The effects of regulation on industry structure and trade generation in the U.S. securities industry

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Abstract

This study investigates the effects of Regulation FD and the Global Research Analyst Settlement on market share within the U.S. securities industry as well as the determinants of market share during 1996-2004. We find that these regulations did not cause top brokers to lose market share in spite of their reduction of information asymmetries existing within the brokerage industry. They did, however, significantly reduce the quarterly variability in market share changes. We find that Regulation FD and the Global Research Analyst Settlement reduce the importance of an all-star analyst, issuer affiliation, and analyst optimism for gaining brokerage market share. We further discover that the Global Research Analyst Settlement increases the importance of coverage as a market share determinant while reducing the value of analyst experience for non-top brokers. We find that our results remain robust even when we limit our analysis to a set of pure brokerage firms.

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1. Introduction

One of the most important functions of sell-side security analysts is to generate trades for their brokerage houses. The amount of revenue generated from these activities is staggering and far exceeds the revenue generated from investment banking activities. For example, Agrawal and Chen (2005) report that over the period, 1994 to 2003, the average brokerage firm generated $154 million in revenue from brokerage activities. This is 58% larger than the $97.28 million generated, on average, from investment banking activities. Despite this important role that analysts play in generating trading revenue, relatively little research has been done in understanding the role sell-side analysts play in establishing and expanding a brokerage house's market share.

The most recent studies examining analysts and their generation of brokerage revenues are those by Irvine (2000, 2004) and Jackson (2005). Using data on Toronto Stock Exchange listed equities, Irvine (2000) finds that brokerage firms increase their market share in stocks covered by their analysts by 3.8% relative to issues not followed by their analysts. Irvine (2004) finds that bold forecasts, which deviate significantly from the consensus, generate significant trading volume for the brokerage house over the two-week period following the forecast's release. Additionally, he finds that buy recommendations generate more trade for the analyst's brokerage firm than sell recommendations. Jackson (2005) examines the Australian market and finds that optimistic and high reputation analysts are able to generate more trade for their brokerage firms.

These studies are unlikely to generalize to the U.S. because of two important recent regulatory developments. The adoption of Regulation Fair Disclosure (henceforth, Reg FD) materially changes how information is shared with investors and eliminates the preferential

access to corporate disclosures that high reputation analysts enjoyed. The Global Research Analyst Settlement of 2002 is a response to the wide-spread practice of research analysts issuing biased recommendations in support of related investment banking transactions. The erection of new administrative walls between the investment banking and brokerage divisions within a brokerage house along with Reg FD's requirement for the universal sharing of information has the potential to affect the importance of the various determinants of brokerage market share, especially those associated with analysts.

While previous research shows that both regulations significantly impact the earnings forecasts and recommendations of security analysts, there is no examination of their effect on brokerage market share.[1] We undertake such an examination in our empirical analysis presented in sections 5 though 7. This analysis helps us to evaluate the usefulness of these regulatory changes and to assess whether these regulations are achieving their desired goals.

We examine the effects of regulation using the set of analyst recommendations available from the I/B/E/S database along with brokerage market share data from Thompson Financial's AutEx database. Our sample period extends from 1996 through 2004. In our empirical tests, we distinguish between high and low reputation brokers. High reputation or top brokers are defined as those ranked in the top 10 in a given year based on aggregate number of shares traded. All others are classified as non-top or low reputation brokers.

The intended purpose of Regulation FD and the Global Research Analyst Settlement's Global Research Analyst Settlement is to increase market transparency and to

[1] For example, see Kadan et al. (2008).

eliminate biased recommendations. Yet these efforts at improving the information quality available in the marketplace have not shifted market share away from top to non-top brokers. The relative stability in market share by the top brokers is surprising in light of Reg FD's elimination of the information advantage enjoyed by high reputation analysts who are disproportionately employed by top brokerages or the Global Research Analyst Settlement's recognition of fraudulent behavior by the largest brokerage houses. We do discover, however, that these regulations are successful in reducing the variability of monthly market share changes. This reduction might be due to less asymmetry in the information environment resulting from Reg FD's requirement for the wider sharing of corporate disclosures and the Global Research Analyst Settlement's prohibition against biased recommendations in support of potential investment banking underwriting business.

We further find that prior to Reg FD, the market share for both top and non-top brokers is positively and significantly related to the optimism of the analyst covering the stock, the presence of an all-star analyst, broker size, and whether the brokerage house is affiliated with the issuing firm. These factors are similar to those documented by Irvine (2000, 2004) and Jackson (2005) for the Canadian and Australian markets. For example, an affiliation adds approximately 6% to 9.5% to a broker's market share in a stock, while the presence of an all-star analyst adds 1% to 2%.

The introduction of regulatory reform through the adoption of Reg FD and the signing of the Global Research Analyst Settlement has changed the magnitude of the relation between these analyst characteristics and brokerage market share. We find that Reg FD and the Global Research Analyst Settlement reduce the importance of an all-star analyst, issuer affiliation, and analyst optimism for gaining brokerage market share. We

further determine that the Global Research Analyst Settlement increases the importance of recommendation quantity as a market share determinant while reducing the value of analyst experience for non-top brokerages. These results remain robust even when we limit our analysis to a set of pure brokerage firms.

The remainder of this paper proceeds as follows. The next section describes the new regulatory environment facing the securities industry, emphasizing the changes resulting from Reg FD and the Global Research Analysts Settlement. Section 3 discusses our hypotheses as they relate to the determinants of brokerage market share and the separate effects of Reg FD and the Global Research Analysts Settlement on the distribution of market share across brokerage houses. Section 4 contains a description of our data and methodological approach. Section 5 examines the structure of the securities industry and how it has evolved in the period surrounding the adoption of both Reg FD and the Global Research Analysts Settlement. Section 6 contains our initial analysis of the determinants of brokerage market share while section 7 investigates the effect of recent regulation changes on these determinants. Section 8 presents a brief summary and our concluding comments.

2. The regulatory environment

Regulation FD was adopted by the SEC in August 2000 and became effective in October 2000. The rule is intended to prevent the restrictive disclosure of "material" information to select analysts and investors. A number of academic researchers over the last several years examine the implications of Reg FD on factors such as returns volatility, trading volume, information efficiency, and analyst-focused measures like forecast

dispersion and accuracy.[2] Mohanram and Sunder (2006) find that analysts who had preferential connections with the firms they covered tend to have a greater forecast accuracy pre-Reg FD, but are unable to sustain their performance during the post-Reg FD period. Mohanram and Sunder interpret their results as consistent with Reg FD democratizing the information environment among analysts by forcing a more universal sharing of materially relevant company information. If Reg FD reduces the informational advantage of affiliated analysts, then we should see a reduction in the market share of affiliated analysts over the post-Reg FD period.

The second regulatory event possessing the potential to affect a broker's market share is the Global Research Analyst Settlement of December, 2002. In June 2001 the Attorney General of New York state began investigating Merrill Lynch for possible misconduct by its security analysts. The immediate issue focused on apparent discrepancies between analysts' true opinions and their published recommendations. The investigation ultimately resulted in the "Global Settlement" between the SEC, the NYSE, the NASD, the New York Attorney General, and ten of the largest U.S. brokerage firms[3]. The most important result of the global settlement was the enforced separation between the investment banking and research departments of these firms. Additionally, the signatories to this settlement agreed to stringent disclosure requirements concerning their analysts' research and the payment of nearly $1.4 billion in fines and penalties. The extensive negative publicity surrounding this settlement and consequent investor loss of confidence in

[2] A partial list of research papers include Heflin, Subramanyam, and Zhang (2003), Eleswarapu, Thompson, and Venkatraman (2004), de Jong and Apilado (2009), and Agrawal, Chadha, and Chen (2006).
[3] Eight out of the ten brokerage firms involved in the Global Research Settlement are classified as top brokers in our sample.

analysts' integrity have the potential to adversely affect the market share of the signatory firms. The subsequent loss in market share might be concentrated in those stocks where an investment banking relationship exists with one of the signatory brokerage firms.

