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Has local informational advantage disappeared?

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Abstract – This study examines how changes in the information environment affect the informational advantage of geographically proximate agents. We find that the long-term advantage of local agents disappeared at the turn of the millennium. This is accompanied by the reduction in local bias of institutional investors and equity analysts. However, institutional investors continue to *trade* local stocks disproportionately more often than nonlocal stocks; moreover, their local trades outperform nonlocal trades in the short term – even for large and liquid stocks. Our results are consistent with improvements in the information environment shortening the horizon of geographic proximity-based informational advantage.

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1. Introduction

Existing studies document that geographic proximity affects the behavior and performance of local agents even when there is no institutional barrier to entry. Coval and Moskowitz (1999, 2001) find that U.S. institutional investors overweight their local stocks – relative to other U.S. stocks – and earn higher returns from their investments in local stocks. In a similar vein, Malloy (2005) finds that analysts located near firm headquarters have an informational advantage. The advantage associated with geographic proximity may arise because local agents are able to directly inspect local firms and acquire information about these firms. They may also be able to collect information from other local sources (e.g., customers and suppliers, local media) at a lower cost. The informational advantage of local agents, however, should depend on the firms' information environment. A more opaque and less competitive environment should provide more profitable opportunities for local agents, if they can obtain information at a lower cost. In contrast, the lifespan of such advantage may be shortened when the playing field is more level.

One important determinant of the quality and competitiveness of firms' information environment is regulation. Rules that curb uneven access to private information and improve the quality of publicly available information should reduce the potential advantage of local agents. At the turn of the millennium, the U.S. securities regulation moved further in this direction with the enactment of the Regulation Fair Disclosure (Reg FD) and the Sarbanes-Oxley Act (SOX). The new rules were designed to affect the flow and timing of information dissemination, as well as influence the quality and reliability of information that firms disclose publicly.[1]

During the same period, there was a breathtaking increase in the availability of and speed of access to corporate information due to the Internet. Internet users increased from 35.8% to 61.7% of the U.S. population between the end of 1999 and 2003.[2] Although broadband access had begun to grow, the vast majority of households continued to rely on dial-up connections at the turn of

[1]Reg FD was aimed at "leveling the playing field" among different types of investors. Its rules were designed to curb selective disclosure of information to market participants and mandated the disclosure of all material information to all investors at the same time. Similarly, SOX mandated the implementation of new rules for financial reporting by public companies with the intent to improve its transparency, reliability, and accountability. In particular, SOX addressed issues such as enhanced financial disclosure, auditor independence, and corporate governance (Coates (2007)).

[2]See World Bank statistics: http://data.worldbank.org/indicator/IT.NET.USER.P2.

the millennium. Between the end of 1999 and 2003, however, availability of broadband access rose from about 1% to over 20% of the U.S. population.[3] This epochal technological progress allowed wider and more timely access to firm disclosures (e.g., via the SEC's EDGAR system of corporate filings), as well as the widespread electronic dissemination of corporate news (e.g., Bloomberg).

If local bias and superior local performance depend on the information environment, we expect that they would decline following these exogenous changes to the quality and competitiveness of the environment. We first examine this conjecture using quarterly portfolio holdings of 13(f) institutions during the 1996 to 2008 period. We observe a sharp decline in the excess local holdings of institutional investors in the more competitive information environment. In particular, we observe a discrete 50% drop in the average excess local institutional ownership around the turn of the millennium. The average excess local ownership is around 8% in the old regime (1996-1999), but only around 4% in the new regime after the turn of the millennium.[4]

We next investigate whether the information content of institutional investors' local holdings also changes around these exogenous shifts in information environment. A corollary of our main argument is that the performance of institutional investors' local holdings would decline in the new regime. We find evidence consistent with this prediction. Whereas institutional investors' local holdings obtain higher returns relative to their non-local holdings in the earlier regime (consistent with previous literature, such as Baik, Kang, and Kim (2010)), the superior performance of local holdings *disappears* in the later period. This finding poses a difficult question for the literature on the geography of stock ownership, and particularly for studies that rely on arguments based on disproportionate local holdings.[5]

We find similar patterns when examining equity analysts. Malloy (2005) documents that sell-side equity analysts have relatively superior information about local firms using a sample that largely consists of pre-2000 years. Consistent with the evidence for institutional investors, we

[3]See Pew Research Center report: http://www.pewinternet.org/2015/12/21/home-broadband-2015.

[4]These shifts in excess local ownership mainly reflect changes in actual local ownership levels since the expected local ownership levels –i.e., due to the geographic clustering of firms and institutional investors– do not vary significantly over time.

[5]One such paper is the study by Hong, Kubik, and Stein (2008) titled "The Only Game in Town: Stock-Price Consequences of Local Bias" in which the authors motivate their asset pricing analysis using the 'incontrovertible' existence of within country local bias (paragraph 2).

find that there is a significant decline in the (excess) local coverage of sell-side equity analysts in the new regime after the turn of the millenium. Moreover, the reduction in analysts' local bias is accompanied by a significant reduction –in fact, a disappearance– of the local information advantage that sell-side equity analysts seemed to enjoy in the old regime.

