whether our main finding has alternative explanations. One possibility is that maybe women herd more often than men given their innate preferences such as they are less overconfident than men (Croson and Gneezy 2009), resulting in more accurate forecasts (due to herding).

To explore this possibility, we introduce *Deviation from consensus*, constructed as the absolute value of the average difference between an analyst's forecast and consensus forecast excluding the focal analyst's forecast, normalized by the stock price at the end of the prior fiscal year, following Hong, Kubik, and Solomon (2000).

We employ a difference-in-differences comparison by first sorting analyst-year observations into the high IDV and low IDV subsamples, then comparing gender difference in *Deviation from consensus* within each subsample, before comparing the gender difference in *Deviation from consensus* between the two IDV subsamples. Essentially, we want to

explore whether herding is behind our finding that female analysts in highly individualistic countries perform the same as their male counterparts, and male analysts perform better than their female peers in low individualistic countries.

Table 7 presents the results. We first show that in the high IDV subsample, female analysts deviate significantly more from consensus forecasts compared to their male counterparts, using both the t- and Wilcoxon tests. In contrast, in the low IDV subsample, using the t-test, we cannot reject the null that female analysts' deviation from consensus forecasts is the same as male analysts'; using the Wilcoxon test, we show that female analysts deviate significantly less from consensus forecasts compared to their male counterparts. When comparing the gender difference in *Deviation from consensus* in the high IDV subsample with the same difference in the low IDV subsample, we find that the relative difference for female analysts in the high IDV countries is significantly larger than the same difference in the low IDV countries, suggesting that female analysts are more overconfident than their male counterparts in the high IDV countries, and that they are also more overconfident than their female peers in the low IDV countries. Using *Deviation from consensus* as a proxy for the degree of overconfidence, we further note that both female and male analysts in the high IDV subsample are far more overconfident than their respective counterparts in the low IDV subsample. We conclude that female analyst performance differences are not driven by herding, instead, individualism fosters overconfidence, resulting in more competitive women in highly individualistic countries.

Another possible explanation for female analysts' superior performance is effort. We introduce two measures to explore this possibility: *Timely forecast,* defined as the number of days between annual earnings announcements and an analyst's revision, and *Forecast frequency,* defined as the number of annual EPS forecasts an analyst makes in a year. Table 7 presents the results. We first show that in both subsamples, female analysts are less timely

and makes fewer forecasts than their male counterparts. We further note that the gap in the number of forecasts in the high IDV subsample is far smaller than that in the low IDV subsample, suggesting that women work harder under competition in highly individualistic countries compared to their counterparts in less individualistic countries.

We also examine the difference in coverage between genders in the high IDV subsample versus that in the low IDV subsample. We first show that female analysts cover significantly fewer firms and industries compared to their male counterparts in the high IDV subsample. In contrast, in the low IDV subsample, female analysts cover the same number of firms/industries as their male counterparts. One possible interpretation is that female analysts tradeoff coverage with accuracy so that they could be more focused which improves their performance.

Prior work such as Clement (1999) and Clement and Tse (2005) show that analyst firm-specific and/or general experience helps performance. We show that female analysts exhibit significantly less experience than their male counterparts in the high IDV subsample. The gender gap in general experience is also significantly larger in the high IDV subsample compared to the low IDV subsample. Clearly, female analysts' performance in highly individualistic countries is not due to their experience compared to their male counterparts.

Finally, using three different measures to capture brokerage resources and prestige: *Brokerage size,* and two indicator variables for a brokerage ranked globally top 10 (20) by size, we show that in both subsamples, female analysts are significantly more likely to be affiliated with the largest and most prestigious brokerages than their male counterparts, and the gender gap in brokerage affiliation is significantly larger in the high IDV subsample compared to that in the low IDV subsample. There are two possible interpretations for the above findings. One is that large and global brokerages have the resources and policies in

place to mitigate workplace discrimination. The other is that due to their superior performance, female analysts are hired and/or promoted to work for large and global firms.

In summary, we conclude that the results in Table 7 suggest that individualism mitigate females' aversion to competition, resulting in the same performance between genders in highly individualistic countries.

6. Conclusions

In an increasingly globalized world, business leaders are constantly faced with the challenges of recruiting and managing a diverse body of employees to achieve its triple bottom line of people, planet, and profit. Much has been said on the demand side. But supply side factors may also play a role including gender differences in preferences and performance under competition. This paper is the first in the literature to study whether and how gender differences in preference for competition and performance under competition vary across countries.

Using a hand-collected sample of 18,300 equity analysts located in 44 countries/regions over the period 2003-2019, we first show that there is a negative and significant association between a country's level of gender equality and its female share of equity analysts, and that there is no significant association between a country's individualism score and its female share of equity analysts. Our first finding is consistent with the gender equality and competition hypothesis in which females' aversion to competition is elevated in countries with high levels of gender equality. Using firm times year fixed effects to account for time-varying unobservables that could potentially drive female analysts' coverage decision and their performance, we show that in highly individualistic countries, there is no significant difference in forecast performance between genders. This finding is consistent with the culture and performance hypothesis in which a country's individualism score

mitigates the negative association between competition and women's on-the-job performance. In additional analysis, we show that in Nordic countries or in countries with the Communist ideology, there is no significant difference in forecast performance between genders. Finally, we find that female analysts are more overconfident as measured by absolute deviations from the consensus forecast in highly individualistic countries compared to their peers in less individualistic countries. We conclude that gender differences in preferences and performance under competition are shaped by a country's gender equality policies, cultural values, and social norms.

The findings in our paper will inform and shape government policies and business practices involving recruitment, development, and deployment of diverse talents by recognizing the importance of national economic, social, and cultural contexts when addressing gender differences in preferences, job choices, and performance outcome under competition.

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Appendix A
Unmasking brokerage name, analyst name, and analyst gender via Capital IQ

From the I/B/E/S recommendation details file, we obtain a list of 1,687 unique brokerages (both in and outside the U.S.) providing recommendations on global equities over the period 2003-2019. I/B/E/S provides an abbreviated brokerage name in the variable *ESTIMID*, a unique brokerage identifier in the variable *EMASKCD,* the last name and first name initial of each analyst in the variable *ANALYST*, and a unique analyst identifier in the variable *AMASKCD.*

To unmask abbreviated brokerage names and analyst names from I/B/E/S, we manually search each brokerage's full name and its analysts from Capital IQ. Our matching process takes three steps. First, we match abbreviated brokerage names in I/B/E/S (*ESTIMID*) to full brokerage names in Capital IQ by resemblance. For example, the abbreviated brokerage name "ZACKSINV" in I/B/E/S resembles Zacks Investment Research, Inc. in Capital IQ. Second, we ascertain this match is correct by matching analyst names in I/B/E/S (*ANALYST*) with those in Capital IQ using the last name and first name initial.[13] For example, we are able to match 27 out of the 28 analysts affiliated with Zacks Investment Research in I/B/E/S with those in Capital IQ (more on this later). Third and finally, we supplement the above two steps by checking whether Capital IQ analysts' stock coverage is the same as that by matched I/B/E/S analysts. To do so, we search through Bloomberg's "*PEOP*" function. Of the 1,687 brokerages in I/B/E/S, we are able to unmask full brokerage names for 1,557 observations (a 92.3% matching rate).

We then obtain individual analyst information including biography, prefix (Mr. vs. Ms.), and office address from their employment history in Capital IQ. Figures A1-A4

[13] We keep observations with perfect match on brokerage name and analyst names. In cases in which multiple analysts have identical last names and first name initials in a brokerage, we drop those analysts. We also drop analysts with name as "RESEARCH TEAM" (referring to team coverage) or "PERMDENIED" (referring to those permanently denied).

illustrate how we obtain such information using Zacks Investment Research, Inc. as an example.

We start by searching "Zacks Investment Research, Inc." in Capital IQ. Figure A1 shows that each brokerage is assigned a unique *companyId* by Capital IQ that we use as the brokerage identifier. Figure 1 also shows that we can search employment history for analysts affiliated with Zacks by navigating to the "*Professionals"* page under the "*People"* tab. Figure A2 shows that we can identify both former and current analysts affiliated with the brokerage, with each analyst having a unique personal ID (*personId*). By clicking on an analyst, we get to their personal profile in Capital IQ shown in Figure A3. We rely on the biography (i.e., "He" vs. "She" is used when referring to an analyst) and the prefix(es) to determine an analyst's gender. We use office address as the location of employment and to proxy for an analyst' residential address as analysts often reside in countries where they are employed. Figure A4 shows that in the case of Zacks Investment Research, Inc., we are able to match all 28 unique analysts in I/B/E/S to those in Capital IQ. However, we note one analyst "BECKER M" has two I/B/E/S analyst IDs (*AMASKCD*) pointing to the same analyst in Capital IQ. Out of precaution, we remove this analyst in our sample.[14]

In the end, we are able to unmask 29,285 out of the 37,459 unique analysts in the I/B/E/S recommendation details file (a 78.2% matching rate).

[14] BROKER_NAME in Figure 4 is the full brokerage name identified via Capital IQ. For analyst "BERCKER M", we are able to match their prior brokerage affiliations in four out of the seven employers, suggesting that Capital IQ have broader coverage in terms of analyst employment history than I/B/E/S.