3. Hypothesis development

3.1 Determinants of brokerage market share

We hypothesize that a number of factors explain the level of a broker's market share in a given stock. These factors serve as the primary independent variables in our regression analysis of brokerage market share.

Previous research suggests that a variety of recommendation characteristics can influence brokerage market share. Irvine (2001), for example, examines a sample of Canadian firms and shows that providing any type of research coverage generates 3.8% of additional market share. Based on Irvine's findings, we anticipate that the number of recommendations issued by a brokerage house on a particular stock is positively related to its market share since trades are often based on analyst recommendations. Therefore, we specify our first hypothesis as:

H1: The number of recommendations issued by a broker on a given stock is positively related to its market share in that stock.

Jackson (2005) finds that relative forecast accuracy is positively related to a broker's market share. We expand on this result and test whether the amount of information contained in a recommendation can also affect market share. To measure the informativeness of a recommendation, we estimate a three-day (day -1 to day +1) cumulative abnormal return (CAR) surrounding the release of a recommendation. We use

the absolute value of the CAR so that the CAR associated with a downgrade is comparable to that of an upgrade. The magnitude of the CAR is our measure of the informativeness of the recommendation. We hypothesize that brokers routinely issuing recommendations with high information content can be anticipated to capture a higher market share. Formally, we propose:

H2: The market share of a broker in a given stock is positively associated with the informativeness of the broker's recommendations.

Irvine (2003) and Jackson (2005) report evidence that optimistic analysts generate more trades for their brokerage firms. We contend that analyst optimism is positively related to a firm's market share. That is, highly positive recommendations are more likely to encourage investors to trade. Therefore, our third hypothesis:

H3: A broker's market share in a given stock is positively related to the optimism of their recommendations for the stock.

Jackson (2005) finds that analyst reputation is an important determinant of market share. He shows that, on average, a top-ranked analyst increases a broker's market share by 1.8%. Our proxy for analyst reputation is derived from *Institutional Investor's* annual All-American Research Team. All-star analysts are widely regarded as having a high reputation (Clarke et al., 2002; Bagnoli, Watts, and Zhang, 2008; Fang and Yasuda, 2008; Chaplinsky and Erwin, 2009). We examine the extent to which their recommendations exert a distinct impact on a broker's market share. We hypothesize that:

H4: All-star analyst coverage has a positive impact on the broker's market share in the covered security.

As an alternative proxy for reputation, we consider the experience of the analyst. Experienced analysts are likely to be viewed as more credible by investors, hence causing their recommendations to generate more trades. We focus on an analyst's general experience, which captures how long the analyst has been issuing recommendations in the IBES database. If the analyst has been issuing recommendations for six years or longer, the general experience indicator variable is coded as one and zero otherwise.[4] We propose:

H5: An analyst with greater experience will generate higher market share

Ellis et al. (2000, 2003) show that broker market share is impacted by investment banking relationships for up to three months after an initial public offerings (IPOs) and secondary equity offerings (SEOs). Additionally, Jackson (2005) finds that acting as a lead manager on an IPO or a SEO adds approximately 6.3%to 8.7% to the broker's market share. Malmendier and Shanthikumar (2008) find that affiliated analysts tend to issue more optimistic recommendations which can also influence market share. Based on these findings, we include an indicator variable to measure affiliation. We define an affiliated analyst as one whose employer acts as an advisor to the firm in a financial transaction such as a bond offering, M&A deal, SEO, or IPO during the year of the recommendation. Consequently, we hypothesize that:

H6: The presence of an investment banking relationship results in a larger market share.

[4] Hong and Kubik (2003) define experienced analysts in a similar manner. Identical results are obtained if we define an experienced analyst as having more than three or five years worth of experience. In unreported results, we find no relation between market share levels and an analyst's stock specific experience.

Our final regressor is broker size. Larger brokers are likely to have greater resources to employ more analysts, to pay higher salaries and thereby attract more talented analysts, and to promote their services more extensively to clients. Consequently, we hypothesize that:

H7: There is a positive relation between broker market share and brokerage house size.

3.2 The impact of Reg FD

The intent of Reg FD is to improve the flow of materially relevant information to all investors at the same time. By eliminating preferential access to news about corporate developments to favored analysts, Reg FD reduces the informational advantage of affiliated analysts. Similar reasoning suggests that all-stars will be less important in the Post Reg FD period. Bagnoli, Watts, and Zhang (2008) find evidence that Reg FD had a significant impact on the ability of some analysts to provide useful information to buy-side investors. We, therefore, hypothesize that:

H8: Post Reg-FD, the impact of an all-star analyst on a broker's staff and the existence of an investment banking relationship has a diminished effect on market share.

We further hypothesize that Reg FD weakens the relation between the number of recommendations and market share since the news content underlying any recommendation is now universally shared:

H9: Post Reg FD, the relation between the number of recommendations and market share has weakened.

3.3 The impact of the Global Research Analyst Settlement

There are several reasons why the signing of the Global Research Analyst Settlement is likely to affect the determinants of market share and indeed, the distribution of market

share within the brokerage industry. The widespread publicity concerning fraudulent analysts reports and the institutionalized conflict of interest between the investment banking and research departments have the potential to shift market share away from the signatory firms. Given that the signatory firms are all top brokerage houses, it is reasonable to hypothesize that the Global Research Analyst Settlement shifts market share to the non-top brokers:

H10: Post Global Research Analyst Settlement, market share has shifted to non-top brokers.

Analyst optimism might also be less important in generating brokerage revenue post-Global Research Analyst Settlement given the additional scrutiny those analysts now face and the requirement for independent analyst recommendations. Thus, we propose:

H11: The Global Research Analyst Settlement has weakened the relation between analyst optimism and market share.

4. The data

This study examines patterns in the distribution of industry market share in brokerage revenue, and the determinants of those levels over the nine-year period beginning in January 1996 through December 2004. This sample period contains the passage of both Reg FD and the Global Research Analyst Settlement. We obtain our data from two primary sources: the I/B/E/S recommendation file and the AutEx BlockDATA file. I/B/E/S data allows us to track recommendations issued by individual analysts and to follow analysts as they migrate from one firm to another. Consequently, we examine

analyst recommendations rather than earnings per share (EPS) forecasts. Bradley et al. (2008) and Autore et al. (2009) also use recommendations from the IBES database.

We are interested primarily in how two recent regulatory actions have affected the determinants of brokerage market share through their effect on analysts and the process surrounding the release of stock recommendations. Consequently, we focus this study on those stocks that enjoy a significant analyst following. For inclusion in our final sample, we require sample firms to be followed by a minimum of ten analysts for at least one month during the sample period.[5] This requirement is consistent with that imposed by other researchers examining the relative performance of security analysts. Clarke and Subramanian (2006), for instance, require that at least 12 analysts provide coverage in a given quarter.

