Selective Information Channels for Investment Research

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Abstract

The channels through which investment research is distributed to investors are varied and complex. Because the market for forward-looking financial data is competitive, we argue that both financial data providers and the brokerage houses that employ analysts who generate these data respond to profit-motivated incentives. These incentives result in market segmentation and price differentiation strategies for the distribution of forward-looking financial data. We examine the properties of earnings estimates across different distribution channels. Based on established theories of analyst behavior, we predict that a two-channel research distribution equilibrium occurs, where a low-cost channel includes all estimates, but a premium channel exists with higher quality estimates. We find that analysts' estimates distributed through the premium channel are less biased and more accurate. Further, estimates distributed through the premium channel generate larger market reactions and increased information asymmetry. Our study provides new evidence on the flow of forward-looking information within the capital markets.

1. Introduction

Numerous studies in accounting and finance examine equity analysts' earnings estimates to understand the determinants, accuracy, bias and especially the mapping of such expectations into market-wide expectations. Decades of research yields rarely challenged conclusions that earnings estimates are (i) frequently inaccurate and (ii) significantly biased, but the I/B/E/S consensus (iii) is the best available proxy for market earnings expectations, and (iv) reduces information asymmetry among investors (see Ramnath, Rock and Shane, 2008 for a summary). Most academic research about earnings estimates is based on the analysis of a single distribution channel for investment research (the I/B/E/S estimates file), yet in practice the channels through which analysts' research is distributed to investors are much more varied and complex than through this single channel.

Investors receive earnings estimates through numerous channels, such as I/B/E/S, First Call Research, Bloomberg, Capital IQ, websites like Yahoo! Finance, and many other niche data providers. Because the market for forward-looking financial data is competitive, we argue that both financial data providers and the brokerage houses that employ the analysts who generate these data respond to profit-motivated incentives. These incentives result in market segmentation and price differentiation strategies for the distribution of forward-looking financial data. As a result, observable differences in distribution channels arise that have implications for information dissemination, investor processing, and price impact. We appeal to classical economic theories suggesting that various distribution channels offer a solution to a mechanism design problem in which higher quality estimates are sold to those most willing to pay for it.

Most research tends to examine the usefulness of analysts' estimates as if all investors receive them simultaneously with similar ability to profit on that information. However,

investment banks spend considerable resources generating research and expect to capitalize upon such expenditures through direct or indirect compensation. Expenditures for sell-side research were over $8 billion globally in 2007, but declined to $4.8 billion in 2013.[1] Whereas prior research has largely focused on the determinants and properties of analysts' estimates and their impact on security prices, in this study we are interested in the *distribution channels* of these estimates and whether the mode of distribution is associated with their properties and usefulness to investors.[2]

The most widely available platform for accessing earnings forecasts is I/B/E/S, which has been compiling earnings estimates since the mid-1970s.[3] Primark owned the I/B/E/S platform until 2000, when Thompson Corporation acquired Primark. Thomson subsequently acquired Reuters in 2007, and Thomson Reuters then integrated First Call and I/B/E/S data, keeping the latter name for its analyst estimates database. In addition to maintaining the I/B/E/S data, Thomson Reuters also aggregates expanded analyst research, including full research reports and notes that include earnings estimates (hereafter "TR Research").

I/B/E/S appears to be an indispensable source of data for most active investors, whereas TR Research can be viewed as an *incremental* data service that provides supplemental information that some investors find valuable. A key feature of I/B/E/S and TR Research is that submitting brokerages can choose whether to have their analysts' earnings estimates included on I/B/E/S, TR Research (via full research reports), or both. Additionally, brokerages can also specify whether

[1] This decline in expenditures accompanies a corresponding decline in trading commissions, which fell over the same period from $13.9 billion to $9.3 billion. See http://www.economist.com/news/finance-and-economics/21586605-old-model-stockmarket-research-changing-analyse

[2] There is some evidence that analysts' research is shared with preferred clients prior to widespread distribution, and it is generally assumed that data is shared with financial sites (like Google and Yahoo!) the day after distribution to preferred clients (Green, 2006).

[3] Other widely available sources of analysts' earnings forecasts include Value-Line, Zacks, and First Call (discontinued in 2012). Several studies examine varying properties of these data providers (e.g., Philbrick and Ricks, 1991; Abarbanell and Lehavy, 2000) but I/B/E/S has emerged as the dominant provider and source of data for archival research on earnings estimates.

individual analysts can be identified, which Thomson clients are permitted access to the data, when and which estimates and reports are made available, and numerous other parameters (see further discussion below). However, unlike earnings estimates contributed to I/B/E/S, brokerages can receive significant compensation from Thomson Reuters for estimates and research reports included in TR Research.[4] In turn, TR Research also receives incremental subscription fees from users who obtain access to TR Research.

In practice, the distribution of financial data is extremely complex. The complexity is derived from the fact that contracts between Thomson and individual brokerages vary by brokerage. For example, the contracts governing the transmission of estimates and other data from brokerages to Thomson specify:

- the means of transmission (e.g., data feed of individual estimates versus full research report);
- the metrics that may be uploaded to the I/B/E/S database (e.g., earnings estimates, recommendations, target prices, etc.);
- which end users have credentials for viewing certain data (e.g., brokerage clients only vs. all subscribers);
- when data may be viewed (e.g., real-time vs. delayed);
- what information, if any, Thomson may extract from analyst research reports and provide separately.[5]

In determining how to distribute research, brokerage houses face competing incentives. On one hand, brokerages gain by widely distributing estimates to facilitate indirect revenue through

[4] Amounts are proprietary, but according to discussions with two managing directors from a bulge bracket firm, the compensation is significant, with large brokerages receiving annual compensation of several million dollars.

[5] We also contacted a representative from Bloomberg and confirmed that they have similarly complex set of contracting arrangements. There are additional financial data distributors like Factset (who also partner with Thomson Reuters), Standard & Poors' Capital IQ, and numerous smaller and/or regional providers such as Moody's Analytics, Zacks, regional Federal Reserve banks, and various consulting firms. In addition, online services like Yahoo! Finance partner with several of these distributors (e.g., analyst data is obtained from Thomson Reuters). We have not spoken with any of these distributors other than Bloomberg, but believe we can safely assume that to the extent that different data providers contract with the same brokerages, contracts for them are likely similarly complex.

trading commissions, investment banking fees, and other services, as well as intangible benefits of reputation. On the other hand, brokerages can also realize incremental benefits by selling high quality estimates to investors who are willing to pay higher fees for the estimates (direct revenue).[6] If brokerage houses can utilize a mechanism design that price discriminates among investors (those who are willing and able to pay more for high quality estimates versus those who are not), then the payoffs for both brokerages and investors are optimized. We propose an institutional theory for such a mechanism design in this setting.

As detailed in the next section, our hypotheses are based on established theories of analyst behavior, such as those found in Jackson (2005) and Beyer and Guttman (2011), which invoke an incomplete unraveling of signals as in Fischer and Verrecchia (2000) and Dye and Sridhar (2004).[7] In these models, analysts receive noisy signals about future EPS realizations and have incentives to bias some of their estimates in equilibrium to increase trading volume or other reasons (e.g., Jackson, 2005; Beyer and Guttman, 2011). An important component of these theories is that investors, in the absence of additional information, cannot discern before or after an earnings release whether an estimate is biased or unbiased with error (e.g., Fischer and Verrecchia, 2000;

[6] Although revenue generated from direct sales of research are generally small relative to the sum of revenues from all other revenues of a brokerage house, Campbell (2015) reports that "Wall Street banks may have finally hit on a way to pinpoint the value of analysts and squeeze more money from their research: Stop making it so easy to share." It is uncontroversial that investors are willing to pay more for higher quality estimates. However, the incremental cost (both monetary and information processing) incurred by an investor to access the higher quality channel will price out traders who either lack resources or place a lower value on higher quality signals. With regards to TR Research, it is generally accepted that there is a 'pecking order' of purchased research. Investors first secure access to I/B/E/S and then supplement that data with TR Research and other information; it is relatively uncommon for an investor to subscribe to only TR Research without some form of an I/B/E/S subscription. Therefore, brokerage houses must choose whether to distribute estimates widely to increase indirect revenue or limit the distribution to investors willing to pay more to increase direct revenue.

[7] The incomplete unraveling of signals is the core of Jackson's (2005) work and the "more realistic setting" in Beyer and Guttman (2011) (i.e., see footnote 13 in the published version and also the working paper version of their study for a formal proof of their proposition).

and Dye and Sridhar, 2004).[8] Analytically, this is because investors do not know the objective or cost functions of the message sender (in this case, the analyst). In equilibrium, an estimate can be biased upwards, biased downwards, or unbiased; however, in these models, estimates are, on average, biased upwards (Jackson, 2005; Beyer and Guttman, 2011). Nevertheless, the estimates are informative so biased estimates are still useful insofar as the payoffs for investors are greater when trading on the signal than ignoring it.

We augment these theories by recognizing that there is a set of investors who are willing to pay higher fees for more accurate and unbiased estimates (who we call 'premium' investors).[9] This demand creates incentives for brokerage houses and data providers to find a mechanism that allows them to price discriminate and extract the higher fees from premium investors, while continuing to distribute estimates widely to generate trading commissions and realize other benefits such as those pertaining to reputation.

In the absence of a mechanism whereby investors can discern whether an analyst biased an estimate or was simply erroneous, investors are unwilling to pay a premium for a service that claims to offer more accurate and less biased estimates. While the investor prefers to obtain such estimates, the analyst has an incentive to bias his estimates because the investor cannot verify truthful reporting, i.e., distinguish bias from error. One possible verification mechanism that could potentially solve this problem is a research report attached to the estimate. In addition to the point estimate, the report provides supporting rationale to substantiate the analyst's estimate—details

[8] To be clear, these models do not claim that, on average, and with large enough sample, bias cannot be detected ex-post. While empirically possible to identify bias for a group of analysts, it is difficult to determine ex post if a specific estimate made by an analyst is biased.

[9] As discussed in Section 2, premium investors are investors who have a high sensitivity to earnings, have resources, and are willing to pay a premium for unbiased and more accurate estimates (e.g., leveraged positions, derivative trading, earnings-based investment strategies, etc.).

that can allow investors to determine whether the analyst reported truthfully. Although possible, it is more difficult for analysts to defend a biased estimate with a report (i.e., the verification mechanism), because it will be easier for premium investors to detect bias.[10] If investors can detect bias when a report is attached to an estimate, analysts will have weaker incentives to provide a report accompanying a biased estimate, because investors will stop purchasing estimates from analysts who bias their estimates. Hence, if a research report allows premium investors to ascertain whether an analyst biased his estimate or was simply wrong, a two-channel equilibrium occurs: (i) a low-cost channel where all estimates are provided and (ii) a premium channel that contains higher quality (less biased, more accurate) estimates accompanied by a report.

We examine the two distribution channels, I/B/E/S and TR Research, where TR Research includes estimates supported by full reports. Accordingly, TR Research is incrementally more expensive. This preliminary observation provides initial support to our distribution channel theory, which predicts that earnings estimates from TR Research are likely to exhibit less bias, higher accuracy, and greater information content. We first examine whether properties of analyst estimates differ based on the channel through which they are distributed. We then investigate distribution channel consequences by examining whether firm-level market reaction and information asymmetry are related to the channel through which earnings estimates are distributed.

An alternative explanation for the existence of two distribution channels (e.g., I/B/E/S and TR research) is that these two channels provide completely different products: estimates and contextual research reports. Under this alternative, investors demand estimates to satisfy one need and reports for another, which gives rise to two distinct distribution platforms. Under certain

[10] There is anecdotal evidence that research reports can assist users to detect bias in analysts' outputs. Turner and Levy (2017) used information within a report on Snapchat by Morgan Stanley to highlight that the analyst revised fundamental information, but did not change the overall estimate, consistent with reports being useful in identifying intentional bias by an analyst.

assumptions (discussed later), such an alternative theory yields similar predictions to the theory we propose. The intuition behind the alternative theory is that research reports are generated to satisfy investor demand, and the production of such a report generates incremental knowledge about the firm and its industry, which in turn facilitates more accurate estimates.[11]

However, there is a key prediction that differentiates our theory and the alternative theory. Although both theories predict estimates accompanied by a report will be more accurate, only our institutional theory predicts that estimates with a report (i.e., those distributed via TR research) will be *less biased*.[12] The theories and predictions we discuss are based on rational forecasting models where analysts intentionally bias (rationally, not behaviorally) their reports. Unlike accuracy, in a rational forecasting model, bias is determined by the analyst's choice and therefore should not decrease with analyst information production, which is the driver of forecast properties under the alternative theory. Nevertheless, a caveat to our analysis is that we cannot completely rule out this plausible alternative theory.

To test our predictions, we require estimates from both the I/B/E/S and TR Research channels. Analysts' estimates on TR Research are included in PDF format, which is not efficiently machine readable because report formats are non-standardized across and sometimes within brokerages. Therefore, we hand-collect these data. Considering the volume of data requiring hand-collection, we assembled a randomized sample for parsimony. Our sample covers 140 firms, for which we collected all estimates from research reports on TR Research spanning 2000-2011. We

[11] We note that these theories are not mutually exclusive, as some analyst outputs (e.g., white papers) clearly provide a distinct service to investors.

[12] Another concern with the alternative theory is that it does not explain why reports are bundled with estimates, as we should observe a channel that only contains reports and another that only contains estimates. The alternative theory also does not explain why reports are incrementally more expensive than estimates.

then merge the hand-collected sample with a firm-matched sample of I/B/E/S estimates, resulting in estimates identified by channel.

