Sell-Side Benchmarks

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Abstract

Sell-side analysts employ different benchmarks when defining their stock recommendations. For example, a 'buy' for some brokers means the stock is expected to outperform its peers in the same sector ("sector benchmarkers"), while for other brokers it means the stock is expected to outperform the market ("market benchmarkers"), or just some absolute return ("total benchmarkers"). We explore the validity and implications of the adoption of these different benchmarks. Analysis of the relation between analysts' recommendations and their long-term growth and earnings forecasts suggests that analysts indeed abide by their benchmarks: Sector benchmarkers rely less on across-industry information, and focus more on ranking firms within their industries. We also find evidence that market- and sector-benchmarkers are successful in meeting or beating their benchmark returns, while total-benchmarkers are not. However, we do not find much evidence that investors react differently to recommendations based on the different benchmarks. The research carries implications for the correct understanding and interpretation of sell-side research and its investment value.

JEL Classifications: G10, G24

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1 Introduction

It is well known that sell-side research analysts publish investment advice on stocks in the forms of recommendations such as 'buys,' 'holds,' and 'sells.' However, not all buys/holds/sells are created equal. An inspection of the disclosures in which analysts describe the meaning of their recommendations reveals that different brokers assign different meanings to their recommendations. For example, in one broker a 'buy' might mean that the stock is expected to outperform its industry peers (we call this broker a "sector benchmarker"); in another a 'buy' might mean that the stock is expected to outperform the market ("market benchmarker"); and in yet another, a 'buy' might mean that the stock is expected earn a return that exceeds some pre-determined threshold such as 10% ("total benchmarker"). Thus, 'buy' recommendations from different brokers carry with them very different literal meanings and investment advice.[1]

In this paper we explore the validity and implications of brokers' reliance on different benchmarks. We ask three questions. First, do analysts abide by their benchmarks? That is, we examine whether the benchmarks declared by analysts influence the way analysts incorporate fundamental information into their stock recommendations.

Second, do the benchmarks affect the predictive value of analysts' recommendations? We explore whether stock recommendations issued with respect to a particular benchmark achieve long-term performance that is consistent with the stated benchmark. The correct interpretation of analysts' stock recommendations is of paramount importance. Accordingly, a large body of research attempts to assess the value of analysts' recommendations. This literature examines whether following the recommendations of analysts yields future abnormal return (e.g., Stickel, 1995; Womack (1996), Barber, Lehavy, McNichols and Trueman, 2001 and 2006; Jegadeesh, Kim, Krische, and Lee, 2005). But the extant literature does not account for the fact that similarly named recommendation issued different brokers can carry different meanings. It is only natural to augment this literature by considering the predictive ability of the recommendation conditional on which benchmark is being used.

[1] Unless otherwise noted, we use the term 'buy' to refer to optimistic recommendations, thus including both *strong buy* and *buy* recommendation levels, while 'sell' refers to recommendations with a pessimistic tone, thus including both *sell* and *strong sell* recommendations levels.

Finally, the different benchmarks used by analysts have implications for investors who need to interpret the investment advice in each recommendation. If investors internalize the different benchmarks used by different analysts they should respond differently to recommendations based on those benchmarks. Our third question, thus, is whether investors interpret and react to recommendations in a manner consistent with the stated benchmark.

Beginning in September of 2002, and following Rule NASD 2711, Rule NYSE 472, and the Global Settlement, brokers are required to define in each report the literal meaning of their recommendations, including the benchmark to be used when interpreting the recommendation advice. To examine our research questions we hand-collect, mostly from full-text analyst reports, the meaning of recommendations for 173 brokers accounting for over 94% of all recommendations issued during our sample period (September 2002-December 2009). We find that the most prevalent benchmarks are sector benchmarks (21% of brokers), market benchmarks (20% of brokers), and total benchmarks (25% of brokers). Other brokers typically use either combinations or risk-adjusted versions of these three benchmarks. Given their popularity, and the simplicity of their meaning, we focus our empirical analysis on brokers employing these three benchmarks exclusively.

We begin our analysis by examining whether brokers indeed abide by their benchmarks. To answer this question we relate stock recommendations to analysts' outputs regarding firms' fundamentals. We expect that sector benchmarkers would primarily use within-industry information about those fundamentals, while market and total benchmarkers would use both within- and across-industry information. Our empirical specification follows an extensive literature examining how analysts' recommendations are related to their forecasts (e.g., Bradshaw, 2004; Ertimur, Sunder and Sunder, 2007; Chen and Chen, 2009; Barniv et al., 2009). This literature, however, does not take into account the benchmark used by the broker. To this end, we break down analysts' earnings and long-term growth (LTG) forecasts into within- and across-industry components. Our analysis shows that, as expected, market and total benchmarkers place more weight on across-industry expectations than sector benchmarkers when forming

their recommendations. These results are consistent with analysts indeed abiding by their benchmarks.

Next we examine whether analysts using a particular benchmark are successful in meeting (or beating) the targets associated with their benchmark. To this end, we collect for each broker the target return associated with the benchmark. For example, a target return for a 'buy' recommendation issued by a sector- (market-) benchmarker specifies by how much the recommended firm is expected to beat the sector (market). Similarly, a target return for a 'buy' recommendation issued by a total-benchmarker specifies an absolute return such as 10%. We then examine whether the returns of the recommended firms meet or beat their targets within a year or until the recommendation is changed. We find that analysts using a market/sector benchmark are successful in meeting their targets. For examples, 'buy' recommendations issued by sector- (market-) benchmarkers beat their targets by an average of 3.25% (5.74%). By contrast, total-benchmarkers on average fail to meet or beat their targets. For example, the average return obtained by 'buy' recommendations issued by those analysts is 4.9% lower than their target return. These results, however, seem to speak more to the choice of the target than to the performance of the analyst. Indeed, total benchmarkers are setting a very high hurdle for themselves, whereby a 'buy' recommendation is not just a relative statement compared to the market or to peers, but also a statement about the market itself.

Our last analysis explores whether investors actually take into account and respond to the different benchmarks. Given that the benchmarks used by analysts are public information we expect investors to incorporate them into their responses. For example, when a sector benchmarker issues a 'buy' recommendation we expect that the short-term stock return will exceed the industry return to reflect that. Similarly, 'buy' recommendations issued by market benchmarkers should result in a price response in excess of the market return. Finally, a 'buy' recommendation issued by a total benchmarker should be followed by a high absolute return. To examine this hypothesis we regress three-day price returns around the date of the issuance of the recommendation on dummy variables for sector, market, and total benchmarks. Surprisingly, we find very little evidence that investors account for the benchmarks in their responses to recommendations. Market-adjusted returns are marginally higher following 'buys' issued

by market benchmarkers, but no similar effect exists regarding industry-adjusted returns or total returns following 'buys'—and reactions to 'sells' also do not depend on the type of benchmark used. We conclude that, for the most part, investors are either not aware of the benchmarks or just do not incorporate them into their trading decisions.

In Kadan, Madureira, Wang, and Zach (2012) we study different aspects of analysts' industry expertise. In one of the analyses we point out the existence of sell-side benchmarks, and use a small sample of disclosures from 20 brokers to study the relation between firm and industry recommendations. In contrast, in this paper we focus exclusively on these sell-side benchmarks, for which we provide the first large scale and comprehensive analysis. Thus, we contribute to the literature by documenting the attributes of these benchmarks, exploring the way in which they are reflected in analysts' recommendations, and by studying their implications for investment value.

Our paper also relates to a long strand of literature examining the relation between stock recommendations and other outputs produced by analysts such as earnings forecasts, price-targets, and long-term forecasts (e.g., Bradshaw, 2004; Ertimur, Sunder and Sunder, 2007; Chen and Chen, 2009; Barniv et al., 2009; Brown and Huang, 2010; Kecskes, Michaely and Womack, 2010). Our analysis emphasizes that the usual method to assess the relation between recommendations and other analysts' outputs can be improved upon: When regressing recommendations on expectations of earnings and LTG, for example, we observe an inconsistency in that recommendations can be industry-adjusted statements (in the case of sector benchmarkers), while expectations of earnings and LTG are not.

In analyzing whether recommendations perform as predicted, we depart from the usual approach taken in the literature. For the most part, the literature has assessed the value of analysts' recommendations through the investment value obtained from following a set of recommendations, for example by looking at risk-adjusted returns relative to CAPM or a multifactor model, obtained from portfolios formed based on recommendations (e.g., Womack (1996), Barber, Lehavy, McNichols and Trueman, 2001 and 2006; Jegadeesh, Kim, Krische, and Lee, 2005). While this approach is useful from the perspective of an investor that diversifies her investment over many

recommendations, we argue that this is at best an imperfect measure of whether each recommendation performs according to its objective. Nothing in the disclosed meaning of a recommendation suggests that it should be seen as a prediction about risk-adjusted performance (other than benchmark-adjusted performance), nor that it should be assessed after it is combined with *other* recommendations. Instead, the literal meaning of a recommendation provides a very clear predictive rule about how its advice should be taken. Our assessment of the recommendation value follows this rule directly.

We proceed as follows. Section 2 describes the data. Section 3 provides some preliminary analysis of the benchmarks used by different brokers. In Section 4 we examine whether analysts abide by their benchmarks. In Section 5 we explore whether analysts are successful in meeting their benchmark-specific targets. In Section 6 we study investor reactions to recommendations issued by analysts using different benchmarks. Section 7 concludes.

2 Data

We focus on analysts' stock recommendations of all U.S. firms in the period of September 2002 to December 2009. The source for the analyst recommendations, earnings forecasts and LTG projections in this study is the IBES database. The data on firm characteristics are from COMPUSTAT. We obtain stock returns from CRSP, and equity offerings data from SDC. Industry membership is inferred through the industry classification defined by the General Industry Classification Standard (GICS) obtained from COMPUSTAT.

We manually collect data on the benchmarks used by brokers that issued at least 100 recommendations during our sample period. There are 249,459 recommendations issued by all brokers during our sample period for US firms, out of which 234,274 are issued by brokers with at least 100 recommendations. Therefore, the threshold of 100 recommendations enables us to concentrate our effort on collecting benchmark data of large brokers without significant loss of recommendation data.

We start by examining the disclosures of analysts regarding the meaning of their firm recommendations. We collect disclosures from three sources. First, we retrieve information from full-text research reports in the Investext database. Under regulations NASD Rule 2711 and NYSE Rule 472, which were adopted prior to the beginning of our sample period, analysts are required to disclose the exact meaning of their recommendations inside their reports. Analysts normally disclose the information on the ratings system, ratings distribution, and the meaning of different ratings in the last section of their reports. Secondly, we collect data from the Investars website,[2] which contains the ratings definitions of some brokers. Finally, if necessary, we obtain data directly from brokers' websites.

< Insert Table 1 here >

We rely on the analysts' disclosures to identify the benchmark they use to define their recommendations. We categorize brokers into ten different types of benchmarks. Table 1 summarizes these benchmarks and gives examples of textual descriptions from the analysts' disclosures. The three most basic benchmarks involve determining recommendations according to the expected performance of the covered stock compared to the performance of industry peers, the performance of the market, or to some return threshold. More formally, we classify brokers as sector benchmarkers if they state that their stock recommendations are benchmarked against sector performance. For example, Smith Barney's analysts rate stocks based on the "stock's performance vs. the analyst's industry coverage for the coming 12-18 months." We classify brokers as market benchmarkers if they state that their stock recommendations are benchmarked against market performance. For example, Wachovia's analysts rate a stock based its expected performance "relative to the market over the next 12 months." Finally, we classify brokers as total return benchmarkers if they issue recommendations based on a stock's expected total return. This is the case, for example, with Deutsche Bank, where a 'buy' recommendation means that the stock's total return is "expected to appreciate 10% or more over a 12-month period."

