Global Settlement and Star Analysts' Career Choices[*]

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Abstract

This study examines the effects of the Global Settlement on the departures of star analysts from investment banks. The Global Settlement prohibits the use of investment banking revenue to fund equity research and compensate equity analysts. After the Global Settlement, we find that star analysts from investment banks are more likely to exit the profession than before. We further document a significant increase in the number of star analysts who moved to the buy side. Finally, we show that the departed star analysts are relatively less biased and more accurate than the remaining analysts who followed the same companies as the departed stars. Moreover, the market reacts more to the earnings forecast revisions and stock recommendations issued by the departed stars. Taken together, these results are consistent with the Global Settlement causing a brain drain in investment banks and having an adverse effect on the information environment of the companies covered by the departed star analysts.

1. Introduction

Sell-side analysts have long been suspected of biasing their research in return for investment banking business (see, e.g., Becker 2001; Morgenson 2001). As a result, regulators implemented a series of reforms starting in 2002 to address these conflicts. This effort culminated with the U.S. Securities and Exchange Commission enforcement actions against ten of the top U.S. investment banks on April 28, 2003 – the so-called "Global Research Analyst Settlement."[1] The Global Settlement requires investment banks to physically separate their investment banking and research departments and restrict interaction between them (i.e., to put in a Chinese wall). In particular, banks' senior management must set the budget of the research department without input from investment bankers and without tying the budget to investment banking revenues. Research analysts are prohibited from participating in investment banking activities or receiving investment-banking-related compensation.[2]

Star analysts, who are listed on *Institutional Investor*'s annual All-American research team, usually take part in their firms' investment banking activities (Krigman, Shaw, and Womack 2001). Since the Global Settlement takes away a major source of compensation from sell-side equity analysts who are heavily involved in investment banking activities, star analysts are more likely than their non-star peers to exit sell-side equity research after the reforms to pursue other lucrative opportunities (Robinson 2009).

[1] In this study, we use the term "Global Settlement" to refer to this series of reforms. The other related regulations include the amendments to New York Stock Exchange Rule 351 (reporting requirements) and Rule 472 (communications with the public), the new National Association of Securities Dealers Rule 2711 (Research Analysts and Research Reports), and section 501 of the Sarbanes-Oxley Act.

[2] The Global Settlement also requires (a) research department management to independently make all decisions to initiate or terminate the coverage of companies, (b) investment bankers to not take part in evaluating analysts' job performance or determining their compensation, (c) investment banks to publicly disclose their research analysts' historical stock ratings and target price forecasts, and (d) the sanctioned banks to contract with at least three independent research firms to furnish independent research to the banks' research clients free of charge for a five-year period.

In this study, we investigate the consequences of the Global Settlement on the career choices of investment bank star analysts. We also examine the potential effects of losing star analysts from the sell-side equity research industry. Specifically, if the Global Settlement induces the better-performing star analysts to leave sell-side research, it will lower the quality of investment research on the companies followed by the departed stars (Institutional Investor 2007; Pizzani 2009). This will adversely affect the investors who use these research services (e.g., individual investors).

The Global Settlement mainly affects investment banks. Therefore, we separately examine sell-side analysts from investment banks and non-investment banks to test if the reforms affect these two groups of analysts differently. Non-investment banks include independent research firms, brokerage firms, and syndicate banks.[3] We further separate investment banks into non-sanctioned and sanctioned banks. The ten sanctioned banks are among the biggest investment banks and hence, they could react more to the Global Settlement as a result of their visibility.

We document evidence consistent with the Global Settlement leading to a brain drain in investment banks and the sell-side research profession. Using data from the ten-year period 1998 through 2007, we find a significant increase in the likelihood that investment bank star analysts, as a representative group of the elite analysts in equity research, leave sell-side research after the Global Settlement. In contrast, the reforms have little effect on the propensity of star analysts from non-investment banks to exit the sell-side research industry. The main results are robust to controlling for two other

[3] We include syndicate banks in the non-investment bank category because they are only involved in distribution and, hence, they face little investment-banking incentives. Our main results are not affected if we exclude syndicate banks or reclassify them as non-sanctioned investment banks.

confounding factors around the time of the Global Settlement: (1) the rise of the hedge fund industry and (2) the drop in the overall revenue of investment banks.

We further track the career choices of the departed star analysts and document that after the reforms, there is a significant jump in the percentage of investment bank star analysts moving to or starting their own asset management, hedge fund, private equity, or venture capital firms. However, the same pattern is not observed for non-investment bank star analysts who left sell-side research after the Global Settlement. Furthermore, we find some evidence that investment banks are trying to keep their star analysts by promoting them to an executive position in the research department or transferring them to another department with a higher earnings potential (e.g., investment banking or asset management).

This study adds to our understanding of the economic consequences of the Global Settlement and related regulations. Prior research has shown that these reforms have made analysts' stock recommendations less upwardly biased (e.g., Barber, Lehavy, McNichols, and Trueman 2006; Kadan, Madureira, Wang, and Zach 2008; Guan, Lu, and Wong 2009) and more consistent with valuation based on analysts' earnings forecasts (Barniv, Hope, Myring, and Thomas 2009; Bradshaw 2009; Chen and Chen 2009). However, no studies have explicitly examined the deadweight loss of these reforms. Boni and Womack (2002) and Boni (2006) suggest that the reforms would cause research departments to reduce their coverage and quality of their research. We present evidence consistent with the Global Settlement leading to an unintended brain drain in investment banks, whereby the best performing analysts exit the sell-side research profession to pursue other lucrative opportunities. This evidence is important for addressing whether the potential benefits from these reforms exceed the costs (Mehran and Stulz, 2007).

Moreover, the brain drain is potentially harmful for the companies covered by the departed star analysts. We find that these departed analysts performed significantly better than other analysts. Specifically, the departed stars are relatively less optimistic and more accurate than other analysts who follow the same companies. Their earnings revisions and stock recommendations are more informative: the market reacts more positively (negatively) to the upward (downward) forecast revisions and recommendations changes made by the departed stars than those issued by other analysts. Furthermore, the market response to the departed stars' recommendation upgrades is complete within three trading days. In contrast, a drift is detected for upgrades issued by other analysts who followed the same companies. The latter is consistent with star analysts contributing to the informational efficiency of the capital market, whereby new information generated by the departed star analysts is impounded into stock prices more quickly.[4] Since the goal of the Global Settlement is to protect investor interests by providing them with less biased and more informative research, our findings are in contrast to the intended objective of the reforms.

This study also contributes to the strand of literature investigating the turnover of sell-side equity analysts. Prior studies have shown that analysts' career outcomes are affected by their forecast accuracy, optimism, and experience (Mikhail, Walther, and

[4] The brain drain might benefit large investors and their clients on the buy side (e.g., hedge funds). Moreover, certain investors (e.g., individuals) who rely on high-quality equity research from sell-side analysts could be harmed. This could potentially lead to wealth transfer from the small investors to their larger counterparts. Such a wealth transfer effect is implicit compared to the direct wealth transfer due to the misleading behaviour of some analysts documented in De Franco, Lu, and Vasvari (2007). We leave this issue for future research.

Willis 1999; Hong, Kubik, and Solomon 2000; Hong and Kubik 2003; Wu and Zang 2009). We show that compensation is a factor that leads to the departure of the best analysts from the investment research profession. Annual pay for top analysts fell to about one-quarter by 2008 from its peak in 2000 (Robinson, 2009). Our study provides systematic evidence supporting the notion that the Global Settlement reduces the earnings potential of sell-side analysts and, hence, affects the career choices of the star analysts.

The next section describes our sample and data. Section 3 presents our analysis linking the Global Settlement to the career choices of star analysts. Section 4 examines the potential loss to the companies covered by the departed star analysts. Section 5 concludes.