Figure A1
Zacks Investment Research, Inc. main page in Capital IQ

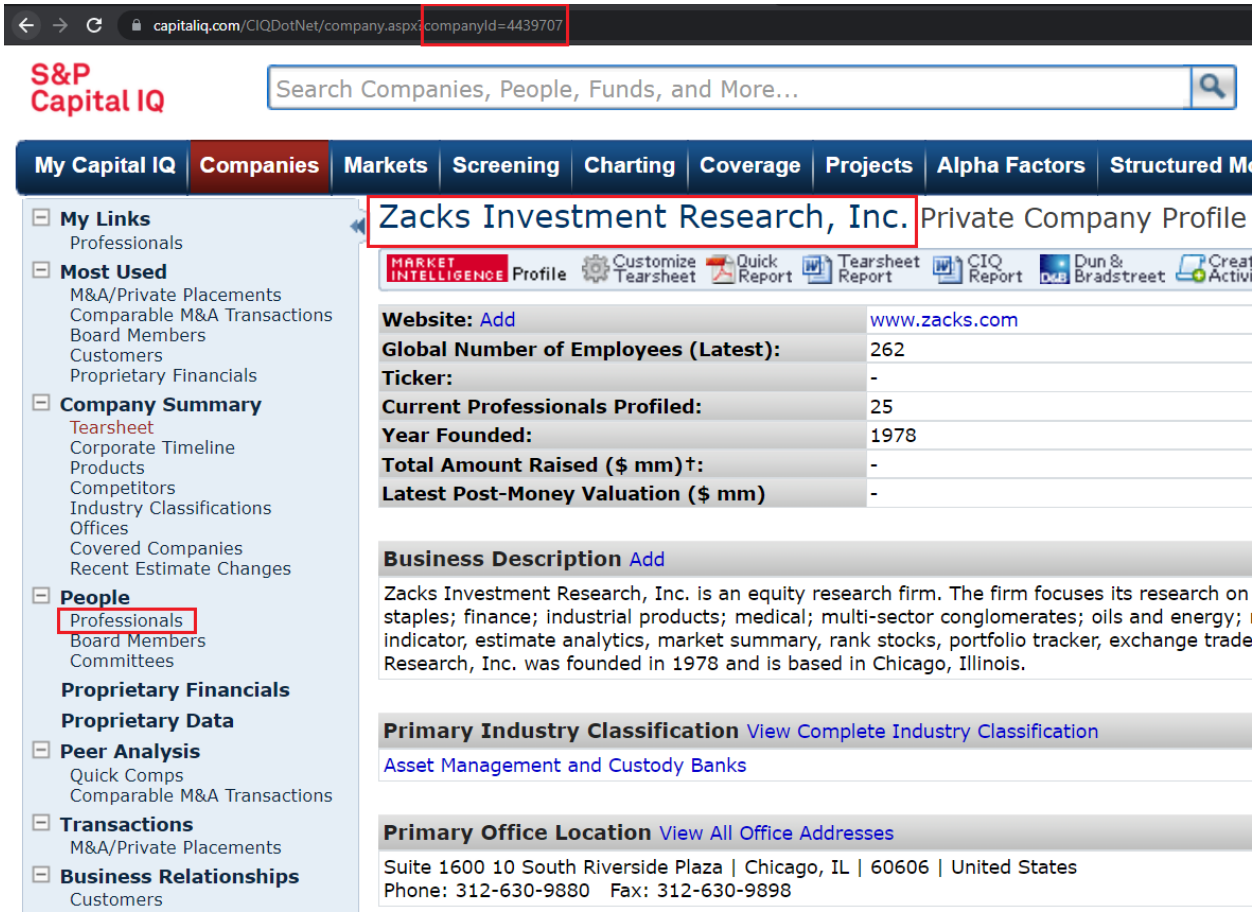
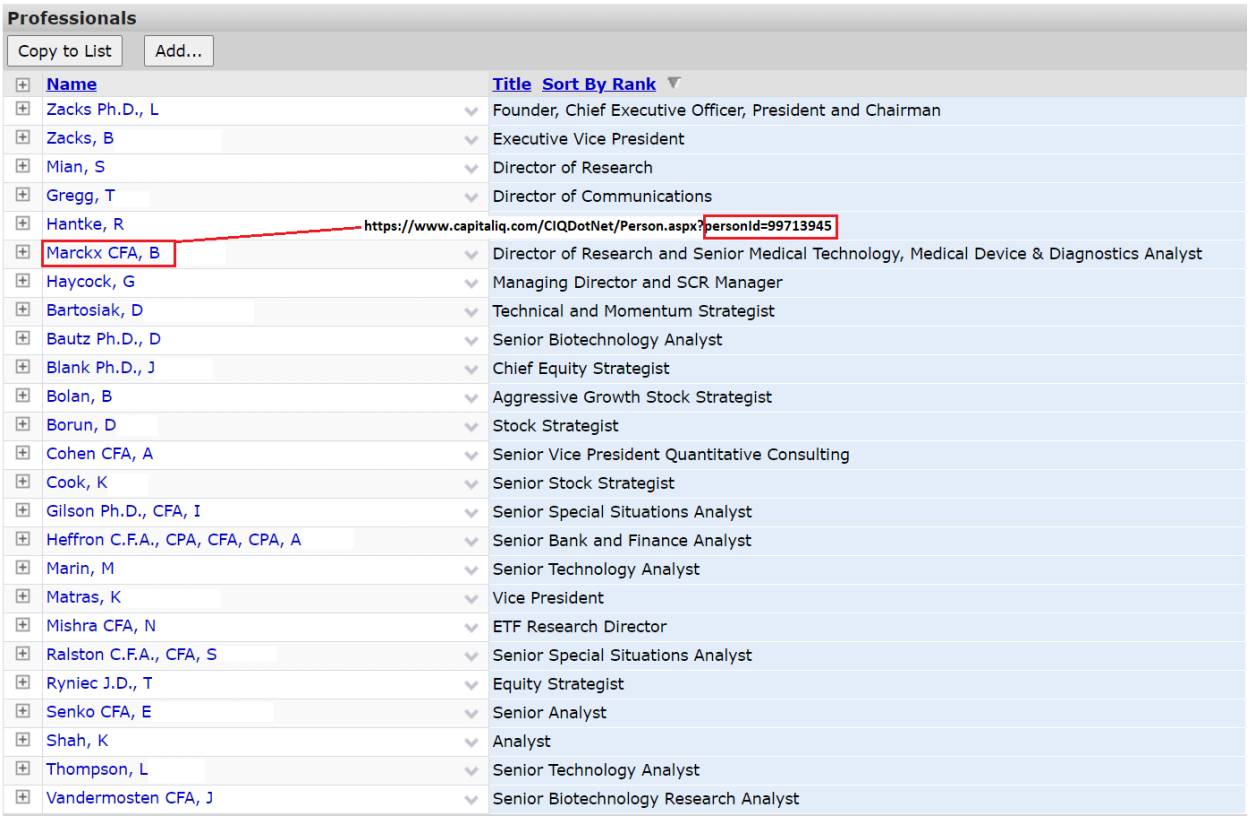


Figure A2
Analysts affiliated with Zack Investment Research, Inc. as recorded by Capital IQ

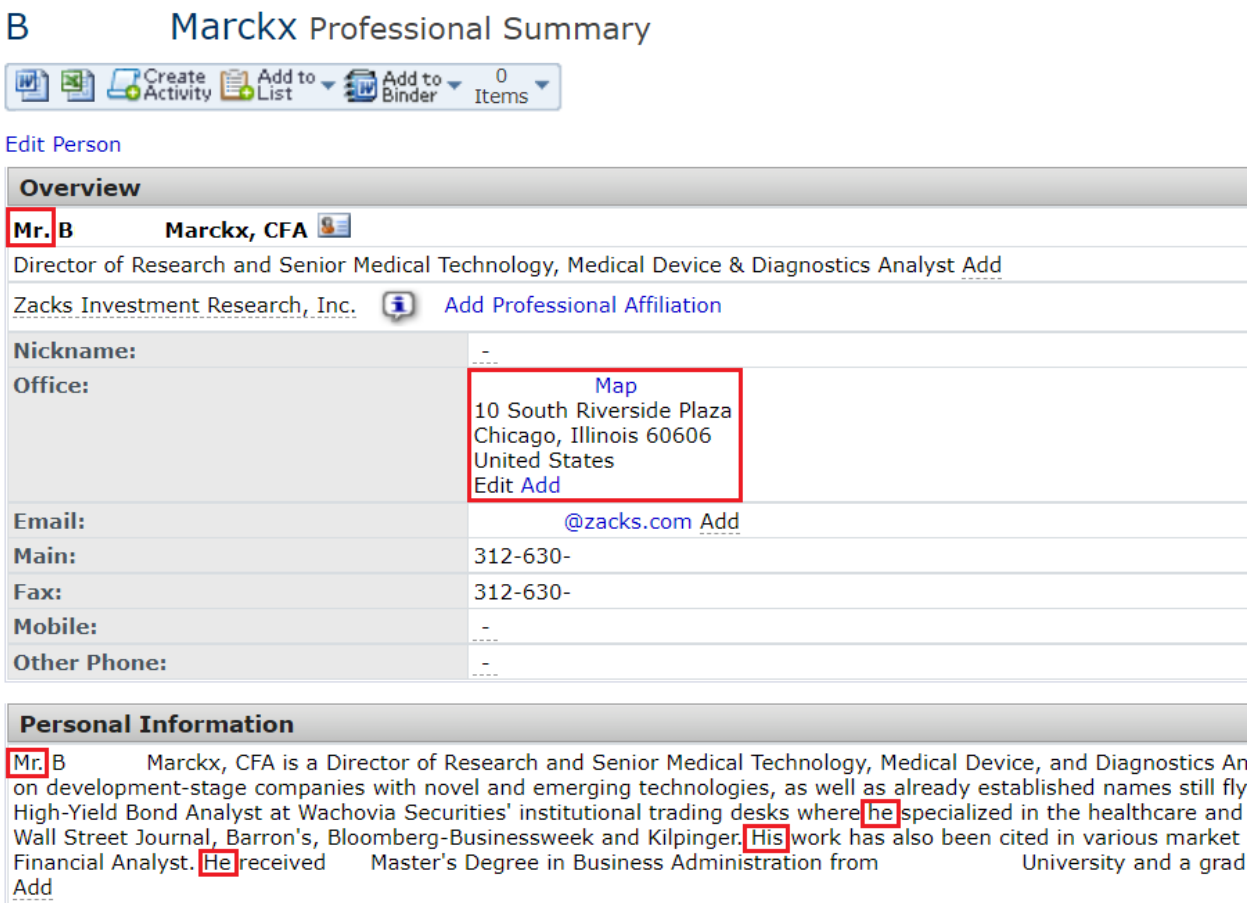


Professionals

Copy to List | Add...