[2] http://www2.investars.com/synopsis.asp

Occasionally brokers determine their recommendations using some combination of these three basic benchmarks. We identify four such combinations. For example, Dougherty & Co combines features of market and sector benchmarks, so that its 'buy' means the corresponding stock is "expected to outperform the broader market and/or its sector." We categorize this broker as a market/sector benchmarker. Other hybrids we identify are total/market, sector/total, and market/sector/total.

Other brokers refine the basic benchmarks by adding a risk-adjustment feature. For example, Morgan Stanley establishes its recommendations based on the "stocks's total return vs. analyst's coverage on a risk-adjusted basis." Notably, the nature of the adjustment for risk is often vague. In order to highlight this feature, we add a new category and classify Morgan Stanley as a sector/risk benchmarker. Similarly, we classify a broker as market/risk (total/risk) when the benchmark involves comparing the stock's expected performance to the market (a total threshold) on some type of risk-adjusted measure.

We also notice some brokers who changed their benchmarks during our sample period. For example, Merrill Lynch used a total benchmark between September 2002 and May 2008, and a sector/total benchmark since June 2008. In this case, we classify Merrill Lynch as a total benchmarker between September 2002 and May 2008, and as a sector/total benchmarker between June 2008 and December 2009. However, for some brokers, we failed to identify the exact date of the change. We classify such instances as a "Changes" category. Finally, some brokers could not be classified in any of the above categories, either because we could not find any data on their analysts' disclosures or because their disclosures did not fall into any of the above categories.

< Insert Table 2 here >

Panel A of Table 2 summarizes the distribution of the different benchmarks.[3] There are 37 brokers that use the sector benchmark during our sample period, and the number of recommendations issued by such brokers accounts for about 33% of all recommendations. The number of brokers relying on a market benchmark is 34, and

[3] Overall, there are 173 brokers with at least 100 recommendations issued during the sample period, and 10 of them change their benchmarks during our sample period. Therefore, the total number of brokers in panel A of Table 2 is 183.

those brokers issued about 18% of all recommendations. There are 43 brokers that base their recommendations on a total return benchmark, and as a group they issued about 23% of all recommendations. The relevance of these basic benchmarks is apparent also when one looks at the size of each broker: Among the twenty largest brokers (according to the number of recommendations issued during our sample period), nine brokers use a sector benchmark, three brokers use market benchmark, and four brokers use total return benchmark.

Brokers using risk-adjusted benchmarks are usually big brokers, as revealed by the average number of recommendations issued by brokers in each category (Morgan Stanley is one such case), but there are relatively few of them. Therefore, as a group, these brokers account for just 11% of recommendations. Similarly, there are few brokers combining the basic benchmarks. Finally, we fail to collect data on benchmarks for 41 brokers, but these brokers are relatively small (with an average number of recommendations of 408 during the sample period), and as a group they issued about seven percent of recommendations in our sample.

In this paper we focus our attention on the three basic benchmarks. Two reasons drive our choice. First, we want to address a set of benchmarks that is representative of the universe of brokers. Sector, market, and total return benchmarkers thoroughly satisfy this requirement: together they account for about 74% of the recommendations in our sample period, and they are adopted by 16 of the 20 largest brokers. Second, we need to address benchmarks that have a straightforward interpretation, so that clear testable hypotheses can be developed. This requirement again favors the three basic benchmarks, as they are the most precisely defined, particularly when compared to the risk-adjusted benchmarks (which do not properly document the meaning of their risk-adjustment feature) or to the benchmarks that combine more than one basic benchmark.

3 Preliminary Analysis

3.1 Benchmark Determinants

The analysts' disclosures document that different brokerage houses rely on different benchmarks. One obvious question is why. Analysts we have interviewed hinted

at a tension about which benchmark should be used. Some analysts suggest that using a sector benchmark fits well with the structure of research departments in brokerage houses, where analysts work in industry groups and are deemed industry specialists (e.g., Boni and Womack, 2006; Kadan, Madureira, Wang, and Zach, 2012). Some analysts also pointed out that ranking firms within an industry arises directly from application of techniques such as comparables.

Others expressed preference towards a total benchmark, given that a total return expectation is a direct product of applying a discounted cash flow (DCF) methodology. They also argued that an expectation about total return, as opposed to the return relative to the industry or to the market, is the most useful output from the perspective of investors. Finally, some argued that the market benchmark makes sense as well, since it is common practice to evaluate each equity asset relative to the market (or a popular index such as the S&P 500).

To add to this anecdotal evidence and provide some large sample results on the determinants of the benchmarks, we explore their possible association with brokers' characteristics. We estimate logistic models for the probability of adopting a certain benchmark. Each observation in these models is a broker-year pair, describing the benchmark used by the broker in that particular year.[4] The models presented differ in the definition of the dependent variable. As explanatory variables we use broker and analyst characteristics (age, size, number of industries covered, experience) as well as characteristics of the covered firms (size and book-to-market).

< Insert Table 3 here >

Table 3 presents the results. Two variables emerge as strong determinants of the choice of benchmark. The first is broker size—measured by the number of recommendations issued by a broker as a fraction of all recommendations issued during the year. Larger brokers are more likely to adopt a sector benchmark as opposed to either market or total benchmarks. It may be that large brokers that employ a large number of analysts can allow analysts to focus on a select group of firms in one particular industry,

[4] We also estimated similar cross-sectional regressions separately for each year during the sample period. The results are similar.

leading to more industry specialization and thereby to sector benchmarking. The second determinant is the number of industries covered. A larger number of covered industries is associated with a higher likelihood of adopting a market or total benchmark. It may be that brokers that follow many industries have a better perspective of the market, and thereby are more capable of benchmarking their recommendations to a market or total reference.

3.2 Benchmark Choice and Industry Concentration

It is well known that brokers tend to organize their sell-side personnel by industry, with each analyst covering firms that are related to each other in terms of industry membership. Boni and Womack (2006) report that the average analyst has 76% of her covered firms belonging to one single industry, and show that most of the value in firm recommendations comes from ranking firms within industries. A sector benchmark comes naturally to this framework. On the other hand, the ability to rank firms within industry is not sufficient to render a diagnostic of the firm's prospects when a market or total benchmark is employed. In particular, the use of a market benchmark implies knowledge of the overall market prospects, which requires expertise that goes beyond the industry being covered. For these market and total benchmarkers, thus, industry specialization is arguably less relevant. This suggests a potential linkage between the organizational structure of a broker and the benchmark it adopts.

We test for this possibility by comparing industry concentration of the broker's analysts across the different types of benchmarks. We follow Boni and Womack (2006) in measuring industry concentration. For each year and each analyst, we first recognize a firm as belonging to the analyst's coverage universe if the firm has received at least one recommendation from the analyst during the year and that the firm has an outstanding recommendation from that analyst at the end of the year. We then define industry concentration as the fraction of the analyst's coverage universe that belongs to her most covered GICS industry. Thus, for each year and each broker, we have the industry concentration measures for the analysts employed by that broker. We then compare the measures of analysts' industry concentration across sector, market, and total benchmarkers.

< Insert Table 4 here >

Panel A of Table 4 shows that in fact analysts employed by sector benchmarkers tend to concentrate in single industries more than their counterparts employed by market and total benchmarkers, though the differences in concentration are relatively small. For example, in 2002 the average analyst employed by a sector benchmarker has 80.2% of her covered firms belonging to one single industry, compared to 75.3% (76.6%) in the case of an analyst employed by a market (total) benchmarker. Given the potential for these averages to be overwhelmed by the industry concentration measures of analysts with a small coverage universe (e.g., the minimum industry concentration for an analyst covering two firms is 50%). Results are similar when we restrict the sample to analysts having at least 5 firms in her coverage universe (Panel B).

The univariate statistics suggest smaller concentration by industry for market and total benchmarkers, but they do not corroborate the view that market or total benchmarkers *avoid* concentrating by industry. In fact, the numbers for market and total benchmarkers clearly show they also concentrate by industry, just not to the same extent that sector benchmarkers do. Moreover, these differences might be an artifact of the brokers' and analysts' characteristics. For example, smaller brokers might have a weaker ability to concentrate. If market benchmakers are smaller, then we could see less concentration due to broker size. The size of the analyst's coverage universe can also mechanically affect the measure of industry concentration, given that the number of firms in a single industry is finite.[5] It is also possible that experience correlates with concentration, because recently hired analysts might be given a relatively easier task of covering firms that are similar to each other.

To control for these confounding factors, we examine the relationship between the analyst's industry concentration and the benchmark adopted by its employer in a regression setup. We run yearly regressions where the data points are analysts for which we were able to collect industry concentration measures. The main variable of interest is a dummy for whether the analyst's broker uses a sector benchmark. As control variables,

[5] Take two analysts who focus mostly on a GICS composed of 30 firms. If one such analyst is covering more than 30 firms, her industry concentration is bound to be lower than 100%; if the other analyst covers fewer than 30 firms, that it is possible to have an industry concentration of 100%.

we use the "size" of the broker (the log of the number of analysts employed by the broker), the analyst coverage universe (proxied by the log of the number of firms in her coverage universe) and analyst experience (proxied by the log of number of days since the analyst first entered the IBES dataset).

The results, reported in Panel B of Table 4, confirm that brokers employing more analysts tend to achieve higher levels of industry concentration. As for analysts, a larger coverage universe and more years of experience are associated with less industry concentration. Finally, the relevance of the association between the adoption of a sector benchmark by a broker and the corresponding industry concentration of its analysts is severely diminished in a multivariate setting, with the coefficient of the sector dummy significant at the 5% level in only 3 out of 8 regression years. If we further restrict the sample to the analysts with a minimum coverage universe of 5 firms, no such coefficient is significant. Therefore, while analysts employed by sector benchmarkers do present a slightly higher industry concentration, this has more to do with brokers and analysts' characteristics, rather than the benchmark adopted by the broker.

3.3 Benchmark Choice and Distribution of Recommendations

Next we examine whether the choice of the benchmark is associated with the characteristics of the recommendations issued by a broker. Panel A of Table 5 and Figure 1 report the distribution of recommendations broken down by the benchmark adopted by the broker. The table demonstrates an important and salient feature that distinguishes the behavior of sector benchmarkers from market and total benchmarkers: Sector benchmarkers tend to be less optimistic. Average recommendation levels from sector benchmarkers are significantly higher as compared to the average recommendation from market and sector benchmarkers.[6] Moreover, for each year during our sample period sector benchmarkers show a smaller proportion of optimistic recommendations and a larger proportion of pessimistic recommendations compared to market or total benchmarkers. The gap between sector vs. market and total benchmarkers has diminished over the years, especially due to the sector benchmarkers reducing their share of

[6] In the computation of the average recommendation, strong buys and buys are mapped to level 1, holds are mapped to level 2, and sells and strong sells are mapped to level 3.

pessimistic recommendations, but it is still significant at the end of the sample. Notably, market and total benchmarkers behave very similarly, especially with respect to the issuance of pessimistic recommendations.

< Insert Table 5 and Figure 1 here >

It is possible that the less optimistic nature of recommendations from sector benchmarkers is an anomaly concentrated in a few industries. We check for this possibility by looking at the distribution of recommendations summarized within each industry. Results are shown in Panel B of Table 5. They suggest that sector benchmarkers are consistently less optimistic across industries. For example, for each type of broker and each industry, we compute the range of recommendation as the difference between the most optimistic and least optimistic recommendation outstanding for that industry. (The maximum range is 2.) Panel B of Table 5 shows that the average industry range for recommendations from sector benchmarkers is consistently higher than the corresponding range from market or total benchmarkers. It is also the case that more often an industry has a bigger range from recommendations issued by sector benchmarkers. Finally, sector benchmarkers consistently have more industries with at least one outstanding recommendation carrying a pessimistic tone.

