Measuring the added value of stock recommendations*

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Abstract

Using data from the Stockholm Stock Exchange we study the value added by (as distinct from the abnormal returns to) analysts' recommendations. Recommending brokers' clients trade profitably around positive recommendations at the expense of the clients of brokers without analyst coverage. Significant profits come from transactions before recommendation dates. Value added is greatest for upgrades to large caps. Value added from downgrades and from recommendations for small caps is largely insignificant despite high abnormal returns to these categories. Brokers making profitable recommendations for their clients are rewarded by abnormal trading volumes, and capture much of the value added themselves.

Keywords: stock recommendations; performance evaluation; information leakages.

JEL codes: G14; G24; J44.

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1 Introduction

Equity research is an expression of investment expertise. Research analysts deploy this expertise by evaluating and recommending stocks in an effort to help their clients outperform the market. In this paper we set out to measure the value added of these recommendations and identify who captures it. The recommendation literature, starting with Cowles (1933), has traditionally assessed the value of recommendations by measuring price reactions or abnormal returns to recommendations.[1] However, as Berk and van Binsbergen (2015) argue in connection with mutual funds, abnormal returns do not measure value added any more than the internal rate of return measures the value added by a project.

We measure the value added of recommendations in terms of the profitability to those who trade on them. This measure has a number of advantages over abnormal returns to recommendations, which may be poor indicators of added value. If investors cannot react in a timely manner, as is frequently assumed, or if their ability to benefit from recommendations is impeded by bid-ask spreads, the price impact of trading, or other market frictions, measured abnormal returns may fail to translate into real gains. The same is true if recommendations coincide with public announcements: here the value of recommendations may prove limited, even if measured abnormal returns are significant. In the extreme case in which recommendations merely reproduce (positive) contemporaneous public announcements, abnormal returns will be positive but no-one will be able to take advantage of them.[2] On the other hand it is possible for investors to do better than what abnormal returns would suggest. Recommendations typically contain more information than what can be conveyed by the standard categories of Buy, Hold and Sell, and the extra information might be exploited by investors in their trading strategies (see, e.g., Asquith, Mikhail, and Au (2005)). Abnormal profits accommodate these factors, and provide a

[1] See, for instance, Diefenbach (1972), Bidwell (1977), Stickel (1995), Womack (1996), Barber, Lehavy, McNichols, and Trueman (2001), Jegadeesh, Kim, Krische, and Lee (2004) and Green (2006).

[2] Altinkiliç and Hansen (2009) show that almost 80% of revisions are in response to corporate events, with firms releasing firm-specific information about earnings and investments a few hours before revisions are announced.

measure of actual, not virtual, added value.

Measuring the abnormal profits of stock recommendations presents its own problems. Berk and van Binsbergen (2015) define the value added by a mutual fund as the fund's gross excess return over benchmark multiplied by its assets under management (AUM). Mutual fund excess returns can be calculated straightforwardly using the daily prices at which everyone deals, and these prices, together with the funds' AUM, are a matter of public record. For stock recommendation we require volume and price data for individual stocks, but we also need a way of separating the trading which is generated by a stock recommendation from that which is not.

To address these challenges, we take advantage of a large and comprehensive proprietary dataset of each broker's daily transactions on the Stockholm Stock Exchange (SSE) between January 1997 and June 2006. The SSE, a pure limit order book market with brokerage firms as members, is a particularly suitable exchange on which to analyze broker trading flows, counterparties, and profits. As client trades are executed between members without passing through dealers or specialists, we can establish a direct link between the trades executed by a brokerage firm and the stock recommendations it issues.

By combining recommendations with volumes transacted and prices paid by each broker, we obtain a measure - abnormal profits - which, we argue, realistically reflects the extent to which recommendations add value to the brokers' client base. This measure is robust to the two major problems that affect recommendation studies: noisy dating of clients' access to recommendations, and lack of investability. Lack of investability is most pronounced for smaller stocks, which are typically less liquid and more expensive to trade (see Keim and Madhavan (1997)), but these are the stocks for which analysts' ability to detect mispricings seems to be the greatest (Stickel (1985); Ivkovic and Jegadeesh (2004); Green (2006)). Noisy dating of clients' access to recommendations, on the other hand, arises from information leakages before the public release of recommendations and from imprecise dating in commercial databases (Womack (1996); Mikhail, Walther, and Willis (2004); Irvine, Lipson, and Puckett (2007); Juergens and Lindsey

(2009); Christophe, Ferri, and Hsieh (2010); Busse, Green, and Jegadeesh (2012); Kadan, Michaely, and Moulton (2015)). A failure to account for the benefits obtainable by investors before the recorded recommendation date can lead to a severe underestimation of the profitability of recommendations.

We compute recommendation-motivated abnormal profits as the product of the daily net trades of the recommending broker in the recommended stock and the abnormal return of the recommended stock. By tracking broker-executed net trades over a wide enough recommendation window we can avoid the underestimation of recommendation profits which arises if we overlook the gains made by investors from early tips and leakages. At the same time we avoid overestimating the benefits of recommendations; for, even if recommendations are issued after public events, or if analysts recommend stocks that have recently appreciated, brokers' net trades before recommendations reach the users are expected to be zero (by market clearing condition), and so are profits.

We follow (in calendar time) the investment performance of trades executed by recommending brokers for their clients. Every time a broker is reported as adding a firm to its buy (sell) list, trades carried out by this broker for its clients in a δ-day window of the recommendation release date are added to a purpose-built portfolio, and liquidated one month after the recommendation date. This strategy is not implementable or replicable in real time by an outside observer, but that is precisely the defining characteristic of private information. Instead, this portfolio and its profits are representative of those of insiders (i.e. the brokers customers) in possession of the information.

In the ten-year period under consideration we find abnormal profits to upgrades of SEK 535,700 (USD 80,000) per day, or SEK 514,300 (USD 77,000) per recommendation, as measured by brokers net trades for their clients. These profits are matched by identical negative profits obtained by the rest of the market, which we segment into the clients of a group of brokers similar to those of the recommending brokers (a control group), and the clients of brokers with no coverage of the recommended stock; the latter tend to stand on the other side of recommendation-motivated trades. Approximately half of the profits

we identify are generated by transactions that take place before the recorded recommendation date. Our results indicate that broker clients profit from upgrades but not from downgrades. Their inability to profit from downgrades does not reflect inaction on their part: the substantial selling activity around downgrades signals that brokers' customers do try to take advantage of them. We find that, for small-cap stocks, profits from both up- and downgrades are insignificant, reflecting low levels of recommendation-motivated trading volumes in these stocks. The profits made by the clients of recommending brokers are net of the costs of the bid-ask spread and the price impact of trading, although not of brokerage commissions, which can be thought of as a payment for that investment advice. We find that extra brokerage commissions to brokers triggered by stock recommendations are of the same order of magnitude as abnormal profits made by the clients who follow them, and that recommendations which are more profitable for a broker's clients lead to more turnover for that broker.

Our paper makes a number of contributions to the existing literature. We propose a new way of estimating the value of security research by using trading data. Like Barber, Lehavy, McNichols, and Trueman (2001), we take an investor-oriented, calendar-time perspective, but, in line with Berk and van Binsbergen (2015), we also stress that a measure of recommendation value should account only for the trading profits obtained by those who receive recommendations.

Applying this prescription, we explore the profits made by investors who trade on recommendations issued on stocks listed on the SSE, with results that are not always consistent with those of traditional abnormal return methodologies. The discrepancy can be seen along three dimensions: the timing of recommendations, the direction of recommendations, and the size of the stock recommended. Abnormal profits allow for the fact that it may be difficult to pinpoint the time when recommendations are accessible (either because recommendations are postdated or because their content is pre-released to selected clients), and, on the other hand, the difficulty in controlling for the release of contemporaneous public news.[3] The fact that half of the abnormal profits in our analysis are

[3]See Womack (1996); Mikhail, Walther, and Willis (2004); Irvine, Lipson, and Puckett (2007); Juergens

made before the recommendation is released, coupled with evidence that recommending brokers' market shares and net trades increase before the release of recommendations, points to information leakages, tipping, or postdated recommendations (see Irvine, Lipson, and Puckett (2007), Juergens and Lindsey (2009) and Christophe, Ferri, and Hsieh (2010)). Our finding that the clients of recommending brokers profit from upgrades but not downgrades suggests that downgrades are uninformative or arrive too late.[4] The result that abnormal profits to both up- and downgrades of small caps are negligible, despite the high abnormal returns to these recommendation changes, points to the lack of investability and the high cost of trading in small caps, which are well documented in the literature.[5]

Our finding that the counterparties to recommendation-motivated trades tend to be investors executing trades through brokers with no coverage of the recommended firms is related to literature on how different investor clienteles react to investment advice. However, it extends the types of clientele beyond the size categories which have tended to be the focus of previous work, and segments clienteles in terms of their informedness about individual stocks.[6]

Finally our paper is, we believe, the first to compare the realized profits of equity research with the extra broking commissions arising from these recommendations for the brokers that make them. The fact that recommending brokers capture extra commission revenues roughly equal to the value of the profits made by their clients (and that more profitable recommendations lead to more commission revenues for recommending brokers) parallels the findings of Berk and van Binsbergen (2015) that the gains from mutual fund management accrue to the managers themselves. In both cases the rewards to investment expertise are captured by those who possess it.