We find that analysts' estimates distributed through TR Research are less biased and more accurate than those on I/B/E/S. These results suggest that market earnings expectations for a subset of investors differ from the I/B/E/S consensus. We also find that estimates distributed through TR Research generate a larger market reaction as well as increased information asymmetry compared to those on I/B/E/S. Our results support the theory of selective distribution channels.

Our study contributes to our understanding of the flow of information within capital markets. We document that analysts and brokerages employ a selective distribution strategy. In addition, the theory we propose supports our predictions of properties of research across different channels and will be useful for future research. Future work may consider extending our analysis to other channels or possible variation in the channels we examine (e.g., real-time versus delayed availability). To the best of our knowledge, there is limited evidence on the complexities of analyst research dissemination, especially on the possible price discrimination aspect of analyst research, and whether such data exhibit differential costs and benefits to investors.

2. Background and hypotheses

2.1 Institutional theory

Price discrimination is the well-known practice of charging different prices for a similar product to different consumers (e.g., Varian, 1989; Phillips, 2005). Similarly, identifying groups of consumers willing to pay differential prices for a differentiated product is the well-known practice of market segmentation (e.g., Smith, 1956; Phillips, 2005; Wedel and Kamakura, 2012). Our main hypothesis is that brokerage houses and financial data distributors partner to maximize collective revenues from the provision and distribution of financial research through different

distribution channels. While classic price discrimination theory does not necessarily address the implicit partnering of two firms, the ultimate profit incentives of both firms provides intuitive predictions for cooperation to cater to different clienteles through different distribution channels. As discussed next, our institutional theory is based on prior analyst research, such as Jackson (2005) and Beyer and Guttman (2011), who invoke an incomplete unraveling as in Fischer and Verrecchia (2000) and Dye and Sridhar (2004). A key observation in our theory is the existence of "verification mechanism" that enables a separating equilibrium.

2.1.1 The players

Investors. Investors adopt different investment strategies and invest differently in investment research. We assume three types of investors for tractability. The first type of investor includes "low-tier" investors, who do not trade based on estimates, so they neither purchase estimates nor expect payoff from doing so. For example, certain investment strategies, such as index and exchange traded funds, are not sensitive to the payoffs from purchasing earnings estimates. We refer to the opposite type of investors as "premium" investors, whose investment strategies are sensitive to earnings estimates and therefore are willing and able to pay a premium for unbiased, more accurate estimates because they expect a greater payoff from doing so. For example, consider investors who employ earnings-based trading strategies, expectations revision strategies, leveraged positions, or derivative trading. In between these two types of investors are "mid-tier" investors. Mid-tier investors trade based on estimates, and purchase estimates based on the expected payoff from doing so, but their trading is not as sensitive to biased or inaccurate estimates as that of premium investors, so they are unwilling to pay a premium for higher quality estimates. Although stylized, we believe this coarse partition of investors maps well into actual markets and observed investment activity. For example, Kacperczyk, Nosal and Stevens (2014, p.

1) observe that, "Some of the robust general trends in household behavior are a growing non-participation in high-return investments and a decline in trading activity. Anecdotal evidence suggests that an ever present and growing disparity in investor sophistication, or investor access to superior investment technologies, is partly responsible for these trends."

Brokerage houses and analysts. In our theory, brokerage houses seek to maximize overall profits from all activities, including their investment in research. Brokerage houses realize trading commissions (and other indirect revenue) from analyst research, but may realize profits from selling more precise estimates to investors willing to pay a premium. For parsimony, we assume that brokerage houses employ analysts whose incentives are aligned with those of the brokerage house. For purposes of our discussion, we specifically focus on earnings per share (EPS) estimates.

An analyst receives a noisy signal about the firm's future EPS realization and, depending on the nature of the signal and incentives, the analyst may bias the estimate in either direction or truthfully reveal it. In Jackson (2005), the analyst biases an estimate upwards only when receiving a bad signal; a good signal is accompanied by truthful reporting by the analyst. The analyst makes this choice conditional on the expected trading volume the estimate will generate this period compared to the cost of biasing the estimate (i.e., loss in accuracy could lead to reduced trading volume in future periods because the investors update their beliefs about the quality of the analyst; see Beyer and Guttman, 2011). Because signals are noisy, after actual EPS realization, and in the absence of additional information, investors cannot discern whether the analyst biased the estimate or was simply incorrect. The scenario reflects incomplete unraveling of information (Fischer and Verrecchia, 2000; Dye and Sridhar, 2004) and is due to investor uncertainty about both the analyst's objective and cost functions. Nevertheless, on average, biased or incorrect estimates are relatively more informative than having no estimates (Jackson, 2005; Beyer and Guttman, 2011).

Financial data distributor. The financial data distributor seeks to maximize profits from aggregating and distributing analyst research. The distributor designs a mechanism that maximizes the wealth of all players under the constraints of the game. By contracting among many investors and analysts, the distributor attempts to solve a coordination problem that maximizes the distributor's profits, provides incremental revenues to brokerages, and permits investors to optimize information acquisition costs within their idiosyncratic investment strategies. In other words, the distributor establishes contracts that extract higher fees from premium investors who are willing to pay more for unbiased, accurate estimates.

2.1.2 Equilibria

2.1.2.1 Case 1: The absence of a verification mechanism – pooling equilibrium

We first assume that there is no mechanism that allows the data distributor or the premium investors to verify that an estimate provided by the analyst was biased or erroneous, even after observing the earnings realization. In this case, a pooling equilibrium occurs, and there will only be one distribution channel that includes all analyst estimates. To see this, assume the distributor attempts to price discriminate between mid-tier and premium investors by creating two distribution channels: (1) an inexpensive, lower quality distribution channel and (2) an expensive, higher quality distribution channel. Suppose that the distributor asks analysts to provide all estimates (biased and unbiased) to the inexpensive distribution channel to enable the brokerage to generate trading commissions and provide only the unbiased estimates to the expensive distribution channel to enable the brokerage to extract the higher price from premium investors. Also, suppose that the distributor pays the analysts only for estimates that are provided to the expensive, unbiased channel.

In the absence of a verification mechanism, investors cannot determine whether an estimate is biased or erroneous. Thus, the analyst has an incentive to claim all estimates are unbiased, because the analyst will be paid by the forecast distributor only for estimates declared to be unbiased. If the premium investors could determine whether the analyst did not report truthfully, the threat of loss of future business may provide sufficient incentive for the analyst to tell the truth. In this scenario, premium investors cannot tell if the analyst biased the report intentionally but know analysts have an incentive to report untruthfully. Thus, such investors will not pay higher prices for the more expensive distribution channel without additional benefit. Therefore, the premium investors will continue to use only the inexpensive channel given that biased estimates are more informative than no estimates (Jackson, 2005; Beyer and Guttman, 2011). In this case, the predicted equilibrium is a single distribution channel (such as I/B/E/S). However, this equilibrium is suboptimal because premium investor demand for unbiased estimates is unsatisfied, and neither analysts/investors nor the distributor benefit from the separation of higher quality estimates.

2.1.2.2 Case 2: The presence of a verification mechanism – separating equilibrium

We now assume that a mechanism exists that enables investors to verify that the analyst reported truthfully and thus provided an unbiased estimate (even if erroneous). Such a verification mechanism will result in a separating equilibrium with two channels: (1) an inexpensive channel that provides all estimates without verification and (2) an expensive channel that provides only the unbiased and more accurate estimates, along with the ability to verify the estimates. To demonstrate, as in the first case, assume the distributor attempts to price discriminate between premium and mid-tier investors by creating two distribution channels. As in the first case, suppose that the distributor asks analysts to provide all estimates (biased and unbiased) to the inexpensive

distribution channel to enable the brokerage to generate trading commission and provide only the unbiased estimates to the expensive distribution channel to enable the brokerage to extract a higher price from premium investors. Additionally, suppose the distributor will pay analysts only for estimates provided to the expensive, unbiased channel.

In contrast to the first scenario, a condition set by the distributor is that analysts sending an estimate to the expensive channel must furnish a report that provides background information on how the estimate was derived (essentially detailing the signals the analyst received). This report serves as a verification and auditing mechanism to enable premium investors to determine whether the analyst reported truthfully. Assuming the report has a positive preparation cost, analysts will not provide a report along with biased estimates because premium investors will be able to detect bias and, as a result, the analysts' brokerage will suffer loss of reputation and future trading fees. Due to the verification mechanism, the analyst faces a significant disincentive to report untruthfully to premium investors so will only submit unbiased estimates in the expensive channel. However, the analyst will continue to provide all estimates (biased and unbiased) to the inexpensive channel for the mid-tier investors, because they are also informative to those investors and profitable for the brokerage through trading commissions. The result of the verification mechanism provided by a full report leads to the separating equilibrium of two distribution channels with differential costs charged to investors.[13]

[13] One important characteristic that we have not discussed is that of timeliness. Although several studies suggest more timely estimates are less accurate (e.g., Mozes 2003; Ramnath et al. 2008; Amiram et al. 2016), the unit of analysis in such studies is the trade-off an individual analyst makes between waiting for more information to compile a more accurate estimate or issuing an estimate before receiving the additional information to be timely. In contrast, our unit of analysis is the distribution channel through which an estimate is distributed. We take analyst issuance as exogenous and ask whether, conditional on the existence of an estimate, estimates distributed through a channel associated with greater costs are more accurate than estimates distributed through a common, widely-distributed channel. Therefore, the tradeoff between timeliness and accuracy is not of primary relevance in our setting. Nevertheless, in all of our tests, we control for forecast horizon, given its association with forecast accuracy (Sinha, Brown and Das, 1997).

2.2 Implications and predictions

2.2.1 Descriptive observations

According to Thomson Reuters, nearly all earnings estimates are ultimately included within I/B/E/S, but through different data aggregation efforts. Some are submitted directly by standardized feeds from brokerages, whereas others are obtained by manual extraction from Thomson Reuters. Although we expect brokerage-level contracts with Thomson Reuters to result in two distinct sets of estimates — those only on I/B/E/S and those on both I/B/E/S and TR Research — our collection of data allows for estimates available only on TR Research (but not on I/B/E/S). This can result if brokers sometimes (either intentionally or unintentionally) prevent Thomson from extracting estimates that are provided in report form only. Moreover, individual analysts can refrain from entering their earnings estimates into standardized data feeds between the brokerage and Thomson Reuters and instead submit only a full report. Alternatively, analysts may submit their estimates via a standardized data feed but refrain from submitting an accompanying report. In our analyses, we compare estimates that are only on I/B/E/S and estimates that are on TR Research (either exclusively or in conjunction with I/B/E/S). The simple observation that different distribution channels exist within a single financial data distributor is consistent with our theory.

An additional observation consistent with our theory is the compensation and fee structure for the distribution channels at Thomson Reuters. No compensation is provided for estimates available on I/B/E/S, and traditional arguments on 'the street' and in the literature are that analysts and brokerages desire to be part of the consensus to be relevant and engaged in the equity research market (e.g., Jame et al., 2016). In contrast, brokerage houses receive compensation for providing research to TR Research, and investors incur additional costs to purchase TR Research. Thomson

Reuters compensates brokerages for research distributed through TR Research based on either pay-per-use or contracted annual fees, which vary across brokerages.[14] Further, analysts and brokerages are subject to higher costs for research distributed through TR Research. For example, full reports are costly to prepare, and reputation costs are more salient when a comprehensive report (i.e., the verification signal) not subject to client entitlements is archived for access by an extended population of investors (i.e., other customers of the financial data provider).[15]

2.2.2 Primary hypothesis

According to the theory discussed above, a distribution channel characterized by incremental costs to investors will include more accurate and less biased estimates.[16] Thus, our first and primary hypothesis (stated in null form) is:

> **H1**: The average bias and accuracy of I/B/E/S estimates is not different from the bias and accuracy of estimates available on TR Research.

As noted earlier, an alternative explanation for the existence of two distribution channels is that investors demand estimates to serve one purpose and reports to serve a different purpose, so estimates are decoupled from full research reports, and any incremental fees are for the non-estimates information. We believe this is a complementary rather than competing explanation. The production of a research report requires the analyst to generate significant knowledge about the

[14] Although Thomson Reuters confirmed the existence of such payments, they are reluctant to reveal proprietary information. We did confirm that such payments reflect millions of dollars for larger brokerages, which prior research has demonstrated exhibit the highest quality research (Jacob, Rock and Weber, 2008).

[15] An entitlement means that an investor may see the identification of a submitted estimate. As described by the Thomson Reuters Real Time I/B/E/S user guide, "for certain brokers, only clients who have an existing relationship with that broker are permitted to attribute data to that broker or use/display the broker's name on their systems."

[16] Our analysis of the accuracy of estimates across different distribution channels follows prior research that makes similar comparisons. For example, Philbrick and Ricks (1991) access forecasts from several data providers, including I/B/E/S, Zacks, and Standard & Poors, and examine the relative accuracy of differently constructed forecast errors and association with returns. More recently, there are several studies of relative accuracy and market association, including that for whisper forecasts (Bagnoli et al., 1999; Rees and Adut, 2005; Bhattacharya et al., 2006) and crowdsourced forecasts (Liew, Guo and Zhang, 2015; Jame et al., 2016). The distinction with our study is that we focus on the distribution channel choice within a single data provider.

firm and its industry, which likely makes estimates more accurate. Accordingly, even if the estimate and other information were capable of being decoupled, we would still make the same prediction that the TR Research channel will have more accurate estimates because of our arguments about the report being a verification signal.