< Insert Table 6 here >

Table 6 further explores the relation between benchmark choice and broker optimism in a multivariate setting. We use firm fixed-effects logistic regressions including all recommendations during our sample period. The dependent variable is an indicator equal to one when the recommendation is optimistic in model (1) and pessimistic in model (2). Given the similarity in the distribution of recommendations from market and total benchmarkers, we compare these two benchmarks, as a group, with the sector benchmarkers. Our main explanatory variable is an indicator for benchmark adopted by the broker issuing the recommendation: It is equal to one if the broker is a sector benchmarker and zero otherwise.

The choice of which control variables to adopt is made easier by the firm fixed-effects specification, since it frees us from having to include firm characteristics that are not varying over time. So, instead, we focus on some broker characteristics and time-varying aspects that have been shown in prior studies to affect the optimism of brokers. There is a long literature relating conflicts of interest stemming from the relationship between investment banking and sell-side research to the optimism in analyst recommendations (e.g., Lin and McNichols,1998; Michaely and Womack, 1999). We use a broker affiliation dummy to proxy for such conflicts of interest. The affiliation dummy variable is equal to one if the broker issuing the recommendation was a lead underwriter or a co-manager in an equity offering for the firm in the 24 months before the recommendation announcement date.[7] We also control for past market and firm performance, based on the evidence that analysts chase momentum (Jegadeesh, Kim, Krische, and Lee, 2004), and for broker and analyst characteristics. SANCT is an indicator equal to one if the recommendation is issued by an analyst who is employed by a brokerage house that was sanctioned during the Global Settlement (Barber, Lehavy, McNichols, and Trueman, 2006; Kadan, Madureira, Wang, and Zach, 2009). TIER3 is an indicator variable for whether a brokerage house uses a three-tier recommendation grid at the time a recommendation is issued (Kadan, Madureira, Wang, and Zach, 2009). Finally, we control for the experience of the individual analyst issuing the recommendation.

The results confirm the univariate inferences in Table 5, showing that the benchmarking decision is strongly associated with the bullishness of the recommendations. Sector benchmarkers are less likely to issue optimistic recommendations and more likely to issue pessimistic recommendations as compared to market and total benchmarkers.[8]

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[7] We also try two other proxies of potential conflicts of interest. Following Kadan, Madureira, Wang, and Zach (2009), these proxies control for whether the firm has gone through an IPO or and SEO during the 6-24 months prior to the recommendation issuance, and for any financial deficit during the year in which the recommendation was issued. Results reported in the paper are robust to the adoption of these proxies.

[8] One way to reinforce the association between a broker's benchmark and the distribution of the broker's recommendations is to look at instances where a broker changes its benchmark. We identify four events where both the old and the new benchmark are one of the three basic benchmarks analyzed here. In two of them (both changes from total to sector benchmarker), no significant change in the distribution of recommendations follows the change in benchmark. In the other two, though, there is a significant increase

It is documented that analysts have a tendency to be overly optimistic for the subjects they cover (e.g., McNichols and O'Brien, 1997). One possible explanation for this optimism is that analysts become attached to the subjects of their coverage—be it firms or industries. Since sector benchmarkers rank firms within their industry, their firm recommendations suffer from only one source of optimism: their attachment to the firms they cover. By contrast, market benchmarkers incorporate both their firm and industry views into their firm recommendations. Hence, their firm recommendations might suffer from two sources of optimism. As a result, the distribution of recommendations coming from market and total benchmarkers is tilted toward optimism when compared to that of sector benchmarkers.

4 Do Analysts Abide by their Benchmarks when Issuing Recommendations?

That an analyst asserts that her recommendation advice should be interpreted according to some specific benchmark does not imply that the benchmark is actually used when a recommendation advice is determined. In fact, the common structure of research departments along industry groups raises the possibility that all analysts determine their recommendation advice through the ranking of their coverage universe regardless of stated benchmark. In this section, we empirically examine whether the different benchmarks are applied by the analysts when they determine their recommendation advice. Answering this question is important both for validating the analysts' disclosures and for better interpreting stock recommendations.

What are the implications of the proper usage of each benchmark? Consider first analysts declaring the use of a sector benchmark. According to their disclosures, stock recommendations are statements about the analysts' expectations on how stocks will perform relative to their industry peers; that is, these analysts just rank firms within each industry. As such, in determining their recommendations, these analysts would focus on their expectations of the firm's performance relative to the industry, as opposed to their expectations of the firm performance relative to the market or of the firm's absolute

in the fraction of 'sell' recommendations around the event of change in benchmark: a jump from 5% to 12% in the case of a change from market to sector benchmarker, and from 3% to 17% in the case of a change from total to sector benchmarker.

performance. By contrast, market and total benchmarkers would determine their recommendations by relying on their expectations of both the firm performance relative to the industry and the industry's overall performance relative to the market. But, of course, the analyst's expectations about these different components are unobservable. For example, when a market benchmarker issues a buy, stating that she expects the stock to outperform the market by 10%, we do not know her true expectation of the firm performance relative to the industry or her expectation of the industry performance relative to the market.

However, some measures of analysts' expectations are observable. Besides issuing recommendations, analysts also consistently release forecasts about the firm's upcoming earnings and about the firm's long-term growth (LTG). Our strategy is thus to rely on the analysts' revealed expectations in order to assess whether benchmarks are in fact used when recommendations are formed. In considering the relation between analysts' recommendations and analysts' other outputs such as earnings and LTG forecasts, we are following a long literature (e.g., Bradshaw, 2004; Ertimur, Sunder and Sunder, 2007; Chen and Chen, 2009; Barniv et al., 2009; Brown and Huang, 2010; Kecskes, Michaely and Womack, 2010). One way to analyze this relation is to regress recommendations on measures of analysts' earnings and LTG forecasts. A typical model looks like

$$\text{Rec} = \beta_0 + \beta_{LTG}\text{LTG} + \beta_{E/P}\text{E/P} + \varepsilon, \qquad (1)$$

where Rec is an integer mapping the recommendation levels—for example, 'strong buy' and 'buy' are mapped to 1, 'hold' to 2, 'sell' and 'strong sell' to '3'. The independent variables are obtained from the analysts' expectations about LTG and earnings. Given that the earnings number is mechanically linked to the number of outstanding shares (and the prevalence of the use of comparables techniques by sell-side analysts when analyzing companies), the earnings-price ratio is used instead of the raw measure of earnings per share estimates. To avoid extreme values in the independent variables, researchers use rankings of the LTG and E/P measures, where values are scaled to range from 0 to 1. The results in the literature show that the coefficients β_{LTG} and $\beta_{E/P}$ are negative: higher

expectations about LTG and forward earnings-price ratios are associated with lower levels of—that is, more optimistic—recommendations.[9]

The model above needs to be revamped if brokers rely on different benchmarks when determining their recommendations. To see this point, consider sector benchmarkers. For these brokers, while recommendations are just a ranking relative to industry peers, expectations about earnings-price ratios and LTG are by nature absolute, and do not immediately translate into an industry ranking. In other words, there is an inconsistency between the left-hand side (LHS) and right-hand side (RHS) variables: the LHS variable, the recommendation, *is* industry-adjusted while the RHS variables are *not*.[10]

We aim at extending model (1) in a way that will capture both within- and across-industry relative expectations. To see the idea, suppose we have the analyst's expectations about (i) how the firm's LTG compares with the LTG of its peers in the industry ("within-industry" LTG expectation); *and* (ii) how the LTG of its industry compares to the LTG of the other industries ("across-industry" LTG expectation). If this analyst is a market or total benchmarker, she will rely on both expectations when determining her recommendation advice. On the other hand, if the analyst is a sector benchmarker, she will mostly (or totally) rely on the first component. In other words, all brokers (sector, market, or total benchmarkers) would "load" on their within-industry expectations, but sector benchmarkers would not load (or at least load less) on the across-industry expectations when compared to market and total benchmarkers.

We do not observe the within-industry and across-industry expectations directly, but we can infer them from the raw forecasts issued by the analysts. More specifically,

[9] LTG and price-earnings ratios are just two examples of "valuation" proxies based on analysts' estimates that can be used in a regression model to explain recommendations. Other proxies have been explored in the literature, such as the residual income valuation model analyzed by Bradshaw (2004). We focus on the LTG and price-earnings proxies in this study for two reasons. They are the simplest and most parsimonious proxies (other proxies such as the residual income depend on further assumptions for their estimation) and their associations with recommendation levels are the most robust across the studies relating recommendations and other outputs from sell-side analysts.

[10] Under the assumption that sector benchmarkers do rely on industry rankings in determining recommendations, mixing sector with market and total benchmarkers when running a regression like model (1) renders the model less likely to capture the proper relationship between recommendations and forecasts of LTG and earnings. That the current literature has captured such relationship even without accounting for the benchmark used by the broker just adds to the robustness of this relationship.

we decompose analysts' expectations of LTG and earnings into an across-industry (AI) and within-industry (WI) components as follows. Starting with the LTG forecasts, each month we first compute for each firm the consensus LTG as the average LTG forecast amongst the outstanding forecasts available for that firm.[11] In the next step, we define for each industry an industry LTG forecast as the average LTG consensus across all firms in that industry. Then, for each firm in that month we compute the firm's industry-adjusted LTG forecast as the firm's LTG forecast minus its industry LTG forecast. We assign each firm a score between 0 and 1 based on the ranking of industry-adjusted LTG forecasts in each industry. We denote this score by WI_LTG. For each firm we also calculate an across-industry LTG score based on the ranking of its industry LTG forecasts across all industries. The latter is denoted AI_LTG. Similarly, we calculate a within- and across-industry earnings estimate rankings denoted by WI_E/P and AI_E/P respectively, based on the analyst earnings forecast scaled by the stock price prevailing when the earnings data are collected.[12]

We then estimate the following model:

$$\text{Rec} = \beta_0 + \beta_{\text{AI_LTG}}\text{AI_LTG} + \beta_{\text{WI_LTG}}\text{WI_LTG} + \beta_{\text{AI_E/P}}\text{AI_E/P} + \beta_{\text{WI_E/P}}\text{WI_E/P} + \varepsilon, \qquad (2)$$

where Rec takes the value of 1, 2, or 3 for "optimistic," "neutral," and "pessimistic," respectively.[13] In line with the prior literature we expect all the coefficients to be negative, reflecting that better earnings and growth prospects are associated with more optimistic recommendations. More relevant for our focus, we run these models separately for sector and market or total benchmarkers. We then expect $\beta_{\text{AI_LTG}}$ and $\beta_{\text{AI_E/P}}$ for market and total benchmarkers to be *more* negative than the corresponding coefficients for sector benchmarkers.

[11] These consensus measures cannot be taken from the summary file from IBES, but rather have to be built from the detail files. This is because the summary file from IBES computes consensus across all available brokers, while in our study we need consensus built from some subsets of brokers (for example, consensus taken from sector benchmarkers only).

[12] We use unadjusted measures of forecasts of 1-year ahead earnings. Forecasts that are older than 12 months are deleted. Results are robust to using 2-year ahead projections, and to relaxing the 12-months limit on the outstanding measures.

[13] Optimistic refer to 'strong buy' and 'buy' recommendations; neutral refer to 'hold' recommendations; and pessimistic refer to 'sell' and 'strong sell' recommendations. This 3-tier mapping differs from the usual 5-tier mapping adopted by the literature. The change is motivated by the sample period of our study. After 2002 (the period of our study), most of the brokers have adopted a three-tier rating system. The qualitative inferences reported here are robust to mapping the recommendations into a range of 1 through 5 (from 'strong buy' to 'strong sell', respectively).