To shed more light on the time-series dynamics of the local information advantage and its horizon, we tap into the recent studies that document the superior short-term performance of institutional investors and examine their actual intraquarter trades. In particular, using trading data provided by ANcerno, Puckett and Yan (2011) document that institutional investors earn superior intraquarter returns on their trades and that this performance is persistent in the cross-section of institutions. However, the information content of institutional trades is incorporated quickly into prices as these trades do not predict returns at longer horizons. Motivated by this evidence, we hypothesize that local investors continue to enjoy an informational advantage in the short term - although this advantage may not exist at longer horizons as our earlier evidence based on holdings data suggests.

We begin this analysis by examining institutional investors' relative trading propensity among local and nonlocal stocks. One unique advantage of the ANcerno trading data relative to 13(f) quarterly portfolio snapshots is that it allows a direct calculation of excess trading levels within each quarter, which can be used to detect local trading bias. Our evidence indicates that existing studies (as well as our earlier analysis) relying on low-frequency (i.e., quarterly) holdings likely underestimate the degree of institutional investors' local bias. In particular, institutional investors buy and sell local stocks disproportionately more often than they trade nonlocal stocks – even when they do not hold more local stocks. We find that the *abnormal* local trading propensity averages between 1 to 2.5 percent of the total institutional trading volume.

Institutional investors' higher propensity to trade local stocks provides indirect evidence for the conjecture that these investors are likely to have access to *short-term* private information about local stocks. We next directly examine whether there is a corresponding pattern in relative trading performance. To measure short-term trading performance, we follow the approach used by Puckett and Yan (2011) and analyze trading profits in the quarter in which the trades are executed. Extending Puckett and Yan (2011), we examine institutional trades in local and nonlocal stocks separately, which allows us to decompose the total intraquarter performance of institutional trading into its local and nonlocal components.[6]

The geography-based performance decomposition indicates that the superior average intraquarter trading profits of institutional investors documented in Puckett and Yan (2011) are mostly driven by local trades. The institutional investors in our sample earn superior intraquarter profits in local stocks, even after adjusting for common risk characteristics and transaction costs. The average characteristic-adjusted intraquarter return of local stocks that institutions buy is higher than the post-trading return of local stocks that they sell by 21 to 34 basis points. This superior local performance is observed even in relatively large and liquid stocks. In contrast, the average nonlocal intraquarter trading profits are not significantly different from zero after accounting for risk characteristics and transaction costs. These findings suggest that even after the epochal changes in firms' information environment at the turn of the millennium, geographic proximity remains a key determinant of the short-term information advantage of a typical institutional investor.

Our analysis contributes to the intersection of three literatures: information environment, local bias, and fund performance. First, we document that changes in the quality and competitiveness of the information environment affect the behavior of market participants (investors and sell-side analysts) who rely on geographic proximity. Second, our results indicate that the existing local bias literature underestimates the degree of local information advantage of institutional investors given its focus on mandated quarterly snapshots of institutional portfolio holdings. With the availability of more efficient communication technologies as well as the adoption of more stringent corporate disclosure rules, analyses of the local information advantage using quarterly portfolio snapshots may not capture the full extent of such advantage. Indeed, our findings based on quarterly holdings indicate that the local tilt of U.S. investor portfolios as well as their local performance have declined sharply over time. Overall, this evidence supports the conjecture that

[6] In our discussion, we use "fund" and "institution" interchangeably. While each institutional investor may operate multiple funds, our unit of observation is at the fund level following Puckett and Yan (2011).

the increased quality and competitiveness of the information environment have eroded the long horizon information advantage of local capital market participants.

Nonetheless, the evidence based on intraquarter trading data shows that geographic distance remains an important determinant of aggregate market outcomes at short horizons. In particular, our findings suggest that local investors are still more likely to be the marginal traders and therefore play a significant role in the process of pricing financial assets, providing liquidity, and exerting corporate governance.[7] Lastly, our findings contribute to the literature on the evaluation of players in the money management industry. We find that the superior aggregate performance of institutional investors documented in Puckett and Yan (2011) is largely due to opportunistic local access to corporate information. This novel finding complements the evidence from recent studies that examine the cross-sectional variation in fund manager skill (e.g., Kacperczyk, Sialm, and Zheng (2005, 2008)), Kacperczyk and Seru (2007), Cremers and Petajisto (2009), and Amihud and Goyenko (2013)).

The rest of the paper is organized as follows. In the next two sections, we develop our testable hypotheses and describe our two main data sources. We then present our analysis based on quarterly institutional holdings in Section 4. We examine the coverage and performance of local analysts in Section 5. We then present our analysis of intraquarter institutional trading and performance conditional on location in Section 6. We conclude in Section 7.

2. Related Literature and Testable Hypotheses

We review here some of the major changes that took place in the U.S. institutional environment at the turn of the millennium, which we posit affect the investors' information acquisition process. We then summarize the related geography-based hypotheses at the heart of our subsequent analysis.

[7]See, e.g., Hong, Kubik, and Stein (2008) for the effect of local investors on asset prices, Shive (2012) and Bernile et al. (2015) for the effect of local investors on stock liquidity, and Chhaochharia, Niessen-Ruenzi, and Kumar (2012) for the effect of local investors on corporate governance.

2.1. Changes to Information Environment

Until the late 1990s, quarterly earnings' conference calls and communication with top-level executives were typically restricted to equity analysts and investors with substantial capital. Companies argued that providing the same level of access to all investors would be too costly. As cheaper communication technology became available with the advent of the Internet, this cost argument became less relevant. In response, the U.S. Securities and Exchange Commission (SEC) proposed the Regulation Fair Disclosure (Reg FD) in December 1999. The general principle advocated by the new rules was that the disclosure of material information should be made to all investors at the same time.