The rest of the paper is organized as follows. Section 2 provides a description of the

and Lindsey (2009); and Christophe, Ferri, and Hsieh (2010) for evidence on the first, and Altinkiliç and Hansen (2009) for evidence on the second.

[4]This is in keeping with Conrad, Cornell, Landsman, and Rountree (2006) who find that analysts are particularly likely to downgrade stocks following a large decline in the stock price.

[5]See Keim and Madhavan (1997); Stickel (1985); Ivkovic and Jegadeesh (2004); and Green (2006).

[6]See Lee (1992), Mikhail, Walther, and Willis (2007), and Malmendier and Shanthikumar (2010) for instance.

data used in the study. Section 3 formally discusses the methodology to evaluate the value added by recommendations, and presents our results on trading and profits. Section 4 summarizes the main findings and concludes.

2 Data Description

Our study combines three data sets: stock recommendations, trading data and stock prices and returns. We collect recommendations of stocks listed on the Stockholm Stock Exchange (SSE) from the Institutional Brokers Estimate System (I/B/E/S), and the SSE trading data is provided by the owner of the exchange, NASDAQ OMX. Each of these data sets is described in detail below.

2.1 Broker Trading Data

This study uses proprietary Swedish equity trading data sourced directly from the Stockholm Stock Exchange. The SSE is a fully electronic limit order book market where members (broker firms) pay both fixed and transaction based fees for matching of order flow. The daily trading data we obtain spans the period from January 1997 to June 2006. For each trading date, stock and member of the exchange we observe the number of trades executed, the number of shares traded (volume) and the value of those trades, measured in Swedish kronor (SEK), all of them broken up on purchases, sales, and internal trading.

The key advantage of using Swedish trading data is that it allows us to identify the brokers executing the trades over a relatively long period of time (almost ten years). The SSE seems also a particularly suitable exchange on which to measure broker trading flows. As client trades are executed between members without passing through dealers or specialists, we can establish a direct link between the trades handled by a brokerage firm and the stock recommendations it issues. Sweden also has a well-developed and competitive stock market. At the end of our sample period, the total market capitalization of the 417 companies listed in the SSE was SEK 3,507 (USD 438) billion, making Sweden the 12th largest stock market in the world at the time, according to the World Federation of Exchanges. The members of the SSE include large domestic brokers such as

Enskilda Securities, Swedbank, and Carnegie, as well as major U.S. and European firms such as Goldman Sachs, J.P. Morgan, Deutsche Bank, and UBS. Domestic and international brokerage firms compete for trades in several large companies such as Ericsson, Nokia, Volvo, Astra Zeneca, and H&M. Many companies have cross-listings on foreign stock exchanges, and are therefore of interest to a wide group of international investors. Competition among brokers is stiff and increased during our sample period. In 1997, there were 50 unique members of the exchange, of which the top 10 accounted for 73% of the total value of share trading.[7] In contrast, in 2006 there were 70 members, of which the top 10 had only 58% of the market share. This development has been primarily driven by a higher degree of competition from international brokers.

2.2 Stock Recommendations

We obtain data on financial analysts' stock recommendations from the Institutional Brokers Estimate System (I/B/E/S) database for the period January 1997 to June 2006.[8] We concentrate on recommendation revisions, as opposed to recommendation levels. Revisions are discrete and salient events and previous research generally finds that they have significant information content (Womack (1996), Jegadeesh, Kim, Krische, and Lee (2004), Sorescu and Subrahmanyam (2006)). To construct the recommendation revision variable we rely on I/B/E/S recommendations' classification. I/B/E/S classifies recommendations into five categories, from 1 to 5, which are usually interpreted along the following lines: (1) strong buy, (2) buy, (3) hold, (4) sell and (5) strong sell. We concentrate on two types of recommendation revisions: positive recommendation revisions ("upgrades") and negative recommendation revisions ("downgrades"). An upgrade (downgrade) is defined as a buy (sell) or strong buy (strong sell) recommendation issued by an analyst whose previous recommendation on the stock was not as positive (negative) as the current recommendation. Defining recommendation revisions this way implies that the

[7]Several members of the exchange have foreign subsidiaries registered also as members. We define unique members by identifying the brokers who belong to the same company or group and treating the group as a unit.

[8]We work with a recent download of I/B/E/S to avoid the issues raised by Ljungqvist, Malloy, and Marston (2009).

analyst issuing the recommendation is required to have an outstanding or previous recommendation on the same stock in order to consider the current recommendation as a revision. In contrast to most studies on financial analysts' recommendations we do not make a distinction based on the strength of the recommendation, that is we do not distinguish between buy and strong buy or sell and strong sell revisions. This is because many of the larger domestic brokers in Sweden use a three-point scale incompatible with that distinction, or moved to one at some point during the sample period.

The original sample consists of 10,935 recommendations of which 4,936 are revisions: 2,924 upgrades and 2,012 downgrades. These recommendations revisions cover 296 firms, which means that an average of 25.7 recommendation changes are made for each firm during the 9.5 year period of the sample. The sample includes recommendations by 824 analysts or teams of analysts and 46 brokerage firms (including all the major players). There is an average of 6 recommendation changes per analyst and the median recommendation change is made by an analyst who makes a total of 4 recommendation changes. The 10 largest brokers in the sample, defined according to trading volume, are responsible for slightly more than 50% of all recommendation revisions. Revisions in our sample are more or less evenly distributed along the 10 year period we study, to the point that there seems to be no significant correlation between the number and type of revisions and the general market conditions.

Researchers are usually careful about excluding recommendation changes issued in the proximity of company earnings announcement dates. In addition to that, it is also common to eliminate observations with current share prices lower than a certain threshold (less than USD 5 or USD 2) to avoid penny stocks since extreme outliers are usually concentrated among them. Since our approach explicitly takes into account these problems we take no further action at this point.

2.3 Stock Prices, Returns and Supplementary Information

Stock prices (adjusted and unadjusted), returns, market values, and complementary information is collected from Datastream. This data is matched to the trade data from the

Stockholm Stock Exchange using securities' ISIN codes. The matching to I/B/E/S recommendations is subsequently done using I/B/E/S tickers and company names (each match is manually checked). Where a company has more than one share class traded in the exchange, the matching is to the most broadly traded security (typically B shares), as identified in the trade data. This is typically the only security for which there is Datastream information available, and is usually identified by I/B/E/S as the recommended security. After matching all three data sets we are left with 2,507 upgrades and 1,730 downgrades across 270 firms. Table I reports features of these revisions, which tend to be concentrated among the largest most liquid firms.

The use of Datastream as a provider of individual stock returns may raise a number of concerns (see Ince and Porter (2006)). For example, Datastream sometimes replaces missing values or pads values with the last available value indicating stale price problems or outright data errors, or fails to correctly account for stock splits. To address these concerns we manually inspect the 270 series of stock returns. Possessing average transaction prices from the Stockholm Stock Exchange provides us with a natural benchmark to compare Datastream data. We uncover only one case where the information in both samples is clearly conflicting and opt to exclude that observation (recommendation).

3 Methodology and Results

The first part of this section examines broker trading activity around recommendation revision dates. The second part makes use of brokers' cumulative positions on recommended stocks to estimate the profits obtained from trading on recommendations. Finally, in the last part of this section, we estimate the abnormal trading volumes associated with recommendations, thereby obtaining a crude measure of recommendation instigated brokerage commission fees – the price paid for access to recommendations.

3.1 Broker Trading around Recommendation Revision Dates

We infer abnormal broker trading by measuring net buying (*NB*) around recommendation revision dates. For each broker b, stock i and day t, net buying is defined as follows,

$$NB_{b,i,t} = B_{b,i,t} - S_{b,i,t}, \tag{1}$$

where $B_{b,i,t}$ and $S_{b,i,t}$ are the values of purchases and sales of stock i executed by broker b at day t.

This measure provides us with a natural benchmark for detecting abnormal trading activity, since market clearance implies that (unconditionally) expected net buying, for any broker, stock and time is zero, i.e.

$$E(NB_{b,i,t}) = 0 \quad \forall b, i, t, \tag{2}$$

Conditioning net buying activity on recommendation releases, we hypothesize that,

$$E(NB_{k,j,t}|I_{k,j,\tau}) \neq 0 \quad \forall t \in [\tau; \tau + \delta], \tag{3}$$

where $I_{k,j,\tau}$ denotes both the recommendation and the information it is based on (if any), and δ is the length of the period during which the recommendation is expected to affect trading. Similar to other studies, we do not know in advance the length of the window in which broker information affects trading, i.e. δ, but since in the absence of broker-specific information expected net buying is zero, we can use the data to infer when abnormal activity, and the recommendation information that motivates it, starts and ends. It is also easy to see that if the conditioning information is irrelevant, (3) reduces to (2), and we should observe zero net buying.

Figure I, which builds on this idea, shows the sample average of cumulative net buying in event time, beginning 20 days before the recorded recommendation date and ending 20 days after it. The solid black line in Panels A and B depicts the average cumulative net position of the recommending broker around positive recommendation revision dates, for big (decile one), and small (deciles two to ten) firms, respectively. During the first two weeks of the window, days -20 to -10, it shows no noticeable sign of recommending brokers taking a position on the recommended stock. From day -10 on, net buying starts to diverge from zero in the direction implied by the recommendation. By the end

of the window, cumulative net buying amounts to SEK 25 million (SEK 47 million for big recommended firms and SEK 7 million for small ones) per recommendation, which is almost 4% of the cumulative value of shares traded by all brokers in the recommended stock in the same period. Since aggregate positions must sum to zero, we know that the rest of the brokers on the market, on average, must be net selling the recommended stock.