< Insert Table 7 here >

We estimate models (1) and (2) using monthly regressions. The results are reported in Table 7. The table shows the Fama-MacBeth's (1973) style coefficients from averaging the monthly regressions from September 2002 through December 2009, where the standard errors for the mean coefficients are adjusted for autocorrelation (see, for example, Loughran and Schultz; 2005; Fama and French, 2002). Specifications (i) and and (ii) in Table 7 show estimates of model (1), the one traditionally pursued in the literature, by which LTG and E/P are not broken into within- and across-industry components. As expected, the coefficients are significantly negative for both sector and non-sector (market or total) benchmarkers, reflecting that better views on the earnings of the company do translate on average into a more favorable recommendation.

In specifications (iii) and (iv) we estimate model (2) separately for sector and for market and total benchmarkers. We also estimate a model on a pooled sample that allows us to compare the coefficients related to different benchmarks (using appropriate dummy variables). The results show that both within- and across-industry expectations are incorporated into the recommendations of both analyst types as all the coefficients are negative. Notice, however, that the loadings on across-industry expectations are significantly higher in absolute value for market and total benchmarkers compared to sector benchmarkers (0.264 vs. 0.183 for LTG and 0.107 vs. 0.032 for E/P, both different at the 1% level). This suggests that market and total benchmarkers put more weight on across-industry expectations when issuing recommendations compared to sector benchmarkers. By contrast, we do not find a significant difference in coefficients of the within-industry measures of expectations for LTG and E/P, suggesting that all brokers take this information into account to a similar degree when issuing recommendations.[14]

These results support the hypothesis that market and total benchmarkers do behave differently from sector benchmarkers in how they use expectations about the firms' fundamentals when determining their recommendations. Sector benchmarkers

[14] A natural concern is that the firms covered by sector and market benchmarkers are fundamentally different, and hence the results we uncover are driven by differences in the characteristics of the covered firms, rather than by the adopted benchmark. To address this issue we repeat the analysis in Table 7 for a subsample of firms that are covered by both sector and market/total benchmarkers. The results of this analysis are very similar to those reported in Table 7 (and available upon request).

mostly rely on the ranking of a firm's fundamentals within its industry (though they also use the across-industry expectation of LTG). Market and total benchmarkers, while also ranking firms within industry, use their expectations about the firm's industry performance as compared to the other industries to a larger degree than sector benchmarkers. This behavior is consistent with the stated benchmark in the analysts' disclosures.

This methodology also sheds some light on why market and total benchmarkers are in general more optimistic than sector benchmarkers. If it was only for the within-industry expectation of the firm's fundamentals, brokers with different benchmarks would be similar in the optimism presented in their recommendations. It is the extra loading on the analysts' expectations about how the fundamentals of the firm's industry compare to the fundamentals of the other industries that distinguishes market and total benchmarkers from the sector benchmarkers. If you take two analysts having the same relative expectations about the firms and their industries fundamentals, the analyst that works based on a market or total benchmark becomes more optimistic compared to a sector benchmarker because she puts extra weights on the across-industry dimensions of her expectations.[15] Notice also that the intercept is significantly smaller in the regression for market and total benchmarkers when compared to regression based on sector benchmarkers (2.998 vs 3.074, significantly different at the 1% level). That is, there is an extra level of optimism for market and total benchmarkers that is not linked to either the industry or the firm's prospects, but this extra level of optimism by itself does not explain the optimism gap between sector and non-sector benchmarkers presented in Table 5.

5 Do Analysts' Meet their Recommendation Targets?

The results in the previous section suggest that analysts do indeed take the different benchmarks into account when issuing their recommendations. Different benchmarks are associated with different targets. Thus, it is natural to ask how successful analysts are in meeting (or beating) the targets declared in their disclosed benchmarks. For sector benchmarkers beating the target would mean beating the sector; for market

[15] This interpretation is made easier given that RHS variables are normalized between 0 and 1.

benchmarkers it would mean beating the market; and for total benchmarkers it would mean beating some absolute threshold. In this section, we analyze the performance of analysts based on whether the recommended stocks behave "as promised" in the analysts' disclosures, meeting or beating their declared target.

< Insert Table 8 here >

In order to ascertain whether the recommendation's objective is achieved, we first take a closer look at how analysts state their objectives. Besides the benchmark, the recommendation's objective (or, its literal meaning) carries a target threshold as well, and the target threshold varies across different analysts. For example, in the case of a 'buy', some analysts may expect the recommended stock return to surpass the benchmark return by 10%, while others may require a 5% outperformance.[16] Table 8 presents summary statistics of the target thresholds used by the brokers in our sample. Panel A shows the thresholds used by market benchmarkers. The most frequent target is '0', saying that a typical 'buy' recommendation issued by a market benchmarker means that the recommended stock's return will exceed the market return over the forecast horizon. This threshold is used by 20 out of the 34 market benchmarkers in our sample. Panel B shows that for sector benchmarkers the most common threshold is also '0', which corresponds to the expectation that the stock's return of a buy recommendation exceeds the industry return over the forecast horizon. Finally, Panel C presents the threshold distribution for total benchmarkers. Here, the most prevalent threshold is 15%, which corresponds to the expectation that the total return of a stock with a buy recommendation over the forecasted horizon should be at least 15%. Though, notably, in this case targets of 10% or 20% are also quite popular. Target thresholds for 'sell' recommendations are typically symmetric, and are not reported for brevity.

We evaluate whether a target has been achieved as follows: (i) If the recommendation has not been changed for a year, we compare the cumulative stock

[16] The literal meaning of the recommendation also includes the forecast horizon: how long should it take for the recommendation prediction to materialize. In this case, though, a very common trend emerges, with the vast majority of the brokers working on a 12-month horizon. In a few cases, the broker adopts a range for its forecast horizon (for example, saying that the recommendation is based on the "stock's performance vs. the analyst's industry coverage for the coming 12-18 months"), though in these situations the 12-months period tends to be part of the declared range.

return during the year to the benchmark; (ii) If the recommendation advice has been changed within 12 months after it was issued (e.g., through a cancelation or an upgrade/downgrade), we compare the cumulative stock return until the end of the day when the recommendation was changed to the benchmark return. We thus refer to the target date of a recommendation as the earlier of 12 months and the date in which the recommendation advice has been revoked.[17]

Panel A of Table 9 presents the fraction of buy/sell recommendations, which meet the target specified by each analyst broken down by the three different categories: Sector, market, and total benchmarkers. The results show that slightly more than 50% of buy recommendations issued by market/sector benchmarkers meet or beat their benchmark. By contrast, less than 40% of buy recommendations issued by total-bencharkers meet their benchmark. The results for "sell" recommendations are similar, as more than 55% of "sells" coming from market/sector benchmarkers achieve their benchmarkers but only about 36% of "sells" coming from total benchmarkers do so.

These results seem plausible, as meeting the benchmark for total-benchmarkers is quite a heroic task. For example, when a typical total-benchmarker issues a "buy" recommendation she expects the stock price to increase by at least 15%, regardless of the market or the industry performance. Thus, a stock recommendation from a total-benchmarker is a statement about the stock and the market, while recommendations from market/industry benchmarkers are only relative statements. Thus, total benchmarkers are much more prone to missing their targets.

Panel B of Table 9 considers the magnitudes by which analysts beat (or miss) their targets. The table reports the average difference between the realized returns and the benchmark return for each recommendation in our sample. The results are consistent with those in Panel A. Indeed, both market- and industry-benchmarkers significantly beat their targets for both "buy" and "sell" recommendations. For example, a "buy"

[17] In other words, a recommendation is evaluated throughout its stated life span as long as its advice is still outstanding. This definition of the life span of a recommendation is similar to the approach used in the literature when examining the investment value of recommendations. When forming portfolio based on recommendations, stocks are included in a portfolio when a new recommendation appears, and the stock in kept in the portfolio until the earlier date between (1) the end of the stated life span of the recommendation and (2) the date when the recommendation advice is revoked. See, for example, Barber, Lehavy, McNichols, and Trueman (2006) and Barber, Lehavy, and Trueman (2007).

recommendation from a sector-benchmarker yields a return that exceeds the sector-benchmark by 325 basis points. By contrast, total benchmarkers on average miss their benchmarks. For example, a "sell" recommendation issued by a total-benchmarker misses the total benchmarker by1260 basis points, on average. Note that the t-stats in this analysis are very large. This is likely due to dependence both across-time and across brokers. We deal with these issues below in our multivariate analysis.

< Insert Table 9 here >

In Panel C we report the raw returns associated with the different stock recommendations broken by benchmark type. As before, the time period is the earliest of 12 months or until the recommendation has been changed. Notice that the raw returns for "buy" recommendations issued by market-, sector-, and total-benchmarkers are not very different from each other (10.6%, 11.1%, and 9.8%). While the t-stats for the comparison between market- and total-benchmarkers seem significant, this is likely due to dependencies in observations, as in the multivariate analysis (to follow) this significance disappears.

In sum, the univariate analysis suggests that market- and sector-benchmarkers are successful in meeting/beating their benchmarks, while total-bechmarkers are not. However, this result stems mostly from the stated benchmarks (which are much tougher form total-benchmarkers) and not from the raw returns, which are not materially different across the three groups.

Table 10 provides a multivariate analysis of these issues. In Panel A we regress the difference between the cumulative return and the target return on benchmark indicators and a set of control variables including past firm and market performance to account for momentum, analysts' experience, broker size, firm size, and book-to-market. We also need to control for the general tendency of a broker to issue each type of recommendation. If a broker is in general more stringent with respect to issuing 'buys' it is likely that its 'buys' are more meaningful.[18] We follow Barber, Lehavy, McNichols

[18] Barber, Lehavy, McNichols and Trueman (2006) report that indeed the investment value of recommendations depends on the overall 'favorableness' (or proclivity to issue 'buys') of each broker. Given the results in Section 3 that the distribution of recommendations differs across different benchmarkers, we also need to control for this favorableness here.

and Trueman (2006) and include dummies for the broker's favorableness quintiles. These quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of each type of recommendation at the end of the previous quarter.[19] We include in the regression dummies for quintiles 1 (least favorable) through quintile 4 (that is, quintile 5, the most favorable, is the baseline to which the other dummies should be compared). In all of the analyses we cluster the standard errors at the broker level to account for intra-broker dependencies.[20]

< Insert Table 10 here >

Column (1) of Panel A shows the result for "buy" recommendations without any controls, which are equivalent to those of Panel A of Table 9, only with clustered standard errors. In this specification the constant of 325 basis points should be interpreted as the excess return (compared to the benchmark) for sector-benchmarkers. It can be seen that market-benchmarkers' excess returns are somewhat higher, while the excess returns for total-benchmarkers are significantly lower, and even negative. When we add the controls in Columns (2) and (3) the results persist. We still observe positive abnormal returns for both market- and sector-benchmarkers, and negative excess returns for total benchmarkers.

When considering "sell" recommendations the results in Column (4) are similar to those in Panel A of Table 9. Once we add the controls the excess returns of market-sector-performance lose their significance, whereas the significant underperformance of total-benchmarkers remains.