Small investors supported the regulation while large investors argued that imposing equal access for all investors would lead to firms disclosing less information (e.g., Weber (2000a, 2000b), Shiller (2000), SEC (2000), Hasset (2000), Bushee, Matsumoto, and Miller (2004), Duarte, Han, Harford, and Young (2008)). Despite these concerns, the SEC approved Regulation FD in October 2000. The market participants who enjoyed selective access to management in the pre-Reg FD environment would likely experience the largest adverse impact of the new rules. Thus, if geographic proximity to management facilitated such access, the curbing of selective disclosures should reduce the competitive advantage of local agents.

Around the time of Reg FD, the fraudulent accounting scandals at Enron, WorldCom, and several other companies undermined the public's confidence in corporate disclosures. For example, fraudulent accounting practices at WorldCom resulted in over-reporting of assets by around $11 billion. These highly-publicized scandals exposed significant conflicts of interests in the relation between corporations and their financial auditors, which cast doubts on the reliability of firm disclosures. Following these scandals, several new proposals were introduced to curb fraudulent accounting practices (Holmström and Kaplan (2003), Coates (2007)).

The Sarbanes-Oxley Act (SOX) was enacted in July 2002 with widespread approval by individual investors and investment groups, and large opposition by companies and industry groups (Hochberg, Sapienza, and Vissing-Jorgensen (2009)). The proponents of these rules advocated them as necessary to restore investors' confidence. In particular, SOX mandated new rules that would lead to enhanced financial disclosure, greater auditor independence, and improved corporate governance with the intent to improve the transparency, reliability, and accountability of firms' financial reports (Coates (2007)).[8]

Concurrent with some of the most substantial reforms in U.S. securities regulation in over half a century, the information and communication technology environment was undergoing unprecedented progress. Fueled by the spreading of the Internet, this process substantially increased the availability of and speed of access to corporate information at progressively smaller costs. Internet users in the U.S. population nearly doubled between the end of 1999 and 2003, while the availability of fast Internet connections across the country was increasing exponentially.[9] This technological progress facilitated the wider and faster dissemination of information about publicly traded firms, both via institutional channels like the SEC's EDGAR system and financial news providers like Bloomberg.

Overall, the regulatory changes and technological trends at the turn of the millennium arguably provide a large exogenous shock to the U.S. corporate information environment. We conjecture that the combined effect of rules facilitating a more level the playing field in the information collection process as well as the progressively smaller costs associated with this process made the information environment more competitive and reduced information asymmetry among investors. In particular, to the extent that it provided local agents with significant informational rents in the old regime, we expect that the role of geographic proximity should diminish in the new regime of information production, dissemination, and acquisition.

[8]For example, most notably, Sections 101-109 created the Public Company Accounting Oversight Board (PCAOB) to provide for auditors' oversight; Sections 302, 401-406, 408-409, and 906 mandated new disclosure rules pertaining to internal control systems and officer certifications; Sections 201-209 and 303 further regulated public company auditors and auditor-client relationship; Sections 301, 304, 306, and 407 introduced requirements for listed companies pertaining to the composition of audit and control committees, and banned officer loans; Sections 802, 807, 902-905, 1102, 1104, and 1106 introduced criminal penalties for fraudulent misreporting; and Sections 806 and 1107 introduced new whistle-blower protections.

[9]During this period, Internet users increased from 35.8% to 61.7% of the U.S. population and the availability of broadband access rose from about 1% to over 20% of the U.S. population.

2.2. Information Environment and Local Market Participants

Do these changes adversely affect the informational advantage of local market participants such as institutional investors and sell-side equity analysts? Anecdotal evidence suggests that physical proximity to firm management is likely to yield informational advantage to local agents. In fact, in its release of Reg FD, the SEC explicitly mentioned that firms often disclose non-public information to both securities analysts and institutional investors.[10] Beyond this anecdotal evidence, previous studies on local and home bias link excess local holdings of institutional investors to the availability of valuable local information (e.g., Coval and Moskowitz (1999, 2001), Baik, Kang, and Kim (2010), Bernile, Kumar, and Sulaeman (2015)). Similarly, Malloy (2005) shows that sell-side equity analysts have relatively more accurate information about local firms.

Local market participants may be able to extract greater benefits from local stocks with high information asymmetry either due to selective access to local private information or because geographic proximity reduces their public information gathering and processing costs. In the first part of our analysis, we examine whether the changes in the information environment at the turn of the millennium influence the ownership patterns of institutional investors, the coverage patterns of equity analysts, and the informational advantage of these two important groups of market participants. Our identification strategy uses those exogenous changes as a natural experiment to identify the causal effect of the information environment on the (time-series) dynamics of local ownership/coverage and local information advantage.