2. Sample and Data

Our initial sample comes from I/B/E/S and covers the period from January 1998 to December 2007. We divide the sample period into two subperiods: The pre-reform period (January 1998 – December 2001) and the post-reform period (January 2002 – December 2007). We examine the effect of Global Settlement on analysts' career choices between the pre- and post-reform periods. As robustness checks, we also repeat our analyses with 2002 and 2003 excluded from the post-reform period. The reforms were proposed and implemented during these two years and, hence, the Global Settlement might not have reached its full effect.[5] The results are qualitatively similar with or without the inclusion of these two years in the post-reform period.

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[5] In May 2002, the SEC approved the amendments to New York Stock Exchange Rule 351 and Rule 472 and the National Association of Securities Dealers new Rule 2711. In July 2002, the U.S. Congress passed the Sarbanes-Oxley Act; section 501 of the Act addresses security analysts' conflicts of interest. In

We retrieve all analysts' earnings forecast and stock recommendation data from Thomson Financial's I/B/E/S database in 2008. We use the 2006 I/B/E/S translation file to identify the affiliation of each equity analyst and the name of each brokerage firm, which allows us to have a sample spanning the period from January 1998 through December 2007.[6] Stock price and return data are from *CRSP* and financial statement data are from *Compustat*.

We define an analyst a star if he/she is on *Institutional Investor*'s All-American research team in a particular year or at least one of the last two years. *Institutional Investor* publishes the list annually in its October issue and the ranking is based on votes from buy-side portfolio managers. An analyst is said to have left the sell-side research profession in a particular year if he/she made earnings forecasts in that year but stopped issuing forecasts the following year, according to data from I/B/E/S. We further confirm his/her departure from sell-side research using Nelson's Directory of Investment Research (Wu and Zang 2009).

We divide analysts into three groups, based on the type of firms they work for.[7] We use Nelson's Directory of Investment Research and Thomson Financial's SDC database to classify securities firms into three types: Sanctioned investment banks, non-sanctioned investment banks, and non-investment banks. Investment banks are those listed as investment banks by Nelson and identified as lead or co-lead underwriters by SDC. The sanctioned investment banks are Bear Stearns, Credit Suisse First Boston,

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December 2002, the SEC proposed enforcement actions against ten of the top U.S. investment banks and the Global Settlement was finalized in April 2003.

[6] I/B/E/S stops providing the translation file for academic research after 2006. We use the 2006 translation file to identify analyst affiliation in 2007. Hence, we lose new investment research firms (and their analysts) that are added to I/B/E/S in 2007.

[7] If an analyst changes job from one firm type to another, we assign him/her to his/her original employer in the switching year.

Goldman Sachs, Lehman Brothers, J.P. Morgan Securities, Merrill Lynch, Morgan Stanley, Citigroup Global Markets (formerly known as Salomon Smith Barney), UBS Warburg, and U.S. Bancorp Piper Jaffray.[8]

Non-investment banks include independent research firms, brokerage firms, and syndicate banks. Independent research firms are those listed as such by Nelson and are not found in the SDC database as lead/co-lead underwriter or manager/co-manager. Brokerage firms are those firms classified by Nelson as a major institutional broker, major or small regional broker, or investment bank/broker that is not identified as lead/co-lead underwriter or manager/co-manager by SDC. Syndicate banks are those firms listed by Nelson as either investment banks or brokers and identified by SDC as managers or co-managers, but not as lead or co-lead underwriters. Our findings are not affected if we exclude syndicate banks from the analysis or reclassify them as non-sanctioned investment banks.

Table 1 reports the numbers of securities firms, analysts, and companies followed by firm type. There are 525 securities firms in the sample, which comprises 10 sanctioned investment banks, 165 non-sanctioned investment banks, and 350 non-investment banks. The sample includes 11,380 sell-side analysts who cover 8,472 unique companies. The analysts in our sample are mainly from investment banks, which account for about 86% of all the analysts (the ten sanctioned banks have over 37% of the analysts in the sample). The number of companies covered by investment bank analysts is also larger than that followed by non-investment bank analysts.

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[8] Deutsche Bank Securities Inc. and Thomas Weisel Partners LLC later joined the Global Settlement in 2004 (SEC 2004). We classify them as non-sanctioned investment banks in our main analysis. However, the results are qualitatively the same if they were included in the sanctioned bank category.

3. The effect of Global Settlement on star analysts' career choices

Star analysts are voted by institutional investors based on a number of features, such as industry knowledge, special services, earnings reports, stock recommendations, etc. (Bagnoli, Watts, and Zhang 2008). Prior research presents evidence that star analysts are superior to their non-star peers. In particular, star analysts provide more accurate and timely earnings forecasts, their status and coverage affect the market share of equity offerings of investment banks, and their forecasts suffer less from conflict-of-interest due to their concern for personal reputation (see, for example, Stickel 1992; Dunbar 2000; Krigman, Shaw, and Womack 2001; Gleason and Lee 2003; Bonner, Hugon, and Walther 2007; Leone and Wu 2007; Clarke, Khorana, Patel, and Rau 2007; Bagnoli, Watts, and Zhang 2008; Fang and Yasuda 2009). Consistent with the notion that star analysts possess higher ability (or are valued more by their employers), Groysberg, Healy, and Maber (2008) find that star analysts receive 61% higher total compensation and 100% higher bonus than their unranked counterparts in a large, high-status investment bank.

We examine the departure of star analysts from the sell-side investment research industry as a consequence of the Global Settlement. We treat star analysts as a representative group of the best performers in the profession. Their departure is considered to reflect the trend of human capital flows. Global Settlement prohibits investment banks from using investment-banking revenue to fund sell-side research and compensate sell-side analysts. As a result, it has led to a reduction in the total compensation of sell-side analysts. Based on a New York-based compensation firm, annual pay from top performing sell-side analysts fell to about $600,000 by 2008 from a peak of $2.5 million in 2000 (Robinson, 2009, page 34).[9] The drop in compensation could cause a brain drain in investment banks and the sell-side research profession if the high ability star analysts exit sell-side research to purse more lucrative opportunities in other industries (Institutional Investor 2007; O'Leary 2007; Pizzani 2009).

Table 2, panel A presents summary statistics on the number of star analysts by year and firm type. Column (1) shows that the number of star analysts in our sample ranges from a low of 305 in 1998 to a high of 429 in 2003. The majority of the star analysts work for investment banks, especially the ten sanctioned banks. In 2007, for example, there were 246, 59, and 21 star analysts at sanctioned investment banks, non-sanctioned investment banks, and non-investment banks, respectively.

Table 2 also reports the number and percentage of star analysts who left the sell-side investment research industry. An analyst is said to have left the industry in a particular year if he/she made earnings forecasts in that year but stopped issuing forecasts the following year; we further confirm his/her departure using Nelson's Directory of Investment Research. Column (3) shows the results for all firm types. It indicates that the percent of star analysts who left the industry is less than 8% in the first four years of our sample period (i.e., the pre-reform period), peaks at 13.6% in 2002, and stays relatively high since then. Panel B indicates that, on average, 6.6% and 12.4% of star analysts left the industry during the pre-reform and post-reform periods, respectively. Columns (6) and (9) present a similar pattern for sanctioned and non-sanctioned investment banks, respectively. For instance, column (6) in panel B reports that the

[9] Using compensation data from a major financial institution for the years 1988 through 2005, Groysberg, Healy, and Maber (2008) document that mean (median) total analyst compensation decreases from the peak of $1,452,376 ($1,148,835) in 2001 to $796,923 ($647,500) in 2005. Most of this drop can be attributed to a reduction in bonus. In particular, average base salaries (bonuses) are $188,967 ($1,263,410) in 2001 and $173,077 ($623,846) in 2005. All amounts are in 2005 dollars.

percent of star analysts from sanctioned banks who departed the industry increased from 5.7% in the pre-reform period to 12.5% in the post-reform period.