Panel B of Table 10 presents a multivariate analysis of raw returns using the same set of controls. In contrast to Panel A, here we do not observe a difference between the

[19] Barber et al (2006) considered favorableness based on fraction of 'buys' only, while we separately look at favorableness towards 'buys' for the regression examining 'buys' and favorableness towards 'sells' for the regression examining 'sells'. The difference is explained by the sample period of the two studies. For Barber et al (2006), most of the data comes from the period before September 2002, when sells were rare, so the vast majority of the recommendations were in practice spread between 'buys' and 'hold', and therefore the favorableness towards 'buys' would be a good summary of the overall distribution of recommendations for the broker. Our sample period starts in September 2002, when recommendations become more balanced between 'buys' and 'sells,' so a broker's favorableness towards 'buys' does not denote necessarily its lack of favorableness towards 'sells.'

[20] We also tried clustering at the year or firm level, and noticed that clustering at the broker level has the most significant effect on the standard errors.

three groups of benchmarkers. This reinforces our interpretation that the difference in abnormal performance comes from the benchmarks and not from the returns.

6 Do Investors Pay Attention to Benchmarks?

In this section we examine short-term reactions to recommendations to study whether investors account for the different interpretations analysts assign to their recommendations. If investors internalize the different benchmarks disclosed by analysts, and believe the recommendation advice, then we expect differential short-term price response to recommendations depending on the benchmark being used.

Take a 'buy' recommendation issued by a market benchmarker, for example. Recall from our previous discussion that such 'buy' is a statement that the recommended stock will outperform the market. If the investors believe the 'buy' statement from a market benchmarker, and they act in an expeditious manner, then this 'buy' should result in an abnormally positive price response relative to the market. Moreover, this belief does not imply any particular price response relative to the sector, or any absolute price response. Similarly, a 'buy' from a sector benchmarker would elicit an abnormally positive price response relative to the industry, and a 'buy' from a total benchmarker would elicit an absolute price reaction, but these buys would not necessarily bring an abnormal positive price response relative to the market.

We measure price responses as the three-day cumulative stock returns around the recommendation announcement date. Given that we have three types of benchmarks, we compute price reactions in three ways: market-adjusted, industry-adjusted, and total (raw) returns. The market-adjusted return is defined as the difference between the return on the stock and the market return over the course of the three days. Similarly, the industry-adjusted return is calculated as the difference between the return on the stock and the return on the corresponding GICS industry.

If investors internalize the different benchmarks then prices reactions should reflect this. For example market-adjusted returns should be higher for 'buy' recommendations issued by market-benchmarkers, as compared to industry and total

benchmarkers. Similarly, industry-adjusted returns for 'sell' recommendations issued by sector benchmarkers should be lower than for such recommendations issued by market and total benchmarkers, and so on. The null hypothesis is that investors do not account for the different benchmarks, and respond equally to recommendations issued by brokers of different types regardless of the adjustment used.

Panel A of Table 11 reports the average three-day returns of buy and hold recommendations issued by analysts with different benchmarks. Regardless of the return measure we use, on average, buy (sell) recommendations from sector benchmarkers are more positive (less negative). However, this is just a univariate test. To control for possible differences in drivers of short-term performance, we regress three-day price reactions on dummies capturing the benchmark adopted by the analyst. We estimate six different OLS models, combining the two types of recommendations ('buys' and 'sells') with the three types of short-term price reactions (market-adjusted, industry-adjusted, and total returns). As in the analysis of the long-term performance, we adopt a firm and year fixed effects regression model. All the explanatory variables are similar to those used in Table 10.

< *Insert Table 11 here* >

Panel B presents results of multivariate regressions to explain short-term reactions to 'buy' recommendations. If investors take into account the literal meanings of the benchmarks we would expect positive coefficients for: (i) the market benchmark dummy in the regression explaining market-adjusted returns; (ii) the sector benchmark dummy in the regression explaining industry-adjusted returns; and (iii) the total benchmark dummy in the regression explaining total returns. There is evidence that market-adjusted reactions are more pronounced when 'buys' are issued by market benchmarkers: the market dummy in specification (1) indicates an extra abnormal return of 21 basis points, significant at 5%. However, part of the effect dissipates when the favorableness quintiles are included: the market dummy is only significant at the 10% level in specification (2). None of the coefficients explaining industry-adjusted and total returns is significantly different from zero—specifications (3) thru (6). The benchmark dummies are also not significantly different from zero in the regressions (Panel C) explaining reactions to

‘sells’. In summary, there is at best very limited evidence that the type of benchmark adopted by the broker matters in how investors react to the recommendation in the short-term period following the issuance of the recommendation.

7 Conclusion

In this paper we examine the literal meaning of sell-side analysts’ stock recommendations. We document that different brokers rely on different benchmarks with respect to which the investment advice in each recommendation should be interpreted. For example, a ‘buy’ from a market benchmarker is a prediction that the recommended stock is expected to outperform the market; a ‘buy’ from sector benchmarker denotes the analyst’s expectation that the stock will outperform its peers in the same industry; finally, a buy from a total benchmarker suggests the stock will beat some absolute return threshold.

We show that these benchmarks are not an irrelevant detail in the analyst’s disclosure about how recommendations should be viewed. Instead, such benchmarks are in fact used when analysts form their recommendation advice. For example, sector benchmarkers, who profess to basically rank firms within each industry, do rely less on across-industry expectations about fundamentals—such as earnings and LTG projections—when compared to market and total benchmarkers. This suggests that the *use* of each recommendation—by investors or by academics—should take into consideration the benchmark under which it is formed.

We apply this reasoning in two different setups. First, we examine whether the benchmarks affects the predictive ability of each recommendation advice. We show that market- and sector-benchmarkers are able to significantly beat their benchmarks, but total-benchmarkers fail to do so. Second, we ask whether investors pay attention to these benchmarks. By examining how short-term price reactions to recommendations depend on the broker’s declared benchmark, we do not find much evidence that benchmarks have mattered in how investors view—and react to—recommendations.

Our evidence suggests that both academics and investors should pay more attention to the declared objective of each recommendation. In particular, the fact that

different recommendations carry different meanings can be used to shed new light on a range of empirical questions. Ramnath, Rock, and Shane (2008), for example, advocate the need for a better understanding of how analysts operate. The different benchmarkers employed by brokers suggest that information shocks would affect recommendations differently depending on the broker's benchmark—e.g., with industry shocks affecting more the recommendations from market and total benchmarkers when compared to recommendations from sector benchmarkers. Another potential area worth of a second look is the long literature on how incentives affect bias and performance of recommendations (e.g., Lin and McNichols, 1998; Michaely and Womack, 1999). This comes naturally once one recognizes that performance is a comparison of the return path of the recommended stock with its stated objective, and thus should take into consideration the benchmark adopted by the broker. In fact, determining superiority among analysts in terms of their stock picking abilities (e.g., Mikhail, Walther, and Willis, 2004) might need adjustment as well, given that different analysts arguably pick stocks according to different objectives. These are left as avenues for future research.

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Table 1. Description of Benchmarks

This table summarizes the different types of benchmarks brokers use in our sample. For each type of benchmark, the description of the benchmark and one example of the textual description of recommendations are provided.

Benchmark	Description	Examples of textual description of recommendations
Sector	Recommendation is benchmarked against performance of peers in the same sector	"Our ratings reflect expected stock price performance relative to each analyst's coverage universe."
Market	Recommendation is benchmarked against market performance	Performance "relative to the market index over the next 12 months."
Total Return	Recommendation is based on a stock's total return.	"The rating system is based on a stock's forward -12-month expected total return (price appreciation plus dividend yield)."
Market/Sector	Recommendation is benchmarked against market and/or sector performance.	Buy: Expected to outperform the broader market and/or its sector over the next six to twelve months.
Total/Market	Recommendations is based on a stock's total return and/or benchmarked against market performance.	Buy means the stock is expected to appreciate and produce a total return of at least 10% and outperform the S&P 500 over the next 12-18 months;
Sector/Total	Recommendations is based on a stock's total return and/or benchmarked against sector performance.	STRONG BUY–The company has strong fundamentals and/or positive near-term catalysts. The stock's total return is expected to exceed the peer group's return in the industry and/or appreciate 15% or more over the next 12 months;
Market/Sector/Total	Recommendations is based on a stock's total return and/or benchmarked against market and/or sector performance.	Buy - anticipates appreciation of 10% or more within the next 12 months, and/or a total return of 10% including dividend payments,and/or the ability of the shares to perform better than the leading stock market averages or stocks within its particular industry sector.
Market/risk	Recommendation is based on a stock's risk-adjusted return relative to the market performance.	"Underperform (U) Expected to underperform on a total return, risk-adjusted basis the broader U.S. equity market over the next 12 months."
Sector/risk	Recommendation is based on a stock's risk-adjusted return relative to sector performance.	"Stock's total return vs. analyst's coverage on a risk-adjusted basis, for the next 12-18 months."
Total/risk	Recommendation is based on a stock's risk-adjusted return.	"Based on the stock's total return for the next 12-18 months on a risk-adjusted basis"
Not sure	Cannot identify which benchmark a broker uses.	"Buy/Add – Buy if you do not own or Add to existing positions. We believe that the shares offer an attractive reward versus risk profile over the next 12-18 months given current information and defined objectives. Shares seem undervalued based on current valuation measures and expectations."
Changes	A broker changes the benchmark during our sample period and we cannot identify when the broker made the change.	Janney Montgonery Scott LLC used total return benchmark in 2004, and used sector benchmark by the end of 2009.
No data	Cannot find data on the definition of ratings.	

Table 2. Summary Statistics

This table presents the summary statistics on the different types of benchmarks. Only brokerage houses which issued at least 100 recommendations to US firms during our sample period (9/2002 – 12/2009) are included in the analysis. For each type of benchmark, we report the number of brokers using this type of benchmark, the distribution of the number of recommendations issued by each broker, the total number of recommendations issued by all brokers and the percentage to the total number of recommendations, and the number of brokers which is amongst the biggest 20 brokers in IBES according to the total number of recommendations issued.

		# of recommendations per broker						
Benchmark	No. of Brokers	Mean # rec	25 percentile	median	75 percentile	Total # rec	% of all	No. of brokers amongst biggest 20
Sector	37	2078	332	737	2668	76868	32.81%	9
Market	34	1230	306	627	1506	41822	17.85%	3
Total	43	1248	217	733	1467	53676	22.91%	4
No Data	41	408	164	211	391	16745	7.15%	0
Sector/Risk	4	2453	694	1081	4212	9810	4.19%	1
Total/Risk	8	1094	346	1159	1466	8753	3.74%	0
Market/Risk	2	3307	3103	3307	3511	6614	2.82%	1
Total/Market	3	2110	340	1626	4363	6329	2.70%	1
Changes	2	2376	1347	2376	3405	4752	2.03%	0
Sector/Total	2	2045	359	2045	3730	4089	1.75%	1
Market/Sector	4	495	392	463	599	1981	0.85%	0
Not Sure	2	772	685	772	859	1544	0.66%	0
Market/Sector/Total	1	1291	1291	1291	1291	1291	0.55%	0
All	183					234274		

Table 3. Determinants of Benchmarks

This table reports the results of estimating logistic models of the probability of adopting a certain benchmark. The models are estimated for all brokers which use either sector or market or total benchmark and with at least 100 recommendations issued during our sample period (9/2002 – 12/2009). The dependent variables are as follows: **Broker Age** is the number of years a broker has appeared in IBES, **Broker Size** is defined as the ratio of the number of recommendations issued by a broker to the total number of recommendations by all brokers in the last year, **Number of Industries** is the number of industries covered by a broker in last year, **Analyst Experience** is the average number of days an analyst has appeared in IBES at the beginning of each year within a brokerage house, **Firm Size** is the average market value of equity of all firms covered by a broker by the end of last year, **BE/ME** is the average ratio of book equity to market equity of all firms covered by a broker in last year. Robust standard errors (in parentheses) are calculated after clustering at the broker level. ***, **, * denote statistical significance at the 1%, 5%, 10% levels, respectively.