However, our theory predicts that estimates included within a report (i.e., TR Research) will be less biased than those in I/B/E/S. While both theories predict estimates accompanied by a report will be *more accurate*, only the price discrimination theory predicts that estimates accompanied by a report will be *less biased*. This is because, in a rational forecasting model, analysts purposefully bias their estimates to maximize their wealth. Therefore, additional information about the firm is unlikely to mitigate the choice of biasing the estimate, as the additional information does not change the costs and benefits of this choice.

2.2.3 Conditional hypotheses

Conditional on rejecting the null of H1, we consider several implications of our primary hypothesis. If estimates exhibit differential properties across distribution channels, it is important to understand the potential implications of observed differences. To assess whether distribution bias has an effect on firms' information environment, we examine the consequences of distribution channel choice. If more accurate, less biased estimates are disseminated through the incrementally costly TR Research distribution channel, investors will react more strongly to estimates provided through that channel.

The distribution of estimates through TR Research via a full report presents an empirical challenge in isolating the effect of the distribution channel from the effect of the content of the report. Because a report is provided, a complementary (non-mutually exclusive) "context hypothesis" for the existence and costs of this distribution channel arises. The explanation is that

investors are willing to pay higher fees for the context of the report, rather than for more accurate, less biased estimates. The potentially greater benefits from supporting contextual information on TR Research warrants the higher monetary and nonmonetary costs of accessing that data, and in equilibrium, we would expect the quality of those estimates to exceed that of I/B/E/S estimates. In either scenario, we expect higher quality estimates to be distributed through TR Research and thus the information content of those reports is predicted to be higher. Our second hypothesis (stated in the null) is:

> **H2:** Estimates distributed through TR Research exhibit information content similar to estimates distributed through I/B/E/S.

Numerous models and empirical papers relate information asymmetry to important factors such as the cost of capital (e.g., Diamond and Verrecchia, 1991), efficient allocation of resources (Harris and Townsend, 1981), and the availability of external funding to corporations (Lang and Lundholm, 1993). In the presence of differential precision of information between investors, the uninformed group will price protect, which therefore raises the cost of funding. Amiram et al. (2016) find that information asymmetry decreases immediately after the release of analyst estimates through I/B/E/S. However, to the extent that the quality of the estimates distributed through the TR Research channel is higher, some investors would gain access to superior information that could result in a short-term increase in information asymmetry until the information is available to less informed investors (Bloomfield, 2002).

Thus, estimates distributed through the incrementally costly channel may attenuate or exacerbate information asymmetry among investors. All else equal, if the more accurate, less biased estimates are reflected in prices, information asymmetry will decline when those estimates

are released. On the other hand, if only a subset of investors receives such estimates, information asymmetry may increase. Our third and final hypothesis (stated in the null) is:

> **H3**: Changes in information asymmetry are no different for analyst estimates distributed through TR Research compared to those distributed through I/B/E/S.

3. Data

Before describing the data collection efforts, we summarize the relevant Thomson Reuters family of product distribution channels and the data release timeline for each of these products. In Appendix A, we provide a simplified diagram of a subset of these products and identify versions of data that are "real-time" or "non-real time."[17] In Appendix B, we also provide an illustrative timeline for estimate dissemination across distribution channels. Our naming of the different channels includes the caveat that some research through both channels is available on a real-time basis while other research is 'embargoed.'[18]

Unfortunately, there is no way for us to identify which estimates were originally received in real-time by which investors, only that eventually all estimates are available to investors (although some estimates are anonymized due to contractually-specified entitlements). In other words, we use the non-real time distribution channels of these estimates with the understanding that some investors received the research in real-time. Not surprisingly, Thomson Reuters is

[17] Once estimates are submitted to I/B/E/S, they are accessible and visible to all subscribers with similar credentials. However, not all subscribers have entitlements to see the identity of the broker that submitted the estimate. Thus, a real-time I/B/E/S subscriber would see the estimate immediately upon availability on I/B/E/S, but would not know the identity of some of the contributing analysts or brokerages. Further, if the broker chooses to withhold estimates from I/B/E/S, the subscriber would only have access to estimates by either reading the associated report on TR Research, if available, or perhaps securing access to the brokerage's proprietary distribution platform. The only benefit for clients with entitlements is that of receiving the broker and analyst identifying information for an individual estimate. In an ideal setting, we would be able to identify the timing of all estimates that appear on TR Research and I/B/E/S and the identity and trades of all subscribers, including whether they are entitled. The combination of the complexity of estimate distribution and individual contracts makes this impossible.

[18] "Embargoed" refers to research that is made available only after a contractually agreed-upon delay contracted with individual brokerages. In addition, I/B/E/S may delay distribution of estimates to verify correctness and consistency (Akbas, Markov, Subasi and Weisbrod, 2018).

unwilling to provide this proprietary data. Nevertheless, even if we did know which investors received estimates or reports in real-time, we would not be able to draw any insights about the impact of such estimates without specific identification of actual trading by specific investors. Identification of real-time versus embargoed estimates and their impact on investors is extremely interesting, but not possible without access to private data.

3.1 Overview of TR Research

TR Research is a fee-based distribution channel that aggregates analyst reports in PDF format. For competitive reasons, Thomson Reuters is reluctant to convey a specific cost for analyst reports accessible through TR Research. The informal understanding among those in the industry is that the larger the investor, the less they pay (on a per-user basis). Additionally, the fees to access the I/B/E/S detail and history file vary depending on the delay an investor is willing to tolerate. In the extreme, some websites, like Yahoo! Finance and Google Finance (via a link to Thomson Reuters), provide a limited history of the I/B/E/S consensus at no cost, but no ability to identify individual analyst estimates without accessing selected individual reports made available on each website. While some brokerage houses are compensated for submitting reports to TR Research, they receive no compensation for providing estimates to I/B/E/S.

3.2 Random selection of firms for the sample

The earnings estimates from the TR Research channel require hand collection from actual analyst reports. We construct an earnings estimate database based on analyst reports from TR Research and append it to the I/B/E/S unadjusted US EPS detail file. Due to the voluminous number of reports on TR Research, we randomly select 100 firms from the S&P 500 and 60 middle market firms, defined as firms with revenues between $10 million and $1 billion. We sample from these two groups of firms to allow us to examine the robustness of the results across different firm

sizes. Our sample begins in 2000 and ends in 2011, i.e., the year before we began collecting and cleaning our data by hand in 2012—a process which took several years to complete. Our final sample covers a total of 140 firms, of which 85 are S&P 500 firms and 55 are middle market firms.[19] Although random sampling may hinder generalizability, we believe our final sample for analysis (based on 31,377 reports) is both comprehensive and reflective of the broader population. We provide details on the data collection procedures in Appendix D.

3.3 Sample

Our initial sample, after integrity checks, covers 140 firms and includes a total of 154,378 analyst reports. We then purge analyst reports that only contain qualitative information and do not have earnings estimates, which limits our sample to 92,287 reports. Each analyst report typically contains quarterly estimates for the current quarter and annual estimates for the current and subsequent year. We then extract the forecasts using the procedures detailed in Appendix D, resulting in a sample of 332,692 estimates. I/B/E/S data only includes changes in estimates. We impose the same restriction on our TR Research estimates. We then augment the TR Research data with data from I/B/E/S, yielding a combined sample of 582,111 observations. 382,208 observations are available exclusively on I/B/E/S, 78,819 observations are available exclusively on TR Research, and 121,084 observations are available on both dissemination channels.

The mapping of estimates to the correct forecast period end is dependent on the correct identification of earnings announcement dates on I/B/E/S and Compustat. Given that the earnings announcement dates on I/B/E/S and Compustat can be inaccurate, potentially leading to errors in

[19] When two publicly-traded firms merge, TR Research sometimes erroneously includes analyst reports for both firms for the pre-merger period when searching for reports for the merged entity. This can lead to a contaminated sample that includes sporadic analyst reports for firms that are not part of our random sample. We therefore drop 20 firms for which this happens from our sample.

our sample, we remove observations that are within two days from the I/B/E/S earnings announcement date. This restriction reduces our sample size to 311,874 observations. We remove observations with missing control variables, leading to a final sample of 309,851 observations. 151,111 of the observations are annual forecasts (67.7 percent of the observations are exclusive to I/B/E/S, 12.2 percent of the observations are exclusive to TR Research, and 20.1 percent of the observations appear on both channels) and 158,740 observations are quarterly forecasts (71.6 percent of the observations are exclusive to I/B/E/S, 11.3 percent of the observations are exclusive to TR Research, and 17.1 percent of the observations appear on both channels).

4. Research design

4.1 Testing of H1

We test the differences in estimate characteristics across distribution channels using univariate and regression analyses. We employ regression analyses to examine which factors attenuate the relationship between the dissemination channel and either bias or forecast accuracy. To do so, we use the following model:

$$\begin{aligned} \textit{Dependent Variable} = {} & b_0 + b_1 \textit{TR\_Research}_{i,BH,t} + b_2 \textit{Horizon}_{i,t} + b_3 \textit{Dispersion}_{i,t} + b_4 \textit{Boldness} \\ & + b_5 \textit{Bulge}_{i,BH,t,t} + b_6 \textit{Timeliness}_{i,BH,t} + b_7 \textit{Star Analyst}_{i,BH,t} + b_8 \textit{Loss}_{i,t} \\ & + b_9 \textit{Write-off}_{i,t} + b_{10} \textit{Stock/Debt Issuance}_{i,t} + b_{11} \textit{Firms Covered}_{i,BH,t} \\ & + b_{12} \textit{General Experience}_{i,BH,t} + b_{13} \textit{Momentum}_{i,t} + b_{14} \textit{Coverage}_{i,t} + e \end{aligned} \quad (1)$$

The *Dependent Variable* represents either bias or accuracy. *Bias* is defined as actual EPS minus the analyst's estimate scaled by price at the end of the prior fiscal period multiplied by 100. *Accuracy* is the absolute value of bias multiplied by -1; higher values of accuracy represent more accurate estimates. *TR_Research* is an indicator variable that captures estimates that are either on TR Research exclusively or both on I/B/E/S and TR Research. Based on our discussion above on

the incremental cost of reports on TR Research, we expect estimates that are available on TR Research to be both more accurate and less biased than I/B/E/S-only estimates.

We include a set of control variables that prior studies have shown to be associated with forecast accuracy. We divide the control variables into three groups. The first group controls for firm factors and includes *Loss* to control for loss firms, *Write-offs* to control for firm-periods that incurred a write-off, and *Dispersion* to control for the level of uncertainty. Within this group, we also control for the firms' information environment using the number of analysts that cover the firm (*Coverage*) and for the performance of the firm using *Momentum*. The second group of control variables addresses analyst and brokerage house characteristics and includes controls for the analyst's experience (*General Experience*), an indicator variable to identify star analysts (*Star Analyst*), an indictor variable to capture bulge bracket brokerage houses (*Bulge*), and the number of firms covered by the analyst to capture his level of busyness (*Firms Covered*). The third group of controls addresses forecast specific characteristics. We include *Horizon* to control for the date of the forecast, *Boldness* to control of the amount of information contained in the estimate, and *Timeliness* to account for its trade-off with accuracy. We also examine the inclusion of firm and year fixed effects in our specifications.

4.2 Testing of H2

The research design for testing our second hypothesis compares the short window abnormal return in response to the release of an analyst estimate across the two distribution channels (I/B/E/S-only or TR Research) and predicts higher quality estimates distributed through TR Research exhibit higher information content. We follow Asquith et al. (2005) and implement the following model:

$$CAR_{i,t} = b_0 + b_1 TR\_Research_{i,t,BH} + b_2 Revision_{i,t,BH} + b_3 TR\_Research_{i,t,BH} * Revision_{i,t,BH} + b_4 Size_{i,t-1} + b_5 Book\text{-}to\text{-}Market_{i,t-1} + b_6 Coverage_{i,FPE} + b_7 Dispersion_{i,t,FPE} + e_{i,t} \quad (2)$$

$CAR_{i,t}$ is firm *i*'s cumulative abnormal return in the three days surrounding an analyst's estimate on day *t* for firm *i*. $TR\_Research_{i,t,BH}$ is an indicator variable equal to 1 if the analyst report by brokerage *BH* on firm *i* on day *t* is on TR Research, and 0 otherwise. $Revision_{i,t,BH}$ is equal to the estimate provided by brokerage house *BH* for firm *i* on day *t* minus the consensus on the prior day scaled by firm *i*'s stock price on day *t*-2. *Size*, *Coverage*, and *Dispersion* are as discussed above and *Book-to-Market* is the book to market ratio. Based on our discussion above on the differential channel costs, we expect that estimates accompanied by a report with context are higher quality and will yield a stronger association with abnormal returns around the estimate date. In additional specifications we replace *CAR* and *Revision* with their absolute value to examine the unidirectional effect of the information contained in TR Research reports.