Name	Title Sort By Rank
Zacks Ph.D., L	Founder, Chief Executive Officer, President and Chairman
Zacks, B	Executive Vice President
Mian, S	Director of Research
Gregg, T	Director of Communications
Hantke, R	
Marckx CFA, B	Director of Research and Senior Medical Technology, Medical Device & Diagnostics Analyst
Haycock, G	Managing Director and SCR Manager
Bartosiak, D	Technical and Momentum Strategist
Bautz Ph.D., D	Senior Biotechnology Analyst
Blank Ph.D., J	Chief Equity Strategist
Bolan, B	Aggressive Growth Stock Strategist
Borun, D	Stock Strategist
Cohen CFA, A	Senior Vice President Quantitative Consulting
Cook, K	Senior Stock Strategist
Gilson Ph.D., CFA, I	Senior Special Situations Analyst
Heffron C.F.A., CPA, CFA, CPA, A	Senior Bank and Finance Analyst
Marin, M	Senior Technology Analyst
Matras, K	Vice President
Mishra CFA, N	ETF Research Director
Ralston C.F.A., CFA, S	Senior Special Situations Analyst
Ryniec J.D., T	Equity Strategist
Senko CFA, E	Senior Analyst
Shah, K	Analyst
Thompson, L	Senior Technology Analyst
Vandermosten CFA, J	Senior Biotechnology Research Analyst

Figure A3
Analyst personal information in Capital IQ



B Marckx Professional Summary

Create Activity | Add to List | Add to Binder | 0 Items

Edit Person

Overview

Mr. B Marckx, CFA

Director of Research and Senior Medical Technology, Medical Device & Diagnostics Analyst Add

Zacks Investment Research, Inc. Add Professional Affiliation

Nickname:	-
Office:	Map 10 South Riverside Plaza Chicago, Illinois 60606 United States Edit Add
Email:	@zacks.com Add
Main:	312-630-
Fax:	312-630-
Mobile:	-
Other Phone:	-

Personal Information

Mr. B Marckx, CFA is a Director of Research and Senior Medical Technology, Medical Device, and Diagnostics An on development-stage companies with novel and emerging technologies, as well as already established names still fly High-Yield Bond Analyst at Wachovia Securities' institutional trading desks where he specialized in the healthcare and Wall Street Journal, Barron's, Bloomberg-Businessweek and Kilpinger. His work has also been cited in various market Financial Analyst. He received Master's Degree in Business Administration from University and a grad Add

Figure A4
An example of two different I/B/E/S analyst IDs pointing to the same analyst in Capital IQ

I/B/E/S file for analyst "BACKER M"

	ANALYST	AMASKCD	ESTIMID	EMASKCD	BROKER_NAME
BACKER	M	171815	ZACKSINV	7654	Zacks Investment Research, Inc.
BACKER	M	79164	RESASSOC	5797	Research Associates, LLC
BACKER	M	79164	HUDSONSQ	7844	Hudson Square Research, Inc.
BACKER	M	79164	ASCENDIA	41105	Ascendiant Capital Markets LLC, Research Division

Capital IQ file for analyst "BACKER M"

personId		ANALYST	companyId	BROKER_NAME
24165186	BACKER	M	129926045	Ascendiant Capital Markets LLC, Research Division
24165186	BACKER	M	12765513	Hudson Square Research, Inc.
24165186	BACKER	M	24165184	Research Associates, LLC
24165186	BACKER	M	7923367	Sidoti & Company, LLC
24165186	BACKER	M	4891357	Soleil Securities Corporation
24165186	BACKER	M	34211035	Wm Smith & Co.
24165186	BACKER	M	4439707	Zacks Investment Research, Inc.

Two I/B/E/S analyst IDs point to the same analyst in Capital IQ

Appendix B
Variable definitions

Panel A: Country-level variables

Variable	Definition	Source
Female ratio	Number of unique female analysts divided by the total number of unique analysts in a country-year. We determine whether an analyst is female or not based on hand-collected information from Capital IQ, Bloomberg, and online search. Please see Appendix A for details.	I/B/E/S, Capital IQ, Bloomberg
Gender equality index (GEI)	An overall gender equality index, estimated as the first principal component of three country-level gender equality-related variables including the Global Gender Gap Index (GGGI) of the World Economic Forum (WEF), the Gender Inequality Index (GII) of the United Nations (UN), and GDP per capita. The three variables are scaled to lie between 0 and 1; the principal component analysis is performed annually on our sample countries at the country-year level. The first principal component is scaled to lie between 0 and 1. The Global Gender Gap Index of World Economic Forum is available after 2006, we fill the missing values before 2006 with applicable values in 2006. The United Nations' GII is only available in 1995, 2000, 2005, 2010, and yearly since 2013. Thus, we use linear interpolation between the available years. The original variable increases with gender inequality. We use 1 – GII to create our measure increasing in gender equality.	World Economic Forum; United Nations; World Bank
Individualism (IDV)	This cultural dimension is related to the preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families (Hofstede 2011). Higher value indicates higher individualism.	Hofstede Culture Dimension website
Masculinity (MAS)	This cultural dimension is related to the preference in a society for achievement, heroism, assertiveness, and material rewards for success (Hofstede 2011). Higher value indicates higher masculinity.	Hofstede Culture Dimension website
High GEI	Indicator equals one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise.	World Economic Forum; United Nations; World Bank
High IDV	Indicator equals one if a country is in the top quartile of individualism in a year, and zero otherwise.	Hofstede Culture Dimension website
High MAS	Indicator equals one if a country is in the top quartile of masculinity in a year, and zero otherwise.	Hofstede Culture Dimension website
Market cap/GDP	Market capitalization of listed domestic companies divided by GDP	World Bank

Sales growth	Average of listed domestic firms' annual growth in sales in a country-year.	Worldscope
Firm size	Average of listed domestic firms' book assets (in millions of dollars) in a country-year.	Worldscope
Ln(Firm size)	Natural logarithm of the average of listed domestic firms' book assets in a country-year.	Worldscope
Tobin's Q	Average of a listed domestic firm's sum of market value of equity and book value of debt to book assets in a country-year.	Worldscope
Net income	Average of a listed domestic firm's net income scaled by book assets in a country-year.	Worldscope
Institutional ownership	Average of a listed domestic firm's total percentage ownership by institutional owners in a country-year. Missing values are assigned a value of zero.	Thomson Reuters Global Ownership
GDP per capita	GDP per capita (in thousands of dollars).	World Bank
Ln(GDP per capita)	Natural logarithm of GDP per capita (in thousands of dollars).	World Bank
Nordic	Indicator equals one if a country resides in Nordic region, which includes Denmark, Finland, Norway, and Sweden.	
Communist	Indicator equals one if a country possesses the Communist ideology, which includes China, Hong Kong SAR, and Vietnam.	

Panel B: Analyst-level variables

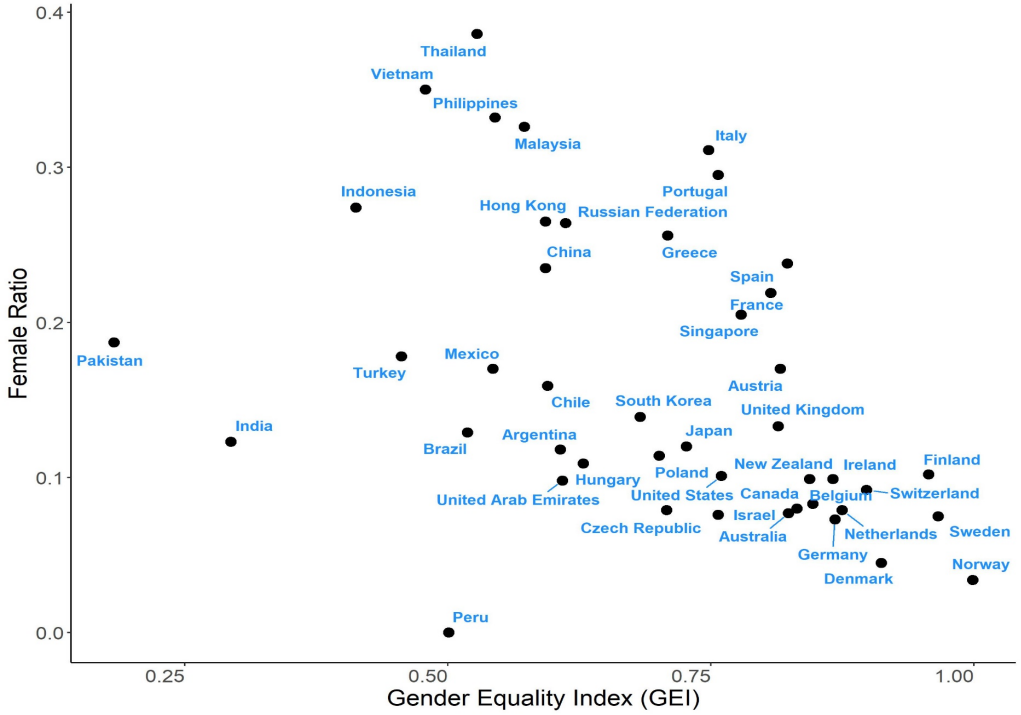
Variable	**Definition**	**Source**
Average forecast error	Average of absolute forecast errors that an analyst makes in a year. Absolute forecast error is the absolute value of the difference between an analyst's annual EPS forecast and actual EPS normalized by the stock price at the end of the prior fiscal year.	I/B/E/S
First forecast error	Absolute value of the forecast error made in an analyst's first forecast in a year.	I/B/E/S
Last forecast error	Absolute value of the forecast error made in an analyst's last forecast in a year.	I/B/E/S
Same day forecast error	Absolute value of the forecast error made in an analyst's forecast if that forecast is made within the five days after last year's annual earnings announcement.	I/B/E/S
Deviation from consensus	Absolute value of the average difference between an analyst's forecast and prior month's consensus forecast excluding the focal analyst's forecast, normalized by the stock price at the end of the prior fiscal year	I/B/E/S