VARIABLES	(1) Sector vs. Market or Total Prob(Benchmark=Sector)	(2) Sector vs. Market Prob(Benchmark=Sector)	(3) Sector vs. Total Prob(Benchmark=Sector)	(4) Market vs. Total Prob(Benchmark=Market)
Log(1+Broker Age)	0.822*	0.651	1.004*	0.305
	(0.474)	(0.569)	(0.540)	(0.469)
Broker Size	94.84***	134.3***	76.55**	-54.74
	(32.87)	(51.59)	(37.57)	(46.62)
Log(Number of Industries)	-0.897***	-1.173***	-0.831**	0.261
	(0.278)	(0.400)	(0.324)	(0.312)
Log(1+Analyst Experience)	-0.163	-0.246	-0.210	0.174
	(0.364)	(0.487)	(0.453)	(0.417)
Log(Firm Size)	0.101	-0.208	0.268	0.393**
	(0.190)	(0.196)	(0.219)	(0.182)
Log(1+BE/ME)	-0.160	-0.263	-0.0581	0.410
	(0.285)	(0.305)	(0.346)	(0.309)
Constant	-1.265	5.747	-3.271	-8.361**
	(3.952)	(4.376)	(4.692)	(4.108)
Observations	715	441	503	486

Table 4. Organizational Structure of Sell-Side Brokers

This table compares the industry concentration of analysts employed by brokers according to their benchmarks. For each analyst and each year, we define industry concentration as the fraction of the analyst's coverage universe that belongs to her most covered industry. The coverage universe of the analyst each year is taken as the set of firms for which the analyst issued recommendations during the year and for which the analyst hold outstanding recommendations by the end of the year. Panel A presents the average industry concentration according to the benchmark adopted by the analyst by the end of the year. Panel B reports results of yearly OLS regression of industry concentration. **Sector** takes value of 1 if a broker uses sector benchmark and 0 if a broker uses market or total return benchmarks. **# Analysts** is the log of the number of analysts employed by the analyst's broker during the year. **Coverage** is the log of the number of firms in the analyst's coverage universe in the year. **Age** is the log of number of days since the analyst first entered the IBES dataset. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

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Panel A – Univariate Statistics on Industry Concentration

	Sample: All Analysts							
	2002	2003	2004	2005	2006	2007	2008	2009
Sector	80.2%	80.4%	80.3%	80.4%	79.3%	78.8%	79.1%	78.1%
Market	75.3%	76.4%	77.4%	76.3%	76.1%	74.1%	75.9%	78.5%
Total	76.6%	77.0%	77.4%	76.1%	74.9%	73.6%	73.4%	70.6%

	Sample: Analysts Covering More than 5 Stocks							
	2002	2003	2004	2005	2006	2007	2008	2009
Sector	79.4%	77.9%	80.5%	78.8%	77.4%	75.8%	78.5%	75.7%
Market	74.4%	75.2%	77.1%	75.4%	74.1%	72.6%	73.9%	76.7%
Total	75.5%	73.8%	75.3%	73.1%	72.0%	70.0%	71.7%	68.0%

Table 4. (*Continued)*

Panel B – Regressions on Industry Concentration

	Sample: All Analysts							
	2002	2003	2004	2005	2006	2007	2008	2009
Intercept	0.7836***	0.8436***	0.7627***	0.7730***	0.8468***	0.8400***	0.8595***	0.8938***
	(0.0341)	(0.0333)	(0.0358)	(0.0361)	(0.0382)	(0.0371)	(0.0393)	(0.0445)
Sector	0.0238**	0.0138	0.0018	0.0139	0.0181*	0.0283***	0.0275**	0.0210*
	(0.0104)	(0.0103)	(0.0104)	(0.0105)	(0.0108)	(0.0108)	(0.0111)	(0.0116)
# Analysts	0.0396***	0.0543***	0.0507***	0.0510***	0.0424***	0.0453***	0.0390***	0.0488***
	(0.0055)	(0.0056)	(0.0054)	(0.0056)	(0.0056)	(0.0058)	(0.0066)	(0.0070)
Coverage	0.7836	-0.0320***	0.7627	-0.0160*	-0.0360***	-0.0550***	-0.0340***	-0.0520***
	(0.0089)	(0.0092)	(0.0094)	(0.0097)	(0.0097)	(0.0097)	(0.0091)	(0.0100)
Age	-0.0230***	-0.0300***	-0.0200***	-0.0230***	-0.0250***	-0.0230***	-0.0270***	-0.0310***
	(0.0050)	(0.0046)	(0.0044)	(0.0046)	(0.0047)	(0.0045)	(0.0045)	(0.0048)
Observations	2,054	2,021	2,054	2,040	2,004	1,948	1,921	1,706
R^2	3.0%	7.0%	5.0%	5.0%	5.0%	6.0%	4.0%	6.0%

	Sample: Analysts Covering More than 5 Stocks							
	2002	2003	2004	2005	2006	2007	2008	2009
Intercept	0.7218***	0.8010***	0.7989***	0.6354***	0.7794***	0.7599***	0.8730***	0.9340***
	(0.0533)	(0.0576)	(0.0601)	(0.0705)	(0.0691)	(0.0657)	(0.0670)	(0.0746)
Sector	0.0177	0.0170	0.0215	0.0132	0.0258*	0.0222	0.0281*	0.0255*
	(0.0127)	(0.0134)	(0.0134)	(0.0143)	(0.0148)	(0.0145)	(0.0151)	(0.0152)
# Analysts	0.0499***	0.0607***	0.0532***	0.0702***	0.0396***	0.0586***	0.0430***	0.0556***
	(0.0073)	(0.0078)	(0.0075)	(0.0081)	(0.0082)	(0.0087)	(0.0093)	(0.0101)
Coverage	0.0231	-0.0020	-0.0120	0.0342	-0.0070	-0.0270	-0.0240	-0.0580***
	(0.0172)	(0.0193)	(0.0200)	(0.0225)	(0.0215)	(0.0206)	(0.0200)	(0.0217)
Age	-0.0300***	-0.0390***	-0.0290***	-0.0310***	-0.0250***	-0.0280***	-0.0340***	-0.0390***
	(0.0067)	(0.0066)	(0.0061)	(0.0069)	(0.0071)	(0.0065)	(0.0059)	(0.0063)
Observations	1,342	1,192	1,149	1,037	1,087	1,056	1,057	957
R^2	4.0%	6.0%	5.0%	8.0%	3.0%	5.0%	6.0%	7.0%

Table 5. Distribution of Recommendations

This table presents the summary statistics on the distribution of recommendations according to the types of benchmarks. Only brokerage houses which issued at least 100 recommendations to US firms during our sample period (9/2002 – 12/2009) are included in the analysis. Summary statistics are obtained for each year of the sample. Each observation in a yearly sample is a pair of firm and broker such that the broker has an outstanding recommendation for the firm at the end of the year, where an outstanding recommendation is the most recent recommendation issued by the broker to the firm during the year and that has not been cancelled by the broker. Panel A presents for each year of the sample and each type of broker, the distribution of the outstanding recommendations at the end of the year, the average recommendation level, and the standard deviation of the recommendation level. Panel B presents statistics on the distribution of recommendations summarized by industry. For each year, each type of broker, and each industry, we compute the industry range as the difference between the most pessimistic and most optimistic outstanding recommendation for the industry. In the computation of the recommendation levels, strong buys and buy are considered optimistic recommendations and are mapped to level 1; holds are mapped to level 2; and sells and strong sells are considered pessimistic recommendations and are mapped to level 3.

Panel A – Distribution of Recommendations

		Dec-02	Dec-03	Dec-04	Dec-05	Dec-06	Dec-07	Dec-08	Dec-09
Market benchmarkers	% buy	52%	45%	45%	47%	48%	51%	47%	46%
	% hold	43%	49%	49%	47%	47%	45%	48%	49%
	% sell	5%	7%	6%	6%	6%	4%	5%	5%
	Avg rec	1.32	1.41	1.39	1.38	1.40	1.31	1.37	1.40
	Std dev rec	0.94	0.99	0.97	0.94	0.91	0.88	0.92	0.92
Total benchmarkers	% buy	51%	48%	46%	50%	49%	53%	52%	52%
	% hold	44%	47%	49%	47%	46%	43%	44%	43%
	% sell	5%	5%	5%	4%	5%	4%	5%	6%
	Avg rec	1.30	1.35	1.37	1.32	1.33	1.25	1.27	1.24
	Std dev rec	0.98	0.94	0.97	0.94	0.95	0.97	1.01	1.05
Sector benchmarkers	% buy	37%	38%	39%	42%	40%	42%	40%	42%
	% hold	44%	48%	48%	49%	50%	50%	51%	49%
	% sell	18%	15%	13%	10%	10%	8%	9%	9%
	Avg rec	1.76	1.70	1.65	1.58	1.60	1.57	1.61	1.58
	Std dev rec	0.85	0.90	0.89	0.86	0.85	0.82	0.84	0.86

Table 5. (*Continued)*

Panel B – Industry Characteristics of the Distribution of Recommendations

	Dec-02	Dec-03	Dec-04	Dec-05	Dec-06	Dec-07	Dec-08	Dec-09
# industries	58	59	60	64	67	67	68	68
Average industry range from sector benchmarkers	1.83	1.86	1.74	1.72	1.70	1.65	1.70	1.67
Average industry range from market benchmarkers	1.51	1.62	1.53	1.53	1.63	1.55	1.46	1.53
Average industry range from total benchmarkers	1.58	1.62	1.68	1.54	1.53	1.44	1.50	1.45
% industries with a bigger range from sector	28%	25%	12%	22%	18%	31%	28%	31%
% industries with a bigger range from market	2%	3%	7%	6%	15%	13%	7%	9%
% industries with a bigger range from total benchmarkers	3%	5%	13%	8%	4%	6%	13%	4%
% industries with at least one sell from sector benchmarkers	83%	81%	67%	69%	64%	58%	63%	59%
% industries with at least one sell from market	50%	56%	53%	50%	55%	48%	38%	46%
% industries with at least one selln from market	53%	54%	60%	47%	48%	33%	40%	32%

Table 6. Logistic Regressions Relating Optimistic/Pessimistic to Different Benchmarks

The table presents results of logistic regressions whose dependent variable equals 1 when a recommendation is either optimistic or pessimistic. Our sample period is between 9/2002 and 12/2009. All models use firm fixed effects. Optimistic recommendations are "strong buy" and "buy," and pessimistic recommendations are "underperform" and "sell." **Sector** takes value of 1 if a broker uses sector benchmark and 0 if a broker uses market or total return benchmarks. **AFF** is an indicator variable equal to 1 if the broker issuing the recommendation was a lead underwriter or a co-manager in an equity offering for the firm in the 24 months before the recommendation announcement date. **SANCT** is an indicator variable equal to 1 if the recommendation is issued by an analyst who is employed by a sanctioned brokerage house. **PASTFIRMPERF** is the average daily stock return over [-180, -2]. **PASTMKPERF** is the average daily market return over [-180, -2]. Analyst **EXPERIENCE** is defined as the number of days the analyst has appeared in IBES. **TIER3** is an indicator variable for whether a brokerage house uses a three-tier recommendation grid at the time a recommendation is issued. Robust standard errors (in parentheses) are clustered at the firm level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1) Prob(Rec=OPT)	(2) Prob(Rec=PESS)
Sector	-0.198***	0.469***
	(0.0122)	(0.0228)
AFF	0.318***	-0.649***
	(0.0240)	(0.0490)
PASTMKTPERF	-2.430	-9.562
	(6.753)	(10.31)
PASTFIRMPERF	42.42***	-52.08***
	(2.972)	(4.403)
SANCT	-0.247***	0.303***
	(0.0141)	(0.0243)
EXPERIENCE	-0.0179***	0.0248***
	(0.00346)	(0.00643)
TIER3	-0.275***	0.0333
	(0.0127)	(0.0230)
Observations	152,186	131,636