[10]Two subsequent SEC enforcement cases provide evidence of selective disclosure practices that may have benefited local institutional investors. In November 2001, the SEC contested that the CEO of Siebel Systems, a California-based technology company, disclosed nonpublic information to selected investors at an invitation-only technology conference hosted by Goldman Sachs & Company in California. In response to questions from a Goldman Sachs analyst, the CEO announced that he was optimistic about the firm since the business was returning to normal. This announcement was opposite to the negative statements made by the CEO three weeks earlier. Following the disclosure at the conference, attendees purchased Siebel's stocks or communicated the information to others who purchased Siebel's shares. Following the conference, Siebel experienced a one-day stock return of about 20% and trading volume twice as its daily average. Thus, investors who attended the conference enjoyed a substantial informational advantage. In another relevant enforcement case, the SEC contested in March 2002 that the CEO of Secure Computing (John McNulty) disclosed nonpublic information about a significant contract to two portfolio managers in violation of the Reg FD. The SEC took exception to the fact that Secure actively promoted its stock to institutional investors through in-person presentations, in addition to a series of conference calls and email exchanges with selected investors. *Source:* Secure Computing Corporation and John McNulty, Exchange Act Release No. 46895, 2002 WL 310948 (November 25, 2002).

2.2.1 Impact on Local Ownership and Coverage

If institutional investors' preference for local stocks (at least partially) reflects their attempts to exploit a potentially uneven playing field, the advent of more efficient communication technology and regulatory changes designed to level the playing field among different types of investors should influence the local institutional ownership patterns. In particular, adverse shocks to the sources of local information advantage should induce institutions to reduce their holdings of local stocks. Therefore, we conjecture that:

> **H1-I:** As the information environment becomes more competitive at the turn of the millennium, local ownership levels around corporate headquarters decrease and the overall firm ownership becomes more diffused.

Following a similar logic, we predict a similar pattern in the coverage decisions of equity analysts:

> **H1-A:** As the information environment becomes more competitive at the turn of the millennium, analysts' coverage of local firms declines.

2.2.2 Impact on Local information Advantage

Next, we directly investigate whether the changes in the information environment reduce the informational advantage of local agents. In particular, to test whether the informational advantage of local institutional investors changes in the new environment, we follow the existing literature and estimate the holdings-based performance of local investor portfolios conditional on the regime. We posit that:

> **H2-I:** As the information environment becomes more competitive at the turn of the millennium, the local component of institutional investors' reported portfolios performs worse.

Similarly, we examine how the changes in the information environment affect local sell-side equity analysts' forecast accuracy following previous studies (e.g., Bailey, Li, Mao, and Zhong (2003), Gintschel and Markov (2004), Agrawal, Chadha, and Chen (2006)). Our hypothesis is that:

H2-A: As the information environment becomes more competitive at the turn of the millennium, the local information advantage of equity analysts declines.

2.2.3 Impact on Local Advantage Horizons

In the last part of our analysis, we examine more closely the *short-term* component of local investors' informational advantage. In particular, it seems plausible that the effect of increased competition in the information environment on local agents may vary with the horizon of the information. Then, local investors may continue to enjoy a competitive advantage with respect to the ability to access short-lived information and one would not be able to detect such informational advantage at coarser frequencies, e.g., based on quarterly holding reports. To conduct this analysis, we use ANcerno data on actual intraquarter trades of institutional investors and test three sets of hypotheses pertaining the horizon of institutional investors' local advantage.

First, we examine the investors' relative propensity to trade local vs. nonlocal stocks. We conjecture that:

H3: If a short lived local information advantage persists after the changes in the information environment, institutional investors continue to be more likely to trade in local stocks.

Second, we examine the horizon of institutional investors' informational advantage. We begin by investigating the short-term performance of their trades. We follow the Puckett and Yan (2011) method and analyze trading performance until the end of the quarter in which the trades are executed. This allows us to decompose the performance of institutional trading into its short-term (within-quarter) and long-term (interquarter) components. Our hypothesis is that:

H4: If a short lived local information advantage persists after the changes in the information environment, institutional investors' local *trades* continue to experience superior intraquarter performance.

Lastly, consistent with the idea that greater competition in the information environment shortens the horizon of the local advantage, we expect such advantage to be reflected in stock prices and dissipate by the end of the trading quarter. Therefore, in line with our conjecture relying on quarterly holdings, we posit that:

> **H5:** If only a short lived local information advantage persists after the changes in the information environment, institutional investors' local trades do not display superior interquarter performance.

In the next section, we briefly describe the main datasets used to test these empirical predictions.

3. Data and Measures

3.1. Data

We use three main data sources to capture the portfolios of local agents: (1) institutional investors' holdings snapshots from 13(f) filings, (2) IBES dataset of analyst coverage, and (3) ANcerno dataset of institutional investors' trading activities. We describe these datasets in turn below.

3.1.1 Institutional Holdings Data: 13(f) Quarterly Snapshots

Our first main dataset is the quarterly common stock holdings of 13(f) institutions compiled by Thomson Reuters. We identify the location (zip code) of institutional investors using the *Nelson's Directory of Investment Managers* and by searching SEC documents and web sites of institutional managers. We designate institutional investors as *Local* based on whether they locate in the same state as the firm's headquarters.

3.1.2 Analyst Coverage

The research coverage of sell-side equity analysts is from Thomson Reuters' I/B/E/S database. We augment this dataset with analyst location data provided by Hongping Tan, and designate equity analysts as *Local* based on whether they locate in the same state as the covered firm's headquarters.