In contrast, we do not observe an increase in the percentage of star analysts from non-investment banks leaving the sell-side research profession. In particular, column (12) in panel B reports that the corresponding statistic for non-investment bank star analysts drops from 19.6% in the pre-reform period to 12.4% in the post-reform period. Taken together, these statistics are consistent with the reforms having a differential impact on the career choices of investment bank star analysts. It is possible that the rise in the percent of star analysts who left investment banks and sell-side research after the reforms could be attributed to the loss of bonuses that are tied to investment-banking revenue. We examine this conjecture in greater details in the rest of this section.

Since star analysts are likely involved in investment-banking business, the results documented in table 2 could also be due to the fact that the demand for their services is lowered after investment-banking deals dried up shortly after the Global Settlement. We address this concern by investigating whether the initial public offering (IPO) and seasoned equity offering (SEO) markets have changed in the post Global Settlement period. We extract the numbers of IPOs and SEOs and the corresponding proceeds from *Thomson Financial's* SDC database for our sample period 1998 – 2007. Figure 1 shows that both the numbers and proceeds of IPO and SEO deals are the lowest in years 2002 and 2003. However, both the numbers and proceeds of investment banking deals started recovering in 2004 and reached or surpassed the 1999 levels in 2007. The latter indicates that the increase in the percent of investment bank star analysts who left the sell-side research industry in the post-reform period cannot be attributed to investment banking market conditions (even thought this might be the case in 2002 and 2003).

Wu and Zang (2009) investigate the effect of 76 mergers in the financial industry during the period 1994 through 2004 on the career outcomes of sell-side analysts. They find that accurate analysts are more likely to turnover and star analysts are more likely to be promoted to an executive position. However, there are only three, one, and two mergers completed in 2002, 2003, and 2004, respectively. Hence, our post-reform period results are not likely driven by the phenomenon documented in Wu and Zang (2009).

3.1. Logistic regression analysis of analysts left the sell-side research industry

To formally examine the impact of the Global Settlement on the loss of star analysts from the sell-side research industry in general and investment banks in particular, we use logistic regression analysis to estimate the propensity of analysts to exit sell-side research firms. The regression is specified as follows:

$$\begin{aligned}\Pr(Left\ Sell-Side=1) = {} & \alpha_0+\alpha_1 D+\alpha_2 STAR+\alpha_3 TOPACCU+\alpha_4 BOTACCU+\\ & \alpha_5 RFOPT+\alpha_6 EXPERIENCE+\alpha_7 D\times STAR+\alpha_8 D\times TOPACCU+\\ & \alpha_9 D\times BOTACCU+\alpha_{10} D\times RFOPT+\alpha_{11} D\times EXPERIENCE+e_t,\end{aligned} \tag{1}$$

where *D* is an indicator variable that equals one in the post-reform period, zero otherwise. *STAR* is an indicator variable that equals one for analysts who are on the *Institutional Investor* All-American research team in the current year or at least one of the last two years, zero otherwise.

We control for other factors that might affect the propensity of analysts to leave the sell-side research industry. In particular, accurate forecasters might leave the industry for other lucrative opportunity and poorly performing analysts might be fired. Following Hong and Kubik (2003) and Wu and Zang (2009), we include *TOPACCU* and

BOTACCU into the logistic regression. *TOPACCU* (*BOTACCU*) is an indicator variable that equals one if the analyst's relative forecast accuracy score is in the top 10% (bottom 10%) of all analysts, zero otherwise. Following Hong and Kubik (2003) and others, we measure relative forecast accuracy for each analyst *i* as the analyst's average forecast accuracy, $Accuracy_{it}$. $Accuracy_{it}$ is computed by averaging $Accuracy_{ijt}$ across all companies followed by analyst *i* in period *t*. In particular,

$$Accuracy_{ijt} = 100 - 100 \times \left\{ \frac{Rank_{ijt} - 1}{NumberFollowing_{jt} - 1} \right\}, \qquad (2)$$

where $Rank_{ijt}$ is analyst *i*'s forecast accuracy rank for company *j* in period *t*, and $NumberFollowing_{jt}$ is the number of analysts following company *j* in period *t*. We use the last forecast made by each analyst for the same company and forecast period. By construction, this measure controls for differences in the composition of companies followed by the analysts and for differences in forecasting period.

Hong and Kubik (2003) also show that forecast optimism affects job separation, especially for analysts who cover stocks underwritten by their firms. Mikhail, Walther, and Willis (1999) and Hong, Kubik, and Solomon (2000) find that forecast accuracy and experience are associated with job separation. Hence, we control for optimism and experience in the logistic regression. Analyst experience, *EXPERIENCE*, is the average number of years the analyst has issued earnings forecasts or recommendations for the companies they follow. We calculate relative forecast optimism, *RFOPT*, as in Cowen, Groysberg, and Healy (2006), using the following equation:

$$RFOPT_{ijt}^{t-k} = \frac{FORECAST_{ijt}^{t-k} - \overline{FORECAST_{jt}^{t-k}}}{STDDEV(FORECAST_{jt}^{t-k})}, \qquad (3)$$

where $FORECAST_{ijt}^{t-k}$ is analysts *i*'s forecast of company *j*'s performance for period *t*, as of *t*-*k*. $\overline{FORECAST_{jt}^{t-k}}$ and $STDDEV(FORECAST_{jt}^{t-k})$ are, respectively, the average and standard deviation of all forecasts for company *j* and period *t*, as of *t*-*k*.[10] We compute $RFOPT_{ijt}^{t-k}$ only for companies that are followed by at least three analysts and we use only the first forecast made by each analyst for the same company and forecast period. $RFOPT_{ijt}^{t-k}$ is then averaged across all companies followed by analyst *i* in period *t* to compute analyst *i*'s average relative forecast optimism at period *t*, $RFOPT_{it}^{t-k}$. By construction, this measure controls for company- and time-specific factors that affect forecast optimism across analysts.

Table 3 presents summary statistics on the explanatory variables of the logistic regression for both the pre- and post-reform periods. In both periods, over 25% of the analysts from sanctioned investment banks are star analysts in current year or in at least one of the last two years. The corresponding statistics for analysts from non-sanctioned banks and non-investment banks are less than 5%. Average *TOPACCU* is about 10% for all three firm types and two subperiods, which is consistent with accuracy being not a main factor in the ranking criteria (Bagnoli, Watts, and Zhang 2008). However, average *BOTACCU* is higher for non-investment banks than investment banks in both subperiods, indicating that non-investment bank analysts are less accurate than their investment bank counterparts. Regarding forecast optimism, *RFOPT*, non-investment bank analysts are relatively more optimistic than other analysts who followed the same companies. The relative optimism of investment bank analysts is equal or close to zero. In terms of

[10] We winsorize forecast optimism at the 1st and 99th percentiles, because some standard deviations (i.e., the deflator) are extremely small. Results are qualitatively similar if we scale this measure by stock price.

experience, sanctioned bank analysts are slightly more experienced in the pre-reform period. The experience of non-investment and sanctioned bank analysts drops in the post-reform period, while that of non-sanctioned bank analysts increases slightly.

Table 4 summarizes the results of the logistic regressions by firm type. As shown in columns (1) and (3), the estimated coefficients on the *STAR* variable are statistically negative, suggesting that investment bank star analysts are less likely than their non-star colleagues to leave the profession during the pre-reform period. However, the estimated coefficients on the interactive term $D \times STAR$, our main variable of interest, are positive and statistically significant, suggesting that the propensity of investment bank star analysts to leave the sell-side research profession increases after the Global Settlement. The impact of the reforms affects sanctioned investment banks more than non-sanctioned investment banks; e.g., the estimated interaction effects are 0.57 and 0.50, respectively. The effects are also economically large, given that the estimated mean effects (i.e., coefficients on *STAR*) are -1.29 and -0.89, respectively.