To make sure we are not simply capturing clientele effects we form two additional groups of brokers for comparison. We label brokers covering or issuing recommendations on the same stock as the recommending broker, but with no current recommendation revision in the analyzed window, as "informed" (on that stock), and brokers not issuing recommendations on the same stock as "uninformed" (on that stock).[9] Informed and recommending brokers are similar in size and scope, and cater to a similar customer base (by definition recommending brokers are informed brokers, on a given stock, outside their recommendation window). The uninformed broker category, on the other hand, includes full service brokers who lack coverage of the specific stock, but also some regular brokers without local research departments, and discount (online) brokers.

The dashed line in Figure I depicts the average cumulative net position of informed brokers (total informed broker net purchases divided by the number of recommendations). Informed brokers maintain a slightly positive net position during much of the window, but unlike recommending brokers do not seem to increase it in the neighborhood of the recommendation release date. These results suggest that the net buying activity we observe in recommending brokers is likely related to their customers having specific knowledge of the stock recommendation rather than the result of clientele effects. We also find that it is mainly the investors trading through uninformed brokers who sell their stocks to investors trading through the recommending brokers.

Panels C and D show the sample average of cumulative net buying around downgrades. The overall pattern is similar to that already described for upgrades, with only minor differences. We find that recommending brokers' net selling tends to increase

[9]The coverage period is assumed to begin two months before the first recommendation released in our dataset and ending twelve months after the final observation.

sharply beginning five trading days before the recorded recommendation date. Cumulative net selling by the end of the window is around SEK 17 million (31 million for big recommended firms and SEK 6 million for small ones), which represents about 2% of the value of all shares sold in that stock. The average aggregate position taken by the recommending brokers is considerably smaller than that of the upgrades. Most of the build up of total net positions at the end of the window occurs five days prior to the recommendation date. As happens with upgrades, we do not observe informed brokers net purchases reacting to recommendations.

In order to explore the statistical significance of these findings we employ a regression approach across event weeks. We estimate two separate OLS regressions of weekly net purchases (NB) on indicator variables, one per event week–broker type pair,

$$NB_{b,i,w} = \sum_{b_C} \sum_{w=-4}^{4} D_{b_C,w} + e_{b,i,w} \quad b_C = (b_R, b_I, b_U), \tag{4}$$

where we have aggregated net purchases over trading weeks, w, defined relative to recommendation dates τ, and $D_{b_C,w}$ are indicator variables that take the value 1 if net buying is measured in week w and the broker executing the trades belong to the b_C category, and 0 otherwise. In this completely specified regression, event week one includes the recommendation date. Regressions are conducted separately for upgrades and downgrades.

The results of performing these estimations are presented in Table II. We obtain eight regression coefficients for each of the three broker categories, recommending (b_R), informed (b_I), and uninformed (b_U), and recommendation types. The coefficients correspond to the sample means of weekly net purchases executed by recommending, informed and uninformed brokers on the recommended stock, expressed in millions of Swedish kronor (SEK). The regression specification allows us to calculate standard errors clustered at the broker level. In this way we allow for a completely arbitrary correlation structure within each broker firm across recommendations and event time. The regression results broadly confirm that recommending broker flows from upgrades peak on the week when the recommendation is released, but they are also significantly different

from zero two weeks prior to this event. On average, net buying is SEK 7.1 million in the first week in which a buy recommendation is released, and is about half the size but still significantly positive, in the following three weeks after the event. SEK 5.7 million of the build-up in the total position occurs in the week prior to the recommendation date. Informed broker flows do not follow this pattern, as revealed by the negative but insignificant coefficients for this group during the weeks immediately surrounding the revision date. For downgrades, negative flows for the recommending broker are largest the week prior to the issuance of the recommendation revision, and statistically significantly negative two weeks prior to the recommendation release. Recommending brokers take a negative position of SEK 7.2 million in the week prior to the revision, which represents about half of the cumulative position at the end of the window. It therefore seems that pre-recommendation trading is more prevalent for downgrades compared to upgrades. There is on the other hand no evidence that brokers continue to be net sellers for a very long time after the issuance of sell recommendations – net buying in weeks three to four is negative, but not significant. We also find that informed brokers trade in the same direction as the recommending brokers during downgrades, but the coefficients for their average position are insignificant.

All in all, our findings reveal that recommending brokers execute an abnormally high number of transactions in the direction of the recommendation, even prior to the recommendation release date. This indicates that recommendations not only garner substantial following among investors (see Irvine (2001) and Niehaus and Zhang (2010)), but also that some individuals are informed about the content of the recommendations before the recorded recommendation revision date, and most importantly that they act on that information. These results, which are broadly consistent with those of Irvine, Lipson, and Puckett (2007), Juergens and Lindsey (2009) and Christophe, Ferri, and Hsieh (2010), provide additional evidence of the severity of the misdating problem, whichever its cause (tips, leaks, or postdating of recommendations), and of the problems of assuming that investors can only act on recommendations starting on the recorded recommendation date.

Our findings also indicate that broker clients' tend to take larger positions when the recommendation is for a big firm, reflecting the fact that these are the firms whose shares are typically more liquid and have greater market depth.

3.2 Profits

The most commonly used measure of recommendation performance is the abnormal return associated with the recommendation. Abnormal returns are easy to compute and undemanding in terms of data, but they are vulnerable to the objection, made by Berk and van Binsbergen (2015), that they are not an accurate measure of value added. In order to make them an accurate measure, we would need to know the precise time at which the recommendation reached investors, and we would have to assume constant levels of investability and trading costs.

When the exact time at which recommendations become available is not known, abnormal returns provide at best an approximation to the real expected returns of investing in the recommended stocks. Choosing a conservative window when computing returns, i.e. assuming recommendations become available to their users the day they appear in most databases, may result in this measure missing part of the profits obtained by investors who benefit from early tips and leakages. Trying to avoid this problem by choosing a wide pre-recommendation window instead risks overestimating the real benefits of recommendations. This overestimation can be severe if recommendations are issued after public events, or if analysts recommend stocks that have recently appreciated.[10] Besides these timing problems, an additional disadvantage of using abnormal returns to assess the value of recommendations is that a large part of the returns identified may not be obtainable by investors. This problem can be particularly acute for small, illiquid stocks, which are precisely those stocks where the measured ability of analysts to detect mispricings seems to be the largest.

To overcome the problems that affect abnormal returns we use an alternative mea-

[10]There is indeed evidence that recommendations tend to chase past returns (Altinkiliç and Hansen (2009)), and that they are frequently revised on earnings announcement dates, management's earnings forecast dates and other newsy dates (Ivkovic and Jegadeesh (2004), Altinkiliç and Hansen (2009)).

sure of recommendation performance: abnormal profits. Abnormal profits capture the value added by recommendation revisions by measuring the excess profits made by investors who channel their recommendation-motivated trades through the broker making the recommendation.[11] They are defined as the product of trades on the recommended stock executed by the recommending broker and the abnormal return obtained on those trades. Formally, for trades executed by broker b, on stock i, on any given day t:

$$\Pi_{b,i,t} = \left[B_{b,i,t} \cdot AR^{B}_{b,i,t:T} - S_{b,i,t} \cdot AR^{S}_{b,i,t:T} \right], \tag{5}$$

where $B_{b,i,t}$ is the amount the broker issuing the recommendation purchased in the recommended stock measured in SEK, $S_{b,i,t}$ is the amount the broker issuing the recommendation sold in the recommended stock, $AR^{B}_{b,i,t:T}$ is a broker-specific abnormal return for purchases and $AR^{S}_{b,i,t:T}$ is a broker-specific abnormal return for sells. These abnormal returns are computed from broker-specific, quantity weighted, average transaction prices and measure the normalized change in price from t, the day in which the transactions take place, to T, some post-event day in which the profitability of the position is measured.[12] Profits are calculated in excess of what could have been obtained by investing in a pre-defined benchmark.

By exploiting information from broker trades, abnormal profits overcome the dating problem that affects abnormal return measures. Even if prices are increasing before the recommendation is released (as would happen if analysts recommend stocks that have recently appreciated) and this increase is included in the pre-recommendation window, measured profits will still be zero if the recommendation signal has not reached its users. This is most easily seen by expressing (5) as $\Pi_{b,i,t} = NB_{b,i,t} \cdot AR_{b,i,t:T}$, which is correct at the transaction level. Only in the presence of broker-specific information expected net positions will diverge from zero. Moreover, only when that broker-specific signal is truly

[11] Conversations with practitioners and evidence from previous studies suggest that investors do tend to trade with the broker whose analyst has provided them with an influential recent report on a stock (Hayes (1998), Irvine (2001) and Irvine (2004), Jackson (2005)).

[12] To be precise: $AR^{B}_{b,i,t:T} = \frac{P_{i,T} - P^{B}_{b,i,t}}{P^{B}_{b,i,t}} - \frac{P^{M}_{T} - P^{M}_{t}}{P^{M}_{t}}$, where $P^{B}_{b,i,t}$ is the broker-specific adjusted price of firm i paid by broker b for purchases and P^{M} is the adjusted price of the benchmark. $AR^{S}_{b,i,t:T}$ is similarly defined.

informative, bringing the brokers clients a real advantage in the market, will these positions be profitable.[13] By choosing a wide enough pre- and post-recommendation window we can avoid the problem of underestimating recommendation profits, without risking overestimating the real benefits of those recommendations. Abnormal profits computed using actual transaction quantities and prices are also free from the investability problems that frequently affect abnormal return measures.