3.1.3 Institutional Trading Data: ANcerno

We use institutional trading data provided by ANcerno. This dataset contains institutional trades for the 1997 to 2010 period. Following previous studies, we exclude trades from 1997 and 1998 because the coverage in these two years is sparse, although our results are similar when these trades are retained. Puckett and Yan (2011) use the same dataset and describe it in detail.[11] We use the following information from the ANcerno dataset: institutional client code, institutional client manager code, stock historical CUSIP, stock ticker, trade date, trade direction (buy or sell), quantity of shares traded, and trade execution price. We use the terms "fund" and "institution" interchangeably going forward. While each institutional investor may operate multiple funds, our unit of observation is at the fund level following Puckett and Yan (2011).

Two unique features of the ANcerno data are central to our study. First, the ANcerno dataset provides the actual trade direction (i.e., buy or sell) for all executed trades, eliminating the need for algorithms such as Lee and Ready (1991) to infer the direction of each trade. Second, the ANcerno dataset provides the names of institutional client managers for our sample period. We use these names to collect the locations of all institutions in the ANcerno database and categorize trades as *Local* or *Nonlocal*. Local trades are those executed on stocks located in the same state as the institution, while the remaining trades are identified as nonlocal trades. The vast majority of institutions in ANcerno are located in the U.S. and they are the focus of our analysis. Using the locations of institutions, we are able to categorize about 79 percent of all trades in the ANcerno database as local or nonlocal trades.

In addition to these main data sources, we use several other standard datasets. We obtain price, volume, return, and industry membership data from the Center for Research on Security Prices (CRSP). The firm headquarters location data are from the CRSP-Compustat merged (CCM) file. We obtain the performance benchmarks for computing characteristic-adjusted stock returns from Russell Wermers' web site.[12] Data on various other firm attributes are from Compustat.

[11] Other recent studies that use the ANcerno data include Goldstein, Irvine, Kandel, and Wiener (2009), Chemmanur, He, and Hu (2009), Goldstein, Irvine, and Puckett (2011), and Busse, Green, and Jegadeesh (2012).

[12] The web site is `http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm`.

3.2. Measures

3.2.1 Excess Local Holdings Measure

The measurement of excess local holdings is at the core of our first hypothesis. We calculate "Excess Local Weight" as the percentage of an institutional investor's portfolio invested in stocks headquartered in the investor's state (local holdings) minus the percentage of the market portfolio located in the investor's state. We use this measure in Table 1. In addition to this institution-level excess holdings measure, we also employ a firm-level excess ownership measure. The excess local ownership is defined as the aggregate ownership of institutions in the firm's HQ state minus that state's average institutional ownership (in all stocks). We use this measure in Figure 1 and Table 3.

3.2.2 Excess Local Coverage Measure

In addition to examining institutional investors, we also examine (sell-side) equity analysts. We measure the quarterly local coverage of each analyst as the fraction of local stocks in that analyst's stock coverage portfolio:

$$\text{LOCCOV}_a = \frac{\text{Local stocks covered by analyst } a}{\text{All stocks covered by analyst } a}$$

We normalize this measure by the fraction of local stocks in the CRSP universe. We use this measure in Table 4.

3.2.3 Excess Local Trading Measure

Since the ANcerno dataset records all trades made by institutional investors in their sample, we can quantify two facets of trading: frequency and intensity. Trading frequency is measured by the number of trades, while trading intensity is measured by dollar trading volume (i.e., dollar amount traded).

The excess local trading *frequency* of institution i in quarter t is defined as

$$Excess\ Local\ Trd\ Freq_{i,t} = \frac{\#Local\ Trades_{i,t}}{\#Trades_{i,t}} - \frac{\#Local\ Stocks_{i,t}}{\#Stocks_t},$$

where $\#Local\ Trades_{i,t}$ is the number of trades of institution i in stocks headquartered in the same state as the institution, $\#Trades_{i,t}$ is the total number of trades made by institution i, $\#Local\ Stocks_{i,t}$ is the number of firms headquartered in the same state as institution i, and $\#Stocks_t$ is the number of all firms in both the ANcerno universe and the CRSP database with identifiable headquarters locations.

Similarly, the excess local trading *intensity* of institution i in quarter t is defined as:

$$Excess\ Local\ Trd\ Int_{i,t} = \frac{Local\ Dollar\ Volume_{i,t}}{Total\ Dollar\ Volume_{i,t}} - \frac{Local\ Market\ Cap_{i,t}}{Total\ Market\ Cap_t},$$

where $Local\ Dollar\ Volume_{i,t}$ is the total dollar volume that institution i trades in stocks headquartered in the same state as the institution, $Total\ Dollar\ Volume_{i,t}$ is the total dollar trading volume of institution i, $Local\ Market\ Cap_{i,t}$ is the market capitalization of firms headquartered in the same state as institution i, and $Total\ Market\ Cap_t$ is the aggregate market capitalization of all firms in both the ANcerno universe and the CRSP database with identifiable headquarters locations.