We obtain data concerning brokerage market share from Thomson Financial's AutEx BlockDATA system, which compiles daily trade information for more than 300 brokerage firms worldwide. The BlockDATA database covers approximately 4,000 listed firms, 8,500 NASDAQ/OTC issues, 15,000 Foreign Ordinaries, and 1,300 American Depositary Receipts (ADRs). For each covered security, BlockDATA ranks the most active brokers, providing both monthly trading volume and market share data. We collect the entire list of brokers that trade each sample firm and calculate their quarterly trading volume and market share in that particular stock. The intersection of the I/B/E/S

[5] We examine several other minimum analyst coverage thresholds and our results remain qualitatively unchanged.

recommendation data and the BlockDATA produces a final sample consisting of 140 brokers and 1,888 unique firms over nine years.[6]

In several tests conducted in this study, we distinguish between brokerage houses based on their reputation.[7] Each year, we identify the top 10 brokerage houses based on the aggregate number of shares traded by each broker. These ten brokers are classified as "Top" brokers. The remaining brokers are classified as "Non-Top" brokers.[8]

5. Characteristics and concentration of the securities brokerage industry

5.1 Characteristics of the brokerage industry

We begin our analysis of the U.S. brokerage industry by presenting in Table 1 selected characteristics of both brokerage houses and individual analysts across three different periods relative to the adoption of Reg FD and the Global Research Analyst Settlement. We also compare the mean value of these characteristics between the top and non-top brokers.

The sample sub-periods bracket the two most important recent regulatory events for the securities industry. The first sub-period captures the pre-Reg FD environment and the statistics are estimated from the first quarter of 1996 through the second quarter of 2000. The second sub-period simultaneously represents both a post-Reg FD and a pre-Global

[6] The sample contains stocks traded on both the NYSE and NASDAQ. While these exchanges differ in their market structures, our results are qualitatively similar when we undertake separate examinations for each exchange.

[7] We also undertake our empirical analysis using the Carter and Manaster (1990) and Carter et al (1998) investment banker reputation rankings as published by Professor Jay Ritter at the University of Florida as an alternative measure for classifying top and non-top brokerage houses. We find that our results are robust to this alternative measure of ranking and hence are not separately reported.

[8] Our results are robust to alternative cutoffs for top and non-top brokers. For example, defining the top 5 brokerage houses produces similar results. We also use the number of analysts employed by the brokers as a measure of reputation and find that are results are qualitatively identical.

Settlement regulatory regime. The statistics are estimated from the third quarter of 2000 through the fourth quarter of 2002. The last sub-period is post-Global Settlement, with statistics calculated from the first quarter of 2003 through the fourth quarter of 2004.

Panel A of Table 1 contains descriptive statistics for a variety of brokerage house and analyst characteristics. All statistics are calculated for the entire sample of brokerage firms as well as for the top and non-top brokers separately. We observe that the number of brokerage houses declines slightly surrounding adoption of Reg FD, but falls quite substantially after the signing of the Global Research Analyst Settlement. Following the Global Research Analyst Settlement, the average number of brokerage houses per quarter falls from nearly 108 to about 87. This decline is most probably the result of recent consolidations through merger that have occurred within the securities industry.

Panel A shows that the top houses consistently employ more analysts than their non-top counterparts. In the pre-Reg FD period, the top firms employ 4.89 times as many analysts as non-top firms. This value rises to 5.03 in the post Reg-FD period and then falls to 4.23 following the signing of the Global Research Analyst Settlement. We also observe that the analysts employed by these top brokers have about a year of additional experience compared to those working for non-top brokers.

We also compare a number of recommendation characteristics between top and non-top brokers in Panel A. Although statistically significant, the difference in the number of recommendations between the top and non-top does not appear to be meaningful. Interestingly, the number of recommendations for both sets of brokers appears to decline following the Global Research Analyst Settlement. The relative informativeness of the recommendations as measured by the announcement period CAR shifts following passage

of Reg FD and the Global Research Analyst Settlement. The CAR associated with non-top recommendations was less than that observed for the top brokers in the period prior to Reg FD. But following both Reg FD and the Global Research Analyst Settlement, the CARs for non-top recommendations have become significantly larger, suggesting an overall higher level of informativeness associated with these recommendations. Non-top recommendations are also consistently more optimistic than those of the top brokers, although a significantly smaller percentage of them are issued by all-star analysts. Indeed, we find that the percentage of all-star recommendations accounted for by non-top brokers declines across each of our sub-periods.

We also include a measure of the quarterly return on investment calculated as Earnings Before Interest and Taxes (EBIT) standardized by total assets. We find that there is no significant difference in this measure of profitability between top and non-top brokers for any of the sub-periods examined in the study. We conclude that the increased access provided by Reg FD and the greater emphasis on the separation between the research and investment divisions of a brokerage house required by the Global Research Analyst Settlement has not translated into return differences between the top and non-top brokerage houses.

In Panel B we present descriptive statistics regarding the firms that the brokerage houses trade. We first note that the size of the average firm as measured by total assets traded by our sample houses increases by over 83.6% from the pre Reg FD period to the post Global Research Analyst Settlement period. The equity market capitalization of these firms also increases over our sample, rising from an average market capitalization of approximately $6 billion to $7.2 billion. Finally, we note that the average market-to-book

ratio of the firms traded by our sample brokerage houses declines following the adoption of both Reg FD and the Global Research Analyst Settlement.

Figure 1 presents an aggregate time series of the quarterly market share of top and non-top brokerage houses over the entire nine-years of our sample period. Between 1996 and 2001, the top brokerage firms appear to gain market share at the expense of non-top brokers in spite of the passage of Reg FD. From 2002 to the end of our sample period, the market share of the top brokers contracts slightly, perhaps as fallout from the Global Research Analyst Settlement. It then remains constant, with no further erosion in the market share of the non-top firms. Figure 1 also shows that approximately 80% of the trading volume reported in AutEx is covered by brokerage houses listed in the I/B/E/S database.

We present a time-series of industry concentration in Figure 2. This plot of Herfindahl index values over time shows that the brokerage industry is not concentrated in the traditional sense, although the ten largest firms account for about half of the industry's revenues. The Herfindahl index begins at 433 in 1996 and never reaches a value in excess of 556.[9] We further note that this pattern of relative fragmentation holds fairly constant throughout the sample period, with no discernible jump in the value of the Herfindahl index corresponding to either passage of Reg FD or signature of the Global Research Analyst Settlement.

[9] According to the Horizontal Merger Guidelines issued by the U.S. Department of Justice and the Federal Trade Commission, a Herfindahl index value of less than 1000 indicates an unconcentrated (i.e., fragmented) industry with no adverse competitive effects. A Herfindahl index value between 1000 and 1800 suggests moderate concentration, while a value in excess of 1800 suggests industry concentration.

5.2 The nature of industry concentration

In Table 2 we examine the quarterly firm level market share of both top and non-top brokerage houses over our sub-periods reflecting regulatory change. For the top brokers we find that their median market share increases in spite of the passage of Reg FD and the Global Research Analyst Settlement. This is inconsistent with H10 and suggests that even with the elimination of the informational advantage typically enjoyed by top analysts prior to Reg FD and the historically accommodating relation between analysts and deal-makers, the top brokers have not lost market share as a result of either Reg FD or the Global Research Analyst Settlement. Although we later show that the determinants of market share change as a result of these new regulatory actions, the trading volume level has not declined.

We do find, however, that the quarterly variability in market share changes has fallen. An examination of the maximum and minimum values observed for the top firms shows that each new regulation narrows the range in the observed changes in market share. This reduction in the variability of quarterly market share changes is further confirmed with the estimates of the standard deviation. We see that the standard deviation in monthly market share changes monotonically declines across our sample periods and that these declines are statistically significant.