4.3 Testing of H3

The research design for testing our third hypothesis is based on numerous studies, such as Lee et al. (1993), Krinsky and Lee (1996), Coller and Yohn (1997), and Amiram et al. (2016). Amiram et al. (2016) demonstrate a reduction in investor information asymmetry immediately following analyst report issuance. Here, we investigate the extent to which the reduction in information asymmetry varies by distribution channel. The model is:

$$\%\Delta InformationAsymmetry_{i,d} = b_0 + b_1 TR\_Research + b_2 \%\Delta Price_{i,d} + b_3 LnSize_{i,t-1} + b_4 Volatility_{i,t-1} + b_5 Turnover_{i,t-1} + b_6 \%\Delta Depth_{i,d} + b_7 Coverage_{i,FPE} + b_8 Dispersion_{i,t,FPE} + b_9 Horizon_{i,t,FPE} + FirmFE + YearFE + e_{i,d} \quad (3)$$

$\%\Delta InformationAsymmetry_{i,d}$ is a measure for the change in information asymmetry from the two days that precede the earnings forecast to the day of the earnings forecast and the following day. We use three different measures of information asymmetry: *Bid-Ask-Spread*, *Depth,* and *PriceImpact*. *Bid-Ask-Spread* is the scaled bid-ask spread on trading day *d*. *Depth* is the average daily quoted depth. *PriceImpact* is the average daily price impact, which is measured as the daily average of price movement per dollar size of every trade. The three measures are constructed using variables obtained from the TAQ database. Our coefficient of interest, b_1, captures the incremental impact of a TR Research report on information asymmetry relative to I/B/E/S-only estimates. We include the change in daily stock price ($\%\Delta Price$) to control for market makers' processing costs (Stoll, 1978), prior quarter (*t*-1) average daily turnover (*Turnover*) to control for the liquidity of the firm's shares, which affects inventory holding costs (Demsetz, 1968), and prior quarter average return volatility (*RetVolatility*), in addition to firm size (*LnSize*) to control for inventory risk. All other variables are as previously defined. In the regressions that include $\%\Delta Bid\text{-}Ask\text{-}Spread$ ($\%\Delta Depth$) as dependent variables, we include $\%\Delta Depth$ ($\%\Delta Bid\text{-}Ask\text{-}Spread$) to control for the market maker's alternative protection mechanism against inventory risk or information asymmetry. As discussed above, all else equal, if more accurate, higher quality estimates are reflected in prices, information asymmetry will decline when those estimates are released; on the other hand, if only a subset of investors consume such estimates, information asymmetry may increase.

5. Results

5.1 Descriptive statistics

Table 1 provides descriptive statistics for our main variables split into I/B/E/S-only estimates and estimates that are either exclusive to TR Research or appear on both dissemination

channels. Panel A provides the results for annual estimates and panel B provides the results for quarterly estimates. For brevity, we limit our discussion to annual estimates. The mean accuracy (i.e., price-scaled forecast error multiplied by 100) for I/B/E/S-only estimates is -4.056 and the mean accuracy for TR research estimates is -2.430. The difference, -1.626, is statistically and economically significant (t-statistic = -22.54). Because higher values represent higher accuracy, the results suggest that TR estimates are more accurate, consistent with our main hypothesis. The average market reaction (*AbsCAR*) to TR Research estimates is 0.041, compared to 0.039 for I/B/E/S-only estimates. The difference, -0.002 (t-statistic = -10.47), suggests TR Research estimates have more information content. The mean bias is -2.792 for I/B/E/S-only estimates and -1.271 for TR Research estimates, where negative values represent optimism and positive values represent pessimism. The economically and statistically significant difference of -1.521 (t-statistic = -20.76) implies TR research estimates are less biased, also consistent with our main hypothesis.

We also find that TR Research estimates are not as bold as I/B/E/S-only estimates, are more common among bulge bracket brokerage houses, and are more common at shorter forecasting horizons. TR Research estimates are issued by more experienced analysts that cover fewer firms compared to I/B/E/S-only estimates. TR Research estimates are more likely to be issued when the information environment is superior, as measured by the number of analysts covering the firm (*Coverage*) and when forecast dispersion is lower (the average dispersion is 0.338 for TR Research estimates and 0.426 for I/B/E/S-only estimates). Lastly, TR Research estimates are less common for loss firms, among star-analysts, and for firm-periods with share or debt issuances. Inferences based on medians or quarterly estimates are generally consistent with our findings for the annual sample means.

5.2 Main results

Table 2 provides the descriptive statistics for accuracy and bias based on the dissemination channel (with annual forecasts in Panel A and quarterly forecasts in panel B). For brevity, we discuss the results for the annual forecasts, but quarterly results are similar. I/B/E/S-only estimates are the most prevalent and represent 67.7 percent of the sample. Within the sample of TR Research estimates, 37.7 percent are exclusive to TR Research and 62.3 percent appear on both dissemination channels. The mean accuracy of I/B/E/S-only estimates is -4.056, compared to a mean of -2.430 for TR Research estimates, indicating TR Research estimates are more accurate. When we partition TR Research estimates to estimates that are exclusive to TR Research and to estimates that appear on both TR Research and I/B/E/S, estimates disseminated through both channels are slightly more accurate. Importantly, when TR Research-only estimates are added to the estimates from I/B/E/S, mean accuracy improves from -4.056 to -3.531.

The second part of Panel A of Table 2 provides the descriptive statistics for bias. The mean bias for I/B/E/S-only estimates of -2.792 represents optimism and is consistent with the findings in the literature. The optimistic bias of TR Research estimates is more than 50 percent lower with a mean of -1.271. When we decompose TR Research estimates to estimates that appear exclusively on TR research and to estimates that appear on both platforms, we find that estimates that appear on both platforms are slightly less biased. Overall, descriptive statistics from Table 2 provide preliminary support for our first hypothesis that brokerage houses and data distributors segment the market and provide superior estimates through the incrementally costly TR Research dissemination channel.

Table 3 provides the regression results from the estimation of equation 1, which controls for potentially confounding factors. Columns 1-3 examine bias, and columns 4-6 examine accuracy. The results for our base model (i.e., the specification without controls) in column 1 convey the same message from the univariate results in Table 2. The intercept, which captures I/B/E/S-only estimates, is -2.792 (t-statistic = -13.61) and reflects optimistic bias. The coefficient estimate on *TR-Research* is positive, with a value of 1.521 (t-statistic = 7.82), suggesting TR Research estimates are less optimistically biased than I/B/E/S-only estimates.

We obtain similar inferences when we introduce control variables in column 2. Note that the intercept in columns 2 and 3 cannot be interpreted in the same manner as in column 1 because of the additional control variables. The mean bias for I/B/E/S-only firms incorporates the interaction of the control variables with their means, which we calculate at the bottom of the table. The conditional mean of the bias of I/B/E/S-only estimates is -2.240, again an optimistic bias. The coefficient estimate on *TR-Research* is positive and significant (coefficient estimate = 0.427; t-statistic = 3.36), which suggests that, consistent with our predictions, TR Research estimates are less biased than I/B/E/S-only estimates. We also find that higher analyst dispersion is associated with a higher optimistic bias and bold estimates are less optimistic. Finally, loss-firms, the issuance of debt or shares, and write-offs are associated with optimism, as well as the analyst's general experience. The results are qualitatively unchanged when we introduce firm and year fixed effects in column 3.

We provide the results for accuracy in columns 4-6. The results for the base model (i.e., without controls) in column 4 are consistent with the descriptive statistics presented in Table 2 and suggest that TR Research estimates are more accurate than I/B/E/S-only estimates. The results are qualitatively unchanged when we incorporate control variables in column 5. Higher values of

accuracy represent more accurate forecasts. The coefficient estimate on *TR-Research* is 0.398 (t-statistic = 3.17), which implies that TR Research estimates are more accurate than I/B/E/S estimates after controlling for factors that may be associated with forecast accuracy. Consistent with prior studies, forecast horizon and dispersion are associated with lower accuracy, as well significant events incurred by firms such as loss years, write-offs, and debt or share issuances. We obtain similar inferences when include firm and year fixed effects in column 6.

Panel B provides the results using quarterly data. Inferences are similar, albeit marginally less significant. Overall, the results in tables 2 and 3 suggest TR Research estimates are more accurate and less optimistically biased. These results are consistent with our primary hypothesis that suggests brokerage houses and data distributors create market segmentation and price differentiation strategies for the distribution of forward-looking financial data.

5.3 The market reaction to analyst estimates and dissemination channel choice

Table 4 provides the results for our second hypothesis. The dependent variables in columns 1 and 2 (3 and 4) capture directional (unsigned) market reactions. Our tests also vary the market reaction windows. The market reaction window in columns 1 and 3 (2 and 4) is from the day prior to the forecast date to the date after the forecast date (the forecast date and the day that follows). Because the results are qualitatively similar across all specifications, we discuss the results in column 1. The coefficient estimate on *Revision* is 0.006 (t-statistic = 7.40), which implies the market reacts to the news incorporated in the earnings estimate. The coefficient estimate on the interaction term *Revision*TR-Research* is 0.020 (t-statistic = 6.49), which implies estimates that are disseminated through TR Research contain more information. As indicated earlier, note that the results can be driven by the dissemination choice or by the qualitative information that is only

available in the written report. In other words, while the results are consistent with investors assigning more value to estimates that are distributed through TR Research due to their accuracy, it is also possible that the greater information content of TR Research estimates is attributable to the qualitative information available in the written report. We present the results using quarterly estimates in Panel B; inferences are qualitatively unchanged.

5.4 Analyst estimates dissemination channel and information asymmetry

We provide the results for testing our third hypothesis in Table 5. Panel A presents he results for annual forecasts and panel B presents the results for quarterly forecasts. Amiram et al. (2016) finds that analyst forecasts decrease information asymmetry. We follow their methodology and include three measures of information asymmetry: (1) bid-ask spread, (2) depth, and (3) price impact. Our dependent variables capture the change in those variables from the two days prior to the analyst forecast to the day of the forecast and the following day. The coefficient estimate on *TR-Research* in column 1 is 0.003 (t-statistic = 2.21), which suggests that the reduction in information asymmetry is lower for the more exclusive TR Research estimates consumed by premium investors. These results are consistent with an informational advantage realized by the subset of investors who access the more exclusive and incrementally costly TR Research dissemination channel.

We find consistent results when we use the percent change in depth as the dependent variable. Market makers can reduce the depth in response to increased information asymmetry to protect against price and inventory risk. The coefficient estimate on *TR-Research* is -0.010 (t-statistic = -2.08), which suggests a lower reduction in information asymmetry following analyst forecasts that are disseminated through the incrementally costly TR Research dissemination

channel. We obtain similar inferences when we use the change in price impact as the dependent variable. Note that we obtain statistically insignificant coefficient estimates on our main variables of interest when we examine quarterly estimates in Panel B. Amiram et al. (2016) find that the reduction in information asymmetry is higher immediately following earnings announcements. Since our sample selection process eliminates estimates with proximity to the annual earnings announcement dates for annual data and estimates with proximity to quarterly earnings announcement dates for quarterly data, the lack of results for the quarterly data could be a manifestation of fewer estimates that immediately follow quarterly earnings announcements. Overall, the results in Table 5 suggest that estimates that are distributed through TR Research lead to a lower reduction in information asymmetry. These results are consistent with the exclusive nature of the TR Research dissemination channel, which provides an informational advantage to investors that are willing and able to obtain it.

6. Conclusion

We investigate the distribution channels of analyst estimates and whether the mode of distribution affects their usefulness to investors. The prevalent use of analyst estimates extracted from I/B/E/S is limited by the source of information which, although convenient and accessible, may not reflect the most reliable analyst estimates. Analysts do not always update their estimates consistently across different distribution channels. Because investors pay an incremental fee for TR Research estimates and these estimates are accompanied by a verification mechanism, we predict that the estimates on that platform will be of higher quality compared to those exclusively on I/B/E/S. This is striking because I/B/E/S is the most widely used academic database for analysts' estimates and is believed to contain the entire universe of such estimates. Our study

focuses on the different channels of forecast data distribution to examine whether the characteristics and market implications of estimates differ across channels in predictable ways.

In this study, we contrast estimates obtained from I/B/E/S with estimates that are extracted from the TR Research channel. TR Research contains complete analyst reports, and unlike I/B/E/S which receives the estimates on a voluntary basis for free, TR Research acquires the analyst reports from the brokerage houses for a fee from various brokerages. In addition, low quality brokerages incur both preparation and reputation costs if they disseminate estimates through TR Research. As a result, we expect and find that TR Research contains analyst estimates that are of higher quality than those provided by I/B/E/S.

Our findings our threefold. First, the evidence we present suggests that the mean bias and accuracy varies by distribution channel and that estimates that are disseminated through the more costly TR Research dissemination channel are more accurate and less biased. Second, we find that TR Research estimates generate a higher market reaction relative to I/B/E/S-only estimates. Finally, we find that TR Research estimates lower information asymmetry to a lesser extent than I/B/E/S-only estimates, which is consistent with the exclusivity of those estimates that allow a subset of investors an informational advantage.

Our study contributes to our understanding of the flow of information within capital markets. In contrast to the notion that all earnings estimates and analyst research are homogeneously and simultaneously available to all investors, we demonstrate evidence consistent with brokerage houses employing a selective distribution strategy. Further, our results suggest that forward-looking information available through a more costly distribution channel exhibits higher quality and appears more valuable to investors who access it.

REFERENCES

Abarbanell, J., and R. Lehavy, 2000. Differences in commercial database reported earnings: Implications for inferences concerning analyst forecast rationality, the association between prices and earnings, and firm reporting discretion. University of North Carolina Mimeo.

Akbas, F., S. Markov, M. Subasi, and E. Weisbrod, 2018. Determinants and consequences of information processing delay: Evidence from the Thomson Reuters Institutional Brokers' Estimate System. *Journal of Financial Economics*, 127(2), pp.366-388.

Amiram, D., E. Owens, and O. Rozenbaum, 2016. Do public disclosures increase or decrease information asymmetry? New evidence from analyst forecast announcements. *Journal of Accounting and Economics* 62(1), pp.121-138.

Asquith, P., M.B. Mikhail, and A.S. Au, 2005. Information content of equity analyst reports. *Journal of Financial Economics*, 75(2), pp.245-282.