We also use an alternative measure of the excess local trading intensity for wich the second term, i.e., the benchmark, is calculated using trading volume rather than market capitalization:

$$Excess\ Local\ Trd\ Int,\ Alt_{i,t} = \frac{Local\ Dollar\ Volume_{i,t}}{Total\ Dollar\ Volume_{i,t}} - \frac{Trading\ Vol.\ of\ Local\ Stocks_{i,t}}{Agg.\ Trading\ Vol.\ of\ All\ Stocks_t},$$

where $Local\ Dollar\ Volume_{i,t}$ and $Total\ Dollar\ Volume_{i,t}$ are as defined above. The trading volume measures in the second term capture trades by all investors, ANcerno institutions or otherwise: $Trading\ Vol.\ of\ Local\ Stocks_{i,t}$ is the total trading volume of firms headquartered in the same state as institution i as reported by CRSP, and $Agg.\ Trading\ Vol.\ of\ All\ Stocks_t$ is the aggregate trading volume of all firms in both the ANcerno universe and the CRSP database with identifiable headquarters locations.

In each of these excess trading measures, the second term represents the expected level of local trading. If institutional investors in our sample do not have any local bias in their trading frequency, the proportion of local trades in the total number of trades should be equal to the fraction of local firms in the total number of stocks in the market. Similarly, no local tilt in the trading intensity would imply that the local trading intensity is equal to the market capitalization (trading volume) of local firms as a proportion of the total aggregate market capitalization (trading volume). Therefore, the excess local trading measure would be significantly positive if investors have a local trading bias, i.e., if they trade local stocks disproportionately more often or more intensely than they trade nonlocal stocks. We use these measures in Table 6.

4. Vanishing Local Holdings Bias and Performance

In this section we examine the investment behavior and performance of local institutional investors using mandated quarterly snapshots.

4.1. Institution-Level Local Holdings Bias

We first examine the relative portfolio weights of local and nonlocal holdings. Specifically, we calculate the *Excess Local Weight* of each institutional investor's quarterly portfolio snapshot as the percentage of the investor's portfolio invested in stocks located in the investor's state (local holdings) minus the percentage of the "market portfolio" located in the investor's state. We compute the average of excess local weights across all institutional investors' portfolios each quarter, and then report the time-series average of those quarterly averages over various periods in Table 1. The quarterly averaging across institutions is either weighted equally or by the total dollar value of the institution's holdings at the beginning of the quarter. This analysis is similar to the analysis in Coval and Moskowitz (2001), except that we use the sample of institutional investors (rather than their mutual fund sample) and extend their analysis (that stops in 1995) to 2008.

Both averaging methods provide the same pattern: local bias is quite strong in the earlier period, and declines significantly after the turn of the millennium. Using equal-weighted average, we find that the excess local weights of institutional investors' portfolios decline by more than 45 percent in the post-2000 period relative to the earlier period (1996–1999). Using dollar-weighted average, the excess weights of institutional investors disappear in the post-2000 period.

4.2. Performance Estimates from Quarterly Snapshots

We next conduct a performance analysis where the unit of observation is the average quarterly return of stocks in various location-based subportfolios of institutional investors. Using this approach, Coval and Moskowitz (2001) reports that mutual fund managers experience higher returns in their local stock portfolio. We repeat their analysis on the performance of institutional investors' local and non-local holdings by subperiods. For each institution with non-zero portfolio weight in local stocks, we calculate the quarterly characteristics-adjusted returns of its local and non-local portfolios, as well as the performance differential (local minus non-local). *Local Portfolio* is comprised of stocks in the institutional investor's portfolio that are located in the investor's state, while *Non-Local Portfolio* is comprised of the rest of the institution's holdings. The portfolio returns are adjusted using the Daniel, Grinblatt, Titman, and Wermers (1997) approach to control for variations in size, book-to-market, and past 12-month return.

As reported in Panel A of Table 2, local holdings of institutional investors outperformed their non-local holdings in the earlier period (1996-1999). Using dollar-weighted average, local holdings outperform non-local holdings by about 13 basis points each month, or about 1.5 percent annually. However, the superior performance of local holdings disappears in the post-2000 period. The performance differential is not significantly different from zero and the point estimate is in fact negative in the latter period.

In Panel B, we estimate the performance of institutional "trades". Unlike our analysis in Section 6 that employs actual trading of institutional investors, the quarterly holdings snapsots do not allow us to observe the actual trades of these institutions. Instead, this analysis uses net changes in quarterly holdings to measure (net) trading by institutions during a quarter. We then measure the average performance of net changes in local/non-local holdings. The pattern that appears in Panel B is similar to the one that we observe in Panel A: local trades are abnormally profitable (i.e., about 1.8% higher annual return than non-local trades) prior to 2000, but this superior performance disappears in the latter period.

4.3. Firm-Level Aggregation

To examine the effects of the reduction in local long-term information advantage on return predictability, we aggregate our observations at the firm level. We start by examining excess local ownership by institutions around firm headquarters. Figure 1 shows the mean excess local ownership computed at the end of each fiscal year using the portfolio holdings of all institutional investors in our quarterly sample. The excess local ownership is defined as the aggregate ownership of institutions in the firm's HQ state minus that state's average institutional ownership (in all stocks). Small and large firms subsamples contain firms in the lowest and highest firm size quartiles, respectively.