Female	Indicator equals one if an analyst is female, and zero otherwise.	I/B/E/S; Capital IQ; Bloomberg
Foreign analyst	Indicator equals one if an analyst resides in a country that is different from the country of primary listing of the firm she follows, and zero otherwise.	I/B/E/S; Worldscope
Forecast horizon	Average number of months between forecast dates of an analyst to the date of annual earnings announcement.	I/B/E/S
Timely forecast	Number of days between annual earnings announcements and an analyst's first annual EPS forecast.	
Forecast frequency	Number of annual EPS forecasts that an analyst makes in a year.	I/B/E/S
# firms followed	Number of firms that an analyst follows in a year.	I/B/E/S
# industries followed	Number of two-digit SIC industries that an analyst follows in a year.	I/B/E/S
Firm experience	Number of years that an analyst has supplied at least one forecast of the focal firm according to I/B/E/S.	I/B/E/S
General experience	Number of years that an analyst has supplied at least one forecast of any firm according to I/B/E/S.	I/B/E/S
Brokerage size	Number of analysts providing forecasts in a brokerage-year.	I/B/E/S
Ln(Brokerage size)	Natural logarithm of the number of analysts in a brokerage-year.	I/B/E/S

Figure 1
Scatterplot of country-level characteristics and female share of equity analysts

This figure presents an overview of our sample countries. Our sample consists of 18,300 equity analysts from 44 countries for the period 2003–2019 for which we have forecast data from I/B/E/S, firm data from Worldscope, institutional ownership data from Thomson Reuters, and country-level data from WEF, UN, World Bank, and Hofstede Culture Dimension website. Panel A plots country-level gender equality index (GEI) and country-means of the female share of equity analysts. Panel B plots individualism (IDV) and country-means of the female share of equity analysts.

Panel A: Gender equity index and female share of equity analysts



Panel B: Individualism and female share of equity analysts

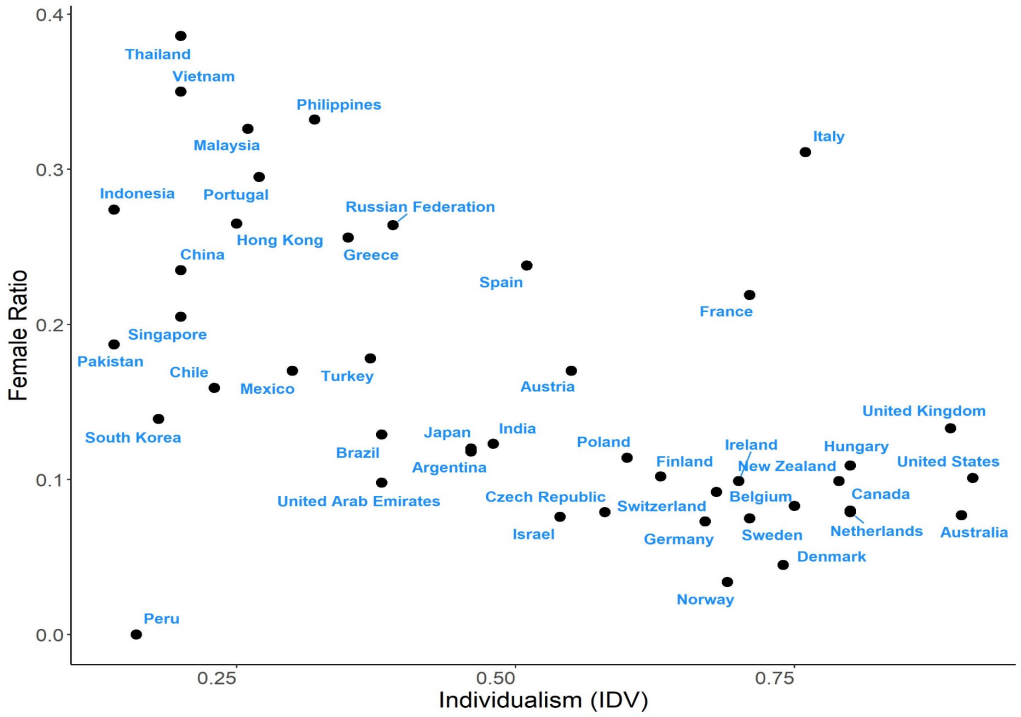


Table 1
Sample formation

This table reports the impact of various matching steps and data filters on the initial sample of analysts covered in the I/B/E/S recommendation file over the period 2003-2019.

	# analysts	# analysts removed	# brokerage	# brokerage removed	# countries	# countries removed
Obtain unique abbreviated institution names and analyst names excluding analyst teams in I/B/E/S recommendation file from 2003 to 2019.	43,193	5,734	1,687	25		
Match abbreviated institution names to full institution names in Capital IQ.	29,285		1,557		83	
Remove observations with missing information on analyst gender and employment address, and analysts with multiple employment addresses in a year in Capital IQ.	26,841	2,444	1,535	22	80	3
Match I/B/E/S recommendation file with I/B/E/S EPS file.	23,932	2,909	1,448	87	80	0
Match with Worldscope; remove observations with missing Worldscope unique identifier (ws_id).	19,769	4,163	1,316	132	77	3
Remove firms with stock price less than USD $1 and market capitalization less than USD $10 millions at the end of the fiscal year.	19,539	230	1,307	9	77	0
Remove countries with fewer than 10 firms over the sample period.	19,472	67	1,288	19	71	6
Remove countries with fewer than 10 analysts over the sample period	19,430	42	1,276	12	57	14
Remove countries with missing information on gender equity measures, individualism, or masculinity.	18,615	815	1,197	79	44	13
Remove observations with missing analyst variables	18,300	315	1,185	12	44	0

Table 2
Sample overview

This table provides an overview of our sample. Our sample consists of 18,300 equity analysts from 44 countries for the period 2003–2019 for which we have forecast data from I/B/E/S, firm data from Worldscope, institutional ownership data from Thomson Reuters, and country-level data from WEF, UN, World Bank, and Hofstede Culture Dimension website. Panel A presents an overview of our global analyst sample by country. Panel B presents an overview of country-level variables. Definitions of the variables are provided in Appendix B.

Panel A: Overview of our global analyst sample

Country	# firm-year obs.	# firms	# analysts	# female analysts	% female analysts	# forecasts	# forecasts made by female analysts	% forecasts made by female analysts
Argentina	328	68	19	5	26.32%	1,204	78	6.48%
Australia	4,619	1,163	597	63	10.55%	62,358	3,814	6.12%
Austria	929	155	53	8	15.09%	3,847	487	12.66%
Belgium	1,648	401	112	19	16.96%	9,582	1,082	11.29%
Brazil	2,521	402	211	35	16.59%	18,894	2,315	12.25%
Canada	9,681	1,840	910	94	10.33%	194,929	12,616	6.47%
Chile	234	63	49	7	14.29%	525	56	10.67%
China	10,266	2,474	1,062	209	19.68%	38,501	8,311	21.59%
Czech Republic	113	49	21	1	4.76%	192	13	6.77%
Denmark	846	161	64	5	7.81%	8,197	242	2.95%
Finland	1,617	265	148	26	17.57%	22,516	1,873	8.32%
France	8,307	1,323	528	123	23.30%	64,854	15,057	23.22%
Germany	7,964	1,500	668	70	10.48%	76,984	3,822	4.96%
Greece	477	85	88	20	22.73%	3,771	840	22.28%
Hong Kong SAR, China	8,671	1,879	878	245	27.90%	56,274	13,002	23.10%
Hungary	218	44	20	3	15.00%	995	65	6.53%
India	5,406	1,079	1,057	149	14.10%	94,214	8,681	9.21%
Indonesia	1,085	174	176	48	27.27%	7,747	2,070	26.72%
Ireland	609	151	78	12	15.38%	2,688	134	4.99%

Israel	349	77	34	5	14.71%	1,567	44	2.81%
Italy	2,486	479	145	44	30.34%	22,416	6,451	28.78%
Japan	15,015	2,048	797	113	14.18%	158,187	14,301	9.04%
Korea, Republic	2,677	602	526	84	15.97%	44,430	7,501	16.88%
Malaysia	2,041	424	224	71	31.70%	15,750	5,433	34.50%
Mexico	857	171	48	11	22.92%	4,930	626	12.70%
Netherlands	2,921	852	234	36	15.38%	15,274	592	3.88%
New Zealand	665	91	31	3	9.68%	4,406	349	7.92%
Norway	2,638	498	265	11	4.15%	32,338	582	1.80%
Pakistan	197	55	88	14	15.91%	736	121	16.44%
Peru	64	21	11	0	0.00%	120	0	0.00%
Philippines	654	88	69	23	33.33%	3,747	1,289	34.40%
Poland	927	200	103	13	12.62%	3,944	241	6.11%
Portugal	616	115	57	21	36.84%	2,430	535	22.02%
Russian Federation	1,140	289	161	44	27.33%	7,716	2,474	32.06%
Singapore	3,353	831	251	61	24.30%	19,497	3,659	18.77%
Spain	1,618	285	127	30	23.62%	10,557	2,937	27.82%
Sweden	2,964	525	263	27	10.27%	35,129	1,660	4.73%
Switzerland	4,663	1,277	293	43	14.68%	27,990	2,148	7.67%
Thailand	2,100	357	198	75	37.88%	20,810	8,816	42.36%
Turkey	810	125	116	28	24.14%	5,439	476	8.75%
United Arab Emirates	1,051	232	37	7	18.92%	4,410	606	13.74%
United Kingdom	20,553	3,862	1,985	338	17.03%	243,251	29,017	11.93%
United States	56,816	9,248	5,426	704	12.97%	1,276,283	103,229	8.09%
Vietnam	240	79	72	31	43.06%	628	293	46.66%
Total	192,954	36,107	18,300	2,979		2,630,257	267,938	