In un-tabulated multivariate regression results, we further examine changes in the quarterly standard deviation of market share. Our list of regressors includes analyst, recommendation, and brokerage house characteristics. When we analyze changes in the standard deviation of market share in the period surrounding adoption of Reg FD, we find

that the general experience of the analyst is positively associated changes in market share variability, suggesting that the presence of more seasoned analysts can cause greater fluctuations in a house's brokerage business in a given share. We also observe that analyst optimism weakly and negatively influences market share changes. But these results are not stable and in the period surrounding implementation of the Global Research Analyst Settlement, both variables are statistically insignificant. Indeed, over this more recent sub-period, we find only weak evidence that larger brokers experience more change in their market share. We conclude from our analysis that changes in market share variability are not driven by brokerage house, analyst, or recommendation characteristics and might be reflective of diverse factors such as investor sentiment or liquidity.

The increase in market share for the top brokers has come from that of the non-top brokers. The median market share of the non-top brokers falls significantly after the passage of Reg FD and then essentially remains flat after the signing of the Global Research Analyst Settlement. Thus it appears that these regulations do not provide any competitive advantage to smaller brokerage firms that would allow them to capture a larger portion of the trading volume in a given equity.

Similar to the top firms, variability in quarterly market share declines for these brokers following each of the new regulatory agreements. The standard deviation in the quarterly market share declines following adoption of Reg FD and falls even further after the signing of the Global Research Analyst Settlement. These changes in the standard deviation are statistically significant.

6. Determinants of broker market share prior to regulation

In this section, we examine the determinants of a brokerage firm's market share prior to the passage of Reg FD and the Global Research Settlement. More specifically, we examine the factors influencing a brokerage house's level of market share in a given stock prior to the introduction of these two critical regulatory events.

In Table 3, we present our results from this initial regression analysis. The results are estimated at the brokerage house-firm-quarter level, with the dependent variable being the brokerage house's market share in a given quarter. We present our findings separately for the top and non-top firms since it is possible that analyst characteristics might be viewed by investors as conditional on the reputation of the brokerage house. For the regressions in this section, we only consider observations between the first quarter of 1996 through the second quarter of 2000. We select this sample period so that Reg FD and the Global Research Analyst Settlement are excluded. Thus, the regressions of Table 3 serve as a base case analysis. The impact of Reg FD and the Global Research Analyst Settlement are examined separately in the following section.

For the top brokers, we find that market share levels are positively and significantly related to the number of recommendations issued analyst optimism, star analyst coverage, affiliation, and broker size. These results are consistent with our hypotheses H1, H3, H4, H6, and H7, respectively. Based on the magnitude of the estimated coefficients, affiliation

has the largest impact on market share levels. An affilation with a firm increases a brokerage house's market share by approximately 6 percent.

We obtain similar, but not identical results for the non-top brokers. Market share levels are positively and significantly related to analyst optimism, the presence of an all-star analyst, affiliation, and broker size. These findings for the non-top brokers support hypotheses H3, H4, H6 and H7. Unlike top brokers, we find that the experience of the analyst also significantly impacts market share as suggested by H5. Inconsistent with H1, we find that the number of recommendations is not an important factor in gaining market share for the non-top brokers. Our results show that affiliation is a more important determinant of market share for non-top brokers than for top brokers. An affiliation with an issuer increases the non-top broker's market share level by approximately 9.5%.

In sum, these initial findings for the Pre-Reg FD period are similar to those documented by Jackson (2005) for the Australian market. Consistent with hypotheses 3 and 4, we find that optimism and reputation, as proxied by the all-star analyst indicator variable, are associated with higher levels of market share for both top and non-top brokers. Further, we determine that affiliation is the strongest predictor of market share levels for both types of brokers.

7. The impact of regulation on brokerage market share

Because the studies by Irvine (2000, 2004) and Jackson (2005) use foreign markets for their empirical analysis, they are unable to examine how the recent adoption of regulatory reforms have altered the determinants of market share or shifted market share between top and non-top brokers. Our analysis in this section addresses these issues by separately

examining the impact on brokerage market share of Reg FD and the Global Research Analyst Settlement.

7.1 Reg FD

In Table 4 we provide the results from our regression analysis. Panel A presents the coefficients for each of the variables as well as for its interaction with a Reg FD indicator variable. The results for the non-interacted variables are identical to those reported in Table 2 and represent the baseline effects of these regressors. The interacted variables in panel A introduce the effect of Reg FD into our analysis.

In panel B we provide a more explicit view of the effect of Reg FD and its impact on the determinants of brokerage market share. We note that Reg FD has a number of effects that are common to both sets of brokerage houses. We find that the informativeness of the recommendation as captured by its average absolute CAR becomes more important for both sets of brokers and hence supportive of H2. This result is also consistent with investors seeking out brokerage houses that can provide them with the most useful recommendations. Following Reg FD, the importance of having either an all-star analyst or an affiliation with an issuer declines significantly as predicted by H8. For example, an affiliation adds 3.2% to market share after Reg FD versus 5.9% prior to its adoption. Although all-star status and affiliation remain positive factors in determining a broker's market share, the wider diffusion of information required by Reg FD has likely eroded the advantages associated with issuer affiliation and the employ of all-star analysts.

As suggested by hypothesis 7, the importance of size to market share also declines following Reg FD, but the effect is only significant among the non-top brokers. We further determine that the importance of the number of recommendations examined with

hypothesis 1 declines in the post Reg FD period, especially for the top brokers. When combined with the results for the informativeness of recommendations, this suggests that Reg FD has shifted investors' attention to the quality rather than the quantity of information about a firm. Reg FD has eliminated for many analysts their preferential access to a convenient source of firm data. Our results suggest that investors will reward with greater market share those brokerage houses that provide informative rather than simply an abundance of recommendations as implied by H9.

Reg FD, however, has a differential effect across brokerage firms on the ability of analyst optimism to attract market share proposed in H3. It has become a marginally more effective factor in generating market share for the top brokerage firms. But analyst optimism has become significantly less important to the non-top brokerage houses. This might be due to the fact that the recommendations of the non-top houses now reflect the same information that previously was restricted to only the most favored analysts. Thus, the analysts of non-top brokerages have less need to make their recommendations alluring to investors by being excessively optimistic.

7.2 Global Research Analyst Settlement

In Table 5 we provide the results from our regression analysis. Panel A presents the coefficients for each of the variables and their interaction with a Global Research Analyst Settlement indicator variable. The observations in this regression are drawn from the third quarter of 2000 through the fourth quarter of 2004. The Global Research Analyst Settlement indicator takes a value of one for observations from the first quarter of 2003 to the end of the sample period and zero otherwise. The interacted variables in panel A introduce the effect of the Global Research Analyst Settlement into our analysis.

In panel B, we provide a more direct examination of the effect of the Global Research Analyst Settlement on brokerage market share. As with Reg FD, we note several commonalities in this regulation's effect across our two sets of brokerage houses. For both the top and non-top brokers, the importance of issuing recommendations for gaining market share increases as argued in H1. Each additional recommendation adds 0.18% to the market share of top brokers following the passage of the Global Research Analyst Settlement. With the implementation of the Global Research Analyst Settlement, analysts are better able to generate unbiased recommendations. Further, established brokerage house analysts must compete with the recommendations issued by the newly funded independent analysts. These facts imply that analysts now have the incentive to generate more recommendations and that these recommendations are more likely to be unbiased. We find that additional recommendations appear to be associated with higher levels of market share.

The importance of broker size for market share described in H7 increases following the Global Research Analyst Settlement, but the effect is only significant for the non-top brokers. It is not surprising that size's influence on market share remains constant for the top brokers following the Global Research Analyst Settlement since the signatories to this agreement were the largest brokers.