Bagnoli, M., M.D. Beneish, and S.G. Watts, 1999. Whisper forecasts of quarterly earnings per share. *Journal of Accounting and Economics*, 28(1), pp.27-50.

Beyer, A. and I. Guttman, 2011. The effect of trading volume on analysts' forecast bias. *The Accounting Review*, 86(2), pp.451-481.

Bhattacharya, N., A. Sheikh, and S.R. Thiagarajan, 2006. Does the market listen to whispers? *The Journal of Investing*, 15(1), pp.16-24.

Bloomfield, R., 2002. The incomplete revelation hypothesis and financial reporting. *Accounting Horizons* 16, pp.233-243.

Brown, L., and A. Hugon, 2008. Team earnings forecasting. *Review of Accounting Studies* 14(4), pp.587-607.

Campbell, D., 2015. Wall Street cracks down on free sharing of analysts' notes. Bloomberg.com, September 22. Available at http://www.bloomberg.com/news/articles/2015-09-22/what-s-an-analyst-report-worth-wall-street-is-about-to-find-out.

Coller, M., and T. Yohn, 1997. Management forecasts and information asymmetry: An examination of bid-ask spreads. *Journal of Accounting Research*, 35, pp.181-191.

Demsetz, H., 1968. The cost of transacting. *Quarterly Journal of Economics,* 82, pp. 33-53.

Diamond, D.W., and R.E. Verrecchia, 1991. Disclosure, liquidity, and the cost of capital. *The Journal of Finance* 46(4), pp.1325-1359.

Dye, R.A., and S.S. Sridhar, 2004. Reliability-relevance trade-offs and the efficiency of aggregation. *Journal of Accounting Research*, 42(1), pp.51-88.

Fischer, P.E., and R.E. Verrecchia, 2000. Reporting bias. *The Accounting Review*, 75(2), pp.229-245.

Green, C.T., 2006. The value of client access to analyst recommendations. *Journal of Financial and Quantitative analysis* 41(1), pp.1-24.

Harris, M., and R.M. Townsend, 1981. Resource allocation under asymmetric information. *Econometrica*, 49(1), pp. 33-64.

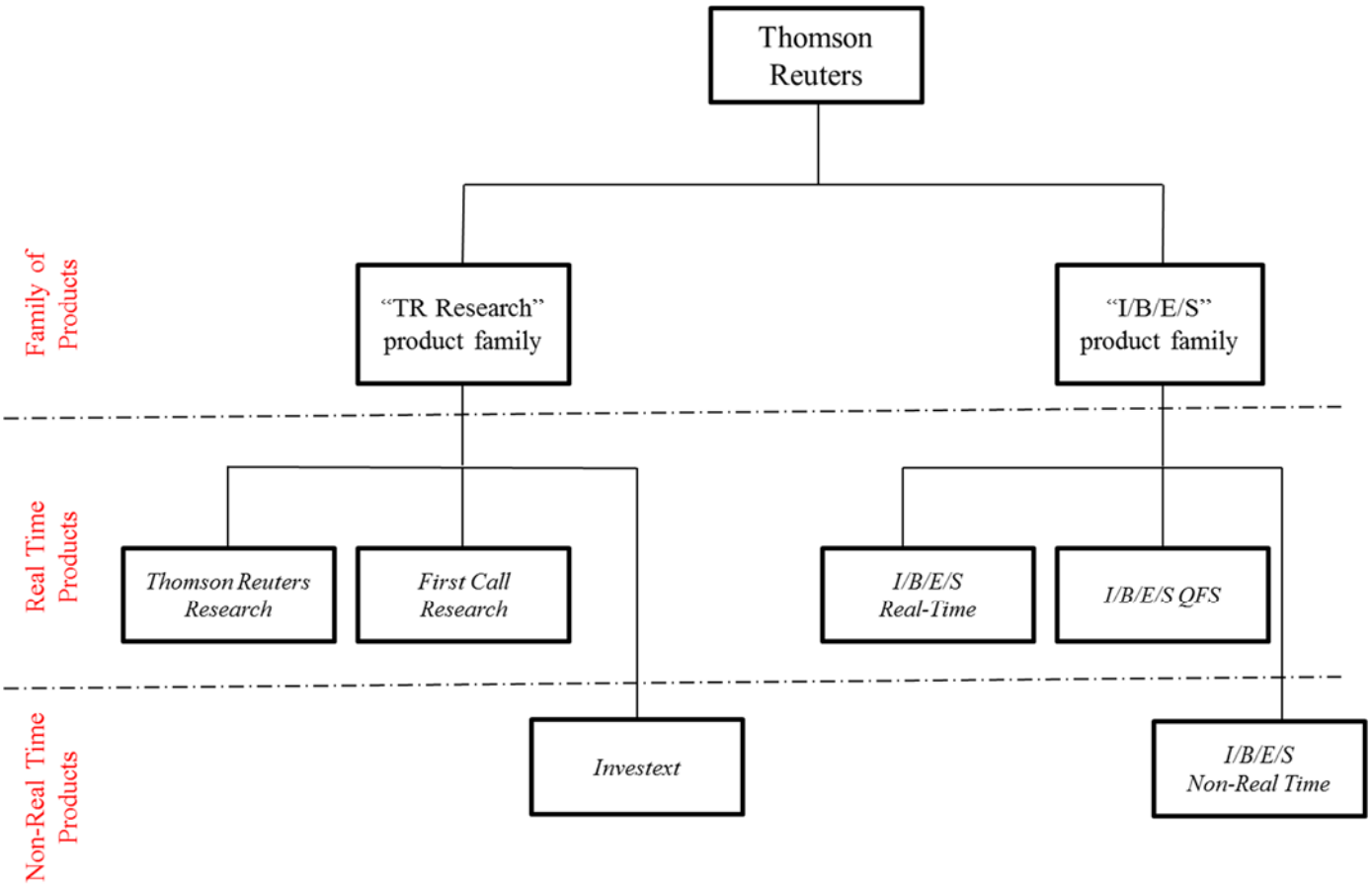
Holden, C., and S. Jacobsen, 2014. Liquidity measurement problems in fast, competitive markets: expensive and cheap solutions. *Journal of Finance*, 69, pp.1747-1785.

Jacob, J., S. Rock, and D.P. Weber, 2008. Do non-investment bank analysts make better earnings forecasts? *Journal of Accounting, Auditing and Finance*, 23(1), pp.23-61.

Jackson, A.R., 2005. Trade generation, reputation, and sell-side analysts. *The Journal of Finance*, 60(2), pp.673-717.

Jame, R., R. Johnston, S. Markov, and M. Wolfe, 2016. The value of crowdsourced earnings forecasts. *Journal of Accounting Research*, 54(4), pp. 1077-1110.
Kacperczyk, M., J.B. Nosal, and L. Stevens, 2014. Investor sophistication and capital income inequality (No. w20246). National Bureau of Economic Research.
Krinsky, I., and J. Lee, 1996. Earnings announcements and the components of the bid-ask spread. *The Journal of Finance*, 51, pp.1523-1535.
Lang, M.H. and R.J. Lundholm, 1993. Cross-sectional determinants of analysts' ratings of corporate disclosure. *Journal of Accounting Research* 31, pp.246-271.
Lee, C., B. Mucklow, and M. Ready, 1993. Spreads, depths, and the impact of earnings information: An intraday analysis. *Review of Financial Studies*, 6, pp.345-374.
Liew, J.K.S., S. Guo, and T. Zhang, 2015. Tweet sentiments and crowd-sourced earnings estimates as valuable sources of information around earnings releases. *The Journal of Alternative Investments*, 19(3), pp. 7-26.
Mozes, H., 2003. Accuracy, usefulness and the evaluation of analysts' forecasts. *International Journal of Forecasting*, 19, pp.417−434.
Philbrick, D., and W. Ricks, 1991, Using Value Line and I/B/E/S Analyst Forecasts in Accounting Research, *Journal of Accounting Research*, 29, pp.397-417.
Phillips, Robert Lewis. *Pricing and revenue optimization*. Stanford University Press, 2005.
Ramnath, S., S. Rock, and P.B. Shane, 2008. Financial analysts' forecasts and stock recommendations: A review of the research. *Foundations and Trends in Finance*, 2(4), pp.311-421.
Rees, L., and D. Adut, 2005. The effect of Regulation Fair Disclosure on the relative accuracy of analysts' published forecasts versus whisper forecasts. *Advances in Accounting*, 21, pp.173-197.
Smith, W.R., 1956. Product differentiation and market segmentation as alternative marketing strategies. *The Journal of Marketing*, 21(1), pp. 3-8.
Stoll, H., 1978. The pricing of security dealer services: An empirical study of NASDAQ stocks. *Journal of Finance*, 33(4), pp.1153-1172.
Turner, M., and R. Levy, 2017. Morgan Stanley made an error analyzing Snapchat, and it shines a light on some big flaws in Wall Street research. *Business Insider*, April 4.
Varian, H.R., 1989. Price discrimination. In *Handbook of Industrial Organization*, 1, pp. 597-654.
Wedel, M., and W.A. Kamakura, 2012. *Market segmentation: Conceptual and methodological foundations* (Vol. 8). Springer Science & Business Media.

Appendix A - Thomson Reuters distribution channels

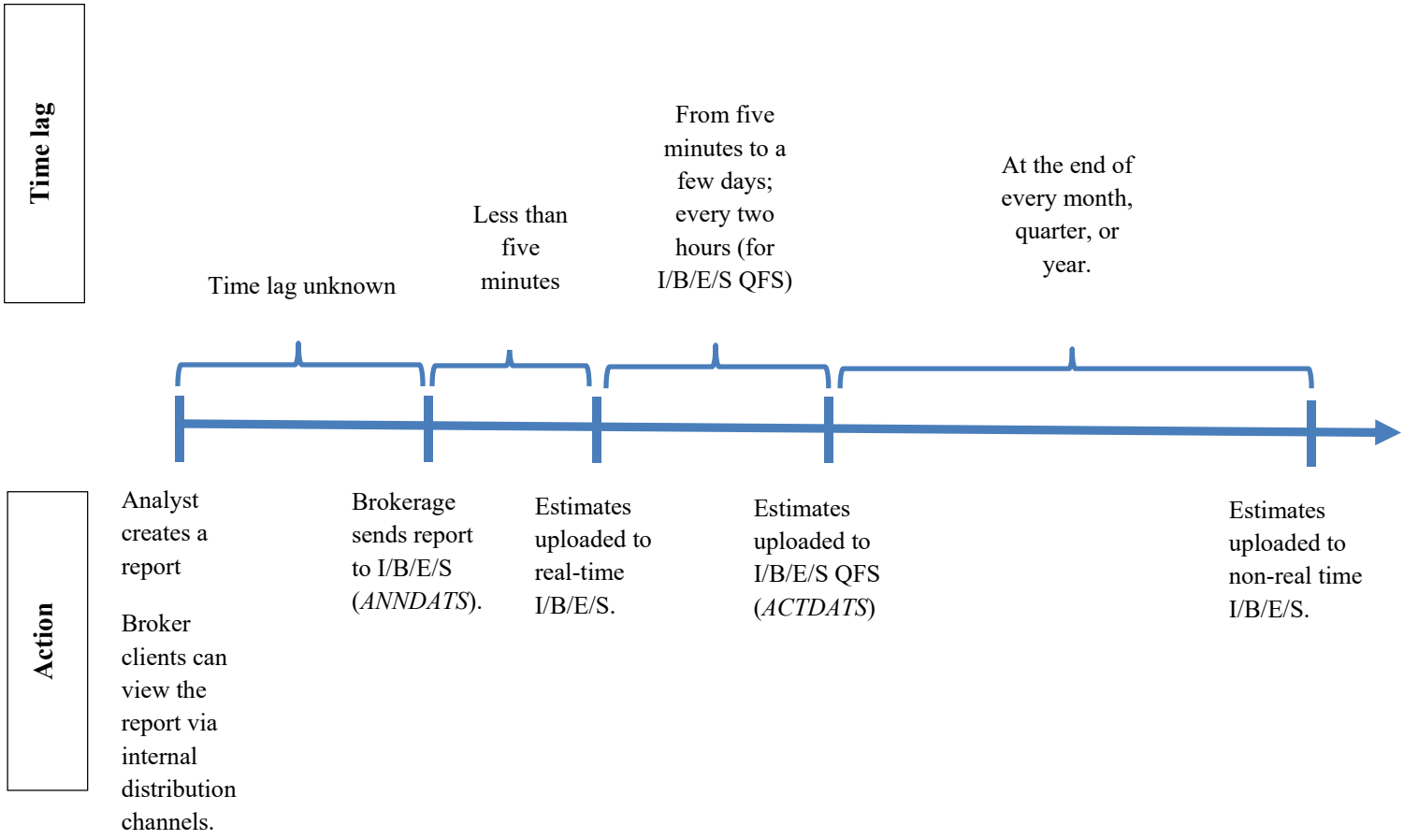


Notes:

I/B/E/S Real-Time is a Thomson Reuters information delivery platform in which estimates are disseminated immediately when Thomson Reuters receives the estimates.

I/B/E/S QFS (Quantitative File System) is a Thomson Reuters information delivery platform in which estimates can be disseminated with a delay by a period ranging from 5 minutes to a few days. The delay period is determined through an agreement between Thomson Reuters and each individual brokerage house.