Table 7. The Relation Between Recommendations, Earnings Forecasts and LTG Projections

This table presents average parameter values from running monthly Fama and MacBeth (1973) cross-sectional regressions—models (1) and (2)—of recommendation levels on measures of analysts' forecasts regarding earnings and long-term growth (LTG). The observations are monthly firms for each month between September 2002 and December 2009. A firm is included in the regression for month *t* only if the firm has outstanding recommendations and outstanding forecasts regarding next annual earnings and forecasts of LTG available at the end of that month. An outstanding recommendation (forecast) issued by a broker to a firm at time *t* is the most recent recommendation (forecast) issued by the broker to that firm that is not older than 12 months and that has not been cancelled by the broker. Models (i) and (iii) [(ii) and (iv)] is based on recommendations and forecasts issued by sector (market or total) benchmarkers only. The dependent variable is the average recommendation level among the outstanding recommendations available for the firm at the end of the month. **E/P** is a score based on the average earnings-price ratio forecasts for the firms in the sample, where earnings forecasts are average 1-year ahead annual earnings forecasts and price is the observed stock price when earnings data are collected. **AI_LTG** and **WI_LTG** (**AI_E/P** and **WI_E/P**) refer respectively to measures of across-industry and within-industry expectations of LTG (earnings-price ratio), and are computed as follows. Starting with the LTG forecasts, each month we first compute for each firm the consensus LTG as the average LTG forecast amongst the outstanding forecasts available for that firm. We then define for each industry an industry LTG forecast as the average LTG consensus across all firms in that industry. Then, for each firm in that month we compute the firm's industry-adjusted LTG forecast as the firm's LTG forecast minus its industry LTG forecast. We compute **WI_LTG** as a score between 0 and 1 based on the ranking of industry-adjusted LTG forecasts in each industry. For each firm we also calculate an across-industry LTG score, denoted as **AI_LTG,** based on the ranking of the industry LTG forecasts across all industries. Similarly, we calculate the within- and across-industry earnings estimate rankings denoted by WI_E/P and AI_E/P respectively, based on the analyst earnings forecast scaled by the stock price prevailing when the earnings data are collected. Robust standard errors (in parentheses) are calculated using the Fama-MacBeth (1973) autocorrelation-adjusted t-statistics. ***, **, * denote statistical significance at the 1%, 5%, 10% levels, respectively. The reported R^2's and number of observations are the time-series averages of the monthly cross-sectional regression measures.

Table 7. (*Continued*)

	(i) Sector Benchmarkers	(ii) Market or Total Benchmarkers	p-value (i)=(ii)	(iii) Sector Benchmarkers	(iv) Market or Total Benchmarkers	p-value (iii)=(iv)
Intercept	2.991***	2.859***	<0.0001	3.074***	2.998***	0.0041
	(0.060)	(0.041)		(0.040)	(0.039)	
LTG	-0.401***	-0.423***	0.1868			
	(0.025)	(0.019)				
AI_LTG				-0.183***	-0.264***	0.0002
				(0.036)	(0.030)	
WI_LTG				-0.349***	-0.344***	0.6965
				(0.032)	(0.020)	
E/P	-0.142**	-0.178***	0.0769			
	(0.058)	(0.041)				
AI_E/P				-0.032*	-0.107***	<0.0001
				(0.017)	(0.015)	
WI_E/P				-0.131***	-0.144***	0.3734
				(0.030)	(0.025)	
Observations	1,028	1,425		1,028	1,425	
R-square	5.30%	7.10%		6.30%	8.00%	

Table 8. Distribution of Recommendation Targets

This table summarizes the distribution of buy recommendation targets for market, sector and total return benchmarkers in our sample. For market (or sector) benchmarkers, a buy recommendation target is defined as the 'x' percent return a stock is expected to outperform the market (or sector) performance. For total return benchmarkers, a buy recommendation target is defined as the 'x' percent total return a stock is expected to achieve.

Panel A - Market Benchmarkers	Target	No. of Brokers
	0	20
	5%	5
	10%	1
	15%	4
	20%	1
	N.A.	3
	All	34

Panel B - Sector Benchmarkers	Target	No. of Brokers
	0	31
	5%	1
	10%	3
	20%	1
	N.A.	1
	All	37

Panel C - Total Benchmarkers	Target	No. of Brokers
	7%	1
	10%	10
	15%	14
	20%	8
	25%	1
	30%	1
	N.A.	8
	All	43

Table 9. Univariate Analysis of Achieving the Targets

This table presents results on whether a recommendation target has been achieved by comparing the performance of stocks recommendations with analysts' recommendation targets during the period of the recommendation day and the upgrade/downgrade date of the stock recommendation. **Panel A** reports the fraction of stock recommendations which achieved the targets. For sector/market benchmarkers, achieving targets means a buy (or sell) recommendation earned a cumulative return higher (or lower) than the sum of industry/market return and the buy (or sell) target return. For total benchmarkers, achieving targets means a buy (or sell) recommendation earned a cumulative return higher (or lower) than the buy (or sell) target return. **Panel B** reports the magnitude by which analysts beat (or miss) their targets. It is calculated as the difference between cumulative stock return and the target return. **Panel C** reports the raw return associated with the different stock recommendations broken by benchmark type.

Panel A

	Buy		Sell	
	Total no. of recs	No. of recs which hit the target	Total no. of recs	No. of recs which hit the target
Sector	13,021	50.2%	4,929	58.2%
Market	9,392	52.9%	1,866	56.8%
Total	13,271	39.0%	1,763	35.8%
Overall	35,684	46.7%	8,558	53.3%

Panel B

	Mean	Median	Mean	Median
Sector	0.0325	0.0011	-0.0294	-0.0377
t-statistics	*10.13*		*-5.18*	
Market	0.0574	0.0157	-0.0167	-0.0347
t-statistics	*13.79*		*-1.68*	
Total	-0.0491	-0.0839	0.1260	0.0928
t-statistics	*-11.09*		*11.15*	
Overall	0.0087	-0.0205	0.0054	-0.0166
t-statistics				
Sector vs. Market	4.81		1.15	
Sector vs. Total	14.88		13.34	
Market vs. Total	16.85		9.51	

Panel C

	Buy		Sell	
	Mean	Median	Mean	Median
Sector	0.1057	0.0762	0.0182	-0.0101
Market	0.1107	0.0778	-0.0088	-0.0339
Total	0.0981	0.0612	-0.0122	-0.0373
Overall	0.1042	0.0714	0.0060	-0.0208
t-statistics				
Sector vs. Market	0.8493		2.1070	
Sector vs. Total	1.3076		2.3345	
Market vs. Total	1.9431		0.2214	

Table 10. Multivariate Analysis of Achieving the Targets

The table presents the results of analyzing the performance of buy/sell recommendations issued by market/industry/total return benchmarkers during the period of the recommendation day and the upgrade/downgrade date of the stock recommendation for our sample period of 9/2002 and 12/2009. In Panel A, the dependent variable is the difference between the cumulative stock return and the target return. In Panel B, the dependent variable is the raw return. Control variables are as follows. **Market (or Total)** takes value of 1 if a broker uses market (or total) benchmark and 0 if a broker uses other benchmarks. **PastFirmPerformance** is the average daily stock return over [-180, -2]. **PastMarketPerformance** is the average daily market return over [-180, -2]. **Analyst's Experience** is the number of days an analyst has appeared in IBES. **Broker Size** is defined as the ratio of the number of recommendations issued by a broker to the total number of recommendations by all brokers in the last year. **Firm Size** is the market value of equity measured 30 days prior to the recommendation day, **BE/ME** is the ratio of book equity to market equity in the last year. **Q1, Q2, Q3 and Q4** indicate a broker's favorableness quintiles. For buys and holds, quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of recommendations which are buys by the end of previous quarter. For sells, quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of recommendations which are sells by the end of last quarter. Q5 is omitted from the regressions due to the multicolinearity problem. Robust standard errors (in parentheses) are clustered at the broker level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(The table appears on the next page.)

Table 10. (*Continued)*

Panel A

	Buy Recommendations			Sell Recommendations		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0325***	0.2833***	0.2825***	-0.0294***	-0.1006	-0.0805
	(0.0103)	(0.0606)	(0.0599)	(0.0097)	(0.0901)	(0.0890)
Market	0.0249*	0.0283*	0.0286*	0.0128	0.0086	0.0106
	(0.0146)	(0.0163)	(0.0150)	(0.0174)	(0.0169)	(0.0165)
Total	-0.0815***	-0.0860***	-0.0767***	0.1554***	0.1573***	0.1543***
	(0.0218)	(0.0271)	(0.0226)	(0.0253)	(0.0260)	(0.0242)
PastFirmPerformance		-2.5264	-2.3126		-7.7170**	-7.6637**
		(1.8057)	(1.8055)		(3.1237)	(3.1288)
PastMarketPerformance		-13.0643***	-13.4814***		-17.4322***	-17.6048***
		(4.3937)	(4.1792)		(6.4638)	(6.3905)
Log(1+Analysts' Experience)		0.0016	0.0015		-0.0116**	-0.0117**
		(0.0021)	(0.0021)		(0.0052)	(0.0053)
Broker Size		1.1104	0.6328		-0.4024	-0.2177
		(1.0570)	(1.0777)		(0.7188)	(0.7489)
Firm Size		-0.0219***	-0.0232***		0.0074	0.0078
		(0.0040)	(0.0038)		(0.0050)	(0.0050)
Log(1+BE/ME)		0.1042***	0.1014***		0.1161***	0.1173***
		(0.0178)	(0.0177)		(0.0231)	(0.0233)
Q1			0.0420*			-0.0398
			(0.0218)			(0.0294)
Q2			0.0163			-0.0090
			(0.0105)			(0.0146)
Q3			0.0114**			-0.0124
			(0.0053)			(0.0084)
Q4			0.0090*			-0.0106
			(0.0052)			(0.0068)
Observations	35,684	35,684	35,684	8,558	8,558	8,558
R-squared	0.0109	0.0237	0.0248	0.0209	0.0387	0.0398

Table 10. (*Continued)*

Panel B

	Buy Recommendations			Sell Recommendations		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.1057***	0.3870***	0.3868***	0.0182	0.0457	0.0690
	(0.0081)	(0.0483)	(0.0483)	(0.0153)	(0.1034)	(0.1023)
Market	0.0050	0.0063	0.0081	-0.0268	-0.0325	-0.0376
	(0.0120)	(0.0152)	(0.0153)	(0.0234)	(0.0292)	(0.0290)
Total	-0.0076	-0.0151	-0.0088	-0.0304	-0.0305	-0.0434
	(0.0123)	(0.0158)	(0.0149)	(0.0248)	(0.0322)	(0.0287)
PastFirmPerformance		-0.3098	-0.1880		-6.2466*	-6.1715*
		(1.8269)	(1.8071)		(3.5223)	(3.5121)
PastMarketPerformance		-19.6656***	-19.9154***		-28.6525***	-28.7281***
		(4.9153)	(4.8802)		(7.8940)	(8.0034)
Log(1+Analysts' Experience)		-0.0010	-0.0011		-0.0157***	-0.0155***
		(0.0021)	(0.0021)		(0.0054)	(0.0054)
Broker Size		0.9325	0.6831		-0.4125	-0.0179
		(0.8392)	(0.9559)		(1.1800)	(1.3388)
Firm Size		-0.0232***	-0.0239***		0.0025	0.0034
		(0.0031)	(0.0031)		(0.0052)	(0.0054)
Log(1+BE/ME)		0.1371***	0.1352***		0.1203***	0.1240***
		(0.0173)	(0.0170)		(0.0274)	(0.0273)
Q1			0.0247			-0.0520
			(0.0275)			(0.0418)
Q2			0.0062			-0.0278
			(0.0129)			(0.0186)
Q3			0.0066			-0.0127
			(0.0066)			(0.0100)
Q4			0.0024			-0.0107
			(0.0049)			(0.0072)
Observations	35,684	35,684	35,684	8,558	8,558	8,558
R-squared	0.0001	0.0149	0.0151	0.0009	0.0206	0.0217