If the aforementioned results for investment bank star analysts are driven by the loss of investment banking-related compensation, we should expect to see the reforms to have less effect on the exit of non-investment bank star analysts. We present the corresponding findings in column (5). In contrast to their investment bank counterparts, star analysts at non-investment banks are no more likely than their non-star peers to leave the sell-side research industry in both the pre- and post-reform periods. Taken together, the results reported in table 4 are consistent with the Global Settlement inducing investment bank star analysts to leave sell-side research.

We obtain the aforementioned results after controlling for other determinants of job separation, promotion, or demotion of sell-side analysts (Mikhail, Walther, and Willis 1999; Hong et al. 2000; Hong and Kubik 2003; Wu and Zang 2009). Adding to these studies, we document statistically positive coefficients on *TOPACCU* for non-sanctioned investment bank analysts and *BOTACCU* for both sanctioned and non-sanctioned investment bank analysts. These results suggest that accurate (top 10%) and inaccurate (bottom 10%) analysts are more likely to exit the profession in the pre-reform period (likely for different reasons). The estimated coefficients on the interaction terms for *TOPACCU* and *BOTACCU* are indistinguishable from zero, indicating that accuracy has no incremental effect after the Global Settlement. Relative forecast optimism, *RFOPT*, has little effect on the propensity of analysts to leave the profession in either subperiod. On the other hand, analyst experience, *EXPERIENCE*, significantly reduces the propensity to exit sell-side research for analysts from non-investment banks before the Global Settlement.

Finally, there are two confounding factors that might also explain the brain drain phenomenon. First, figure 2 shows that the post-reform period coincides with the rise of the hedge fund industry. Both the number of hedge funds and the amount of assets under management increase at a fast rate since 2002. Hence, there are more opportunities for star analysts to move to the buy side during the post-reform period. Second, investment banks are facing decreasing performance in the post-reform period because the profitability of their trading division is adversely affected by a drop in soft dollar arrangements, trading volume, and commission rate (Goldstein, Irvine, Kandel, and Wiener 2009). As a result, bonuses tied to firm-wide profit are adversely affected, making it difficult to use firm-wide bonuses to retain star analysts. Together, these two reasons will lead to more star analysts to move to or start their own hedge fund firms.

We control for these two factors by including *NOFUNDS* and *TOTREV* in the logistic regressions. *NOFUNDS* is the number of global hedge funds estimated by International Financial Services London (IFSL, 2009). *TOTREV* is the revenue of the firms in the industries with 4-digit SIC codes of 6200 (security and commodity brokers, dealers, exchange and services), 6211 (security brokers, dealers and flotation companies), and 6282 (investment advice). The results are summarized under columns (2), (4), and (6) of table 4. The estimated coefficients on *NOFUNDS* and *TOTREV* are statistically significant for analysts from non-sanctioned investment banks only. We also include bank fixed effects in columns (1) and (2) to control for unobservable heterogeneity across the 10 sanctioned investment banks. For example, a sanctioned bank might be affected more by the drop in trading revenue and, hence, exhibits a higher departure rate. Similarly, we add brokerage firm and syndicate bank dummies into columns (5) and (6) to control for heterogeneity among the different type of non-investment banks. Notwithstanding these additional control variables, the results on our main variable of interest, $D \times STAR$, remain unchanged.

3.2. Career choices of star analysts who exited the sell-side research industry

While the results presented in tables 2 and 4 strongly suggest a rise in the percentage and propensity of star analysts departing sell-side research after the Global Settlement, they do not address whether they are being forced out because of funding cuts or are leaving voluntarily to pursue other opportunities. Only the latter is consistent with our conjecture that the Global Settlement leads to a brain drain in investment banks, because star analysts lose investment-banking-related bonuses after the reforms (e.g., see O'Leary 2007 and Robinson 2009).

To further investigate the reason behind the exit of star analysts, we keep track of all 373 star analysts who left the sell-side investment research industry during the ten-year period from 1998 through 2007. We first use the I/B/E/S translation file to extract the initial and last name of these star analysts. We then look up the full name of these analysts from Nelson's Directory of Investment Research and, if not found, the corresponding issues of the *Institutional Investor*. Given the full names, we check the Nelson's Directory to determine whether these star analysts indeed left the sell-side research industry or are promoted to a managerial position in their firms or other sell-side research firms. Finally, we search *Factiva* and *Google* to identify the first job the remaining star analysts took after they left the sell-side research industry.

Based on the information collected, we classified these departed star analysts into one of the following eight categories:

(A) Promoted to a managerial position within the firm or to another firm. This category includes analysts that are listed as key executives in Nelson's Directory of Investment Research. For example, Benjamin Bowler of Merrill Lynch was promoted to Co-Head of Global Equity Research.

(B) Transfer laterally to a different department within the firm. This category includes analysts who stayed with the same firm after leaving sell-side research (i.e., no longer found in I/B/E/S), but they are not listed as analyst or key executives in Nelson's Directory. For example, Anatol Feygin of Banc of America Securities became the firm's Head of Global Commodity Strategy.

(C) Moved to a buy side, hedge fund, private equity, or venture capital firm. This category includes analysts who either moved to or started their own asset management, hedge fund, private equity, or venture capital firms. For example, William Julian left Smith Barney Citigroup in 2003 to become the founding partner of Calimar Capital Management, a hedge fund focused on small cap stocks.

(D) Started own investment research firm or moved to another research firm that is not covered by I/B/E/S. For example, John Tumazos left Prudential Equity Group in 2008 to found Very Independent Opinions, LLC.

(E) Moved to a non-financial industry. This category includes the analysts who left the financial industry. For example, Mark Rowen left Prudential Equity Group to join eBay as its vice president of investor relations.

(F) Retired or fired for causes. Besides those who announced retirement, this category also includes a few analysts who were banned from the financial services industry (e.g, Henry Blodget of Merrill Lynch) or fired for causes (e.g., Peter Caruso of Merrill Lynch for tipping off clients).

(G) Still a sell side analyst but not found in I/B/E/S. Some analysts are no longer covered by I/B/E/S, but we found their names on the Nelson directory. Not all investment research firms are covered by I/B/E/S.

(H) Not enough information to classify. We are not able to find enough information on 56 analysts to classify them into one of the above categories. This category includes these “unclassified” analysts.

Table 5 presents the number and percentage of the departed star analysts in each of the above categories by firm type and subperiod. In particular, we are interested in investigating whether the percent of star analysts moving to these categories changes after the Global Settlement and whether the change is consistent with star analysts moving to more lucrative careers. Elite analysts are known to leave the sell-side industry to manage money as portfolio managers at the buy side (see, e.g., Groysberg, Healy, and Chapman 2008). It is generally believed that money managers at the buy side can earn more than sell-side star analysts. This is especially true after the Global Settlement, which prohibits tying analyst compensation to investment-banking revenues. Hence, we consider moving to the buy side as evidence that star analysts exit the sell-side industry to pursue more lucrative opportunities. We define buy side to include asset management, hedge fund, private equity, or venture capital firms.

Furthermore, if investment banks really want to keep their star analysts, they might promote them to a managerial position or transfer them to a different department with a higher earnings potential (e.g., investment banking or asset management). Hence, an increase in the percent of star analysts moving to categories (A) and (B) is also consistent with investment banks making an effort to keep their star analysts in the banks, albeit in a different capacity.