Appendix B – Timeline of I/B/E/S estimates distribution



Appendix C – Variable definitions

$AbsCAR_{i,t}$	The absolute value of firm *i*'s cumulative abnormal return over the three day window around the analyst report date *t.* Abnormal return is calculated as firm return less the value-weighted market return.
$Accuracy_{i,BH,FPE,t,Group}$	The absolute value of the bias. It is defined as $\lvert Bias_{i,BH,FPE,t,Group} \rvert$ *-1.
$\%\Delta Bid\text{-}Ask\ Spread_{i,d}$	The percent change in firm *i*'s bid-ask spread in the two days starting on forecast day *d* relative to the two previous trading days. Firm *i*'s bid-ask spread in basis points on trading day *d* is measured as the mean daily bid minus ask, scaled by the midpoint. We use the consolidated quotes files from the TAQ database. The mean bid-ask spreads are calculated during regular trading hours, from 9:30am to 4:00pm.
$Bias_{i,BH,FPE,t,Group}$	The forecast error of the estimate by broker house *BH* issued on day *t* for firm *i*'s fiscal period end *FPE. Group* indicates whether the estimate was either on I/B/E/S-only or TR Research. *FE* is defined as $100*(Actual_{i,FPE} - Estimate_{i,BH,FPE,t,Group})/Price_{i,FPE-1}$. $Actual_{i,FPE}$ is the I/B/E/S actual EPS value from the I/B/E/S unadjusted detail file. $Price_{i,FPE-1}$ is firm *i*'s stock price on the date of the previous fiscal period end.
$Boldness_{i,BH,FPE,t}$	The absolute value of the percent difference between brokerage house *BH* estimate for firm *i*'s fiscal period end, *FPE*, on estimate date *t* and the prevailing consensus estimate. The consensus is the prevailing consensus on the day prior to the estimate, and is calculated as the weighted average, by the age of the estimate, of all analysts' latest estimates for firm *i*'s fiscal quarter *FPE*.
$Book\text{-}to\text{-}Market_{i,FPE}$	Firm *i*'s book-to-market ratio at the end of the prior fiscal period.
$Bulge_{BH,t}$	An indicator variable equal to one if brokerage house *BH* is a bulge bracket firm, and zero otherwise. Bulge bracket firms include: Bank of America Merrill Lynch, Barclays, Bear Stearns, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, J.P. Morgan, Lehman Brothers, Morgan Stanley, UBS.
$CAR_{i,t}$	The cumulative absolute abnormal return for firm *i* in the three days around day *t*.
$Coverage_{i,FPE}$	The number of analysts covering firm *i* in the year ending on the fiscal period end *FPE*.
$\%\Delta Depth_{i,d}$	The percent change in firm *i*'s quoted depth from the two days prior to day *d* to days *d* and *d+1*. Firm *i*'s quoted depth on trading day *d* is measured as the mean bid size plus offer size. Bid size and offer size represent 100 share lots. We use the consolidated quotes files from the TAQ database. The mean quoted depth is calculated during regular trading hours, from 9:30am to 4:00pm.
$Dispersion_{i,t,FPE}$	The standard deviation of all outstanding estimates by all analysts covering firm *i* as of day *t* for fiscal period *FPE.*

Firms Covered	The number of firms covered by an analyst in the six months surrounding the forecast date.
General Experience	The number of years from the date an analyst first appears on I/B/E/S to the forecast date.
$Horizon_{i,t}$	The difference in months between the estimate date, *t*, and firm *i*'s earnings announcement.
$InformationAsymmetry_{i,d}$	Takes the value of either *Bid-Ask Spread, Depth,* or *Price Impact* for firm *i* on day *d*, depending on the specification.
$LnSize_{i,t}$	The log of the market value of firm *i* at the end of the prior fiscal period.
$Loss_{i,FPE}$	An indicator variable equal to 1 if firm *i* experienced a loss in fiscal period *FPE* and 0 otherwise.
$Momentum_{i,t}$	Firm *i*'s returns in the year ending 5 days prior to the forecast date *t*.
$\%\Delta Price_{i,d}$	The percent change in firm *i*'s stock price from days *d-2* and *d-1* to days *d* and *d+1*, obtained from the daily CRSP file.
$\%\Delta PriceImpact_{i,d}$	The percent change in the transaction-based dollar price impact from the two days prior to the forecast date *d* to the two days starting on day *d*. The average transaction-based dollar price impact is based on all trades in firm *i*'s stock on day *d* (multiplied by 100). The price impact of the k^{th} trade is computed as $2*\|M_{k+5} - M_k\|$, where M_{k+5} is the midpoint of the bid and offer five minutes after the midpoint M_k (Holden and Jacobsen, 2014).
$Revision_{i,t,BH}$	The estimate provided by brokerage house *BH* for firm *i* on day *t* minus the consensus on the prior day scaled by firm *i*'s stock price on day *t*-2.
$Size_{i,FPE}$	Log of firm *i*'s total assets at the end of the prior fiscal period.
$Star\ Analyst_{a,t}$	An indicator variable that equals one if the analyst was on the *Institutional Investor* All-America research team in the three calendar years around the report date *t*, and zero otherwise.
$Stock/Debt\ Issuance_{i,FPE}$	An indicator variable equal to 1 if firm *i* issued shares or debt in the fiscal period ending *FPE* and 0 otherwise.
$TR\ Research_{i,BH,FPE}$	An indicator variable equal to one if the estimate by brokerage house *BH* for firm *i*'s fiscal period end *FPE* is available on TR Research, and 0 otherwise.
$Timeliness_{i,BH,t}$	The timeliness of the estimate by brokerage house *BH* issued on day *t* for firm *i*, calculated as the number of days between the immediately preceding estimate and the estimate of interest, divided by the number of days between the immediately succeeding estimate and the estimate of interest (Brown and Hugon, 2008).
$Turnover_{i,t}$	Average daily stock turnover of firm *i* during fiscal quarter containing day *t*.

$Volatility_{i,t}$	Firm *i*'s return volatility, defined as the standard deviation of firm *i*'s daily stock return during the fiscal quarter containing day *t*.
$\%\Delta Volume_{i,t}$	The percent change in trading volume of firm *i* in the two days beginning on forecast date *d* relative to the two prior trading days.
$Write\text{-}offs_{i,FPE}$	An indicator variable equal to 1 if firm *i* recorded a write-off in the fiscal period ending on *FPE* and 0 otherwise.

Appendix D – The hand collection procedures

D.1 Details on the hand collection process and quality assurance

The first step of the data collection process involves downloading all analyst reports and creating an Excel file that catalogs the reports. TR Research allows users to download analyst reports and an Excel file with general information on the reports in groups of 50 reports. Exhibit A shows an example of the Excel file generated by TR Research and Exhibit B shows an example of the first page of the analyst report, which generally contains the earnings estimates. The next step is to fill in additional columns in the Excel file for the inclusion of the earnings estimates. We add columns for recording the quarterly and annual EPS actuals from the previous year, the quarterly and annual EPS estimates for the current year, the annual EPS estimates for the subsequent year, and a comments column to record irregularities that require attention.[20]

The hand collection process follows two steps.[21] The first step is to identify the current fiscal year. Most reports indicate the prior year by adding "A" next to the year heading. Similarly, the current year is identified by adding the letter "E" next to the year heading. After the identification of the current and prior fiscal year, the EPS estimates need to be transcribed from the report to the Excel file. Exhibits B and C show how the EPS estimates are mapped from the analyst report to the Excel file.

Analyst estimates are collected for one firm at a time. Once all reports for a given firm are collected, we randomly sample multiple observations and compare them against the analyst reports to ensure accuracy. We also examine the comments column to see whether issues are raised by the

[20] Examination of an extensive number of analyst reports suggests that most brokerage houses follow the disclosure policy of providing quarterly estimates for the current year only.

[21] We employ several research assistants for the hand collection process. The research assistants are tested on a sample template in which they need to hand collect the earnings estimates for 25 reports of varying complexity. This ensures that the research assistants understand the task at hand before the actual hand collection takes place.

research assistant and investigate as needed. Next, we browse through the estimates to check if any of the EPS estimates or actuals are obviously anomalous, in which case we compare the data to the values on the analyst report. Finally, we perform standard outlier identification procedures based on distributional properties and correct or remove obviously erroneous data. Estimates that appear both on I/B/E/S and on TR research have two values; one from our hand collection and another from I/B/E/S. We test and find that the TR research estimates are not statistically different from their I/B/E/S counterparts, which provides some level of comfort that our hand collection procedures are effective.

D.2 Matching the observations on I/B/E/S and TR Research and identifying estimate horizon

We match I/B/E/S and TR Research reports based on the brokerage house, firm, and whether the date of the analyst report from TR Research is within a five-day window around the I/B/E/S estimate date (ANNDATS). If the brokerage house name cannot be matched, we conduct a search based on the analyst name, since it may be possible for the two channels to name a single brokerage house differently.[22] The matching is done manually to ensure that technical name differences will not hinder the matching process.

We identify the estimate period end of each estimate by comparing the report date to the date of the last earnings announcement. For example, if the report was issued on April 17, 2010 and the Q1 results were announced on April 10, 2010, we can infer that the current year is 2010 and the current quarter is Q2. Consequently, Q1 current will be the actual EPS for the fiscal quarter ending on March 31, 2010, Q2 current will be the EPS estimate for the fiscal quarter ending on June 30, 2010, Q3 current will be the EPS estimate for the fiscal quarter ending on September 30,

[22] Discrepancies in the brokerage house names across the channels can occur when mergers occur and brokerage house names are changed.

2010, and lastly, Q4 current will be the EPS estimate for the fiscal quarter ending on December 31, 2010. The identification of the fiscal period ends of the annual data follows the same process. This process results in a database that has a format and structure similar to the I/B/E/S unadjusted EPS detail file.

Table 1: Descriptive statistics based on dissemination channel

Table 1 presents the means and median values for our main variables of interest for estimates that are exclusive to I/B/E/S (*I/B/E/S-only*) and estimates that appear on TR Research. Variable definitions are provided in Appendix C.

Panel A: Annual Forecasts

	Means					Medians				
	I/B/E/S-only	*TR Research*	Difference	t-stat	p-value	*I/B/E/S-only*	*TR Research*	Difference	t-stat	p-value
Accuracy	-4.056	-2.430	-1.626	-22.54	<.0001	-0.803	-0.624	-0.179	-24.19	<.0001
AbsCAR	0.039	0.041	-0.002	-10.47	<.0001	0.024	0.026	-0.002	-6.94	<.0001
Boldness	0.182	0.163	0.019	7.16	<.0001	0.054	0.042	0.012	20.08	<.0001
Bulge	0.357	0.436	-0.079	-29.69	<.0001	0.000	0.000	0.000	1.72	0.086
Coverage	20.995	21.455	-0.460	-8.40	<.0001	21.000	21.000	0.000	6.43	<.0001
Dispersion	0.426	0.338	0.088	25.03	<.0001	0.211	0.163	0.048	35.28	<.0001
Bias	-2.792	-1.271	-1.521	-20.76	<.0001	-0.030	0.016	-0.046	-9.94	<.0001
Firms Covered	16.088	15.279	0.809	19.50	<.0001	15.000	15.000	0.000	2.06	0.040
General Experience	12.878	13.544	-0.666	-15.05	<.0001	13.208	14.619	-1.411	-15.90	<.0001
Horizon	439.972	370.923	69.049	52.01	<.0001	422.000	366.000	56.000	27.21	<.0001
Stock/Debt Issuance	0.315	0.255	0.060	21.99	<.0001	0.135	0.122	0.013	13.34	<.0001
Loss	0.134	0.116	0.018	9.71	<.0001	0.000	0.000	0.000	1.38	0.169
Momentum	0.001	0.022	-0.021	-8.04	<.0001	0.061	0.072	-0.011	-4.44	<.0001
Star Analyst	0.243	0.204	0.039	16.8	<.0001	0.000	0.000	0.000	1.63	0.104
Timeliness	1.086	0.927	0.159	14.06	<.0001	0.328	0.143	0.185	31.70	<.0001
Write-offs	-0.003	-0.003	0.000	1.63	0.1022	0.000	0.000	0.000	-0.18	0.859
	102,277	48,834	53,443			102,277	48,834	53,443		

Panel B: Quarterly Forecasts

	Means					Medians				
	I/B/E/S-only	*TR Research*	Difference	t-stat	p-value	*I/B/E/S-only*	*TR Research*	Difference	t-stat	p-value
Accuracy	-0.973	-0.659	-0.314	-12.87	<.0001	-0.211	-0.169	-0.042	-20.60	<.0001
AbsCAR	0.040	0.042	-0.002	-5.74	<.0001	0.025	0.026	-0.001	-5.00	<.0001
Boldness	0.244	0.211	0.033	9.44	<.0001	0.074	0.056	0.018	28.24	<.0001
Bulge	0.358	0.456	-0.098	-36.24	<.0001	0.000	0.000	0.000	1.61	0.107
Coverage	22.758	22.557	0.201	4.20	<.0001	22.000	21.000	1.000	>100	<.0001
Dispersion	0.087	0.074	0.013	21.89	<.0001	0.048	0.038	0.010	31.25	<.0001
Bias	-0.502	-0.246	-0.256	-10.95	<.0001	0.016	0.023	-0.007	-4.85	<.0001
Firms Covered	15.806	15.361	0.445	11.33	<.0001	15.000	15.000	0.000	0.62	0.537
General Experience	12.857	13.683	-0.826	-18.44	<.0001	13.115	14.847	-1.732	-19.85	<.0001
Horizon	164.174	144.007	20.167	38.90	<.0001	163.000	127.000	36.000	35.78	<.0001
Stock/Debt Issuance	0.577	0.552	0.025	5.58	<.0001	0.300	0.277	0.023	8.90	<.0001
Loss	0.146	0.126	0.020	10.41	<.0001	0.000	0.000	0.000	1.33	0.183
Momentum	-0.010	0.017	-0.027	-10.01	<.0001	0.057	0.069	-0.012	-5.47	<.0001
Star Analyst	0.229	0.211	0.018	7.66	<.0001	0.000	0.000	0.000	1.40	0.163
Timeliness	1.090	0.969	0.121	9.85	<.0001	0.286	0.161	0.125	27.84	<.0001
Write-offs	-0.004	-0.005	0.001	5.95	<.0001	0.000	0.000	0.000	0.34	0.733
	113,696	45,044	68,652			113,696	45,044	68,652		

Table 2: Accuracy and bias by dissemination channel

Table 2 provides descriptive statistics for accuracy and bias based on dissemination channel. *I/B/E/S* represents estimates that are exclusive to I/B/E/S. *TR-Research* identifies estimates that appear on TR Research either exclusively or both on I/B/E/S and TR Research. *Exclusive TR-Research* appear only on TR research. *Both* represents estimates that appear both on I/B/E/S and TR Research and *Pooled* covers estimates for the entire sample.