Table 11. Three-Day Price Reactions to Recommendations

This table presents results on the three-day price reactions to recommendations issued by brokers with different benchmarks during our sample period of 9/2002 and 12/2009. **Panel A** reports the univariate tests on three-day price reactions. **Panel B** reports results on the cross-sectional regressions. **Sector** takes value of 1 if a broker uses sector benchmark and 0 if a broker uses market or total return benchmarks. **PastFirmPerformance** is the average daily raw stock return over [-180, -2]. **PastMarketPerformance** is the average daily market return over [-180, -2]. **Analyst's Experience** is the number of days an analyst has appeared in the IBES. **Broker Size** is defined as the ratio of the number of recommendations issued by a broker to the total number of recommendations by all brokers in the last year. **Firm Size** is the market value of equity measured 30 days prior to the recommendation day. **BE/ME** is the ratio of book equity to market equity in the last year. **Q1, Q2, Q3 and Q4** indicate a broker's favorableness quintiles. For buys (or sells), quintiles are determined each quarter by ranking brokers in ascending order according to the percentage of recommendations which are buys (or sells) by the end of previous quarter. Q5 is omitted from the regressions due to the multicolinearity problem. All regression models use firm and year fixed effects. Robust standard errors (in parentheses) are clustered at the firm level. ***, **, * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Univariate Tests

	Buys				Sells			
Benchmark	N	Raw Return	Market Adjusted Return	Industry Adjusted Return	N	Raw Return	Market Adjusted Return	Industry Adjusted Return
Sector	15624	0.032419	0.031758	0.030115	5745	-0.048863	-0.049303	-0.047736
Market	12392	0.029693	0.028824	0.027509	2708	-0.051403	-0.052433	-0.052068
Total	18588	0.028078	0.026761	0.025548	3019	-0.055552	-0.056204	-0.053981

Table 11. (*Continued)*

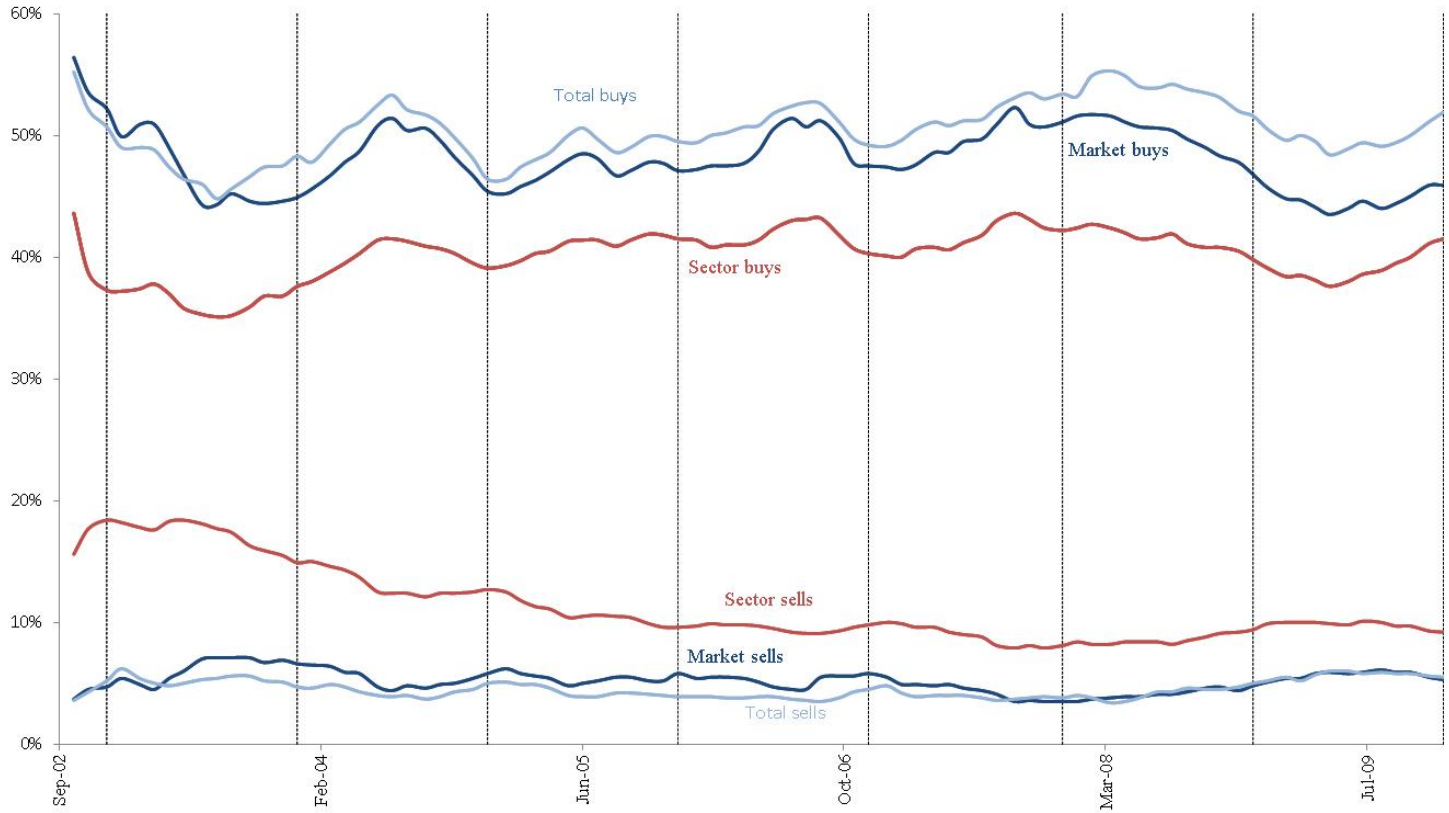
Panel B: Short-Term Reaction Regressions – Buy Recommendations

	Market Adjusted Return		Industry Adjusted Return		Total Return	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Market	0.0021**	0.0017*				
	(0.0010)	(0.0010)				
Sector			0.0010	-0.0006		
			(0.0008)	(0.0009)		
Total					-0.0020**	-0.0005
					(0.0010)	(0.0010)
PastFirmPerformance	-2.0611***	-2.0627***	-1.8682***	-1.8616***	-1.9464***	-1.9459***
	(0.3544)	(0.3541)	(0.3445)	(0.3444)	(0.3645)	(0.3642)
PastMarketPerformance	4.5874***	4.5722***	4.4461***	4.4275***	2.6524***	2.6395***
	(0.7355)	(0.7354)	(0.7126)	(0.7122)	(0.7789)	(0.7793)
Log(1+Analysts' Experience)	0.0019***	0.0019***	0.0018***	0.0018***	0.0018***	0.0018***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0003)
Broker Size	0.5565***	0.4124***	0.4897***	0.3618***	0.5224***	0.4029***
	(0.0392)	(0.0420)	(0.0380)	(0.0395)	(0.0402)	(0.0436)
Firm Size	-0.0403***	-0.0404***	-0.0387***	-0.0389***	-0.0401***	-0.0402***
	(0.0043)	(0.0043)	(0.0043)	(0.0043)	(0.0044)	(0.0044)
Log(1+BM)	0.0041	0.0037	0.0034	0.0029	0.0047	0.0043
	(0.0118)	(0.0118)	(0.0117)	(0.0117)	(0.0119)	(0.0119)
q1		0.0101***		0.0109***		0.0092***
		(0.0016)		(0.0017)		(0.0018)
q2		0.0051***		0.0054***		0.0051***
		(0.0008)		(0.0008)		(0.0008)
q3		0.0024***		0.0026***		0.0022***
		(0.0005)		(0.0005)		(0.0005)
q4		0.0019***		0.0020***		0.0019***
		(0.0003)		(0.0003)		(0.0003)
Constant	0.5542***	0.5527***	0.5343***	0.5334***	0.5511***	0.5491***
	(0.0630)	(0.0631)	(0.0626)	(0.0627)	(0.0637)	(0.0638)
Observations	46,604	46,604	46,604	46,604	46,604	46,604
R-squared	0.0502	0.0514	0.0481	0.0496	0.0481	0.0491

Table 11. (*Continued)*

Panel C: Short-Term Reaction Regressions – Sell Recommendations

	Market Adjusted Return		Industry Adjusted Return		Total Return	
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Market	0.0008	0.0025				
	(0.0026)	(0.0028)				
Sector			0.0005	-0.0023		
			(0.0022)	(0.0026)		
Total					-0.0013	-0.0000
					(0.0028)	(0.0029)
PastFirmPerformance	1.1522*	1.2109*	1.3504**	1.3959**	1.2914*	1.3443*
	(0.7003)	(0.6993)	(0.6733)	(0.6724)	(0.7087)	(0.7076)
PastMarketPerformance	6.1448***	6.1347***	4.9171***	4.9164***	4.3649**	4.3531**
	(1.6772)	(1.6815)	(1.5872)	(1.5914)	(1.8062)	(1.8075)
Log(1+Analysts' Experience)	-0.0037***	-0.0037***	-0.0031***	-0.0031***	-0.0039***	-0.0039***
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Broker Size	-0.2172**	-0.2797***	-0.2320***	-0.2680***	-0.2699***	-0.3146***
	(0.0859)	(0.0892)	(0.0848)	(0.0862)	(0.0927)	(0.0957)
Firm Size	-0.0103**	-0.0105**	-0.0083*	-0.0085**	-0.0099**	-0.0101**
	(0.0045)	(0.0045)	(0.0043)	(0.0043)	(0.0048)	(0.0048)
Log(1+BM)	-0.0116	-0.0121	-0.0108	-0.0112	-0.0099	-0.0102
	(0.0110)	(0.0110)	(0.0107)	(0.0106)	(0.0115)	(0.0114)
q1		-0.0028		-0.0037		-0.0002
		(0.0055)		(0.0054)		(0.0058)
q2		-0.0071***		-0.0066***		-0.0066***
		(0.0017)		(0.0018)		(0.0018)
q3		-0.0027***		-0.0027***		-0.0023**
		(0.0010)		(0.0010)		(0.0010)
q4		-0.0028***		-0.0025***		-0.0026***
		(0.0007)		(0.0006)		(0.0007)
Constant	0.1274*	0.1382**	0.0952	0.1072*	0.1260*	0.1344*
	(0.0660)	(0.0659)	(0.0622)	(0.0619)	(0.0694)	(0.0692)
Observations	11,472	11,472	11,472	11,472	11,472	11,472
R-squared	0.0203	0.0230	0.0180	0.0203	0.0215	0.0238

Figure 1. End-of-Month Distribution of Outstanding Recommendations

This table presents, for each month between September 2002 and December 2009, the fraction of buys and fraction sells among the outstanding recommendations issued by market, total, and sector benchmarkers. Only brokerage houses which issued at least 100 recommendations to US firms during our sample period (9/2002 – 12/2009) are included in the analysis.