Panel A in table 5 reports the findings for departed star analysts from sanctioned investment banks. In particular, columns (1) and (2) show that there are a total of 60 star analysts who left the sell-side profession in the pre-reform period (1998 – 2001): 16.7% are promoted to a managerial position, 5.0% transferred to a different department in the same firm, 26.7% moved to the buy side, and 20.0% moved to a non-financial industry.

Columns (3) and (4) present the corresponding statistics for the post-reform period (2002 – 2007) and column (5) shows the change relative to the pre-reform period.

Specifically, column (4) in panel A shows that of the 223 star analysts who exit the sell-side profession in the post-reform period, 31.8% moved to the buy side, which is a significant 5.2% point increase relative to that before the Global Settlement.[11] This is the largest percentage point increase among the eight categories. In contrast, the percent of star analysts who are promoted increases by 1.3% points and those who moved to another department increases by 2.6% points. If potential compensation is higher on the buy-side, this finding is consistent with star analysts leaving sell-side research to pursue more lucrative opportunities on the buy side after the Global Settlement.

Panel B, table 5 reports the corresponding results for non-sanctioned investment banks. In particular, columns (5) and (6) show that the percent of star analysts moving to the buy side increases significantly by 15.0% points in the post-reform period. Once again, this is the biggest percentage point increase among all categories. On the other hand, the percentage of star analysts who are promoted (category A) or retired/being fired (category F) decreases significantly after the Global Settlement.

If star analysts are valuable for the investment banks in other capacities, we would expect to find the investment banks to make some efforts to keep them within the banks. Panel A provides some support that sanctioned investment banks are able to retain the star analysts by transferring them to another department within the banks. Specifically, we document a significant 2.6% point increase in category B. However, panel B shows that non-sanctioned investment banks are not able (or willing) to keep their star analysts.

[11] Under the null hypothesis that the reforms have no effect on the career choices of star analysts, the percent changes are zero. We assume that the percent changes from these eight categories are drawn from a student's *t*-distribution, with zero mean. Hence, we estimate the standard error for statistical inference using the standard deviation of the percent changes across these eight categories. We also try more finely defined categories and the findings (not tabulated) are qualitatively similar to those reported here.

To further support our conjecture that the Global Settlement causes the brain drain in investment banks, we perform the same analysis on non-investment banks. Under our conjecture, non-investment banks should be least affected. Panel C, column (5) shows that there is an insignificant reduction in the percent of non-investment bank star analysts who moved to the buy side during the post-reform period. However, we find a significant increase in the percent of non-investment bank star analysts who moved to the non-financial industries. However, the results presented in panel C should be interpreted with caution, given the small sample of star analysts who departed non-investment banks.

Taken together, the evidence documented in this section suggests that the sell-side equity research profession loses more of their star analysts to the buy side after the reforms. More importantly, this effect only applies to star analysts from investment banks, which are the target of the Global Settlement. We attribute this "brain drain" phenomenon to the fact that the Global Settlement has not only put close scrutiny on investment bank analysts, but also barred them from receiving investment-banking related compensation. To the extent that the Global Settlement induces this brain drain, it causes an unintended adverse consequence for the sell-side equity research industry in general and investment banks in particular (Institutional Investor 2007; O'Leary 2007; Pizzani 2009).

4. Effect on the companies being followed by the departed star analysts

We investigate the potential losses to the companies followed by the departed star analysts. We do so by comparing the quality of research made by the departed star analysts with that of other analysts who cover the same companies and who remain in the sell-side research industry. In particular, we examine their relative forecast accuracy, relative forecast optimism, and informativeness of forecast revisions and stock recommendations changes. We measure these properties using data from the year before the star analysts leave the sell-side research industry. We compute the mean of the differences across year. *t*-statistics are computed by dividing the mean of the differences by the standard error of the annual differences.

We provide evidence consistent with the departed analysts being more accurate and less optimistic. In table 6, we examine relative forecast accuracy and relative forecast optimism, which are calculated as described in section 3.1. Over the 10-year period from 1998 through 2007, 37 star analysts on average exit the industry per year. Columns (3) to (5) show that their average relative forecast accuracy score is 59.85, which is statistically higher than that of the remaining analysts by 5.20 points. Further, the departed star analysts exhibit a higher relative accuracy score in nine out of ten years, which is unlikely due to chance based on a binomial test. Higher relative accuracy indicates that star analysts provide higher quality earnings reports, consistent with prior studies (e.g., Stickel 1992). Columns (6) to (8) present the relative forecast optimism results. The departed star analysts are less optimistically biased than the other analysts who covered the same companies, but the difference is not distinguishable from zero. In only three of the ten years, the departed star analysts are relatively more optimistic than the other analysts.

Next, we present evidence that the forecast revisions made by the departed stars are more informative than other analysts who covered the same companies. Table 7 summarizes our findings on the information content of forecast revisions. On average, the departed star analysts revise upward their earnings forecasts 714 times and downward 794 times in a year. Columns (3) to (5) report the 3-day market-adjusted abnormal returns from day –1 to day +1, where day 0 is the day when the analysts issue their revisions. For upward revisions, the market reacts more to the revisions issued by the departed stars than to those issued by other analysts. The associated numbers are 1.76% and 1.45%, respectively, with the difference being statistically positive. Moreover, the upgrade revisions of the departed stars are more informative that those of other analysts in all ten years. Columns (6) to (8) present the market reactions over the post-revision window from day +2 to day +21. There is no distinguishable difference between the stars and their peers, as their revisions lead to significantly positive drifts of about 1% each. Indeed, the differences are positive in five of the ten years and negative for the other five years. For downgrade revisions, the market again reacts stronger to the revisions made by the departed star analysts. The 3-day market-adjusted abnormal return is –2.24% versus –2.04%, with the difference being statistically significant. However, we find no significant drift or reversal in the period after the downward revisions. In sum, the results documented in table 7 indicate that the stock market responds to both upward and downward forecast revisions made by the departed stars more strongly in the 3-day window, suggesting that the earnings revisions of star analysts are more informative.

Finally, we find that both the recommendation upgrades and downgrades issued by the departed stars are more informative than other analysts following the same companies. In particular, table 8, columns (3) to (5) show that the market reacts more positively to departed stars' upgrades than those of their peers in the three days around the upgrades, with the difference being significantly positive, and positively so in eight of the ten years. Similarly, the downgrades of the departed stars also lead to a more negative reaction from the stock market. Although the difference is statistically insignificant, it is more negative in eight of the ten years, which cannot be due to chance alone based on a binomial test. We report the long-window results under columns (6) to (8). There is a significantly positive drift for recommendation upgrades made by other analysts, but the same is not true for those issued by the departed stars. While the difference is indistinguishable from zero, there are significantly more years with a lower market reaction. In other words, the market's responses to the departed analysts' upgrades are faster and more complete than those of the other analysts. On the other hand, recommendation downgrades do not cause a significant drift or reversal for either the departed stars or their remaining peers.

5. Concluding remarks

This paper examines the consequences of the Global Settlement and related regulation on the career choices of star analysts. After the Global settlement and its related reforms, we find a significant increase in the percentage and likelihood of star analysts, especially those from investment banks, leaving the sell-side investment research profession for the buy-side. If this movement is due to the drop in earnings potential at investment banks as a result of the Global Settlement, the reforms unintentionally cause a brain drain at investment banks. We also show that the forecast revisions and recommendation changes from the departed analysts are more informative than the remaining analysts for a given company. Hence, the companies followed by the departed stars are adversely affected by their departures. In summary, this study provides the first evidence supporting the argument that the Global Settlement has lead to an unintended brain drain in investment banks. The investors who rely on the services of these best performers might be adversely affected, as a result.