Panel A: All annual forecasts						
Accuracy						
Provider	**N**	**Mean**	**Std. Dev.**	**P25**	**P50**	**P75**
I/B/E/S	102,277	-4.056	15.328	-2.452	-0.803	-0.251
TR-Research	48,834	-2.430	6.386	-1.827	-0.624	-0.188
Exclusive TR-Research	18,407	-2.540	6.641	-1.839	-0.672	-0.214
Both	30,427	-2.363	6.225	-1.823	-0.593	-0.176
Pooled	151,111	-3.531	13.145	-2.233	-0.736	-0.229
Bias						
Provider	**N**	**Mean**	**Std. Dev.**	**P25**	**P50**	**P75**
I/B/E/S	102,277	-2.792	15.538	-1.403	-0.030	0.499
TR-Research	48,834	-1.271	6.596	-0.852	0.016	0.49
Exclusive TR-Research	18,407	-1.451	6.879	-0.888	0.000	0.538
Both	30,427	-1.162	6.417	-0.826	0.021	0.467
Pooled	151,111	-2.301	13.341	-1.217	0.000	0.496

Panel B: All quarterly forecasts						
Accuracy						
Provider	**N**	**Mean**	**Std. Dev.**	**P25**	**P50**	**P75**
I/B/E/S	113,696	-0.973	5.011	-0.577	-0.211	-0.072
TR-Research	45,044	-0.659	2.026	-0.463	-0.169	-0.056
Exclusive TR-Research	17,935	-0.611	1.592	-0.426	-0.158	-0.054
Both	27,109	-0.691	2.267	-0.489	-0.175	-0.058
Pooled	158,740	-0.884	4.378	-0.543	-0.198	-0.067
Bias						
Provider	**N**	**Mean**	**Std. Dev.**	**P25**	**P50**	**P75**
I/B/E/S	113,696	-0.502	4.808	-0.234	0.016	0.196
TR-Research	45,044	-0.246	2.045	-0.151	0.023	0.179
Exclusive TR-Research	17,935	-0.253	1.607	-0.132	0.025	0.175
Both	27,109	-0.241	2.29	-0.165	0.022	0.183
Pooled	158,740	-0.43	4.214	-0.21	0.019	0.191

Table 3: Regression analyses of accuracy and bias by dissemination channel

Table 3 presents the results for estimating Eq. (1) to test whether bias and accuracy vary with the distribution channel. *TR-Research*, our variable of interest, is equal to 1 if the estimate appears on TR Research (either exclusively or both on TR Research and I/B/E/S) and zero otherwise. All variable definitions are presented in Appendix C. Robust *t*-statistics are reported in parentheses. *, **, and *** indicate significance levels (two-sided) of 10%, 5%, and 1%, respectively.

Panel A: Annual forecasts						
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Bias*	*Bias*	*Bias*	*Accuracy*	*Accuracy*	*Accuracy*
Intercept	-2.792***	4.117***	5.264***	-4.056***	3.674***	4.611***
	(-13.61)	(8.04)	(11.36)	(-20.07)	(8.25)	(10.44)
TR-Research	1.521***	0.427***	0.468***	1.627***	0.398***	0.324***
	(7.82)	(3.36)	(4.64)	(7.60)	(3.17)	(3.31)
Horizon		-0.004***	-0.005***		-0.006***	-0.006***
		(-12.68)	(-16.10)		(-18.68)	(-23.29)
Dispersion		-4.378***	-4.441***		-4.809***	-4.437***
		(-8.31)	(-8.19)		(-9.41)	(-8.26)
Boldness		2.217***	1.445***		1.027***	0.654***
		(11.18)	(10.52)		(4.87)	(5.19)
Bulge		0.238	0.238*		0.254	0.225**
		(0.96)	(1.67)		(1.22)	(1.98)
Timeliness		0.017	0.023		0.005	0.015
		(0.68)	(1.27)		(0.19)	(0.85)
Star Analyst		-0.699*	-0.218		-0.546*	-0.225
		(-1.93)	(-1.06)		(-1.77)	(-1.25)
Loss		-12.123***	-11.846***		-11.327***	-10.590***
		(-16.09)	(-18.27)		(-15.26)	(-16.56)
Write-off		-37.948***	-21.272***		-39.948***	-19.696***
		(-5.83)	(-4.12)		(-6.16)	(-3.90)
Stock/Debt Issuance		-3.278***	-6.957***		-3.328***	-6.599***
		(-6.59)	(-9.07)		(-6.82)	(-8.43)
Firms Covered		0.004	0.002		0.008	0.010
		(0.28)	(0.17)		(0.59)	(0.98)
General Experience		-0.068***	-0.020		-0.066***	-0.019
		(-3.55)	(-1.40)		(-3.66)	(-1.48)
Momentum		1.514***	-0.013		1.634***	0.275**
		(7.47)	(-0.09)		(9.25)	(2.25)
Coverage		-0.003	0.000		-0.006	-0.007
		(-0.41)	(0.06)		(-0.97)	(-0.88)
Clustered Std Errors	BH	BH	BH	BH	BH	BH
Fixed Effects	None	None	Firm,Year	None	None	Firm,Year
Observations	151,111	151,111	151,111	151,111	151,111	151,111
Adjusted R-squared	0.003	0.198	0.352	0.003	0.212	0.357
Conditional Means:						
I/B/E/S-only	-2.792	-2.240	-2.008	-4.056	-3.750	-2.976

TR-Research	-1.271	-1.813	-1.540	-2.429	-3.352	-2.652

Panel B: Quarterly forecasts

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Bias*	*Bias*	*Bias*	*Accuracy*	*Accuracy*	*Accuracy*
Intercept	-0.502***	0.597***	0.346**	-0.973***	0.428***	-0.056
	(-10.14)	(6.28)	(2.56)	(-16.80)	(4.48)	(-0.39)
TR-Research	0.257***	0.095***	0.069**	0.314***	0.098***	0.043
	(5.90)	(2.77)	(2.48)	(5.76)	(2.65)	(1.52)
Horizon		-0.002***	-0.003***		-0.003***	-0.003***
		(-13.47)	(-13.14)		(-15.44)	(-14.27)
Dispersion		-4.167***	-4.386***		-6.579***	-6.703***
		(-11.60)	(-10.47)		(-12.06)	(-8.73)
Boldness		0.215***	0.108***		-0.129***	-0.139***
		(5.73)	(2.70)		(-4.55)	(-4.50)
Bulge		-0.010	0.035		-0.009	-0.001
		(-0.22)	(1.13)		(-0.17)	(-0.03)
Timeliness		-0.001	0.002		-0.004	-0.000
		(-0.19)	(0.39)		(-0.56)	(-0.06)
Star Analyst		-0.102	-0.037		-0.105	-0.061
		(-1.01)	(-0.49)		(-1.02)	(-0.70)
Loss		-2.686***	-2.576***		-2.385***	-2.137***
		(-13.84)	(-15.20)		(-13.16)	(-13.73)
Write-off		-1.717***	-1.022***		-2.204***	-0.981***
		(-4.49)	(-3.20)		(-5.69)	(-3.17)
Stock/Debt Issuance		0.132**	-0.021		0.080	-0.024
		(2.39)	(-0.23)		(1.39)	(-0.23)
Firms Covered		-0.001	0.005		0.000	0.007**
		(-0.35)	(1.34)		(0.06)	(2.31)
General Experience		-0.012**	-0.003		-0.012**	-0.002
		(-2.07)	(-0.57)		(-2.16)	(-0.45)
Momentum		0.616***	0.262***		0.743***	0.383***
		(9.23)	(5.60)		(9.14)	(7.51)
Coverage		0.006***	0.011***		0.008***	0.022***
		(4.84)	(3.34)		(6.24)	(6.38)
Clustered Std Errors	BH	BH	BH	BH	BH	BH
Fixed Effects	None	None	Firm,Year	None	None	Firm,Year
Observations	158,740	158,740	158,740	158,740	158,740	158,740
Adjusted R-squared	0.001	0.087	0.162	0.001	0.108	0.185
Conditional Means:						
I/B/E/S-only	-0.502	-0.378	-0.544	-0.973	-0.915	-0.865
TR-Research	-0.245	-0.283	-0.475	-0.659	-0.817	-0.822

Table 4: Market reaction to analyst forecasts

Table 4 presents the results for estimating Eq. (2) to test whether the information content of analysts' estimates varies with the distribution channel. *TR-Research*, our variable of interest, is equal to 1 if the estimate appears on TR Research (either exclusively or both on TR Research and I/B/E/S) and zero otherwise. All variable definitions are presented in Appendix C. Robust *t*-statistics are reported in parentheses. *, **, and *** indicate significance levels (two-sided) of 10%, 5%, and 1%, respectively.

Panel A: Annual forecasts				
	(1)	(2)	(3)	(4)
VARIABLES	CAR [-1,1]	CAR [0,1]	ABS(CAR [-1,1])	ABS(CAR [0,1])
Intercept	0.043***	0.034***	0.067***	0.053***
	(6.97)	(7.60)	(13.09)	(11.82)
TR-Research	0.000	0.000	0.000	0.001
	(0.84)	(0.12)	(0.48)	(1.30)
Revision	0.006***	0.005***		
	(7.40)	(6.10)		
*Revision*TR-Research*	0.020***	0.017***		
	(6.49)	(6.29)		
Abs(Revision)			0.003***	0.003***
			(6.72)	(7.00)
*Abs(Revision)*TR-Research*			0.008***	0.008***
			(4.58)	(4.10)
Size	-0.005***	-0.004***	-0.001*	-0.001***
	(-7.23)	(-7.01)	(-1.91)	(-2.60)
Book-to-Market	-0.003***	-0.002***	0.010***	0.007***
	(-3.81)	(-3.38)	(13.73)	(13.03)
Coverage	-0.000***	-0.000***	0.000***	0.000***
	(-5.03)	(-4.77)	(7.98)	(8.28)
Dispersion	-0.002***	-0.001**	0.006***	0.004***
	(-4.34)	(-2.57)	(10.22)	(9.54)
Clustered Std Errors	BH	BH	BH	BH
Fixed Effects	Firm,Year	Firm,Year	Firm,Year	Firm,Year
Observations	150,129	150,129	150,129	150,129
Adjusted R-squared	0.027	0.021	0.164	0.147

Panel B: Quarterly forecasts

VARIABLES	(1) CAR [-1,1]	(2) CAR [0,1]	(3) ABS(CAR [-1,1])	(4) ABS(CAR [0,1])
Intercept	0.061***	0.055***	0.061***	0.047***
	(6.42)	(7.73)	(7.54)	(7.36)
TR-Research	0.001	0.001	-0.000	0.000
	(1.54)	(1.37)	(-0.19)	(0.62)
Revision	0.004***	0.004***		
	(4.91)	(4.57)		
*Revision*TR-Research*	0.016***	0.011***		
	(4.31)	(3.35)		
Abs(Revision)			0.002***	0.002***
			(4.63)	(5.14)
*Abs(Revision)*TR-Research*			0.008***	0.008***
			(4.45)	(4.97)
Size	-0.007***	-0.006***	-0.001	-0.001
	(-5.89)	(-6.75)	(-0.49)	(-0.94)
Book-to-Market	0.012***	0.010***	0.005***	0.004***
	(8.73)	(8.46)	(3.72)	(4.35)
Coverage	-0.001***	-0.000***	0.000***	0.000***
	(-7.65)	(-6.30)	(3.84)	(4.73)
Dispersion	-0.031***	-0.019***	0.042***	0.034***
	(-7.70)	(-4.88)	(11.47)	(12.03)
Clustered Std Errors	BH	BH	BH	BH
Fixed Effects	Firm,Year	Firm,Year	Firm,Year	Firm,Year
Observations	50,066	50,066	50,066	50,066
Adjusted R-squared	0.037	0.029	0.175	0.158

Table 5: The change in information asymmetry following analyst forecasts

Table 5 presents the results for estimating Eq. (3) to test whether the change in information asymmetry following analysts' forecasts varies with the distribution channel. *TR-Research*, our variable of interest, is equal to 1 if the estimate appears on TR Research (either exclusively or both on TR Research and I/B/E/S) and zero otherwise. All variable definitions are presented in Appendix C. Robust *t*-statistics are reported in parentheses. *, **, and *** indicate significance levels (two-sided) of 10%, 5%, and 1%, respectively.