Figure II shows cumulative abnormal profits, and returns, in event time, for transactions starting 20 trading days before the broker releases an upgrade (downgrade) until 20 trading days afterwards. Cumulative abnormal profits measure the cumulative profitability of all transactions carried out by the recommending broker in the chosen window. For each transaction, abnormal profits are measured as the difference between the price paid (obtained) for the stock when it was acquired (sold), at day t, and the market price for that stock one month after the recommendation revision date (the reference date, T). Abnormal profits are computed in excess of the profits that could have been obtained by investing the same amount of money in the value-weighted Swedish SIX index. Cumulative abnormal returns, are defined in the traditional way, and measure the return that can be attained by investing in the recommendation at the beginning of the window, in excess of what could have been obtained by investing in a portfolio of firms of similar risk.

In common with most of the literature, we find positive abnormal returns following (and preceding) recommendation upgrades, and negative abnormal returns following (and preceding) downgrades. In the 40-day window shown in Figure II abnormal returns to upgrades equal 4.0%, and -1.6% for downgrades. Most of these abnormal returns, however, occur in the pre-recommendation window, with only a small fraction located in the post-event period. A conservative estimate of recommendations' performance would clearly ignore pre-event returns, but given the evidence of brokers building positions consistent with their recommendations several days before the recommendation release, it is natural to believe that at least part of those abnormal returns can be captured by

[13]Even if some transactions are privately informed, this poses no problem to the argument as long as they are equally likely to be channeled through any of the brokers in the market. If that is the case their contribution to brokers' expected net purchases, and profits, will cancel out.

investors who follow financial analysts' advice.

In this vein, the solid black line in Figure II, which measures the aggregate cumulative profitability of all transactions carried out by the recommending broker in an δ-day window of the recommendation date, goes a step further. By documenting the existence of broker-specific abnormal profits on days immediately preceding and following positive recommendation announcements it reveals that broker clients possess an informational advantage at that point, and that they make use of it.[14] This goes beyond what could be inferred just by looking at abnormal returns. Altogether, broker clients make an average of 514,300 SEK per upgrade. These abnormal profits are concentrated around dates analysts release upgrades and are matched by negative profits obtained by the rest of the brokers (the abnormal profits measure we use here is indeed a zero-sum measure; this means that any positive profits for a broker have to be exactly balanced by negative profits for another). Interestingly roughly half of those profits are associated with transactions that take place before the recorded date of the upgrade. The same is not true of downgrades, for which brokers do not appear to execute profitable transactions for their clients. If anything we observe negative, but small, abnormal profits on those dates, suggesting that either these downgrades do not confer an information advantage or that it is not exploited.

In order to allow for overlapping recommendation windows in our statistical analysis, we study abnormal profits associated with recommendations in calendar time. For this we build two portfolios, an "upgrade" and a "downgrade" portfolio, using recommending brokers' daily trades around the dates of these changes in recommendation.

Each time a firm receives a recommendation that is both positive (buy or strong buy)

[14] An alternative interpretation of these results is that analysts' do not convey information to their clients but that they instead extract information from their trades, and use it in the elaboration of recommendations. This reverse causality explanation seems, however, unlikely. Informal discussions with practitioners reveal that financial analysts do not observe detailed enough order flow information, let alone take advantage of it when making recommendations. If they did, it would mean that they are able to successfully identify informed trades and free ride them. The prevailing view in this respect is quite the opposite, analyst do not take advantage of insider traders but rather compete with them for a share of informed trading profits (Bushman, Piotroski, and Smith (2005)). If there were a real chance of analysts free riding on certain traders' information it would certainly be wise for them to channel their trades through more anonymous execution platforms.

and entails a positive change with respect to the previous recommendation, all trades executed by the recommending broker on the recommended stock in an δ-day window of the recommendation change are added to the upgrade portfolio on the date they were actually executed. Choosing a window centered on the recommendation date implies that transactions occurring before as well as after the recommendation date will be included in the corresponding portfolio. In this way we capture pre-recommendation leaks and avoid overestimating profits by considering investments only if the broker, on behalf of its clients, invested in the stock (or shorted it).

Purchases and sales of each stock and the gains or losses associated with those positions are kept in the portfolio until $T = 20$ trading days after the recorded release date of the recommendation that motivated its inclusion in the portfolio, at which point all positions opened in relation with that recommendation are liquidated. This means that at the end of any given day t the upgrades portfolio will be invested in all stocks recommended in an δ-day window of that trading date and the amounts invested in each stock will be equal to the net trade on date t in that stock by all brokers who recommended it (in an δ-day window of t) plus the net position in that stock at time $t-1$ adjusted to reflect past returns. The portfolio therefore reflects how investors responded to the recommendations, without having to assume when or how much they traded. Keeping the horizon fixed, even when working with narrow trade windows, means that those trades are kept in the portfolio (plus/minus gains/loses) until a fixed date after the recommendation is released, facilitating comparisons between different windows. A relatively wide window also helps avoid the effect of price pressure in our measures.

Formally, for each stock i and broker b, we calculate daily individual abnormal profits in the following way:

$$AP_{b,i,t} = CNB_{b,i,t-1} \cdot AR_{i,t} + \lambda_{b,i,t}, \tag{6}$$

with

$$\lambda_{b,i,t} = \frac{P_{i,t} - P^B_{b,i,t}}{P^B_{b,i,t}} B_{b,i,t} - \frac{P_{i,t} - P^S_{b,i,t}}{P^S_{b,i,t}} S_{b,i,t},$$

where $CNB_{b,i,t-1}$ is broker b's net position in stock i at the end of the previous day ($CNB_{b,i,t-1} = CNB_{b,i,t-2}\,(1 + R_{i,t-1}) + NB_{b,i,t-1} + \lambda_{b,i,t-1}$), $AR_{i,t}$ is day t daily abnormal return on stock i computed from closing prices and $\lambda_{b,i,t}$ is an intraday adjustment that corrects for the fact that transactions may be carried out at prices other than closing prices ($P_{i,t} - P^B_{b,i,t}$ is the difference between stock's i closing price on day t and the weighted average transaction price on that same stock for purchases (S, sales) by broker b on that same day).

To obtain a time series of aggregate daily abnormal profits we sum individual abnormal profits across all recommended stocks in each calendar day. We then calculate average daily abnormal profits and assess their statistical significance using Newey-West standard errors (the abnormal profits series is stationary in the period analyzed). Annualized abnormal profits are computed by multiplying daily abnormal profits by 250 trading dates. We follow the same procedure for downgraded stocks in the downgrade portfolio. It is important to keep in mind that the calendar time strategy we pursue here is not just implementable, but actually implemented (at least in aggregate) by broker clients.

We report daily and annualized abnormal profits calculated using this procedure in Table III. It is evident from this table that brokers clients trades around positive recommendation revision dates are profitable, and significantly so. This shows that, at least gross of trading fees, investors *actually* profit from analysts' recommendations. Daily abnormal profits obtained by recommending brokers are estimated to be between SEK 466,971 and SEK 535,652 (between SEK 116 and SEK 133 million once annualized) depending on the window used for measurement. The results are similar in all three windows analyzed, suggesting that abnormal profits are concentrated in a short window of the recommendation change, although their statistical significance decreases as we broaden the window. This is reasonable, as recommendations tend to be more valuable, and trades based on them more profitable, at the moment of their release or shortly

after it, but their value quickly recedes as investors act on them and their information gets impounded into prices. Expanding the window therefore only results in additional non-event days that dilute the statistical significance without significantly affecting the estimate.

Most of these profits are obtained by trading in the shares of relatively large firms. More than 80% of the documented abnormal profits comes from trades on revisions in firms ranked in the first decile of the size distribution, with the rest coming from trading in firms classified in deciles 2 to 10, even though less than half of the recommendations are issued on decile 1 firms. This is despite the finding that, on average, stock prices increase more following upgrades, and decline more following downgrades, for small firms than for large firms (5.42% vs. 2.29% for positive revisions and -1.97% vs. -0.93% for negative ones, see Figure III).[15] Smaller stocks have larger price responses, but they also typically have higher transactions costs, and there is usually not much room to trade in them, as revealed by the minimal cumulative net purchases (sales) observed at the end of their recommendation windows.

The profits to clients of recommending brokers are matched by trading losses made by clients of the other brokers active in the market. Table IV, which offers a contrast between scaled profits obtained by the clients of recommending, informed, and uninformed brokers, shows that the clients of informed brokers do not execute profitable transactions during the recommendation window. Given that informed brokers, our control group, are similar in scope, scale, and customer base to recommending brokers, and only differ from them in not having issued a contemporaneous recommendation on the recommended stock, this observation provides further evidence that the abnormal profits we identify are most likely related to analysts' recommendations and not just the result of existing differences in broker clients' ability or information.[16]

[15]Consistent with previous research by Stickel (1985) and (1995), Ivkovic and Jegadeesh (2004) and Jegadeesh and Kim (2006)

[16]In particular it shows that the results we obtain are not driven by a particular group of clients. For instance, institutional clients may be more likely to trade through large brokerage houses housing research departments. They may also have an informational advantage, compared to individuals, unrelated to recommendations (see, for example, Barber, Lee, Liu, and Odean (2009)). Yet, since they are equally likely to trade through recommending or informed brokers they cannot be driving the reported results.