Figure 1 shows that the level of local institutional ownership declines markedly starting at the turn of the millennium. The average excess local ownership level is consistently around 8% in each year of the pre-2000 period. It drops sharply to below 6% immediately following the passage of Reg FD and then stabilizes at a level of about 4% in the post-2004 period. Thus, the excess local ownership of institutional investors drops by half around this period. In absolute terms, the drop in the level of local ownership is larger for smaller firms. Specifically, the local ownership levels for small, medium, and large firms drop from 14.42%, 5.86%, and 2.98% in 2000 to 8.46%, 2.80%, and 1.91% in 2004, respectively. However, in relative terms, excess local ownership levels drops by about half across all size groups.[13]

[13]We perform formal statistical tests of these differences in a regression setting, controlling for changes in firm characteristics, and continue to find similar general reduction in local ownership. We also find that firms with worse information environments have significantly higher local ownership levels prior to 2000, but these relations become significantly weaker after 2000. These results are reported in Table IA-1 of the Internet Appendix. We also examine the overall geographical shifts in the composition of firm ownership. We measure geographical ownership concentration of firms using state-level institutional ownership data. We find that firm ownership has also become more diffused geographically. Our state-level geographic concentration measure declines from 0.171 in 2000 to 0.115 in 2004, which represents a 32.75% decline between the pre-2000 and post-2000 periods (see Table IA-2 of the Internet Appendix).

We next perform return predictability analysis similar to that in Baik, Kang, and Kim (2010, henceforth BKK), who show that HQ state's institutional ownership predicts future stock returns. In particular, we regress subsequent quarter stock returns on the lagged level and current change of share ownership of the following two groups of institutional investors. The first group includes local institutions, while the second includes all non-local institutions. We use characteristics-adjusted return computed using the Daniel, Grinblatt, Titman, and Wermers (1997) method as the dependent variable to account for potential non-linearities in the relation between certain firm characteristics and future stock returns that a linear regression specification may not accommodate. We control for all stock characteristics included in the BKK study (i.e., size, B/M ratio, and past returns) and estimate the following model using the Fama-MacBeth (1973) approach.

$$\begin{aligned} Char\ Adj\ Return_{f,t+1} &= \beta_{Local} * Local\ \%Own_{f,t-1} + \beta_{NonLocal} * NonLocal\ \%Own_{f,t-1\to t} \\ &\quad + \Theta * Controls_{f,t} + e_{f,t}. \end{aligned}$$

We report three sets of regression estimates in Table 3: for the full sample (1996-2008), for the pre-2000 subsample, and for the post-2000 subsample.

Consistent with results in BKK, we find that subsequent quarter characteristics-adjusted returns vary directly with local ownership (model 1). However, these relations are much weaker in the latter subperiod and not statistically significant (model 3). In sum, our results in this subsection are consistent with our earlier findings using institution-level aggregation: local holdings bias and local (long-term) performance have declined (or even disappeared) after the turn of the millennium.[14]

We also examine whether this return predictability results extend to the price discovery process. A natural implication of our results so far is that the adverse selection concerns attributed to local ownership should decline with the profitability of local trades after the turn of the millenium. To test this conjecture, we examine the relation between local ownership and stock market-based

[14] Bernile, Kumar, and Sulaeman (2015) find that the ownership of institutional investors located in non-HQ areas that are relevant for the firm has a sizeable, significant, and robust relation with the firm's subsequent stock returns. Including these semi-local ownership measures does not affect the time-series decline in Table 3.

measures of adverse selection conditional on the information environment. We report this analysis in Table IA-3 of the Internet Appendix. The results indicate that the adverse selection component of stock prices (e.g., ADJPIN from Duarte and Young (2009)) is directly and significantly related to prior year-end excess local ownership levels over the whole sample period. However, our results indicate that the relation between adverse selection measures and local ownership is weaker and becomes statistically insignificant after 2000.[15] We also find similar evidence when we examine the link between local ownership and bid-ask spreads before earnings announcement: the local ownership-spread relation is attenuated after 2000. Taken together, the results from these microstructure-based tests indicate that market participants expected local investors to exhibit a lower propensity to engage in informed trading after 2000.

5. Local Equity Analysts

Local sell-side equity analysts are likely to be adversely affected in the new information environment, to the extent that the net benefits of local access to management they may have enjoyed in the old regime have decreased.

5.1. Equity Analysts' Local Coverage

We start by examining the time-series variation in excess propensity of analysts to cover local stocks. We define excess local coverage of a sell-side analyst as the fraction of local stocks covered by the analyst minus the fraction of local stocks available to the analyst. Unlike institutional investors, there is no obvious weighting scheme for analyst coverage. Therefore, we examine both equal- and value-weighted local coverage fractions.

We find that sell-side analysts around corporate headquarters display excess propensity to provide local coverage. Panel A of Table 4 reports those averages. The average excess local coverage over the whole sample period is 9.61 (6.28) percent using equal- (value-) weighting. However, the excess propensity to cover local stocks declines sharply in the post-2000 information

[15] Duarte and Young (2009) decompose the PIN measure introduced by Easley, Hvidkjaer, and O'Hara (2002) into two components: the probability of private information-related trade (i.e., ADJPIN) and the probability that a given trade happens during a symmetric order flow shock (i.e., PSOS).)

environment. Prior to the turn of the millennium, we find that the value- (equal-)weighted excess local coverage is about 8.2 (11.4) percent. In the more recent regime, the excess local coverage declines by about a quarter to 5.4 (value-weighted) or 8.8 (equal-weighted) percent.

In Panel B, we perform formal statistical tests of this decline by regressing excess local coverage on an indicator variable for the years 2000 onwards (POST-2000), analyst characteristics, and state fixed effects. The analyst characteristics include analyst tenure, past performance, the number of firms covered, and an indicator variable for analysts employed by prestigious brokerage houses.