Panel A: Annual forecasts			
	(1)	(2)	(3)
VARIABLES	%ΔBid-Ask Spread	%ΔDepth	%ΔPrice Impact
Intercept	-0.478***	0.144	0.262
	(-27.45)	(1.35)	(1.61)
TR-Research	0.003**	-0.010**	0.022***
	(2.21)	(-2.08)	(2.70)
%ΔPrice	-0.182***	-0.611***	1.037***
	(-2.90)	(-2.71)	(37.39)
LnSize	0.000	0.003	-0.029*
	(0.28)	(0.46)	(-1.80)
Volatility	-1.472***	-4.237***	-0.343
	(-8.27)	(-7.79)	(-0.26)
Turnover	0.000	0.000	-0.000
	(1.21)	(0.69)	(-0.23)
%ΔDepth	-0.007***		
	(-3.72)		
%ΔVolume	0.013***	0.118***	0.177***
	(9.19)	(8.84)	(14.77)
AbsCAR	0.150***	0.281**	0.889***
	(7.64)	(2.57)	(3.82)
Coverage	-0.000***	-0.001***	-0.001***
	(-2.83)	(-2.91)	(-4.12)
Dispersion	-0.002	0.016***	-0.012***
	(-1.63)	(3.21)	(-4.56)
Horizon	0.000	0.000***	0.000
	(1.24)	(3.82)	(0.94)
%ΔBid-Ask Spread		-0.259***	
		(-7.42)	
Fixed Effects	Firm, Year	Firm, Year	Firm, Year
Clustered Std Errors	BH	BH	BH
Observations	148,240	148,240	148,238
Adjusted R-squared	0.039	0.035	0.067

Panel B: Quarterly forecasts

VARIABLES	(1) *%ΔBid-Ask Spread*	(2) *%ΔDepth*	(3) *%ΔPrice Impact*
Intercept	-0.458***	-0.295**	0.494
	(-21.18)	(-2.26)	(1.49)
TR-Research	0.001	-0.008	-0.004
	(0.53)	(-1.25)	(-0.40)
%ΔPrice	-0.173***	-0.641***	1.052***
	(-3.35)	(-3.01)	(33.41)
LnSize	0.001	0.015	-0.053
	(0.56)	(1.24)	(-1.23)
Volatility	-1.814***	-3.769***	1.859
	(-6.84)	(-5.07)	(0.52)
Turnover	0.000**	-0.000	-0.003
	(2.54)	(-0.76)	(-0.95)
%ΔDepth	-0.004***		
	(-4.25)		
%ΔVolume	0.011***	0.139***	0.170***
	(7.71)	(5.55)	(10.00)
AbsCAR	0.177***	0.115	0.842**
	(10.01)	(0.49)	(2.23)
Coverage	-0.001***	-0.001	-0.002***
	(-5.15)	(-1.47)	(-4.28)
Dispersion	-0.015**	0.174***	-0.115***
	(-1.99)	(5.04)	(-7.19)
Horizon	0.000***	0.000***	0.000
	(3.85)	(2.88)	(0.99)
%ΔBid-Ask Spread		-0.323***	
		(-5.02)	
Fixed Effects	Firm, Year	Firm, Year	Firm, Year
Clustered Std, Errors	BH	BH	BH
Observations	155,731	155,731	155,729
Adjusted R-squared	0.040	0.035	0.013

Exhibit A – Example of the Excel file generated by TR Research

PPV	TOC	Title	Subtitle	Date	Pages	Price	Contributor	Analyst	Ratings	Language	Report #	Collection
N	Y	MICROSOFT CORPORATION	Microsoft "On the Road with Management" (Buy) Thill	12/1/2010	9	Subscription	UBS RESEARCH	THILL, BRENT, ET AL	***	English	16993775	INV
N	N	YAHOO! INC./MICROSOFT CORPORATION/GOOGLE INC	Online Advertising Update	11/18/2010	5	Subscription	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	****	English	16921639	INV
N	Y	MICROSOFT CORPORATION		11/16/2010	13	Subscription	RISKMETRICS GROUP ISS GOVERNANCE SERVICES	LARA, VITTORIO, ET AL		English	30034238	INV
N	Y	MICROSOFT CORPORATION		11/16/2010	41	Subscription	GLOBALDATA	GLOBALDATA		English	16913186	INV
N	N	GOOGLE INC/YAHOO! INC./MICROSOFT CORPORATION	Thoughts On Facebook Messages Product Launch	11/16/2010	4	Subscription	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	****	English	16913422	INV
N	Y	SYNNEX CORP/TAKE-TWO INTERACTIVE SOFTWARE ET	Re-enters Japan Market with Acquisition	11/15/2010	4	Subscription	KAUFMAN BROTHERS	WU, SHAW	*****	English	16908084	INV
N	Y	MICROSOFT CORPORATION		11/12/2010	44	Subscription	WRIGHT INVESTORS SERVICE	ANON		English	16931366	INV
N	Y	MICROSOFT CORPORATION - FINAL TRANSCRIPT	MSFT - Event Transcript of Microsoft conference call, Nov. 11, 2010 / 12:00pm ET	11/11/2010	12	Subscription	THOMSON STREETEVENTS	ANON		English	16896838	INV
N	N	GOOGLE INC/MICROSOFT CORPORATION	Google Roundup: Oct CPCs, SEM Checks, Pay Increase	11/11/2010	6	Subscription	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	****	English	16900709	INV
N	Y	MICROSOFT CORPORATION	Microsoft : Notes from the Road with Microsoft	11/8/2010	14	Subscription	JPMORGAN	DIFUCCI, JOHN	**	English	16868180	INV
N	N	GOOGLE INC/YAHOO! INC./MICROSOFT CORPORATION	Key Takeaways from Kaufman Bros. Online Advertising Dinner	11/8/2010	5	Subscription	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	****	English	16900707	INV
N	N	MICROSOFT CORPORATION	MSFT: "Windows 7 Tablet Edition" On The Horizon?	11/5/2010	22	Subscription	CREDIT SUISSE - NORTH AMERICA	WINSLOW, PHILIP, ET AL	***	English	16859384	INV
N	Y	MICROSOFT CORPORATION		11/4/2010	11	Subscription	BARCLAYS	HERNANDEZ, ISRAEL, ET AL		English	16842199	INV
N	Y	MICROSOFT CORPORATION	Action - Buy Microsoft (MSFT) Price Target $36	11/3/2010	3	Subscription	CROWELL, WEEDON & CO.	RAGAN, JAMES D	**	English	16839359	INV

Exhibit B – Example of the first page by a UBS Analyst report from December 1, 2010 on Microsoft

UBS

Global Equity Research

Americas

Software

12-month rating	**Buy** *Unchanged*
12m price target	US$35.00 *Unchanged*
Price	US$26.04

RIC: MSFT.O BBG: MSFT US

1 December 2010

UBS Investment Research
Microsoft Corp.

On the Road with Management

■ The Empire Strikes Back

We spent the day with management in NYC. The key message was that enterprise demand is coming back, which is benefitting ASPs and revenue on stronger enterprise mix (vs. consumer).

■ Key Points – Still Early in Upgrade Cycle, Increased Interest in Cloud

1) Seeing accelerated enterprise demand as customers are increasingly interested in its broader platform (on-premise + cloud). 2) Still early in the multi-year enterprise upgrade cycle. 3) Strength of current product line has emboldened enterprise customers to consider more strongly MSFT's cloud offerings. 4) The Server business will be a key engine of growth and profitability going forward with significant room for operating margin improvement. 5) Office growth fuelled by new products (Lync, SharePoint) in collaboration, messaging, communications.

■ Challenges

1) Shareholder frustration with recent insider sales and stock performance (-14% YTD vs. NASDAQ +12% YTD), 2) relevancy on important emerging computing form factors like smartphones and tablets with nascent product strategies, limited market share, and formidable competition in both segments.

■ Valuation: Looks inexpensive at 10.5x our FY11E EPS vs. 15.4x 5-Yr Avg

We expect this valuation gap to narrow due to improving sentiment with continued execution throughout FY11. Our $35 price target equals 14x our FY11 EPS estimate of $2.50.

Trading data

52-wk range	US$31.39-23.01
Market cap.	US$226bn
Shares o/s	8,695m (COM)
Free float	87%
Avg. daily volume ('000)	62,319
Avg. daily value (m)	US$1,584.0

Balance sheet data 06/11E

Shareholders' equity	US$51.2bn
P/BV (UBS)	4.3x
Net Cash (debt)	US$36.5bn

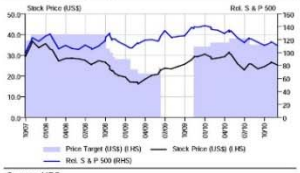
Forecast returns

Forecast price appreciation	+34.4%
Forecast dividend yield	2.5%
Forecast stock return	+36.9%
Market return assumption	5.5%
Forecast excess return	+31.4%

EPS (UBS, US$)

	06/11E		06/10
	UBS	Cons.	Actual
Q1	0.62	0.62	0.40
Q2E	0.70	0.69	0.74
Q3E	0.55	0.56	0.45
Q4E	0.63	0.60	0.51
06/11E	2.50	*2.46*	
06/12E	2.80	*2.68*	

Performance (US$)



Source: UBS

Highlights (US$m)	06/09	06/10	06/11E	06/12E	06/13E
Revenues	58,437	62,484	69,498	75,393	81,010
EBIT (UBS)	20,781	24,098	27,707	30,279	32,742
Net Income (UBS)	15,272	18,760	21,458	23,198	25,280
EPS (UBS, US$)	1.70	2.10	2.50	2.80	3.15
Net DPS (UBS, US$)	0.48	0.52	0.61	0.64	0.64

Profitability & Valuation	5-yr hist av.	06/10	06/11E	06/12E	06/13E
EBIT margin %	38.9	38.6	39.9	40.2	40.4
ROIC (EBIT) %	<-500	292.2	424.0	474.7	409.0
EV/EBITDA (core) x	10.6	7.8	6.0	5.5	5.1
PE (UBS) x	18.3	13.1	10.4	9.3	8.3
Net dividend yield %	3.7	1.9	2.3	2.5	2.5

Source: Company accounts, Thomson Reuters, UBS estimates. (UBS) valuations are stated before goodwill-related charges and other adjustments for abnormal and economic items at the analysts' judgement.
Valuations: based on an average share price that year, (E): based on a share price of US$26.04 on 01 Dec 2010 16:42 EST

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Exhibit C – Example of the modified Excel file used to hand collect EPS data and the mapping of the EPS data from the analyst report in Exhibit B into the Excel file in Exhibit A

Title	Date	Pages	Contributor	Analyst	Report #	Ticker	$Q1_{PRIOR}$	$Q2_{PRIOR}$	$Q3_{PRIOR}$	$Q4_{PRIOR}$	$Q1_{CURRENT}$	$Q2_{CURRENT}$	$Q3_{CURRENT}$	$Q4_{CURRENT}$	Y_{PRIOR}	$Y_{CURRENT}$	Y_{NEXT}	COMMENTS
MICROSOFT CORPORATION	12/1/2010	9	UBS RESEARCH	THILL, BRENT, ET AL	16993775	MSFT	0.4	0.74	0.45	0.51	0.62	0.7	0.55	0.63	2.1	2.5	2.8	
YAHOO! INC./MICROSOFT CORPORATION/GOOGLE INC	11/18/2010	5	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	16921639	MSFT												
MICROSOFT CORPORATION	11/16/2010	13	RISKMETRICS GROUP ISS GOVERNANCE	LARA, VITTORIO, ET AL	30034238	MSFT												
MICROSOFT CORPORATION	11/16/2010	41	GLOBALDATA	GLOBALDATA	16913186	MSFT												
GOOGLE INC/YAHOO! INC./MICROSOFT CORPORATION	11/16/2010	4	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	16913422	MSFT												
SYNNEX CORP/TAKE-TWO INTERACTIVE SOFTWARE ET AL	11/15/2010	4	KAUFMAN BROTHERS	WU, SHAW	16908084	MSFT												
MICROSOFT CORPORATION	11/12/2010	44	WRIGHT INVESTORS SERVICE	ANON	16931366	MSFT												
MICROSOFT CORPORATION - FINAL TRANSCRIPT	11/11/2010	12	THOMSON STREETEVENTS	ANON	16896838	MSFT												
GOOGLE INC/MICROSOFT CORPORATION	11/11/2010	6	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	16900709	MSFT												
MICROSOFT CORPORATION	11/8/2010	14	JPMORGAN	DIFUCCI, JOHN	16868180	MSFT												
GOOGLE INC/YAHOO! INC./MICROSOFT CORPORATION	11/8/2010	5	KAUFMAN BROTHERS	MASUREKAR, MAYURESH	16900707	MSFT												
MICROSOFT CORPORATION	11/5/2010	22	CREDIT SUISSE - NORTH AMERICA	WINSLOW, PHILIP, ET AL	16859384	MSFT												
MICROSOFT CORPORATION	11/4/2010	11	BARCLAYS	HERNANDEZ, ISRAEL, ET AL	16842199	MSFT												
MICROSOFT CORPORATION	11/3/2010	3	CROWELL, WEEDON & CO.	RAGAN, JAMES D	16839359	MSFT												
MICROSOFT CORPORATION	11/2/2010	8	COWEN AND COMPANY	MOSKOWITZ, GREGG	16829301	MSFT												
MICROSOFT CORPORATION	11/1/2010	7	WELLS FARGO SECURITIES, LLC	MAYNARD, JASON	16824734	MSFT												
NVIDIA CORP./ADVANCED MICRO DEVICES, INC./INTEL CORP. ET AL	11/1/2010	8	THINKEQUITY LLC	SHANKAR, KRISHNA	16825007	MSFT												