Panel B: Overview of country-level variables

Country	Female ratio	GGGI	GII	GDP per capita	GEI	IDV	MAS
Argentina	0.118	0.646	0.716	9.813	0.607	0.460	0.560
Australia	0.077	0.874	0.726	52.669	0.824	0.900	0.610
Austria	0.170	0.898	0.716	47.279	0.816	0.550	0.790
Belgium	0.083	0.920	0.737	44.449	0.847	0.750	0.540
Brazil	0.129	0.549	0.674	10.799	0.519	0.380	0.490
Canada	0.080	0.879	0.736	48.209	0.832	0.800	0.520
Chile	0.159	0.672	0.681	13.211	0.595	0.230	0.280
China	0.235	0.805	0.675	5.022	0.593	0.200	0.660
Czech Republic	0.079	0.861	0.680	20.398	0.708	0.580	0.570
Denmark	0.045	0.948	0.766	60.084	0.912	0.740	0.160
Finland	0.102	0.928	0.824	46.698	0.957	0.630	0.260
France	0.219	0.898	0.717	41.389	0.807	0.710	0.430
Germany	0.073	0.904	0.762	42.981	0.868	0.670	0.660
Greece	0.256	0.850	0.676	25.228	0.709	0.350	0.570
Hong Kong SAR, China	0.265	0.805	0.675	32.888	0.593	0.250	0.570
Hungary	0.109	0.752	0.673	14.144	0.629	0.800	0.880
India	0.123	0.423	0.632	1.468	0.294	0.480	0.560
Indonesia	0.274	0.488	0.667	3.309	0.413	0.140	0.460
Ireland	0.099	0.848	0.770	56.777	0.866	0.700	0.680
Israel	0.076	0.858	0.702	31.143	0.757	0.540	0.470
Italy	0.311	0.879	0.680	35.923	0.748	0.760	0.700
Japan	0.120	0.875	0.652	45.719	0.727	0.460	0.950
Korea, Republic	0.139	0.907	0.634	23.443	0.683	0.180	0.390
Malaysia	0.326	0.727	0.655	9.682	0.573	0.260	0.500
Mexico	0.170	0.616	0.674	9.663	0.543	0.300	0.690
Netherlands	0.079	0.941	0.745	51.277	0.875	0.800	0.140
New Zealand	0.099	0.841	0.776	35.088	0.844	0.790	0.580
Norway	0.034	0.931	0.826	89.221	0.999	0.690	0.080
Pakistan	0.187	0.437	0.550	1.026	0.183	0.140	0.500
Peru	0.000	0.569	0.687	5.197	0.501	0.160	0.420

Philippines	0.332	0.545	0.771	2.404	0.545	0.320	0.640
Poland	0.114	0.846	0.703	12.990	0.701	0.600	0.640
Portugal	0.295	0.871	0.713	22.409	0.757	0.270	0.310
Russian Federation	0.264	0.701	0.693	10.679	0.612	0.390	0.360
Singapore	0.205	0.896	0.685	48.476	0.779	0.200	0.480
Spain	0.238	0.899	0.741	31.003	0.823	0.510	0.420
Sweden	0.075	0.952	0.814	53.596	0.966	0.710	0.050
Switzerland	0.092	0.942	0.745	77.313	0.898	0.680	0.700
Thailand	0.386	0.611	0.692	5.221	0.528	0.200	0.340
Turkey	0.178	0.586	0.602	11.964	0.456	0.370	0.450
United Arab Emirates	0.098	0.690	0.627	43.576	0.609	0.380	0.530
United Kingdom	0.133	0.830	0.747	40.935	0.814	0.890	0.660
United States	0.101	0.753	0.722	50.329	0.760	0.910	0.620
Vietnam	0.350	0.691	0.688	1.417	0.479	0.200	0.400

Table 3
Summary statistics

This table provides the summary statistic for our global analyst sample and the U.S. analyst sample. Panel A provides the summary statistics of country-level variables. The sample consists of 645 country-year observations over the period 2003–2019. Panel B provides the summary statistic of analyst-level variables. The sample consists of 611,031 analyst-firm-year observations over the period 2003–2019. Definitions of the variables are provided in Appendix B.

Panel A: Country-level variables

	Global sample					U.S. sample				
	Mean	Median	Std. dev	P25	P75	Mean	Median	Std. dev	P25	P75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Female ratio	0.169	0.145	0.119	0.081	0.250	0.101	0.097	0.011	0.093	0.111
Gender equality index (GEI)	0.689	0.717	0.166	0.565	0.826	0.761	0.761	0.007	0.757	0.765
Individualism (IDV)	0.495	0.480	0.240	0.260	0.710	0.910	0.910	0.000	0.910	0.910
Masculinity (MAS)	0.529	0.540	0.179	0.430	0.640	0.620	0.620	0.000	0.620	0.620
High GEI	0.256	0.000	0.437	0.000	1.000	0.000	0.000	0.000	0.000	0.000
High IDV	0.242	0.000	0.429	0.000	0.000	1.000	1.000	0.000	1.000	1.000
High MAS	0.291	0.000	0.455	0.000	1.000	0.059	0.000	0.243	0.000	0.000
Market cap/GDP	0.911	0.586	1.426	0.346	0.966	1.278	1.337	0.223	1.153	1.432
Sales growth	0.164	0.148	0.117	0.085	0.230	0.173	0.186	0.066	0.148	0.214
Firm size	8,631.975	6,716.633	6,450.665	3,616.888	12,910.010	6,819.897	6,327.443	1,986.257	5,220.363	8,260.749
Ln(Firm size)	8.731	8.812	0.902	8.193	9.466	8.788	8.753	0.290	8.560	9.019
Tobin's Q	1.276	1.220	0.392	0.986	1.519	1.707	1.776	0.230	1.620	1.835
Net income	0.021	0.032	0.044	-0.002	0.053	-0.051	-0.047	0.027	-0.079	-0.028
Institutional ownership	0.097	0.070	0.088	0.048	0.120	0.481	0.518	0.055	0.453	0.518
GDP per capita	29.210	29.399	21.539	10.110	44.856	49.694	49.406	2.621	48.467	51.052
Ln(GDP per capita)	2.944	3.381	1.105	2.313	3.803	3.905	3.900	0.053	3.881	3.933
N	645					17				

Panel B: Analyst-level variables

	Global sample					U.S. sample				
	Mean	Median	Std. dev	P25	P75	Mean	Median	Std. dev	P25	P75
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Average forecast error	2.902	0.741	7.797	0.276	2.074	2.244	0.539	6.680	0.210	1.494
First forecast error	3.684	0.912	9.627	0.300	2.730	3.054	0.714	8.564	0.243	2.142
Last forecast error	1.988	0.370	5.868	0.107	1.241	1.371	0.214	4.882	0.067	0.702
Same day forecast error	3.322	0.881	8.109	0.301	2.603	2.962	0.745	7.669	0.261	2.188
Female	0.110	0.000	0.312	0.000	0.000	0.080	0.000	0.271	0.000	0.000
Gender equality index (GEI)	0.741	0.761	0.125	0.734	0.798	0.760	0.761	0.009	0.754	0.769
Individualism (IDV)	0.724	0.890	0.246	0.480	0.910	0.910	0.910	0.000	0.910	0.910
Masculinity (MAS)	0.607	0.620	0.150	0.570	0.660	0.620	0.620	0.000	0.620	0.620
High GEI	0.201	0.000	0.401	0.000	0.000	0.000	0.000	0.000	0.000	0.000
High IDV	0.646	1.000	0.478	0.000	1.000	1.000	1.000	0.000	1.000	1.000
High MAS	0.294	0.000	0.456	0.000	1.000	0.066	0.000	0.248	0.000	0.000
Foreign analyst	0.185	0.000	0.388	0.000	0.000	0.115	0.000	0.319	0.000	0.000
Forecast horizon	7.558	7.400	1.983	6.367	8.483	7.616	7.500	1.761	6.546	8.292
Forecast frequency	4.196	4.000	2.518	2.000	5.000	4.665	4.000	2.472	3.000	6.000
# firms followed	15.310	14.000	8.300	10.000	19.000	17.875	17.000	8.014	13.000	22.000
# industries followed	4.262	4.000	2.792	2.000	6.000	3.814	3.000	2.489	2.000	5.000
Firm experience	4.029	3.000	3.269	2.000	6.000	4.222	3.000	3.382	2.000	6.000
General experience	7.926	7.000	4.778	4.000	11.000	8.578	8.000	4.874	5.000	12.000
Brokerage size	105.454	43.000	118.567	18.000	173.000	106.813	47.000	119.367	19.000	175.000
Ln(Brokerage size)	3.901	3.761	1.328	2.890	5.153	3.914	3.850	1.345	2.944	5.165
N	611,031					263,758				

Table 4
Cross-country differences in the female share of equity analysts

This tables examines the cross-country differences in the female share of equity analysts using OLS regression with year fixed effects. The dependent variable is a country's female share of equity analysts (*Female ratio*), defined as the number of unique female analysts divided by the total number of unique analysts in a country-year. In panel A, we present results including all countries in column (1) and present the results removing analysts based in the U.S. in column (2). *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. In panel B, we present results when grouping counties with a focus on gender equality or ideology. *Nordic* is an indicator variable that takes the value of one for any of the four Nordic countries—Denmark, Finland, Norway, and Sweden, and zero otherwise. *Communist* is an indicator variable that takes the value of one for any of the three practicing countries/regions—China, Hong Kong, and Vietnam, and zero otherwise. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: The cross-country differences in the female share of equity analysts using the global sample with/without the U.S.