Tables III and IV also reveal that pre-recommendation profits, defined as those associated with transactions that take place before the reported recommendation date, are also positive and significant (when we look at narrow windows) and amount to almost half of the total recommendation profits. Pre- and post-recommendation profits are computed by narrowing the trading window to $(t-\delta; t-1)$ and $(t+1; t+\delta)$ respectively, but always keeping the reference horizon fixed ($T = 20$). This provides further evidence of informed and profitable activity taking place before the recorded recommendation date. This finding, coupled with evidence that both recommending brokers' net trades and market shares increase prior to the release of recommendations, is consistent with the evidence about tipping provided by Irvine, Lipson, and Puckett (2007) and Christophe, Ferri, and Hsieh (2010), but also with alternative stories (post-dating of recommendations). It suggests that ignoring activity in the pre-recommendation window can be misleading, and will likely result in severe underestimation of recommendations' profitability (in our case roughly half of the profits dissipate if we omit the pre-recommendation window).

From the results for downgrades in the same tables we conclude either that negative revisions do not contain valuable information or that investors fail to capitalize on them. This may seem surprising given the evidence of substantial selling activity around these recommendations coupled with negative average abnormal returns. Most of those returns, however, are pre-recommendation returns and they may not be exploitable by investors.[17] Average post-event abnormal returns, (t; t+20), amount to only -0.1% for the average sell recommendation.

We close this subsection with a word on risk adjustment. We have assumed that the risk of the average recommended stock is similar to the risk of the average stock in the market, i.e. $\beta = 1$; this seems a reasonable assumption. Analysts cover most of the market and constantly issue positive and negative recommendations on most stocks. We also know from previous studies that multifactor models typically do not add much to this picture (see Green (2006)); size and book to market usually have no impact on the

[17]They may in fact just be the result of analysts realigning their optimal level of optimism and accuracy following large price drops, as argued by Conrad, Cornell, Landsman, and Rountree (2006).

alphas of recommendation-based strategies, and neither do other variables that proxy for the state of the economy.[18]

3.3 Abnormal Volume and Trading Commissions

One justification for the provision of stock analysis is that it leads to increased commission revenues. To compare estimated profits to trading commissions, we estimate the value of abnormal trading volume attributable to recommendation revisions. We estimate the value of abnormal buy volume using the following model for each broker-stock-year triplet, b, i, y:

$$BV_{b_R,i,t} = \beta_0 + \beta_1 BV_{b_U,i,t} + \beta_2 BUY_t + \beta_3 BV_{b_U,i,t} \cdot BUY_t + \epsilon_{b_R,i,t}, \tag{7}$$

where $BV_{b_R,i,t}$ is the buy side SEK volume of recommending broker b_R on stock i and day t; $BV_{b_U,i,t}$ is the aggregate buy side SEK volume of uninformed brokers on stock i and day t and BUY_t is a dummy variable equal to one if broker b_R issued an upgrade on firm i less than 20 days away from t and zero otherwise. We use $\beta_2 + \beta_3 BV_{b_U,i,t} + \epsilon_{b_R,i,t}$, the difference between total observed buy volume and the estimated normal amount of buy volume, as our estimate of the abnormal amount of purchases executed by the recommending broker b_R on firm i on each day t in the upgrade recommendation window. We use an identical set of regressions to estimate the abnormal value of sales for downgrades. By including the buy (sell) side trading volumes of non-recommending institutional brokers, we control in a parsimonious way for sources of common variation (public information) in trading.

Table V and Figure IV show recommending brokers' estimated average cumulative abnormal trading volume in the recommended stock around recommendation revision dates. In Table V we report recommending brokers' estimated average cumulative abnormal trading volume using several windows around the recommendation change and

[18] In an accompanying appendix, we present the results of estimating abnormal returns on portfolios constructed based on trades by the recommending broker. The results from a conditional asset pricing model are quite insensitive to our choice of factors suggesting that using more sophisticated risk-adjusting models is unlikely to change our results much.

for brokers of different sizes. Standard errors are computed using the Driscoll and Kraay (1998) covariance matrix estimator. This covariance matrix estimator yields standard errors that are robust to heteroscedasticity and general forms of cross-sectional and temporal dependence.

Results in Table V suggest that recommendation revisions are associated with a significant increase in trading among broker clients. Most of the effect of the recommendation revision on trading volume occurs within a narrow timeframe. For upgrades (downgrades), 74% (73%) of the abnormal trading volumes we find in the (t-20; t+20) window is already present in the narrower (t-5; t+5) window. The average cumulative abnormal trading volume per recommendation 20 trading days after a recommendation release is SEK 56 million. The total value of average broker purchases for the same period is SEK 650 million, so estimated abnormal trading volume is less than 10% of the total in the (t-20; t+20) window. The average cumulative net buy position is SEK 25 million after 20 trading days. This suggests that approximately 50% of the positions taken during the recommendation window are closed during the 40-day event window. The comparison is similar for downgrades. The estimate for cumulative abnormal sell volume is much smaller (SEK 24 million at the end of day 20), and is closer to the net position held throughout the investigated window (SEK 11 million).

As in other studies, we find that abnormal trading volume is much higher for upgrades than for downgrades (see, for example, Irvine (2004) and Jackson (2005)). This has been generally attributed to individuals' reticence to short sell stocks. We find further support for this by comparing differences in abnormal trading volumes for small firms, which are typically especially difficult to short sell. While recommendation upgrades, for large and small firms, are associated with significant increases in recommending broker trading volumes, downgrades of small firms do not seem to lead to more sell volume in the downgraded stock.

Results presented in Table VI indicate that recommendation revisions not only lead to increased trading among broker clients, but that the increase in trading volumes is more

pronounced the more profitable the brokers recommendations have been in the recent past. When we sort recommending brokers based on the past profitability of their recommendations (over the previous three years), we find that brokers that issued more profitable recommendations in the past (top tercile brokers) benefit from a larger following for their recommendations (i.e. their recommendations lead to more trading) in the future. While bottom tercile brokers' recommendation lead to abnormal trading volume of SEK 30 million, on a 40 day window around the recommendation day, top tercile brokers lead to more than three times that amount of trading, SEK 100 million. This result is consistent with a framework in which investment expertise (in the form of stock recommendations) is rewarded in proportion to the extent to which it benefits clients.

According to industry sources, the commissions earned by the leading brokers of Swedish equities averaged around 30 basis points (0.3%) of the volumes traded during the sample period. We cross-checked this against data supplied by Abel Noser, a firm specializing in trading cost analysis for 2006, the last year in our sample period, which showed an average commission earned by leading brokers of Swedish equities of 20 basis points. In order to estimate the commission earned by recommending brokers over the sample period, we therefore use a commission rate of 25 basis points per transaction. Multiplying recommendation-motivated volumes of SEK 56 million per upgrade by a commission fee of 25 basis points, we arrive at SEK 140,000 per recommendation change. Assuming that the recommending broker also receives commission on a second transaction of the same magnitude (roundtrip commissions of 50 basis points), gives us commission revenues for the recommending broker of SEK 280,000 per upgrade. This equates to some 55% of the SEK 514,000 gross profits estimated for each upgrade in the widest observation window. As for downgrades, we have already found that there are no abnormal gross profits and therefore no real service to investors. Still, a 50 basis point commission rate on the abnormal trading triggered by a downgrade would yield SEK 120,000 in commissions per recommendation change.

Summing up abnormal profits and commissions, upgrades and downgrades, and as-

suming a roundtrip commission rate per recommendation of 50 basis points, investors would make SEK 61 million per year in upgrades (abnormal profits minus commissions) and lose SEK 60 million per year in downgrades (abnormal losses and commissions).[19] Brokers executing these trades would receive commission fees totaling SEK 73 million per year for upgrades and SEK 22 million per year for downgrades, for a grand total of SEK 96 million per year. These total revenues are likely to be an underestimate of the value added by equity research. First, we consider only the direct monetary benefits of recommendation revisions, which represent fewer than 40% of all recommendations we collected. Revisions represent salient events which have been found to be more powerful in explaining abnormal returns and trading, but it is very likely that the remaining recommendations also provide some service to customers and induce trading. Second, financial analysts not only issue stock recommendations; they also produce other types of research such as earnings forecasts and industry analysis, which can also be a useful source of information for their clients. Third, research by Irvine (2001) and Madureira and Underwood (2008), among others, also suggests that investors reward research production by brokers on a much more general level. Brokerage houses research departments have historically provided services to other branches, such as retail sales, investment banking, and proprietary trading desks. Since we can only speculate about the magnitude of trade-generation outside our sample of revisions, we simply emphasize that brokers seem to capture most of the measured trading profits generated by up- and downgrades.

4 Summary and Conclusions

The last two decades have seen significant academic research on stock recommendations. These studies tend to show the existence of substantial abnormal returns to recommendation revisions or revision based strategies. Nonetheless many researchers remain unconvinced about the value of recommendations. This is partly because the results often seem to be driven by small, illiquid stocks in which there may be little room for investment,

[19] Bid-ask spread and price impact of trading costs are already taken into account in this figure computed based on actual prices and quantities traded

but also because researchers, facing poorly dated recommendations, are forced to make strong assumptions regarding the time clients gain access to them.