But perhaps the most important finding in our analysis of the Global Research Analyst Settlement is the decline in the importance of affiliation to broker market share proposed in H6. The value of a prior affiliation with an issuer for subsequent trading volume for by a given broker significantly declines following the Global Research Analyst Settlement. This result holds for both the top and non-top brokers. Our result is consistent with the agreement's intent to eliminate the linkage between the investment banking and brokerage

departments of a brokerage house's business. Although ten of the top brokers signed the agreement, clearly the policy implications regarding the need for independence in securities research and analyst recommendations are applicable to all brokerages. Not surprising, we further note that the effect of analyst optimism on market share described in H3 also falls. This result is consistent with the Global Research Analyst Settlement's focus on restoring investor confidence in the integrity of analyst recommendation and its requirement for the generation of independent recommendations.

The Global Research Analyst Settlement has also produced some different effects across brokerage groups. The importance of recommendation informativeness discussed in H2 declines for the top brokerage houses while increasing for the non-top brokers. This might be the result of investor perceptions regarding differences in the extent to which recommendation bias exists between the top and non-top brokers. The importance of an all-star recommendation argued in H4 in gaining market share declines for the non-top brokers, perhaps reflecting the new importance and empowerment of independent analysts and the reduced influence of affiliation. Finally, we note that the impact of analyst experience developed in H5 appears to matter less for non-top brokers following the Global Research Analyst Settlement. Again, we conjecture that this is due to the emergence of independent analysts and the industry's new focus on recommendation unbiasedness.

7.3 Pure brokerage firms

Not all brokerage houses have investment banking departments. For these firms, most of the relationships directly proscribed by the Global Research Analyst Settlement and its associated requirements are not directly relevant. Further, because pure brokerage houses are not as prominent as the full service houses, they are less likely to employ the influential

analysts who enjoyed preferential access prior to Reg FD. Thus, to assess the robustness of our findings, we construct from our sample brokers, a subset consisting of pure brokerage firms. Consistent with Barber, Trueman, and Lehavey (2007), we define any brokerage house that does not appear as a lead underwriter or M&A advisor as a pure brokerage firm. Table 6 contains our results.

We observe that many of the effects reported for the aggregate sample of brokerages also hold for this more limited sample. We find that the importance of analyst optimism described in H11 for gaining market share declines for these firms following adoption of both Reg FD and the Global Research Analyst Settlement. Similarly, all-star analysts and their importance in gaining market share discussed in H4 are less influential in the new regulatory environment for attracting new brokerage business. We also determine that recommendation informativeness discussed in H2 increases in importance for generating trading revenue, consistent with our early findings regarding Reg FD. We conclude from this analysis of pure brokerage firms that our overall conclusions regarding the effects of regulation on the determinants of market share are robust and not driven solely by the presence of investment banking activities within a brokerage house.

8. Conclusion

This paper examines how two recent pieces of regulation have affected the distribution of market share within the U.S. securities industry as well as the determinants of that market share. Although earlier studies by Irvine (2000, 2004) and Jackson (2005) investigate the determinants of brokerage market share for Canada and Australia, their

results may not generalize to the U.S. because of the structural effects induced by Reg FD and the Global Research Analyst Settlement.

We find that the adoption of both Reg FD and the Global Research Analyst Settlement did not shift market share from top to non-top brokers in spite of their reduction of informational asymmetries existing in within the brokerage industry. Top brokers did not lose market share, even though Reg FD eliminated the preferential advantage to corporate news enjoyed by many of the analysts employed by these houses. The adverse publicity resulting from the signing of the Global Research Analyst Settlement did not affect the market share of the top brokers, a majority of whom were signatory firms. We do find, however, that both of these regulatory actions reduced the variance of monthly market share changes, perhaps as a result of the improvement in the quality of the information environment for investors.

We interpret these results as consistent with arguments that these regulatory events have reduced the information asymmetry between investor and analyst by either making investors more informationally complete (Reg FD) or by reducing the bias in the information available to investors (Global Research Analyst Settlement). The encouragement of a wider diffusion of unbiased information by the regulations is consistent with sound public policy for financial markets.

We also find that these regulatory events have important effects on market share determinants, thus limiting the applicability of studies of foreign markets to the U.S. brokerage industry. Reg FD and the Global Research Analyst Settlement reduce the importance of all-star analysts, issuer affiliation, and analyst optimism in explaining brokerage market share. We further determine that the Global Research Analyst Settlement

increases the importance of recommendation quantity as a market share determinant while reducing the value of analyst experience for non-top brokerages. We obtain qualitatively similar results when we restrict our analysis to a set of pure brokerage firms.

We conclude from our analysis that a complete understanding of the distribution of market share across the U.S. brokerage industry and the factors that shape that market share require an explicit consideration of both Reg FD and the Global Research Analyst Settlement. Both of these regulatory actions had a salutary impact on the quality and dispersion of information available to investors and analysts.

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Table 1:
Sample descriptions of brokerage house, analyst, and firm

This table summarizes the characteristics of the brokerage houses, the analysts, and the sample firms. Sample brokerage houses are those for which trading volume is recorded in AutEx and recommendations for the sample firm are recorded in I/B/E/S. Top 10 brokerage houses are determined each year based on their aggregate trading volume. We select the analyst with the longest experience when there are multiple analysts covering the same firm in the same brokerage house for a given quarter. In each quarter, mean (median) values for each variable is measured and mean of mean (median) variables are reported over the three distinct periods. Pre-Reg FD is from 1st quarter of 1996 to the 2nd quarter of year 2000, post-Reg FD is from the 3rd quarter of year 2000 to the 4th quarter of year 2002, and post-Global Settlement is from the 1st quarter of year 2003 to the 4th quarter of year 2004. t-values from the pooled t-test between Top and Non-Top brokers are reported in the last column. In Panel A, *Number of Recommendations* is the number of recommendations that are released for the sample firm in a given quarter from a given brokerage house. *Absolute CAR* is the quarterly average of the absolute CARs of the stock around the recommendation date when there are multiple recommendations released in a given quarter. *Optimistic Recommendation* is the proportion of recommendations, which is higher than the monthly median recommendation for the same firm. *Star Analyst Coverage* is the proportion of recommendations released by an All-Star analyst in a given quarter. *Experience* is measured as the difference between the quarter that the analyst's first forecast report appeared in I/B/E/S and the quarter that the analyst released a recommendation report for the sample firm. *Quarterly Return on Investment* is estimated as EBIT standardized by total assets. In Panel B, assets and the common equity for the sample firms at the end of each quarter are collected from COMPUSTAT and the stock price and the number of outstanding shares are collected from CRSP. *Size* is measured as the number of shares outstanding multiplied by the stock price and *Market-to-Book ratio* is the size divided by the book value of common equity. Panel B are dollar values as of 1996.

Panel A. Brokerage House and Analyst Characteristics

	Pre Reg FD				Post Reg FD				Post Global Settlement			
	All	Top	Non-Top	t-stat	All	Top	Non-Top	t-stat	All	Top	Non-Top	t-stat
Number of Brokers	118.4	10.0	108.4		107.8	10.0	97.8		86.9	10.0	76.9	
	(119)	(10)	(109)		(107)	(10)	(97)		(87)	(10)	(77)	
Number of Analysts	12.8	42.6	8.7		17.1	57.4	11.4		16.3	47.9	11.3	
	(6)	(39)	(5)		(9)	(55)	(7)		(10)	(48)	(8)	
Number of Recommendations	0.34	0.33	0.34	-8.15	0.23	0.23	0.24	-2.65	0.17	0.17	0.17	2.63
	(0.11)	(0.11)	(0.11)		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	
Absolute CAR (%)	5.62	5.70	5.58	0.84	7.13	6.89	7.39	-9.95	4.54	3.96	5.02	-14.55
	(3.48)	(3.58)	(3.44)		(4.27)	(4.09)	(4.45)		(2.70)	(2.43)	(2.99)	
Optimistic Recommendation (%)	29.66	28.30	30.67	-8.32	25.14	23.58	26.48	-15.22	25.12	19.51	29.63	-48.43
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	
Star Analyst Coverage (%)	19.97	37.37	6.79	164.68	17.53	32.32	5.07	158.33	17.11	33.28	4.07	168.03
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)	
Experience (year)	6.94	7.18	6.74	23.78	7.42	7.94	6.98	38.08	7.92	8.43	7.51	33.12
	(5.92)	(6.83)	(5.53)		(6.03)	(6.73)	(5.59)		(6.63)	(7.25)	(6.19)	
Quartely Return on Investment (%)	1.38	1.47	1.35	-1.14	0.84	1.07	0.75	1.09	0.74	0.68	0.76	-0.72
	(1.36)	(1.46)	(1.23)		(0.80)	(1.09)	(0.70)		(0.71)	(0.70)	(0.76)	