	Female ratio	Female ratio
	(1)	(2)
High GEI	-0.067***	-0.058**
	(0.024)	(0.025)
High IDV	-0.010	-0.017
	(0.028)	(0.029)
Market cap/GDP	0.008***	0.007***
	(0.003)	(0.003)
Sales growth	-0.032	-0.021
	(0.086)	(0.085)
Ln(Firm size)	0.010	0.013
	(0.017)	(0.017)
Tobin's Q	-0.022	-0.022
	(0.035)	(0.033)
Net income	0.447*	0.453*
	(0.245)	(0.237)
Institutional ownership	-0.190	-0.337
	(0.114)	(0.209)
Exclude the U.S.	No	Yes
Year Fixed Effects	Yes	Yes
Intercept	Yes	Yes
Obs.	645	628
R^2	0.212	0.212

Panel B: The cross-country differences in the female share of equity analysts focusing on gender equality and ideology

	Female ratio	Female ratio
	(1)	(2)
Nordic	-0.095***	
	(0.018)	
Communist		0.096**
		(0.039)
Market cap/GDP	0.008***	-0.000
	(0.003)	(0.005)
Sales growth	-0.016	-0.036
	(0.088)	(0.078)
Ln(Firm size)	0.003	0.006
	(0.018)	(0.018)
Tobin's Q	-0.042	-0.049*
	(0.034)	(0.029)
Net income	0.629***	0.653***
	(0.212)	(0.223)
Institutional ownership	-0.182	-0.132
	(0.135)	(0.130)
Year Fixed Effects	Yes	Yes
Intercept	Yes	Yes
Obs.	645	645
R^2	0.182	0.187

Table 5
Cross-country difference in female analysts' performance under competition

This table examines the cross-country differences in female analysts' performance under competition using OLS regression with firm times year fixed effects. We use four different measures of analyst forecast performance as the dependent variables. *Female* is an indicator variable that takes the value one if an analyst is a female, and zero otherwise. *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. In panel A, we present the regression results using the global sample. In panel B, we present the results after removing analysts based in the U.S. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: The cross-country differences in female analysts' performance under competition using the global sample

	Average forecast error	First forecast error	Last forecast error	Same day forecast error
	(1)	(2)	(3)	(4)
Female	0.041*	0.039	0.049*	0.116***
	(0.024)	(0.029)	(0.028)	(0.043)
Female × High GEI	0.029	0.003	0.028	0.014
	(0.051)	(0.057)	(0.050)	(0.069)
Female × High IDV	-0.066**	-0.091**	-0.039	-0.128**
	(0.031)	(0.037)	(0.035)	(0.051)
High GEI	0.062**	0.065**	0.087***	0.058**
	(0.026)	(0.030)	(0.029)	(0.028)
High IDV	-0.065**	-0.040	-0.046	-0.047
	(0.032)	(0.035)	(0.033)	(0.035)
Foreign analyst	0.053**	0.007	0.078***	0.011
	(0.023)	(0.025)	(0.023)	(0.024)
Forecast horizon	0.156***	0.081***	0.215***	0.011***
	(0.003)	(0.003)	(0.004)	(0.003)
Forecast frequency	-0.001	0.016***	-0.028***	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
# firms followed	0.000	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
# industries followed	-0.003	-0.005*	0.001	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)
Firm experience	-0.003**	-0.004**	-0.003	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
General experience	-0.003**	-0.001	-0.005***	-0.002
	(0.001)	(0.001)	(0.002)	(0.001)
Ln(Brokerage size)	-0.008*	-0.003	-0.012**	-0.011**
	(0.004)	(0.005)	(0.005)	(0.004)
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Tests if Female + Female × High IDV = 0				
F value	2.10	6.05	0.22	0.29
P-value	0.147	0.014	0.640	0.593
Obs.	611,031	611,031	611,031	318,641
R^2	0.932	0.935	0.833	0.960

Panel B: The cross-country differences in female analysts' performance under competition excluding U.S. analysts

	Average forecast error (1)	First forecast error (2)	Last forecast error (3)	Same day forecast error (4)
Female	0.031	0.026	0.040	0.096**
	(0.025)	(0.029)	(0.030)	(0.046)
Female × High GEI	0.097	0.084	0.113*	0.091
	(0.065)	(0.073)	(0.063)	(0.109)
Female × High IDV	-0.134**	-0.183***	-0.108*	-0.193*
	(0.059)	(0.069)	(0.059)	(0.111)
High GEI	0.019	0.021	0.014	0.031
	(0.033)	(0.038)	(0.037)	(0.037)
High IDV	-0.037	-0.029	0.011	-0.018
	(0.042)	(0.045)	(0.041)	(0.047)
Foreign analyst	0.073**	0.015	0.098***	0.025
	(0.034)	(0.037)	(0.033)	(0.043)
Forecast horizon	0.159***	0.095***	0.210***	0.014***
	(0.004)	(0.004)	(0.005)	(0.005)
Forecast frequency	0.002	0.022***	-0.034***	-0.001
	(0.004)	(0.005)	(0.004)	(0.006)
# firms followed	-0.001	0.000	-0.002	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)
# industries followed	-0.004	-0.007	0.004	-0.007
	(0.004)	(0.005)	(0.005)	(0.005)
Firm experience	-0.005	-0.004	-0.006*	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)
General experience	-0.002	-0.000	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)
Ln(Brokerage size)	-0.018**	-0.002	-0.039***	-0.026***
	(0.008)	(0.008)	(0.008)	(0.009)
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Tests if Female + Female × High IDV = 0				
F value	3.89	6.49	1.63	1.00
P-value	0.049	0.011	0.201	0.316
Obs.	347,273	347,273	347,273	139,488
R^2	0.927	0.930	0.838	0.961

Table 6
Cross-country difference in female analysts' performance under competition in subsamples

This table examines the cross-country differences in female analysts' performance under competition using OLS regression focusing on different subsamples. We use four different measures of analyst forecast performance as the dependent variables. *Female* is an indicator variable that takes the value one if an analyst is a female, and zero otherwise. *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. In panel A, we present the regression results when limiting the sample to analysts based in the U.S. In panel B, columns (1) to (4) present the results when limiting the sample to analysts based in Nordic countries—Denmark, Finland, Norway, and Sweden. Columns (5) to (8) present results when limiting the sample to analysts based in Communist countries—China, Hong Kong, and Vietnam. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: Cross-country difference in female analysts' performance under competition focusing on U.S. analysts

	Average forecast error	First forecast error	Last forecast error	Same day forecast error
	(1)	(2)	(3)	(4)
Female	-0.005	-0.008	0.021	0.003
	(0.016)	(0.019)	(0.023)	(0.020)
Forecast horizon	0.152***	0.057***	0.224***	0.009***
	(0.004)	(0.004)	(0.006)	(0.003)
Forecast frequency	-0.003	0.011***	-0.018***	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)
# firms followed	0.000	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
# industries followed	0.004	0.001	-0.000	0.005
	(0.003)	(0.003)	(0.004)	(0.004)
Firm experience	-0.002	-0.004**	-0.001	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)
General experience	-0.003*	-0.000	-0.007***	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)
Ln(Brokerage size)	0.003	-0.004	0.013***	-0.004
	(0.004)	(0.005)	(0.005)	(0.005)
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Obs.	263,758	263,758	263,758	179,153
R^2	0.951	0.952	0.843	0.963

Panel B: Cross-country difference in female analysts' performance under competition focusing on analysts based in Nordic/Communist countries

	Average forecast error	First forecast error	Last forecast error	Same day forecast error	Average forecast error	First forecast error	Last forecast error	Same day forecast error
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female	0.070	0.140	0.057	0.045	0.028	0.011	0.036	0.161
	(0.152)	(0.162)	(0.192)	(0.204)	(0.048)	(0.051)	(0.057)	(0.115)
Foreign analyst	-0.061	-0.232**	0.020	-0.211*	-0.024	-0.015	0.019	-0.081
	(0.106)	(0.117)	(0.133)	(0.112)	(0.059)	(0.059)	(0.073)	(0.101)
Forecast horizon	0.203***	0.081***	0.290***	-0.005	0.150***	0.087***	0.202***	0.014
	(0.023)	(0.026)	(0.029)	(0.027)	(0.008)	(0.008)	(0.011)	(0.017)
Forecast frequency	0.008	0.032**	-0.012	0.024*	-0.013	0.011	-0.042***	-0.011
	(0.011)	(0.016)	(0.014)	(0.015)	(0.013)	(0.013)	(0.016)	(0.025)
# firms followed	-0.018	-0.009	-0.026**	0.006	-0.006**	-0.002	-0.008**	0.009
	(0.011)	(0.014)	(0.013)	(0.014)	(0.003)	(0.003)	(0.003)	(0.005)
# industries followed	-0.029	-0.002	-0.031	-0.018	0.014	-0.002	0.028**	-0.035*
	(0.020)	(0.026)	(0.023)	(0.022)	(0.009)	(0.009)	(0.012)	(0.019)
Firm experience	-0.030**	-0.035*	-0.030*	-0.014	-0.020	-0.009	-0.026*	-0.029
	(0.013)	(0.019)	(0.017)	(0.014)	(0.012)	(0.013)	(0.014)	(0.029)
General experience	0.018*	0.017	0.025**	-0.001	0.006	0.008	0.013	0.020
	(0.010)	(0.013)	(0.012)	(0.010)	(0.009)	(0.009)	(0.009)	(0.019)
Ln(Brokerage size)	-0.021	0.010	-0.058	-0.006	-0.009	-0.004	-0.017	-0.034
	(0.048)	(0.061)	(0.058)	(0.050)	(0.019)	(0.018)	(0.023)	(0.028)
Nordic	Yes	Yes	Yes	Yes				
Communist					Yes	Yes	Yes	Yes
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	16,473	16,473	16,473	9,581	36,861	36,861	36,861	13,667
R^2	0.939	0.928	0.855	0.958	0.931	0.945	0.848	0.963