In this study we benefit from a large and comprehensive dataset of brokers' daily transactions, covering a period of almost 10 years. This enables us to explore trading behavior in response to privately observed recommendations, and infer more precisely when and to what extent recommendations are used. We provide evidence that broker clients tend to trade in the direction suggested by recommendations. Moreover, transactions executed by recommending brokers in recommended stocks around upgrades are on average profitable, showing that brokers clients actually benefit from the information contained in recommendations. The clients of brokers without research coverage of these stocks stand on the other side of these profitable trades.[20]

A comparison between abnormal returns and abnormal profits highlights where abnormal returns can be most misleading as a measure of added value. A sizeable part of the abnormal profits to upgrades is associated with trades executed before the recorded recommendation date. This, coupled with evidence that both recommending brokers' net trades and market shares increase prior to the release of recommendations, is consistent with the evidence about tipping provided by Irvine, Lipson, and Puckett (2007) and Christophe, Ferri, and Hsieh (2010), but also with alternative explanations (post-dating of recommendations). Ignoring activity in the pre-recommendation window can result in a severe underestimation of recommendations' profitability (in our case roughly half of the profits dissipate if we omit the pre-recommendation window). But including it without due care is also dangerous, as it is not always the case that investors are in possession of recommendation information at that point. Our results indicate that broker clients do not profit from negative recommendations. Their inability to do so cannot be accounted for by inaction on their part; rather the reason lies elsewhere, most likely in that these recommendation revisions do not contain new information but simply piggyback on recent news. Moreover we find that, in contrast to abnormal returns, abnormal profits for both

[20]These profits are gross of brokerage commissions but net of other trading costs. This is an appropriate metric if the objective is to assess the investment value of recommendations, independently of who (brokers or clients) appropriates that value.

upgrades and downgrades of small caps are insignificant. These small profits reflect the size of positions taken in such stocks by investors, who are likely inhibited from taking larger positions by lack of investability and high transaction costs.

Measuring the benefit of stock recommendations using abnormal profits provides us with a monetary value of recommendations, which we can compare with the monetary value of the brokerage commissions generated by those recommendations. We find that the two are largely equal, suggesting that recommending brokers capture the benefit of their own recommendations. Furthermore, among brokers recommendations, those which prove more profitable for their clients lead to higher abnormal turnover for the brokers that issued them. These findings mirror those of Berk and van Binsbergen (2015) for asset managers: the benefit of investment expertise accrues to those who possess it.

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Table I: Sample Statistics

This table shows the number of recommendation revisions (positive and negative) issued on firms in each firm-size decile. It also shows the average market capitalization and total value of shares traded in firms in each firm-size decile (in billions of Swedish kronor). Market capitalization and value of shares traded are averaged across firms and measured at the end of 2005 (the last column, labeled, Total, shows total market capitalization and value of shares traded for the entire market). The last two rows in the table display the aggregate market share of brokerage firms which have analysts issuing recommendations on (i.e. covering) firms in each firm-size decile, measured by share volume and number of trades. Data from January 1997 to June 2006.

		Firm-size decile										Total
		1	2	3	4	5	6	7	8	9	10	
Up-grades	# of recommendations	1,164	505	372	245	105	67	32	14	2	1	2,507
	% of total	46.4%	20.1%	14.8%	9.8%	4.2%	2.7%	1.3%	0.6%	0.1%	0.0%	59.2%
Down-grades	# of recommendations	717	377	281	185	57	51	29	16	15	2	1,730
	% of total	41.4%	21.8%	16.2%	10.7%	3.3%	2.9%	1.7%	0.9%	0.9%	0.1%	40.8%
All	# of recommendations	1,881	882	653	430	162	118	61	30	17	3	4,237
	% of upgrades	61.9%	57.3%	57.0%	57.0%	64.8%	56.8%	52.5%	46.7%	11.8%	33.3%	59.2%
	Market Capitalization (SEK, B)	116.98	9.47	3.63	1.76	0.98	0.60	0.37	0.19	0.08	0.03	3,507
	Total Trading (SEK, B)	146.59	14.75	3.55	1.42	1.08	0.44	0.58	0.22	0.12	0.10	6,121
	Coverage, value of trading	69.5%	50.3%	48.3%	40.1%	23.7%	17.2%	13.2%	5.8%	3.8%	1.9%	66.1%
	Coverage, number of trades	58.0%	39.2%	34.7%	24.6%	14.8%	11.8%	7.0%	3.4%	1.8%	0.5%	45.5%

Table II: Average Weekly Net Buying

Each coefficient in this table shows the mean weekly net purchases executed by recommending, informed, and uninformed brokers on the recommended stock, expressed in millions of Swedish kronor (SEK). These average net purchases are displayed for buy and sell recommendations in event time, from four weeks before to four weeks after the recommendation revision date. Event week one includes the recommendation revision date. Coefficient estimates and standard errors are obtained from two OLS regressions of weekly net purchases on indicator variables, one per event week–broker type pair. Regressions are conducted separately for upgrades and downgrades. The number of observations on each type of broker in each regression is denoted by n_C. The sample period is January 1997 to June 2006. Standard errors are clustered on broker identity. USD 1 corresponds to about SEK 8 during the sample period. Note: t-statistics in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

		Event week								
	Broker category	**-4**	**-3**	**-2**	**-1**	**1**	**2**	**3**	**4**	n_c
Upgrades	Recommending	0.23 (0.28)	0.94 (0.93)	2.00* (1.74)	5.65*** (4.51)	7.09*** (4.34)	3.10*** (3.47)	3.61*** (4.32)	2.47** (2.56)	2,507
	Informed	0.28 (0.84)	0.28 (0.96)	-0.61 (-0.12)	-0.11 (-0.18)	-0.13 (-0.19)	-0.25 (-0.51)	0.21 (0.59)	-0.17 (-0.46)	29,092
	Uninformed	-0.14 (-0.98)	-0.16 (-0.75)	-0.03 (-0.15)	-0.18 (-0.82)	-0.18 (-0.83)	-0.04 (-0.16)	-0.27 (-0.94)	-0.07 (-0.27)	71,034
Downgrades	Recommending	1.62 (1.04)	-2.53 (-1.60)	-1.61* (-1.93)	-7.18*** (-4.41)	-3.00* (-1.91)	-2.27** (-2.28)	-0.27 (-0.20)	-0.96 (-0.63)	1,730
	Informed	0.07 (0.17)	0.25 (0.53)	0.04 (0.09)	-0.18 (-0.33)	-0.09 (-0.12)	0.29 (0.81)	-0.19 (-0.48)	-0.08 (-0.17)	18,921
	Uninformed	-0.01 (-0.03)	0.09 (0.65)	0.07 (0.58)	0.34*** (2.90)	0.12 (0.70)	-0.03 (-0.25)	0.07 (0.61)	0.03 (0.18)	48,847

Table III: Daily Portfolio Profits of Recommending Brokers' Clients

This table shows the daily profits of recommending brokers' clients around recommendation revision dates. Daily profits are measured over three different windows around the recommendation revision date: $(\tau - 20; \tau + 20)$, $(\tau - 10; \tau + 10)$, and $(\tau - 5; \tau + 5)$. The table also presents annualized profits implied by the point estimates. In the second part of the table the profits are further decomposed into pre- and post-recommendation revision date profits by selecting only the transactions executed by the recommending broker before or after the recorded recommendation revision date. The table also reports results for big (decile one) and small (deciles two to ten) recommended firms in the sample separately. Profits are expressed in Swedish kronor (SEK). USD 1 corresponds to about SEK 8 during the sample period, January 1997 to June 2006. Standard errors are robust to heteroscedasticity and autocorrelation as described by Newey-West (1987), where t-statistics are presented in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

		Upgrades				**Downgrades**		
	Recs.	(τ-5; τ+5)	(τ-10; τ+10)	(τ-20; τ+20)	Recs.	(τ-5; τ+5)	(τ-10; τ+10)	(τ-20; τ+20)
All Recommendations	2507	466,971 (2.70)***	477,771 (2.30)**	535,652 (1.94)*	1730	37,565 (0.28)	-106,567 (-0.45)	-152,170 (-0.42)
Annualized		116,742,750	119,442,750	133,913,000		9,391,250	-26,641,750	-38,042,500
Timing								
Pre-Recommendation Date (τ-δ; τ-1)	2507	223,387 (2.25)**	175,345 (1.12)	246,710 (1.05)	1730	-847 (-0.01)	-80,976 (-0.43)	-146,020 (-0.46)
Post-Recommendation Date (τ; τ+δ)	2507	234,584 (2.11)**	302,425 (2.48)**	288,942 (2.05)**	1730	38,412 (0.41)	-25,591 (-0.41)	-6,150 (-0.05)
Firm Size								
Small Firms	1366	154,731 (1.68)*	180,340 (1.71)*	143,759 (1.11)	1027	-26,339 (-0.35)	-70,474 (-0.70)	-106,527 (-0.86)
Big Firms	1141	788,421 (2.46)**	782,789 (1.96)**	951,840 (1.72)*	703	165,163 (0.37)	-256,544 (-0.33)	-360,088 (-0.29)