Panel B. Firm Characteristics

	Pre Reg FD	Post Reg FD	Post Global Settlement
Assets (MM $)	7,217	10,479	11,611
	(1,207)	(1,492)	(1,686)
Price ($)	33.43	24.20	23.61
	(28.39)	(21.03)	(20.99)
Size (MM $)	5,649	6,155	6,022
	(1,253)	(1,286)	(1,503)
Market-to-Book ratio	3.87	3.12	3.00
	(2.72)	(2.24)	(2.29)

Table 2. Firm Level Market Share of Brokers

This table reports the summary statistics of the quarterly firm level market share of Top and Non-Top Brokerage houses over the three distinct periods. Pre-Reg FD is from 1st quarter of 1996 to the 2nd quarter of year 2000, post-Reg FD is from the 3rd quarter of year 2000 to the 4th quarter of year 2002, and post-Global Settlement is from the 1st quarter of year 2003 to the 4th quarter of year 2004. Top 10 brokerage houses are determined each year based on their aggregate trading volume. In the fourth and fifth columns, we report the mean (median) difference of the market share and the F-value from the tests for the equality of variances of market share changes between pre- and post-Reg FD and pre- and post-Global Settlement. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively, based on the pooled t-test and Wilcoxon rank-sum test.

		pre-Reg FD (1)	post-Reg FD (2)	post-GS (3)	Difference (2) - (1)	Difference (3) - (2)
Top	Mean(MS_t)	5.98	5.82	6.09	-0.17 ***	0.27 ***
	Median(MS_t)	3.49	4.37	5.06	0.88 ***	0.69 ***
	Std Dev(MS_t - MS_{t-1})	5.30	3.82	2.97	1.92 ***	1.66 ***
	Max(MS_t - MS_{t-1})	22.94	15.60	10.99		
	Min(MS_t - MS_{t-1})	-23.28	-15.31	-10.98		
Non-Top	Mean(MS_t)	1.46	0.87	0.75	-0.58 ***	-0.12 ***
	Median(MS_t)	0.15	0.09	0.10	-0.06 ***	0.01 ***
	Std Dev(MS_t - MS_{t-1})	1.77	1.10	0.75	2.59 ***	2.12 ***
	Max(MS_t - MS_{t-1})	10.33	6.16	4.07		
	Min(MS_t - MS_{t-1})	-10.74	-6.66	-4.12		

Table 3: Determinants of market share levels prior to Reg FD

Firm fixed-effects regressions are estimated over the period from the 1st quarter of 1996 to the 2nd quarter of 2000. Top 10 brokerage houses are determined each year based on their aggregate trading volume. The dependent variable is the quarterly *Market Share* of a given brokerage house for a given sample firm. *Number of Recommendations* is the number of recommendations that are released for the sample firm in a given quarter from a given brokerage house. *Average Absolute CAR* is the quarterly average of the absolute CARs when there are multiple recommendations released in a given quarter. Analyst optimism measure is coded as 1 when the recommendation is higher than the monthly median recommendation for the same firm, 0 otherwise. *Average Analyst Optimism* is the average of analyst optimism measure in a given quarter. *Star Analyst Dummy* is coded as 1 when the recommendation is released by an All-Star analyst in a given quarter, 0 otherwise. Experience is measured as the difference between the quarter that the analyst's recommendation or forecast report for any firm initially appeared in I/B/E/S and the quarter that the analyst released recommendation report for the sample firm. *High Experience* is coded as 1 when the experience is greater than 6 years, 0 otherwise. *Affiliation Dummy* is coded as 1 when the given brokerage house has any investment banking business, such as IPO, SEO, M&A, or Bond issues, with the sample firm in a given quarter, 0 otherwise. *Broker Size* is the number of analyst in the given brokerage house who release at least one recommendation in a given quarter. *t*-statistics are reported in the parenthesis. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Variable	Top Brokers	Non-Top Brokers
Intercept	0.516	0.210
	(0.34)	(0.29)
Number of Recommendations	0.409 **	-0.042
	(1.98)	(-0.44)
Average Absolute CAR	0.333	0.421
	(0.33)	(0.81)
Analyst Optimism	0.792 ***	0.674 ***
	(5.02)	(8.45)
Star Analyst Dummy	1.071 ***	1.561 ***
	(6.69)	(9.33)
High Experience Dummy	0.219	0.148 **
	(1.38)	(1.96)
Affiliation Dummy	5.903 ***	9.463 ***
	(22.73)	(26.30)
Broker Size	0.065 ***	0.050 ***
	(21.47)	(22.59)
N	16,623	26,768
R^2	0.266	0.269
Firm Fixed Effects	Yes	Yes

Table 4: Impact of the Reg FD on the determinants of market share

Firm fixed-effects regressions are estimated over the sample period from 1st quarter of 1996 to the 3rd quarter of 2002. Top 10 brokerage houses are determined each year based on their aggregate trading volume. In panel A, the dependent variable is the *Quarterly Market Share* of a given brokerage house for a given sample firm. *Number of Recommendations* is the number of recommendations that are released for the sample firm in a given quarter from a given brokerage house. *Average Absolute CAR* is the quarterly average of the absolute CARs when there are multiple recommendations released in a given quarter. Analyst optimism measure is coded as 1 when the recommendation is higher than the monthly median recommendation for the same firm, 0 otherwise. *Average Analyst Optimism* is the average of analyst optimism measure in a given quarter. *Star Analyst Dummy* is coded as 1 when the recommendation is released by an All-Star analyst in a given quarter, 0 otherwise. Experience is measured as the difference between the quarter that the analyst's recommendation or forecast report for any firm initially appeared in I/B/E/S and the quarter that the analyst released recommendation report for the sample firm. *High Experience* is coded as 1 when the experience is greater than 6 years, 0 otherwise. *Affiliation Dummy* is coded as 1 when the given brokerage house has any investment banking business, such as IPO, SEO, M&A, or Bond issues, with the sample firm in a given quarter, 0 otherwise. *Broker Size* is the number of analyst in the given brokerage house who release at least one recommendation in a given quarter. *Post Reg FD Dummy* is 1 if the market share is measured since the 3th quarter of 2000, 0 otherwise. We also added the interaction terms between Post Reg FD and the independent variables defined above. *t*-statistics are reported in the parenthesis. In Panel B, we report the results of the *F*-test on whether each independent variable '*X*' examined in Panel A and the linear combination of '*X* + *X*Post Reg FD Dummy*' to be 0 in the first two columns. In the last column, we report the results of the *F*-test on whether the interaction term, '*X*Post Reg FD Dummy*', to be 0. *F*-values are reported in parenthesis. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Panel A. Regression Results