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Table 1
Statistics on the number of securities firms, equity analysts, and companies being followed by firm type
The sample covers the period from January 1998 to December 2007. Analyst data are from Thomson Financial's I/B/E/S database. Investment banks are those listed as investment banks by Nelson's Directory of Investment Research and identified as lead or co-lead underwriters by Thomson Financial's SDC database. The sanctioned investment banks are Bear Stearns, Credit Suisse First Boston, Goldman Sachs, Lehman Brothers, J.P. Morgan Securities, Merrill Lynch, Morgan Stanley, Citigroup Global Markets (formerly known as Salomon Smith Barney), UBS Warburg, and U.S. Bancorp Piper Jaffray. Non-investment banks include independent research firms, brokerage firms, and syndicate banks. Specifically, independent research firms are those listed as such by Nelsons and not found in the SDC database. Brokerage firms are those firms classified by Nelson as a major institutional broker, major or small regional broker, or investment bank/broker and not found in SDC as lead/co-lead underwriter or manager/co-manager. Syndicate banks are those firms listed by Nelsons as either investment banks or brokers and identified by SDC as managers or co-managers, but not lead or co-lead underwriters.

	All Firms (1)	Sanctioned investment banks (2)	Non-sanctioned investment banks (3)	Non-investment Banks (4)
Number of securities firms	525	10	165	350
Number of analysts	11,380	3,859	5,848	2,863
Number of companies followed	8,472	5,906	8,184	6,484

Table 2
Statistics on star analysts who left the sell-side research profession by firm type, year, and subperiod
The table presents the number and percentage of star analysts left the sell-side research industry. An analyst is considered a star analyst in a particular year if he/she is on the *Institutional Investor* All-American research team list in that year or at least one of the last two years. An analyst is said to have left the sell-side research industry in a particular year if he/she made earnings forecasts in the current year but stopped issuing forecasts the following year and his/her departure is confirmed based on information from the Nelson's Directory of Investment Research. See table 1 for the classification of analyst firm types.

	All firms			Sanctioned investment banks			Non-sanctioned investment banks			Non-investment banks		
	Total (1)	# Left (2)	%Left (3)	Total (4)	# Left (5)	%Left (6)	Total (7)	# Left (8)	%Left (9)	Total (10)	# Left (11)	%Left (12)
Panel A: by year												
1998	305	11	3.6%	196	6	3.1%	94	4	4.3%	15	1	6.7%
1999	349	24	6.9%	243	18	7.4%	93	4	4.3%	13	2	15.4%
2000	377	28	7.4%	279	13	4.7%	87	11	12.6%	11	4	36.4%
2001	407	32	7.9%	343	23	6.7%	52	6	11.5%	12	3	25.0%
2002	426	58	13.6%	355	51	14.4%	58	5	8.6%	13	2	15.4%
2003	429	58	13.5%	346	44	12.7%	66	12	18.2%	17	2	11.8%
2004	380	46	12.1%	305	39	12.8%	56	5	9.0%	19	2	10.5%
2005	349	32	9.2%	270	25	9.3%	54	3	5.6%	25	4	16.0%
2006	339	43	12.7%	255	33	12.9%	58	6	10.3%	26	4	15.4%
2007	326	41	12.6%	246	31	12.6%	59	9	15.3%	21	1	4.8%
Panel B: by period												
Pre-reform (1998-2001)	1,438	95	6.6%	1,061	60	5.7%	326	25	7.7%	51	10	19.6%
Post-reform (2002-2007)	2,249	278	12.4%	1,777	223	12.5%	351	40	11.4%	121	15	12.4%

Table 3
Descriptive statistics of regression variables
STAR is an indicator variable that equals to one for analysts on the *Institutional Investor* All-American research team list in a particular year or at least one of the last two years. *TOPACCU* (*BOTACCU*) is an indicator variable that equals one for analysts whose relative forecast accuracy scores are in the top 10% (bottom 10%), and zero otherwise. Relative forecast accuracy and relative forecast optimism, *RFOPT*, are calculated as described in the text. *EXPERIENCE* is the forecasting experience of an analyst and is defined as the number of years that analyst appears in the I/B/E/S database. See table 1 for the classification of analyst firm types.

	Sanctioned investment banks (1)	Non-sanctioned investment banks (2)	Non-investment Banks (3)
Panel A: Pre-reform period (1998 – 2001)			
STAR	0.26	0.05	0.02
TOPACCU	0.10	0.10	0.09
BOTACCU	0.10	0.10	0.14
RFOPT	-0.01	-0.00	0.02
EXPERIENCE	7.31	6.99	6.64
Panel B: Post-reform period (2002 – 2007)			
STAR	0.27	0.04	0.03
TOPACCU	0.12	0.09	0.10
BOTACCU	0.12	0.09	0.15
RFOPT	-0.02	-0.01	0.02
EXPERIENCE	6.92	7.05	6.44

Table 4
Logistic regressions of analysts who left the sell-side investment research industry
D is an indicator variable that equals one in the post-reform period (January 1998 – December 2001), and zero in the pre-reform period (January 2002 – December 2007). *STAR* is an indicator variable that equals one for analysts on the *Institutional Investor* All-American research team list in a particular year or at least one of the last two years. *TOPACCU* (*BOTACCU*) is an indicator variable that equals one for analysts whose relative forecast accuracy scores are in the top 10% (bottom 10%), and zero otherwise. Relative forecast accuracy and relative forecast optimism, *RFOPT*, are calculated as described in the text. *EXPERIENCE* is the forecasting experience of an analyst and is defined as the number of years that analyst appears in the I\B\E\S database. *TOTREV* is the revenue of the firms in the industries with SIC codes 6200, 6211, and 6282. *NOFUNDS* is the estimated number of global hedge funds. Ten sanctioned bank dummies are included in columns (1) and (2), and brokerage and syndicate bank dummies are included in columns (5) and (6). *p*-values are in square brackets. See table 1 for the classification of analyst firm types. *, **, and *** denote statistically different from zero, respectively, at the 10%, 5%, and 1% level, using a two-sided test.

	Sanctioned investment banks		Non-sanctioned investment banks		Non-investment banks	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-1.60 ***	-1.29 ***	-1.59 ***	-1.72 ***	-1.05 ***	-1.24 ***
	[0.00]	[<0.00]	[0.00]	[<0.00]	[0.00]	[<0.00]
D	0.42 ***	0.74 ***	0.13 ***	0.38 ***	-0.15	-0.24
	[0.00]	[<0.00]	[0.09]	[0.00]	[0.20]	[0.28]
STAR	-1.29 ***	-1.31 ***	-0.89 ***	-0.89 ***	-0.17	-0.17
	[0.00]	[<0.00]	[0.00]	[<0.00]	[0.66]	[0.65]
TOPACCU	-0.22	-0.20	0.22 ***	0.22 **	0.25	0.24
	[0.20]	[0.24]	[0.04]	[0.04]	[0.14]	[0.15]
BOTACCU	0.72 ***	0.76 ***	0.67 ***	0.67 ***	0.40 ***	0.39 ***
	[0.00]	[<0.00]	[0.00]	[<0.00]	[0.00]	[0.00]
RFOPT	0.00	0.01	0.03	0.03	-0.13	-0.13
	[0.97]	[0.94]	[0.70]	[0.66]	[0.18]	[0.18]
EXPERIENCE	-0.00	-0.00	-0.01	-0.01	-0.03 ***	-0.03 ***
	[0.83]	[0.95]	[0.14]	[0.13]	[0.00]	[0.00]
D×STAR	0.57 ***	0.54 ***	0.50 *	0.50 *	-0.42	-0.42
	[0.00]	[0.00]	[0.08]	[0.08]	[0.38]	[0.37]
D×TOPACCU	0.26	0.27	-0.19	-0.19	-0.19	-0.20
	[0.19]	[0.18]	[0.13]	[0.20]	[0.39]	[0.37]
D×BOTACCU	-0.19	-0.21	-0.19	-0.20	0.08	0.07
	[0.24]	[0.20]	[0.13]	[0.13]	[0.63]	[0.67]
D×RFOPT	-0.10	-0.10	-0.04	-0.04	0.11	0.09
	[0.33]	[0.35]	[0.66]	[0.62]	[0.39]	[0.46]
D×EXPERIENCE	-0.00	-0.00	-0.01	-0.01	-0.01	-0.01
	[0.96]	[0.92]	[0.13]	[0.13]	[0.63]	[0.64]
TOTREV		0.00		0.00 ***		0.00
		[0.85]		[0.00]		[0.59]
NOFUNDS		-0.00		-0.00 ***		0.00
		[0.11]		[0.01]		[0.88]
Pseudo-R^2(%)	5.64	7.30	1.44	1.55	2.09	2.45
N	9,113	9,113	15,878	15,878	6,025	6,025