Table 7
Difference-in-differences analysis on female analyst characteristics

This table presents difference-in-differences analysis to help explain female analysts' performance. We sort analyst-year observations into the high IDV (top quartile) and low IDV (the remainder) subsamples. Within each subsample, we compare the female and male difference in their forecast deviation from consensus, timely forecast, forecast frequency, number of firms/industries followed, firm/general experience, and brokerage size. We further conduct difference-in-differences (DID) analysis of the female and male difference between high IDV and low IDV subsamples. Columns (5) and (12) report the female and male difference in high and low IDV subsamples, respectively. We conduct both t-test and Wilcoxon test for the gender difference and present the p-values of these tests in columns (6), (7), (13), and (14). We report the difference-in-differences results in column (15) and the p-value of the associated t-test in column (16). Definitions of the variables are provided in Appendix B. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

	High IDV							Low IDV								
	Female		Male		Difference between female and male			Female		Male		Difference between female and male			DID test	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Mean	Median	Mean	Median	Diff. in mean	t-test	Wilcoxon test	Mean	Median	Mean	Median	Diff. in mean	t-test	Wilcoxon test	Diff. in mean	t-test
Deviation from consensus	0.799	0.006	0.697	0.006	0.101	0.00	0.09	0.131	0.009	0.146	0.010	-0.015	0.16	0.00	0.116	0.00
Timely forecast	33.213	10.789	29.002	7.000	4.212	0.00	0.00	54.147	35.000	51.914	32.714	2.233	0.00	0.12	1.978	0.01
Forecast frequency	4.301	4.000	4.319	4.000	-0.018	0.43	0.19	3.069	2.800	3.263	3.000	-0.194	0.00	0.00	0.177	0.00
# firms followed	11.336	11.000	13.563	13.000	-2.227	0.00	0.00	10.108	9.000	11.537	10.000	-1.430	0.00	0.00	-0.798	0.00
# industries followed	3.668	3.000	4.019	3.000	-0.351	0.00	0.00	4.323	4.000	4.307	4.000	0.016	0.63	0.59	-0.368	0.00
Firm experience	3.564	2.800	3.923	3.000	-0.358	0.00	0.00	3.142	2.231	3.461	2.667	-0.319	0.00	0.00	-0.039	0.37
General experience	6.670	6.000	7.814	7.000	-1.144	0.00	0.00	5.889	5.000	6.698	6.000	-0.808	0.00	0.00	-0.336	0.00
Ln(Brokerage size)	4.159	4.190	3.887	3.761	0.272	0.00	0.00	3.818	3.611	3.727	3.497	0.091	0.00	0.00	0.181	0.00
Top10 brokerage	0.372	0.000	0.254	0.000	0.118	0.00	0.00	0.271	0.000	0.218	0.000	0.053	0.00	0.00	0.066	0.00
Top20 brokerage	0.441	0.000	0.347	0.000	0.094	0.00	0.00	0.350	0.000	0.304	0.000	0.046	0.00	0.00	0.048	0.00

Internet Appendix for
"Gender, Competition, and Performance: International Evidence"

Table IA1
Correlation matrix

This table presents the correlations matrix for our sample over the period 2003–2019. Panel A provides the correlation matrix of country-level variables. The sample consists of 645 country-year observations. Panel B provides the correlation matrix of analyst-level variables. The sample consists of 611,031 analyst-firm-year observations. Definitions of the variables are provided in Appendix B. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: The correlation matrix of country-level variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Female ratio	1.000													
2	Gender equality index (GEI)	-0.299***	1.000												
3	Individualism (IDV)	-0.420***	0.657***	1.000											
4	Masculinity (MAS)	-0.054	-0.057	0.207***	1.000										
5	High GEI	-0.339***	0.658***	0.554***	-0.153***	1.000									
6	High IDV	-0.236***	0.378***	0.748***	0.125***	0.341***	1.000								
7	High MAS	-0.066*	0.157***	0.216***	0.705***	0.085**	0.020	1.000							
8	Market cap/GDP	0.104**	0.011	-0.114***	0.017	-0.021	-0.049	-0.124***	1.000						
9	Sales growth	-0.060	-0.163***	0.001	0.007	-0.027	0.037	-0.126***	0.075*	1.000					
10	Firm size	-0.022	0.364***	0.211***	-0.039	0.218***	0.028	0.116**	0.017	-0.304***	1.000				
11	Ln(Firm size)	-0.057	0.414***	0.247***	0.036	0.187***	0.042	0.192***	0.060	-0.306***	0.892***	1.000			
12	Tobin's Q	-0.199***	0.063	0.151***	0.036	0.178***	0.126***	0.039	0.060	0.364***	-0.177***	-0.131***	1.000		
13	Net income	0.300***	-0.592***	-0.599***	0.006	-0.366***	-0.406***	-0.012	0.059	0.097**	-0.137***	-0.244***	-0.009	1.000	
14	Institutional ownership	-0.269***	0.289***	0.434***	0.125***	0.155***	0.269***	0.092**	0.009	0.009	0.221***	0.293***	0.272***	-0.439***	1.00

Panel B: The correlation matrix of analyst-level variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Average forecast error	1.000																			
2	First forecast error	0.950***	1.000																		
3	Last forecast error	0.894***	0.794***	1.000																	
4	Same day forecast error	0.935***	0.995***	0.758***	1.000																
5	Female	0.001	-0.001	0.005***	0.000	1.000															
6	Gender equality index (GEI)	-0.019***	-0.012***	-0.029***	-0.012***	-0.086***	1.000														
7	Individualism (IDV)	-0.068***	-0.055***	-0.081***	-0.059***	-0.137***	0.534***	1.000													
8	Masculinity (MAS)	-0.005***	-0.003**	-0.020***	-0.009***	-0.037***	-0.074***	0.030***	1.000												
9	High GEI	0.025***	0.021***	0.032***	0.020***	-0.037***	0.475***	0.086***	-0.288***	1.000											
10	High IDV	-0.076***	-0.064***	-0.087***	-0.057***	-0.093***	0.439***	0.890***	-0.057***	-0.013***	1.000										
11	High MAS	0.027***	0.019***	0.028***	0.014***	0.006***	0.142***	-0.180***	0.563***	0.191***	-0.278***	1.000									
12	Foreign analyst	0.014***	0.008***	0.023***	0.012***	0.043***	0.123***	0.011***	-0.084***	0.160***	0.017***	0.114***	1.000								
13	Forecast horizon	0.047***	0.027***	0.079***	0.031***	0.004***	-0.036***	-0.009***	0.016***	-0.022***	0.006***	-0.018***	-0.001	1.000							
14	Forecast frequency	0.002*	0.019***	-0.020***	0.037***	-0.039***	0.177***	0.248***	-0.103***	0.062***	0.236***	-0.136***	-0.002	-0.054***	1.000						
15	# firms followed	-0.026***	-0.021***	-0.033***	-0.015***	-0.097***	-0.001	0.111***	0.228***	-0.208***	0.113***	-0.020***	-0.116***	0.024***	0.047***	1.000					
16	# industries followed	0.003***	0.002*	0.006***	0.003	-0.006***	-0.032***	-0.151***	0.030***	0.031***	-0.149***	0.066***	-0.100***	0.045***	-0.109***	0.403***	1.000				
17	Firm experience	-0.046***	-0.042***	-0.051***	-0.043***	-0.041***	0.087***	0.085***	0.073***	0.031***	0.057***	0.005***	-0.071***	-0.050***	0.209***	0.131***	0.026***	1.000			
18	General experience	-0.045***	-0.041***	-0.051***	-0.039***	-0.069***	0.124***	0.149***	0.085***	0.028***	0.119***	-0.024***	-0.056***	-0.025***	0.121***	0.269***	0.108***	0.608***	1.000		
19	brokerage size	-0.013***	-0.013***	-0.014***	-0.026***	0.051***	-0.003**	0.036***	0.124***	-0.047***	0.047***	0.077***	0.203***	-0.046***	0.102***	0.013***	-0.117***	0.030***	0.025***	1.000	
20	Ln(Brokerage size)	-0.021***	-0.020***	-0.024***	-0.030***	0.035***	0.018***	0.035***	0.124***	-0.041***	0.057***	0.086***	0.202***	-0.040***	0.116***	0.013***	-0.152***	0.050***	0.047***	0.891***	1.000

Table IA2
Cross-country differences in the female share of equity analysts

This tables examines the cross-country differences in the female share of equity analysts using OLS regression with year fixed effects. The dependent variable is female share of equity analysts (*Female ratio*), defined as the number of unique female analysts divided by the total number of unique analysts in a country-year. In panel A, we present results including all countries in column (1) and present the results removing analysts based in the U.S. in column (2). *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. *High MAS* is an indicator variable that takes the value of one if a country is in the top quartile of masculinity in a year, and zero otherwise. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