Variable	Top Brokers	Non-Top Brokers
Intercept	0.516	0.210
	(0.40)	(0.34)
Number of Recommendations	0.409 **	-0.042
	(2.30)	(-0.51)
Average Absolute CAR	0.333	0.421
	(0.39)	(0.95)
Analyst Optimism	0.792 ***	0.674 ***
	(5.83)	(9.89)
Star Analyst Dummy	1.071 ***	1.561 ***
	(7.77)	(10.92)
High Experience Dummy	0.219	0.148 **
	(1.60)	(2.30)
Affiliation Dummy	5.903 ***	9.463 ***
	(26.39)	(30.78)
Broker Size	0.065 ***	0.050 ***
	(24.93)	(26.43)
Post Reg FD Dummy	-1.344	-6.794 *
	(-0.47)	(-1.93)
Post Reg FD * Number of Recommendations	-0.758 ***	-0.011
	(-3.20)	(-0.10)
Post Reg FD * Avg Abs CAR	2.535 **	1.814 ***
	(2.11)	(2.99)
Post Reg FD * Analyst Optimism	0.210	-0.327 ***
	(1.02)	(-3.15)
Post Reg FD * Star Analyst	-0.396 **	-0.520 **
	(-2.03)	(-2.08)
Post Reg FD * High Experience	-0.083	-0.010
	(-0.43)	(-0.11)
Post Reg FD * Affiliation	-2.697 ***	-4.200 ***
	(-8.97)	(-8.95)
Post Reg FD * Broker Size	-0.003	-0.006 **
	(-0.60)	(-2.25)
N	32,936	49,325
R^2	0.258	0.284
Firm Fixed Effects	Yes	Yes

Panel B. F-test results

Variable	Top Brokers			Non-Top Brokers		
	pre-Reg FD	post-Reg FD	Difference	pre-Reg FD	post-Reg FD	Difference
Number of Recommendations	0.409 **	-0.349 **	-0.758 ***	-0.042	-0.053	-0.011
	(5.27)	(5.00)	(10.24)	(0.26)	(0.46)	(0.01)
Average Absolute CAR	0.333	2.868 ***	2.535 **	0.421	2.235 ***	1.814 ***
	(0.15)	(11.81)	(4.46)	(0.90)	(29.22)	(8.96)
Analyst Optimism	0.792 ***	1.002 ***	0.210	0.674 ***	0.347 ***	-0.327 ***
	(33.99)	(42.81)	(1.05)	(97.73)	(19.81)	(9.94)
Star Analyst Dummy	1.071 ***	0.676 ***	-0.396 **	1.561 ***	1.040 ***	-0.520 **
	(60.37)	(23.87)	(4.11)	(119.16)	(25.62)	(4.32)
High Experience Dummy	0.219	0.136	-0.083	0.148 **	0.138 *	-0.010
	(2.57)	(1.01)	(0.19)	(5.27)	(3.66)	(0.01)
Affiliation Dummy	5.903 ***	3.206 ***	-2.697 ***	9.463 ***	5.263 ***	-4.200 ***
	(696.66)	(254.78)	(80.52)	(947.20)	(220.41)	(80.12)
Broker Size	0.065 ***	0.062 ***	-0.003	0.050 ***	0.043 ***	-0.006 **
	(621.62)	(334.58)	(0.36)	(698.72)	(459.36)	(5.05)

Table 5: Impact of the Global Settlement on the determinants of market share

Firm fixed-effects regressions are estimated over the sample period from 3rd quarter of 2000 to the 4th quarter of 2004. Top 10 brokerage houses are determined each year based on their aggregate trading volume. In panel A, the dependent variable is the *Quarterly Market Share* of a given brokerage house for a given sample firm. *Number of Recommendations* is the number of recommendations that are released for the sample firm in a given quarter from a given brokerage house. *Average Absolute CAR* is the quarterly average of the absolute CARs when there are multiple recommendations released in a given quarter. Analyst optimism measure is coded as 1 when the recommendation is higher than the monthly median recommendation for the same firm, 0 otherwise. *Average Analyst Optimism* is the average of analyst optimism measure in a given quarter. *Star Analyst Dummy* is coded as 1 when the recommendation is released by an All-Star analyst in a given quarter, 0 otherwise. Experience is measured as the difference between the quarter that the analyst's recommendation or forecast report for any firm initially appeared in I/B/E/S and the quarter that the analyst released recommendation report for the sample firm. *High Experience* is coded as 1 when the experience is greater than 6 years, 0 otherwise. *Affiliation Dummy* is coded as 1 when the given brokerage house has any investment banking business, such as IPO, SEO, M&A, or Bond issues, with the sample firm in a given quarter, 0 otherwise. *Broker Size* is the number of analyst in the given brokerage house who release at least one recommendation in a given quarter. *Post GS Dummy* is 1 if the market share is measured since the 1st quarter of 2003, 0 otherwise. We also added the interaction terms between Post GS and the independent variables defined above. *t*-statistics are reported in the parenthesis. In Panel B, we report the results of the *F*-test on whether each independent variable '*X*' examined in Panel A and the linear combination of '*X* + *X*Post GS Dummy*' to be 0 in the first two columns. In the last column, we report the results of the *F*-test on whether the interaction term, '*X*Post GS Dummy*', to be 0. *F*-values are reported in parenthesis. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Panel A. Regression results

Variable	Top Brokers	Non-Top Brokers
Intercept	1.966	-0.819
	(1.27)	(-0.36)
Number of Recommendations	-0.349 ***	-0.053
	(-3.01)	(-0.98)
Average Absolute CAR	2.868 ***	2.235 ***
	(4.62)	(7.84)
Analyst Optimism	1.002 ***	0.347 ***
	(8.80)	(6.46)
Star Analyst Dummy	0.676 ***	1.040 ***
	(6.57)	(7.34)
High Experience Dummy	0.136	0.138 ***
	(1.35)	(2.78)
Affiliation Dummy	3.206 ***	5.263 ***
	(21.47)	(21.54)
Broker Size	0.062 ***	0.043 ***
	(24.61)	(31.10)
Post GS Dummy	-0.665	4.458 *
	(-0.32)	(1.66)
Post GS * Number of Recommendations	0.527 ***	0.265 ***
	(2.83)	(2.62)
Post GS * Avg Abs CAR	-2.200 *	0.115
	(-1.71)	(0.20)
Post GS * Analyst Optimism	-0.355 **	-0.129
	(-2.02)	(-1.61)
Post GS * Star Analyst	0.027	-1.010 ***
	(0.17)	(-4.50)
Post GS * High Experience	0.084	-0.175 **
	(0.52)	(-2.26)
Post GS * Affiliation	-0.665 ***	-1.973 ***
	(-2.78)	(-5.43)
Post GS * Broker Size	0.001	0.025 ***
	(0.25)	(8.87)
N	27,506	38,239
R^2	0.241	0.311
Firm Fixed Effects	Yes	Yes

Panel B. F-test results

Variable	Top Brokers			Non-Top Brokers		
	pre-GS	post-GS	Difference	pre-GS	post-GS	Difference
Number of Recommendations	-0.349 ***	0.179	0.527 ***	-0.053	0.211 **	0.265 ***
	(9.04)	(1.50)	(8.01)	(0.97)	(6.14)	(6.86)
Average Absolute CAR	2.868 ***	0.668	-2.200 *	2.235 ***	2.349 ***	0.115
	(21.38)	(0.35)	(2.94)	(61.52)	(22.72)	(0.04)
Analyst Optimism	1.002 ***	0.647 ***	-0.355 **	0.347 ***	0.219 ***	-0.129
	(77.48)	(23.42)	(4.09)	(41.71)	(13.64)	(2.59)
Star Analyst Dummy	0.676 ***	0.703 ***	0.027	1.040 ***	0.030	-1.010 ***
	(43.19)	(31.36)	(0.03)	(53.94)	(0.03)	(20.28)
High Experience Dummy	0.136	0.219 *	0.084	0.138 ***	-0.037	-0.175 **
	(1.82)	(3.15)	(0.28)	(7.71)	(0.38)	(5.09)
Affiliation Dummy	3.206 ***	2.541 ***	-0.665 ***	5.263 ***	3.289 ***	-1.973 ***
	(461.10)	(185.33)	(7.73)	(464.05)	(149.30)	(29.47)
Broker Size	0.062 ***	0.064 ***	0.001	0.043 ***	0.068 ***	0.025 ***
	(605.54)	(149.68)	(0.06)	(967.12)	(768.77)	(78.59)