Table IV: Daily Portfolio Profits across Broker Categories

The table shows the daily profits of the clients of recommending, informed, and uninformed brokers around recommendation dates. Daily profits are measured over a $(\tau - 5; \tau + 5)$ window around the recommendation revision date. The profits are decomposed into pre- and post-recommendation revision date profits by selecting only the transactions executed by the broker group before or after the recorded recommendation revision date. The table also presents annualized profits implied by the point estimates. Profits are expressed in Swedish kronor (SEK). USD 1 corresponds to about SEK 8 during the sample period, January 1997 to June 2006. Standard errors are robust to heteroscedasticity and autocorrelation as described by Newey-West (1987), where t-statistics are presented in parentheses. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

		Upgrades			**Downgrades**		
		Rec. Broker	Informed	Uninformed	Rec. Broker	Informed	Uninformed
Total Profits	Daily	466,971 (2.70)***	-27,249 (-0.88)	-3,629 (-0.27)	37,565 (0.28)	35,102 (0.79)	-15,858 (-0.87)
(τ-5; τ+5)	Annualized	116,742,775	-6,812,250	-907,368	9,391,345	8,775,493	-3,964,393
Pre-Recommendation Profits	Daily	223,387 (2.25)**	-3,371 (-0.15)	-5,950 (-0.60)	-846 (-0.01)	36,511 (1.06)	-15,171 (-1.08)
(τ-5; τ−1)	Annualized	55,846,775	-842,638	-1,487,405	-211,578	9,127,870	-3,792,680
Post-Recommendation Profits	Daily	243,584 (2.11)**	-23,878 (-1.26)	2,320 (0.31)	38,412 (0.41)	-1,410 (-0.09)	-687 (-0.04)
(τ; τ+5)	Annualized	60,896,000	-5,969,612	580,036	9,602,923	-352,378	-171,713

Table V: Abnormal Buy and Sell Volume for Recommending Brokers

This table shows recommending brokers' average cumulative abnormal buy and sell volume in the recommended stock over three different windows around the recommendation date: $(\tau - 20; \tau + 20)$, $(\tau - 10; \tau + 10)$, and $(\tau - 5; \tau + 5)$. The figures are further decomposed into pre- and post- recommendation revision dates abnormal buy and sell volume and according to recommended firm size. Abnormal buy volume (for upgrades) and abnormal sell volume (for downgrades) are estimated using the regression specified in Equation 7. The reported figures are averages of 2,507 observations for upgrades, and 1,730 observations for downgrades. Abnormal buy and sell volume is expressed in Swedish kronor (SEK). USD 1 corresponds to about SEK 8 during the sample period, January 1997 to June 2006. Robust t-statistics (in parenthesis) are computed using Driscoll and Kraay (1998) standard errors. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

		Upgrades				**Downgrades**		
	Recs.	(τ-5; τ+5)	(τ-10; τ+10)	(τ-20; τ+20)	Recs.	(τ-5; τ+5)	(τ-10; τ+10)	(τ-20; τ+20)
All Recommendations	2507	43,633,183 (5.80)***	50,513,568 (5.01)***	55,769,184 (3.79)***	1730	28,372,091 (2.41)**	29,567,349 (2.20)**	24,274,341 (1.39)
Timing								
Pre-Recommendation Date (τ-δ; τ-1)	2507	22,469,670 (4.08)***	27,597,740 (3.75)***	28,290,780 (2.80)***	1730	19,520,120 (2.15)**	22,406,440 (2.26)**	23,362,040 (1.88)*
Post-Recommendation Date (τ; τ+δ)	2507	21,166,242 (5.72)***	22,919,787 (4.29)***	27,480,558 (3.34)***	1730	8,858,874 (1.79)*	7,172,910 (1.03)	942,011 (0.10)
Firm Size								
Small Firms	1366	15,382,026 (6.24)***	16,515,410 (5.23)***	18,103,882 (4.14)***	1027	3,501,819 (1.78)*	163,671 (0.05)	-5,875,849 (-1.48)
Big Firms	1141	77,495,319 (4.90)***	91,269,549 (4.20)***	100,934,743 (3.17)***	703	64,871,114 (2.30)**	72,729,846 (2.28)**	68,530,024 (1.63)

Table VI: Past Abnormal Profits and Abnormal Buy and Sell Volume for Recommending Brokers

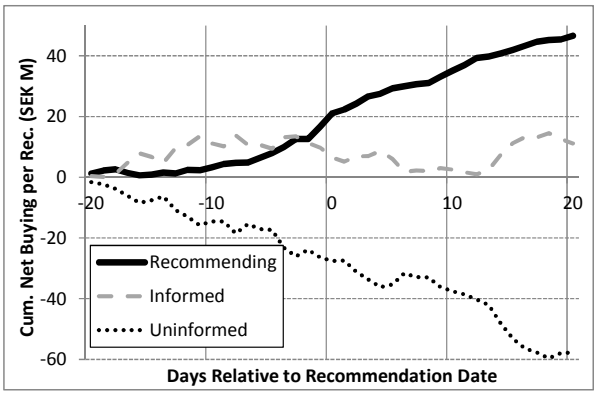
This table shows recommending brokers' average cumulative abnormal buy (upgrades) or sell (downgrades) volume in the recommended stock for three groups of brokers sorted into terciles by their clients past recommendation profitability. Abnormal buy volume (for upgrades) and abnormal sell volume (for downgrades) are estimated using the regression specified in Equation 7. Results are shown for abnormal buy and sell volumes measured over three different windows around the recommendation revision date: $(\tau - 20; \tau + 20)$, $(\tau - 10; \tau + 10)$, and $(\tau - 5; \tau + 5)$. Cumulative abnormal volume is expressed in Swedish kronor (SEK). USD 1 corresponds to about SEK 8 during the sample period, January 1997 to June 2006. Robust t-statistics (in parenthesis) are computed using Driscoll and Kraay (1998) standard errors. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively.

	Brokers sorted on past recommendation profitability			
	T1 (Lowest)	T2	T3 (Highest)	T3 - T1
(τ-20; τ+20)	29,544,416 (1.82)*	50,782,960 (3.25)***	99,932,320 (3.71)***	70,387,904 (1.97)**
(τ-10; τ+10)	36,466,100 (2.14)**	42,155,860 (3.90)***	81,886,320 (4.12)***	45,420,220 (1.77)*
(τ-5; τ+5)	30,642,250 (2.16)**	37,988,330 (4.99)***	62,535,780 (3.90)***	31,893,530 (1.50)

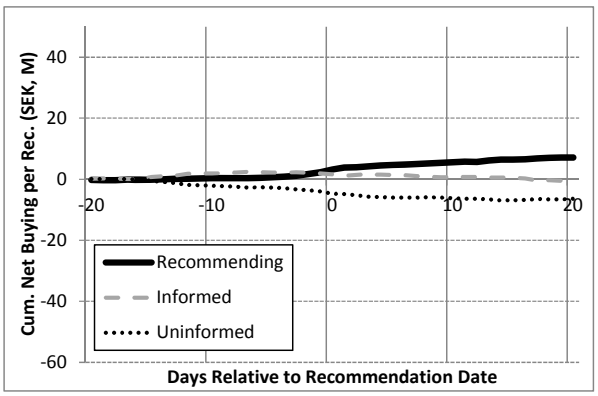
Figure I: Cumulative Net Buying around Recommendation Revision Dates

The figures show the cumulative net buying by recommending, informed, and uninformed brokers around recommendation revision dates. Cumulative net buying is measured in millions of Swedish kronor (SEK, M) and averaged over recommendations. Net buying is accumulated in event time for upgrades and downgrades separately. Results are shown separately for big (decile one) and small (deciles two to ten) recommended firms and for upgrades and downgrades. The sample contains 1,141 big firm recommendation upgrades, 1,366 small firm recommendation upgrades, 709 big firm recommendation downgrades and 1,027 recommendation downgrades. USD 1 corresponds to about SEK 8 during the sample period, January 1997 to June 2006.

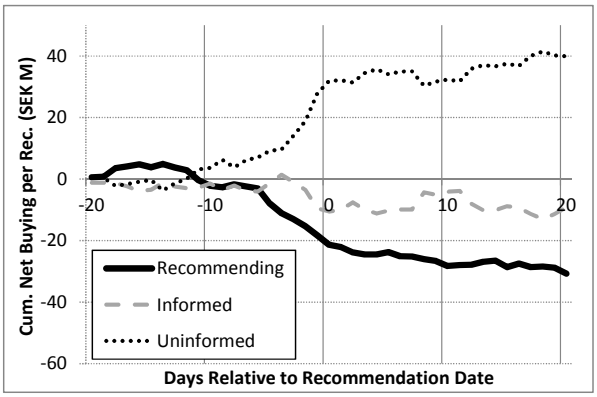
A: Upgrades, big firms



B: Upgrades, small firms



C: Downgrades, big firms



D: Downgrades, small firms

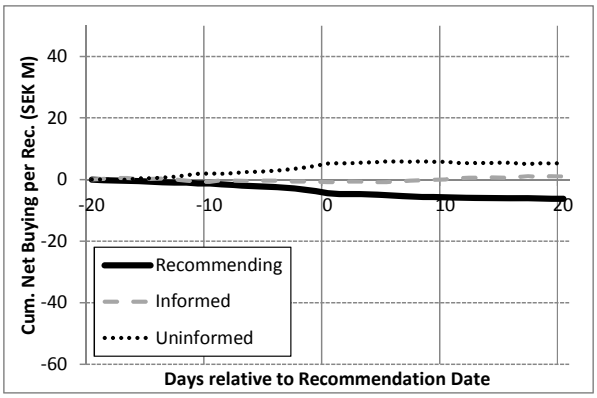


Figure II: Abnormal Profits and Returns around Recommendation Revision Dates

This figure shows cumulative abnormal profits and returns for transactions starting 20 trading days before the broker releases a buy or strong buy (sell or strong sell) recommendation that positively (negatively) revises an existing recommendation up until 20 trading days after that recommendation. Buy and hold abnormal returns (BHAR) are measured as the difference between raw buy and hold returns and the market return over the corresponding period. Abnormal profits are measured as the difference between raw profits and the profits that investors could have made by investing a similar amount in the market index. Each point in the abnormal profits line is computed as the average, across recommendations, of the cumulative abnormal profits obtained on transactions executed up until the day of the observation. The reference price in the profits computation is the price prevailing 20 trading days after the recommendation revision date. The reported figures are averages of 2,507 observations for upgrades, and 1,730 observations for downgrades. Profits are measured in millions of Swedish kronor (SEK, M). USD 1 corresponds to about SEK 8 during the sample period.