Table 5
Descriptive statistics on the career choice of star analysts who left the sell-side research industry
We keep track of star analysts who left the sell-side research profession in the period 1998 through 2007 and classify their career choice into one of eight categories: (A) Promoted to a managerial position within the firm or to another firm; (B) Transferred laterally to a different department within the firm; (C) Moved to a buy-side, hedge fund, private equity, or venture capital firm; (D) Started own investment research firm or moved to another research firm not covered by I/B/E/S; (E) Moved to a non-financial industry; (F) Retired or fired for cause; (G) Still a sell-side analyst but not found in I/B/E/S; and (H) Not enough information to classify. We first use the Nelson's Directory of Investment Research to verify that the analysts have left sell-side research and check whether they are promoted to a managerial position in investment research. Next, we search Factiva and Google to identify the first job these analysts took after they left the sell-side research industry. To compute the t-statistics, we estimate the standard error using the standard deviation of the percent changes across these eight categories, assuming that the percent changes from these eight categories are drawn from a normal distribution with zero mean. Panels A, B, and C report the statistics for departed star analysts from sanctioned investment banks, non-sanctioned investment banks, and non-investment banks, respectively. See table 1 for the classification of analyst firm types.

Category	Pre-reform period 1998 – 2001		Post-from period 2002 – 2007			
	# left (1)	% left (2)	# left (3)	% left (4)	(4) – (2) (5)	t-stat (6)
Panel A: Sanctioned investment banks						
A. Promoted	10	16.7	40	17.9	1.3	0.9
B. To another department	3	5.0	17	7.6	2.6	1.9
C. To buy side	16	26.7	71	31.8	5.2	3.8
D. To another research	1	1.7	6	2.7	1.0	0.8
E. To non-financial	12	20.0	34	15.2	-4.8	-3.5
F. Retired or fired	5	8.3	23	10.3	2.0	1.5
G. Not on I/B/E/S	3	5.0	4	1.8	-3.2	-2.4
H. Lack information	10	16.7	28	12.6	-4.1	-3.0
Total	60	100.0	223	100.0		
Panel B: Non-sanctioned investment banks						
A. Promoted	5	20.0	4	10.0	-10.0	-3.1
B. To another department	2	8.0	3	7.5	-0.5	-0.2
C. To buy side	5	20.0	14	35.0	15.0	5.1
D. To another research	2	8.0	2	5.0	-3.0	-1.0
E. To non-financial	4	16.0	6	15.0	-1.0	-0.3
F. Retired or fired	2	8.0	0	0.0	-8.0	-2.7
G. Not on I/B/E/S	0	0.0	2	5.0	5.0	1.7
H. Lack information	5	20.0	9	22.5	2.5	0.8
Total	25	100.0	40	100.0		

(Continued…)

Table 5 (… continued)

Category	Pre-reform period 1998 – 2001		Post-from period 2002 – 2007			
	# left (1)	% left (2)	# left (3)	% left (4)	(4) – (2) (5)	t-stat (6)
Panel C: Non-investment banks						
A. Promoted	3	30.0	2	13.3	-16.7	-4.2
B. To another department	0	0.0	1	6.7	6.7	1.7
C. To buy side	5	50.0	7	46.7	-3.3	-0.8
D. To another research	0	0.0	1	6.7	6.7	1.7
E. To non-financial	0	0.0	2	13.3	13.3	3.4
F. Retired or fired	0	0.0	1	6.7	6.7	1.7
G. Not on I/B/E/S	0	0.0	0	0.0	0.0	0.0
H. Lack information	2	20.0	1	6.7	-13.3	-3.4
Total	10	100.0	15	100.0		

Table 6
Relative accuracy and relative optimism of departed star analysts and other analysts
This table presents the relative accuracy and relative optimism of 373 departed star analysts and other analysts who followed the same companies in the year prior to the star analysts leaving sell-side equity research. The t-statistic is calculated using the Fama-MacBeth approach. *, **, and *** denote statistically different from zero at the 10%, 5%, and 1% level, respectively, using a two-sided *t*-test. #Positive is the number of years with positive difference in the 10-year period from 1998 through 2007. *p*-value is the probability of having #Positive smaller than the number indicated in the parentheses, using a binomial test.

	Number		Relative Accuracy			Relative Optimism		
	Departed stars (1)	Other analysts (2)	Departed Stars (3)	Other analysts (4)	Difference (3) – (4) (5)	Departed Stars (6)	Other analysts (7)	Difference (6) – (7) (8)
Mean	37	3,611	59.85	54.65	5.20	-0.041	-0.006	-0.035
t-statistic					5.38***			-1.05
#Positive					10			3
p-value					0*** (#Positive>10)			0.054* (#Positive<3)

Table 7
Short- and long-window market responses to upward and downward earnings revisions
This table presents the market responses to revisions of annual earnings forecasts of 373 departed star analysts and other analysts who followed the same companies in the year prior to the star analysts leaving sell-side equity research. CAR(–1,+1) is the market-adjusted abnormal returns from day –1 to day +1, where day 0 is the earnings revision date. CAR(+2,+21) is the market-adjusted returns from day +2 to day +21. The t-statistic is calculated using the Fama-MacBeth approach. *, **, and *** denote statistically different from zero at the 10%, 5%, and 1% level, respectively, using a two-sided *t*-test. #Positive is the number of years with positive difference in the 10-year period from 1998 through 2007. *p*-value is the probability of having #Positive smaller than the number indicated in the parentheses, using a binomial test.

	Number		CAR(–1,+1)			CAR(+2,+21)		
	Departed stars (1)	Other analysts (2)	Departed Stars (3)	Other analysts (4)	Difference (3) – (4) (5)	Departed Stars (6)	Other analysts (7)	Difference (6) – (7) (8)
Upgrade revisions								
Mean	714	7,671	1.76%	1.45%	0.31%	1.06%	0.99%	0.07%
t-statistic			10.41***	11.33***	4.08***	3.99***	3.34***	0.39
#Positive					10			5
p-value					0*** (#Positive>10)			0.376 (#Positive<5)
Downgrade revisions								
Mean	794	8,394	-2.24%	-2.04%	-0.20%	0.44%	0.31%	0.13%
t-statistic			-7.61***	-8.99***	-1.74*	1.51	1.15	0.79
#Positive					4			6
p-value					0.171 (#Positive<4)			0.171 (#Positive>6)