Table 6: Determinants of market share of the pure brokerage houses over three distinct periods

Firm fixed-effects regressions are estimated over the three distinct periods. Pre-Reg FD is from 1st quarter of 1996 to the 2nd quarter of year 2000, post-Reg FD is from the 3rd quarter of year 2000 to the 4th quarter of year 2002, and post-Global Settlement is from the 1st quarter of year 2003 to the 4th quarter of year 2004. The dependent variable is the quarterly *Market Share* of a given pure brokerage house for a given sample firm. Pure brokerage house is defined as any brokerage house that does not appear as a lead underwriter or M&A advisor. *Number of Recommendations* is the number of recommendations that are released for the sample firm in a given quarter from a given brokerage house. *Average Absolute CAR* is the quarterly average of the absolute CARs when there are multiple recommendations released in a given quarter. Analyst optimism measure is coded as 1 when the recommendation is higher than the monthly median recommendation for the same firm, 0 otherwise. *Average Analyst Optimism* is the average of analyst optimism measure in a given quarter. *Star Analyst Dummy* is coded as 1 when the recommendation is released by an All-Star analyst in a given quarter, 0 otherwise. Experience is measured as the difference between the quarter that the analyst's recommendation or forecast report for any firm initially appeared in I/B/E/S and the quarter that the analyst released recommendation report for the sample firm. *High Experience* is coded as 1 when the experience is greater than 6 years, 0 otherwise. *Broker Size* is the number of analyst in the given brokerage house who release at least one recommendation in a given quarter. *t*-statistics are reported in the parenthesis. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Variable	pre-Reg FD	post-Reg FD	post-GS
Intercept	-0.103	-1.069	-0.965
	(-0.12)	(-0.38)	(-1.00)
Number of Recommendations	-0.081	-0.067	-0.051
	(-0.68)	(-0.58)	(-0.46)
Average Absolute CAR	-1.309 *	0.987 *	2.602 ***
	(-1.88)	(1.80)	(4.00)
Analyst Optimism	0.693 ***	0.364 ***	0.137 *
	(6.74)	(3.44)	(1.71)
Star Analyst Dummy	1.196 ***	0.507 *	0.050
	(5.16)	(1.70)	(0.18)
High Experience Dummy	-0.283 ***	0.116	0.132
	(-2.59)	(1.01)	(1.41)
Broker Size	0.118 ***	0.058 ***	0.113 ***
	(14.83)	(27.15)	(16.28)
N	5,947	5,126	3,606
R^2	0.486	0.591	0.547
Firm Fixed Effects	Yes	Yes	Yes

Figure 1: Quarterly Aggregate Market Share of Top, Non-Top, and Non-I/B/E/S Brokerage Houses

This figure compares the quarterly market share of Top, Non-Top, and Non-IBES brokerage houses based on the trading volume reported in the AutEx BlockDATA security details reports.

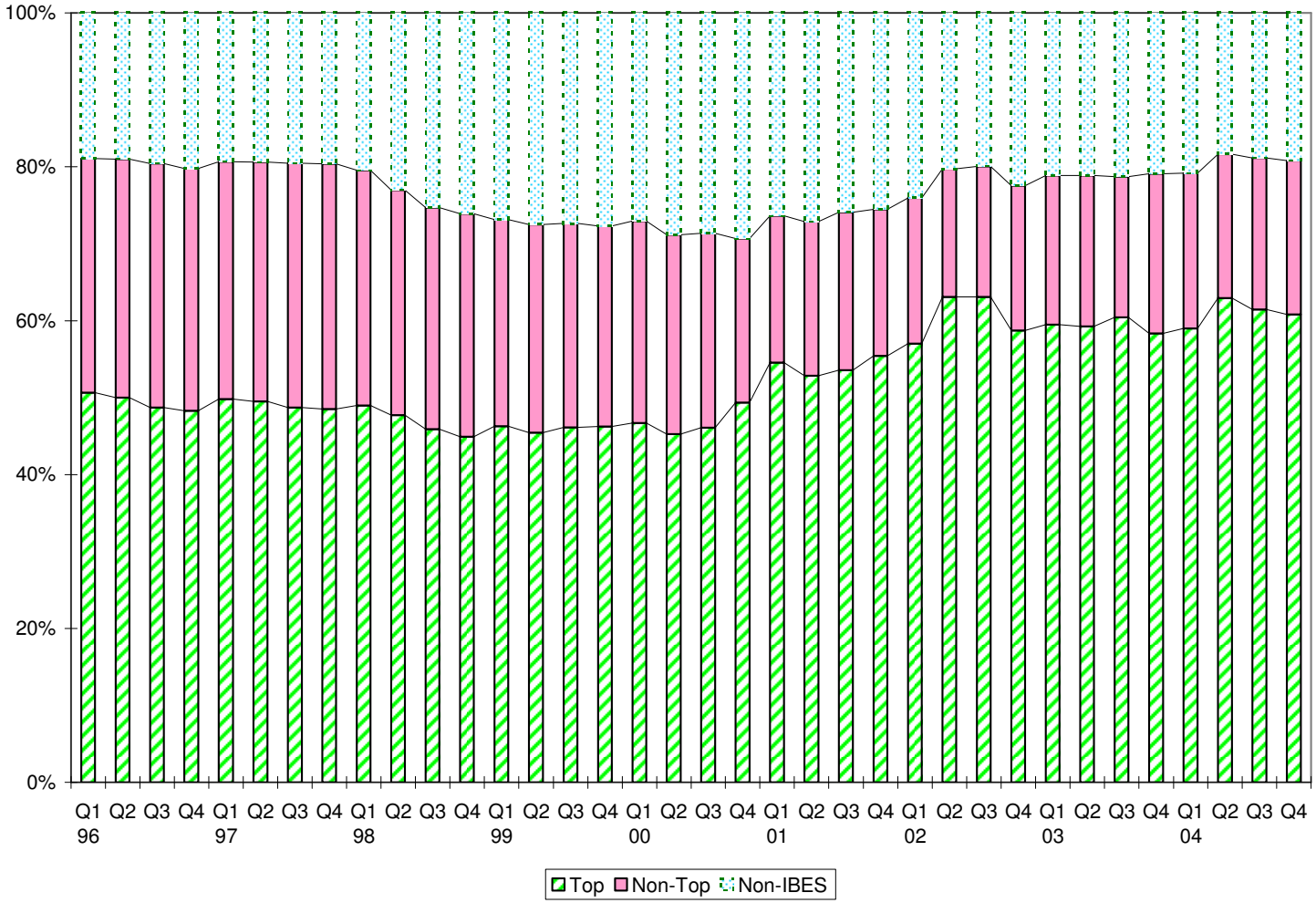

Figure 2: Herfindahl Index and Top 10 Brokerage Houses' Market Share

This figure shows the Herfindahl Index (HI) for the brokerage industry and the aggregate market share of the Top 10 brokerage houses for each quarter of the sample period.