	Female ratio (1)	Female ratio (2)
High GEI	-0.067***	-0.058**
	(0.024)	(0.025)
High IDV	-0.011	-0.017
	(0.028)	(0.028)
High MAS	-0.009	-0.005
	(0.025)	(0.025)
Market cap/GDP	0.008***	0.007**
	(0.003)	(0.003)
Sales growth	-0.037	-0.024
	(0.090)	(0.089)
Ln(Firm size)	0.011	0.013
	(0.016)	(0.017)
Tobin's Q	-0.021	-0.021
	(0.036)	(0.035)
Net income	0.454*	0.457*
	(0.246)	(0.237)
Institutional ownership	-0.187	-0.330
	(0.115)	(0.209)
Exclude the U.S.	No	Yes
Year Fixed Effects	Yes	Yes
Intercept	Yes	Yes
Obs.	645	628
R^2	0.213	0.213

Table IA3
Cross-country difference in female analysts' performance under competition

This table examines the cross-country differences in female analysts' performance under competition using OLS regression with firm times year fixed effects. We use four different measures of analyst forecast performance as the dependent variables. *Female* is an indicator variable that takes the value of one if an analyst is a female, and zero otherwise. *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. *High MAS* is an indicator variable that takes the value of one if a country is in the top quartile of masculinity in a year, and zero otherwise. In panel A, we present the regression results using the global sample. In panel B, we present the results after removing analysts based in the U.S. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: The cross-country differences in female analysts' performance under competition using the global sample

	Average forecast error	First forecast error	Last forecast error	Same day forecast error
	(1)	(2)	(3)	(4)
Female	0.059**	0.057	0.053*	0.130***
	(0.030)	(0.035)	(0.032)	(0.049)
Female × High GEI	0.044	0.019	0.032	0.032
	(0.051)	(0.057)	(0.051)	(0.071)
Female × High IDV	-0.072**	-0.097**	-0.040	-0.132**
	(0.033)	(0.039)	(0.036)	(0.053)
Female × High MAS	-0.059	-0.059	-0.014	-0.072
	(0.037)	(0.043)	(0.041)	(0.067)
High GEI	0.066**	0.071**	0.089***	0.063**
	(0.025)	(0.029)	(0.029)	(0.029)
High IDV	-0.060*	-0.035	-0.044	-0.044
	(0.032)	(0.034)	(0.033)	(0.035)
High MAS	-0.022	-0.030	-0.011	-0.035
	(0.026)	(0.029)	(0.028)	(0.034)
Foreign analyst	0.054**	0.009	0.079***	0.017
	(0.023)	(0.026)	(0.024)	(0.027)
Forecast horizon	0.156***	0.081***	0.215***	0.011***
	(0.003)	(0.003)	(0.004)	(0.003)
Forecast frequency	-0.001	0.016***	-0.028***	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)
# firms followed	0.000	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
# industries followed	-0.003	-0.005*	0.001	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)
Firm experience	-0.003**	-0.004**	-0.003	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
General experience	-0.003**	-0.001	-0.005***	-0.002
	(0.001)	(0.001)	(0.002)	(0.001)
Ln(Brokerage size)	-0.007*	-0.002	-0.012**	-0.010**
	(0.004)	(0.005)	(0.005)	(0.004)
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Tests if Female + Female × High IDV = 0				
F value	0.64	3.89	0.37	0.01
P-value	0.425	0.049	0.546	0.924
Obs.	611,031	611,031	611,031	318,641

R^2	0.932	0.935	0.833	0.960

Panel B: The cross-country differences in female analysts' performance under competition excluding analysts based in the U.S.

	Average forecast error	First forecast error	Last forecast error	Same day forecast error
	(1)	(2)	(3)	(4)
Female	0.045	0.037	0.038	0.108**
	(0.032)	(0.037)	(0.035)	(0.052)
Female × High GEI	0.095	0.082	0.112*	0.086
	(0.065)	(0.073)	(0.063)	(0.107)
Female × High IDV	-0.121**	-0.172***	-0.108*	-0.175*
	(0.056)	(0.066)	(0.058)	(0.102)
Female × High MAS	-0.043	-0.033	0.004	-0.055
	(0.043)	(0.050)	(0.048)	(0.083)
High GEI	0.021	0.023	0.015	0.030
	(0.033)	(0.037)	(0.037)	(0.037)
High IDV	-0.024	-0.015	0.017	-0.012
	(0.041)	(0.044)	(0.042)	(0.045)
High MAS	-0.048	-0.055	-0.029	-0.034
	(0.031)	(0.035)	(0.034)	(0.046)
Foreign analyst	0.072**	0.013	0.097***	0.028
	(0.033)	(0.037)	(0.033)	(0.044)
Forecast horizon	0.159***	0.095***	0.210***	0.014***
	(0.004)	(0.004)	(0.005)	(0.005)
Forecast frequency	0.002	0.022***	-0.034***	-0.001
	(0.004)	(0.005)	(0.004)	(0.005)
# firms followed	-0.001	0.001	-0.002	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)
# industries followed	-0.004	-0.007	0.004	-0.007
	(0.004)	(0.005)	(0.005)	(0.005)
Firm experience	-0.005	-0.004	-0.006*	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)
General experience	-0.002	-0.001	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)
Ln(Brokerage size)	-0.017**	-0.001	-0.038***	-0.024***
	(0.008)	(0.008)	(0.008)	(0.009)
Firm × Year Fixed Effects	Yes	Yes	Yes	Yes
Exclude USA	Yes	Yes	Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Tests if Female + Female × High IDV = 0				
F value	2.09	4.90	1.50	0.60
P-value	0.148	0.027	0.221	0.437
Obs.	347,273	347,273	347,273	139,488
R^2	0.927	0.930	0.838	0.961

Table IA4
Cross-country difference in female analysts' performance under competition

This table examines the cross-country differences in female analysts' performance under competition using forecast-analyst-firm-level observations. We use four different measures of analyst forecast performance as the dependent variables. *Female* is an indicator variable that takes the value of one if an analyst is a female, and zero otherwise. *High GEI* is an indicator variable that takes the value of one if a country is in the top quartile of our composite gender equity index in a year, and zero otherwise. *High IDV* is an indicator variable that takes the value of one if a country is in the top quartile of individualism in a year, and zero otherwise. In panel A, we present the OLS regression results using the global sample. Column (1) presents the results with firm times year fixed effects, and column (2) presents results with firm times year times month fixed effects. In panel B, columns (1) to (4) present the results limiting the sample to analysts based in Nordic countries—Denmark, Finland, Norway, and Sweden. Columns (5) to (8) present the results limiting the sample to analysts based in Communist countries—China, Hong Kong, and Vietnam. Definitions of the variables are provided in Appendix B. Heteroscedasticity-consistent standard errors (in parentheses) are clustered at the country level. ***, **, * correspond to statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A: The cross-country differences in female analysts' performance under competition using the global sample

	Forecast error	Forecast error
	(1)	(2)
Female	0.064**	0.085**
	(0.032)	(0.042)
Female × High GEI	0.071	0.038
	(0.072)	(0.085)
Female × High IDV	-0.095**	-0.107*
	(0.044)	(0.056)
High GEI	0.056***	0.076***
	(0.020)	(0.022)
High IDV	-0.062*	-0.072**
	(0.032)	(0.036)
Foreign analyst	0.074***	0.062**
	(0.023)	(0.026)
Forecast horizon	0.007***	0.006***
	(0.000)	(0.000)
Forecast frequency	-0.003	-0.004
	(0.003)	(0.003)
# firms followed	0.001	0.000
	(0.001)	(0.001)
# industries followed	-0.000	0.002
	(0.002)	(0.002)
Firm experience	-0.001	-0.000
	(0.001)	(0.002)
General experience	-0.005***	-0.005***
	(0.001)	(0.001)
Ln(Brokerage size)	-0.006*	-0.009**
	(0.004)	(0.004)
Firm × Year Fixed Effects	Yes	
Firm × Year × Month Fixed Effects		Yes
Intercept	Yes	Yes
Tests if Female + Female × High IDV = 0		
F value	2.67	0.98
P-value	0.102	0.323
Obs.	2,630,257	2,630,257
R^2	0.818	0.922

Panel B: Cross-country difference in female analysts' performance under competition focusing on analysts based in Nordic/Communist countries

	Forecast error	Forecast error	Forecast error	Forecast error
	(1)	(2)	(3)	(4)
Female	0.068	0.066	0.006	0.123
	(0.098)	(0.052)	(0.108)	(0.098)
Foreign analyst	-0.006	-0.035	-0.018	-0.029
	(0.063)	(0.054)	(0.075)	(0.073)
Forecast horizon	0.007***	0.007***	0.006***	0.006***
	(0.000)	(0.000)	(0.001)	(0.001)
Forecast frequency	0.004	-0.001	-0.001	-0.001
	(0.006)	(0.011)	(0.007)	(0.020)
# firms followed	-0.011	-0.006***	-0.010	-0.005
	(0.007)	(0.002)	(0.008)	(0.004)
# industries followed	-0.021*	0.014*	-0.014	0.008
	(0.012)	(0.008)	(0.014)	(0.015)
Firm experience	-0.020***	-0.032**	-0.017*	-0.032
	(0.007)	(0.013)	(0.009)	(0.025)
General experience	0.011*	0.009	0.006	0.010
	(0.006)	(0.009)	(0.007)	(0.016)
Ln(Brokerage size)	-0.034	0.001	-0.064**	-0.008
	(0.028)	(0.017)	(0.032)	(0.027)
Nordic	Yes		Yes	
Communist		Yes		Yes
Firm × Year Fixed Effects	Yes	Yes		
Firm × Year × Month Fixed Effects			Yes	Yes
Intercept	Yes	Yes	Yes	Yes
Obs.	98,180	95,403	98,180	95,403
R^2	0.814	0.811	0.924	0.939