Table 8

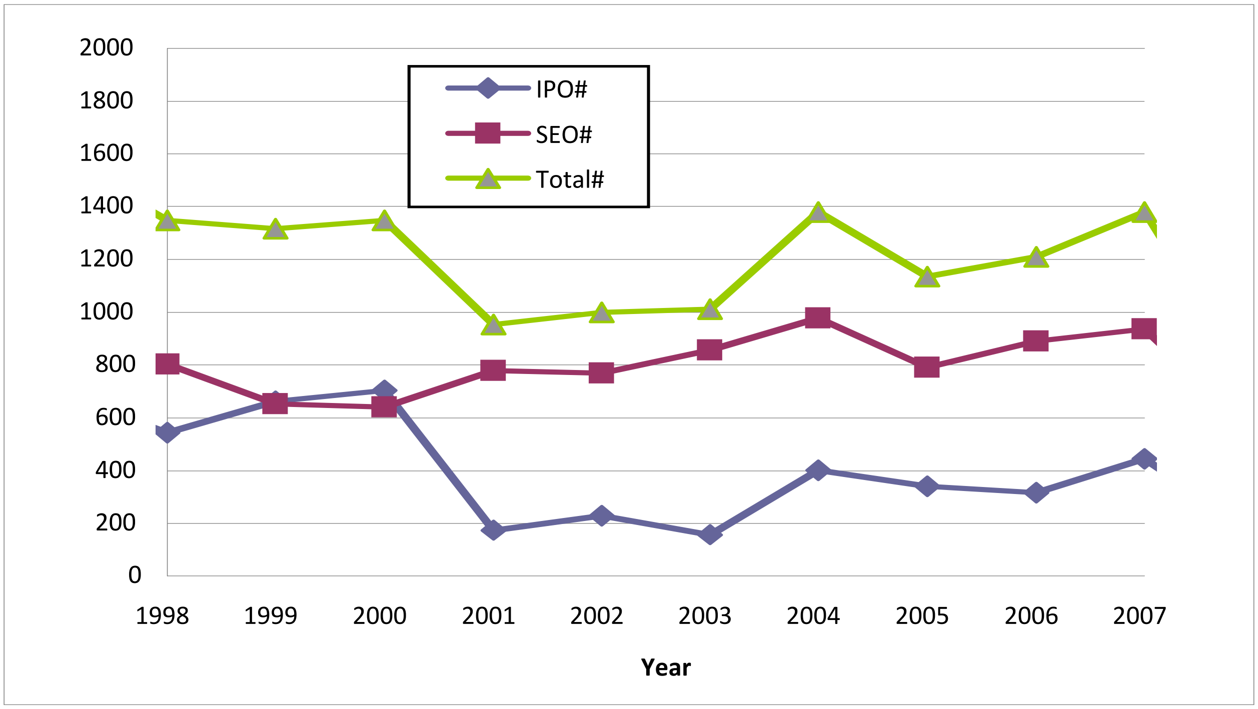
Short- and long-window market responses to stock recommendation upgrades and downgrades

This table presents the market responses to the change in stock recommendations of 373 departed star analysts and other analysts who followed the same companies in the year prior to the star analysts leaving sell-side equity research. Recommendation upgrades are those revised upward to buy/strong buy or initiated at buy/strong buy. Recommendation downgrades are those revised downward to buy/hold/sell/strong sell or initiated at hold/sell/strong sell. CAR(–1,+1) is the market-adjusted abnormal returns from day –1 to day +1, where day 0 is the recommendation revision date. CAR(+2,+21) is the market-adjusted returns from day +2 to day +21. The t-statistic is calculated using the Fama-MacBeth approach. *, **, and *** denote statistically different from zero at the 10%, 5%, and 1% level, respectively, using a two-sided *t*-test. #Positive is the number of years with positive difference in the 10-year period from 1998 through 2007. *p*-value is the probability of having #Positive smaller than the number indicated in the parentheses, using a binomial test.

	Number		CAR(–1,+1)			CAR(+2,+21)		
	Departed stars (1)	Other analysts (2)	Departed Stars (3)	Other analysts (4)	Difference (3) – (4) (5)	Departed Stars (6)	Other analysts (7)	Difference (6) – (7) (8)
Recommendation upgrades								
Mean	110	11,975	2.73%	2.11%	0.62%	0.23%	0.98%	-0.75%
t-statistic			8.42***	10.24***	2.31**	0.49	3.50***	-1.38
# Positive					8			3
p-value					0.010*** (#Positive>8)			0.054* (#Positive<3)
Recommendation downgrades								
Mean	139	11,289	-4.37%	-3.99%	-0.38%	0.11%	-0.14%	0.25%
t-statistic			-6.68***	-8.08***	-0.85	0.17	-0.60	0.34
# Positive					2			7
p-value					0.010*** (#Positive<2)			0.054* (#Positive>7)

Figure 1
The number and proceeds of investment banking deals, 1998 – 2007
The figure shows the number and proceeds of IPOs and SEOs for the period from 1998 through 2007. Data are extracted from *Thomson Financial's* SDC database.

Panel A: Number of IPOs and SEOs



Panel B: Proceeds from IPOS and SEOs

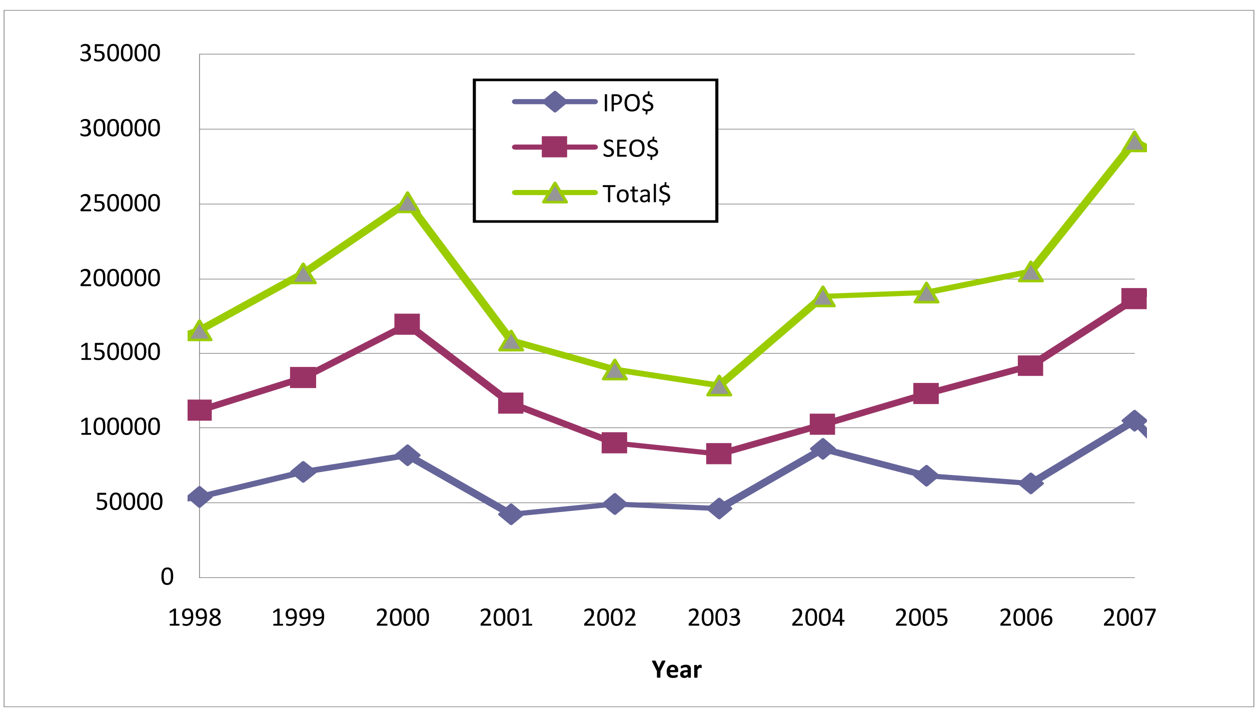


Figure 2

Estimated global hedge funds, 1998 – 2007

The figure shows the estimated number and total assets of global hedge funds for the period from 1998 through 2007. Data is extracted from International Financial Services London Research Report entitled "Hedge Funds 2009."