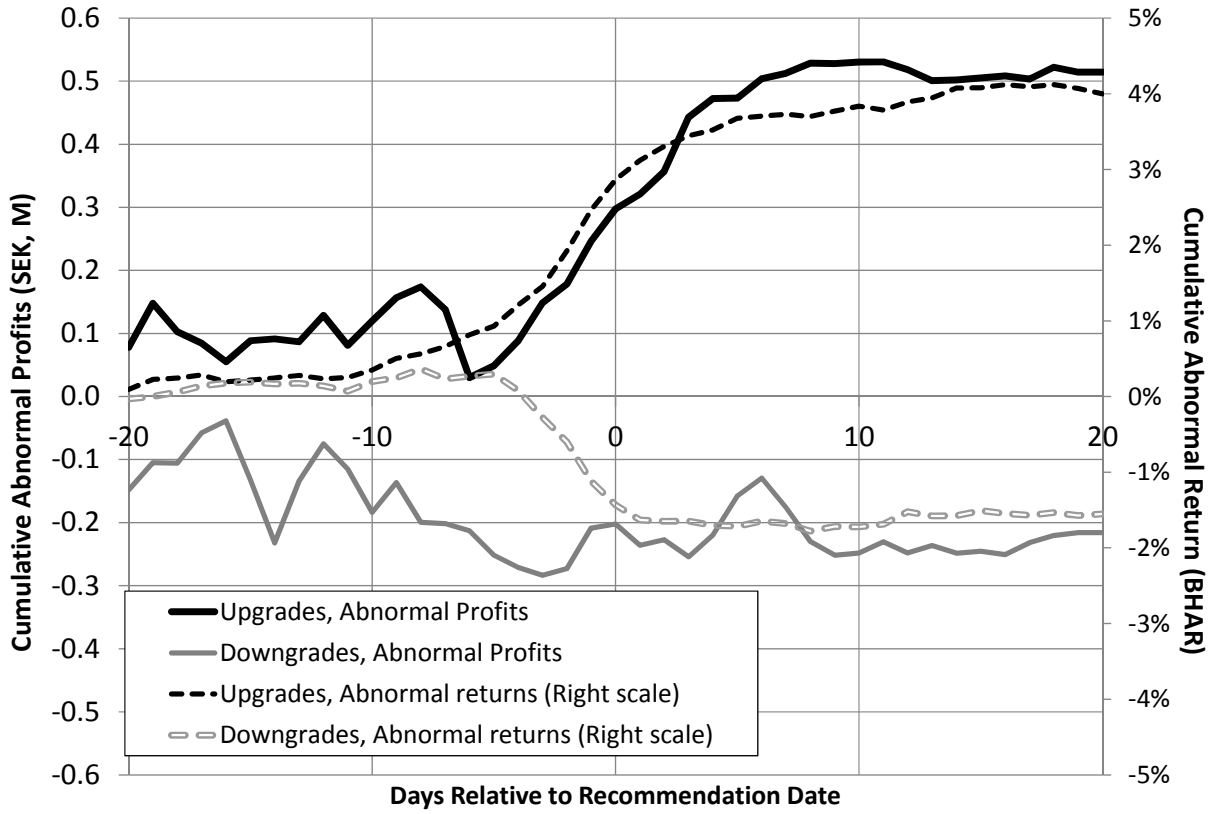
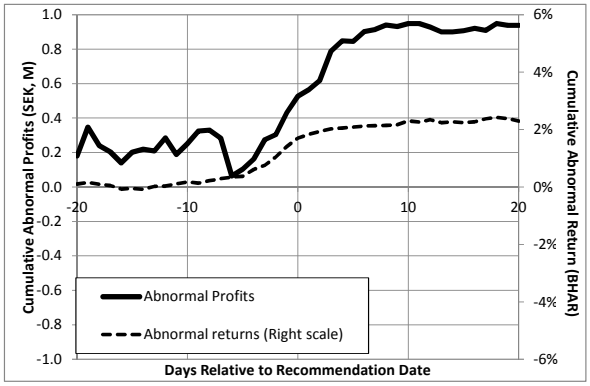


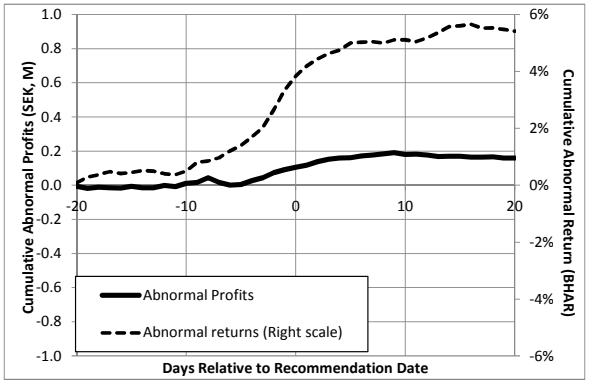
Figure III: Abnormal Profits and Returns around Recommendation Revision Dates

This figure shows cumulative abnormal profits and returns for transactions starting 20 days before the broker releases a buy or strong buy (sell or strong sell) recommendation that positively (negatively) revises an existing recommendation up until 20 days after that recommendation. Buy and hold abnormal returns (BHAR) are measured as the difference between raw buy and hold returns and the market return over the corresponding period. Abnormal profits are measured as the difference between raw profits and the profits that investors could have made by investing a similar amount in the market index. Each point in the abnormal profits line is computed as the average, across recommendations, of the cumulative abnormal profits obtained on transactions executed up until the day of the observation. The reference price in the profits computation is the price prevailing 20 trading days after the recommendation revision date. Results are shown separately for big (decile one) and small (deciles two to ten) recommended firms and for upgrades and downgrades. The sample contains 1,141 big firm recommendation upgrades, 1,366 small firm recommendation upgrades, 709 big firm recommendation downgrades and 1,027 recommendation downgrades. Profits are measured in millions of Swedish kronor (SEK, M). USD 1 corresponds to about SEK 8 during the sample period.

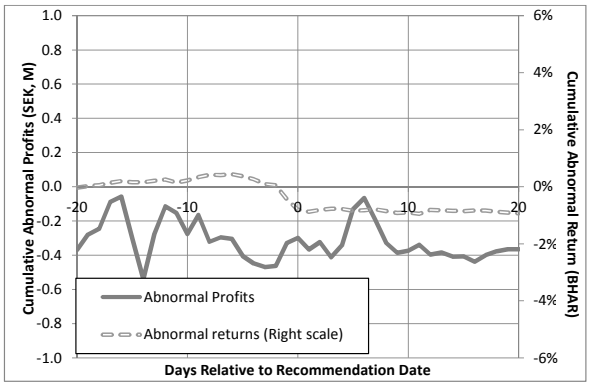
A: Upgrades, big firms



B: Upgrades, small firms



C: Downgrades, big firms



D: Downgrades, small firms

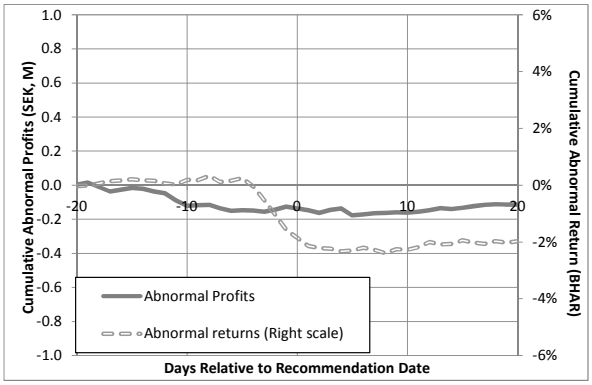


Figure IV: Cumulative Abnormal Buy and Sell Volume around Recommendation Revision Dates

This figure shows recommending brokers' average cumulative abnormal SEK trading volume in the recommended stock starting 20 days before the recorded recommendation revision date and ending 20 days after that date. Abnormal buy volume (for upgrades) and the negative of abnormal sell volume (for downgrades) are estimated using the regression specified in equation 7, and expressed in millions of Swedish kronor (SEK, M). The reported figures are averages of 2,507 observations for upgrades, and 1,730 observations for downgrades. USD 1 corresponds to about SEK 8 during the sample period.