The coefficient estimates on POST-2000 in models (1) and (3) suggest that, relative to the period prior to the changes in the information environment, excess local coverage declines by 3.07 to 3.48 percentage points in the new information environment. Focusing on the analysts employed by prestigious brokerage houses, we find that they are less likely to cover local stocks prior to 2000. However, their excess local coverage after 2000 is similar to that of analysts employed by less prestigious brokerage houses.

5.2. Equity Analysts' Local Performance

We next examine the relative local performance of equity analysts. In particular, we examine the forecast accuracy of analysts' quarterly earnings forecasts. As analysts are evaluated against their peers, we employ two *relative* accuracy measures that compare each analyst's forecast against all forecasts on the same earnings report. The first measure is an indicator for whether the analyst's forecast error is below the median error, while the second measure is the percentile ranking of the analyst's forecast error. Following Malloy (2005), we also use the demeaned absolute forecast error (DAFE) to measure forecast accuracy, where a negative DAFE implies better than average forecast accuracy and a positive DAFE reflects below-average forecast accuracy.

Table 5 reports the coefficient estimates from regressing the analyst accuracy measures on a LOCAL indicator variable that takes the value of one if the analyst and the firm headquarters are located in the same state and zero otherwise, its interaction with the POST-2000 indicator, and time-varying analyst fixed effects to capture variation in analysts' skill and characteristics. We do not include stand-alone regime variables or time fixed effects in these specifications because they are subsumed by the time-varying analyst fixed effects. We cluster the errors for all forecasts issued for the same earnings report because they are correlated due to how our measures are constructed.

The coefficient estimates in Table 5 suggest that local analysts are significantly more accurate prior in the old information regime prior to 2000, consistent with the findings in Malloy (2005). However, the superior accuracy of local analysts declines significantly after the turn of the millennium. Adding up the point estimates of LOCAL and LOCAL × POST-2000 in Columns (1), (2), or (3), we find that superior local performance is at most negligible in the new information regime.

When we estimate the accuracy regressions for different subperiods, similar to the evidence in Malloy (2005), LOCAL has a significantly negative coefficient estimate in the pre-2000 period (see Column (4)), and negative but insignificant coefficient estimate in the period after 2000 (see Column (5)). This evidence indicates that local analysts no longer possess a local information advantage after the changes that curtailed selective access to firm management and made the information environment more competitive.

Collectively, the results in Tables 4 and 5 provide consistent evidence for our hypotheses (H1-a and H2-a) that the changes in the information environment at the turn of the millennium affect local sell-side equity analysts. Prior to 2000, like local institutional investors (or even more so), local analysts were likely to enjoy an advantage in the information-gathering process for local firms. In the more competitive information environment after 2000, the informational advantage of local analysts disappears.

5.3. Local Analysts and Local Investors

In this short subsection, we briefly discuss the results from an analysis examining whether the local information advantage of analysts and institutional investors are related. Specifically, we investigate whether the recommendations from local analysts drive the local information advantage of institutional investors. We estimate the local bias and performance of institutional investors, conditional upon the presence of local analysts. We sort states into three groups based on the number of analysts in the state: top 5 states, the next 15 states (6th to 20th), and the remaining states. This grouping is done to ensure that institutional investors are spread as evenly as possible across the three groups. Within each group, we measure the local bias of institutional investors as well as their portfolio performance during different subperiods.

We report the analysis in Table IA-4 of the Internet Appendix. The results indicate that the pattern of declining local bias is similar, irrespective of the level of local analyst coverage. However, the time-series patterns in local performance is quite different. In states with a high number of local analysts, institutional investors do not display superior performance both before and after the turn of the millennium. In contrast, institutional investors exhibit superior local performance in states with low analyst presence prior to 2000. This superior local performance weakens significantly after 2000.

This evidence suggests that the local information advantage of institutional investors in the old regime did not merely reflect the local information advantage of equity analysts. In fact, they are likely to have competed for local information rather than shared it. In the next section, we examine whether the increased competitiveness of the information environment also had adverse effects on the *short-term* profitability of local institutional investors' trades.

6. Trading Dataset and Short-term Profitability

In this section, we follow the method in Puckett and Yan (2011) and analyze the performance of institutional trades in the quarter in which the trades are executed. This method allows us to break down the trading performance into a short-term component (intraquarter) and a long-term component (interquarter). The interquarter performance measure corresponds to the performance estimates obtained using quarterly snapshots in Section 4 (Table 2), while the intraquarter performance estimates allow us to identify the short-term performance component that cannot be captured using the coarser approach. We also use the averaging method and statistical tests used in Puckett and Yan (2011). In particular, we average returns across all institution-quarters, and use two-way clustered standard errors.[16]

The sample period of our ANcerno dataset is from 1999 to 2010. Table 6 provides summary statistics for the institutional trading data. Of particular interest is the subsample of institutions for which we are able to identify the manager location and the latter is in the U.S. In particular, as shown in Panel A, we are able to assign about 90% of the institutions and about 80% of the trades to a manager in the U.S. Panel B reports the geographic distribution of ANcerno investors across the U.S. states.

6.1. Local Trading Bias Estimates

Before examining the performance of local trades, we examine whether there is a local bias in the trading activities of institutional investors. Panel A of Table 7 reports the equal-weighted averages of *excess* local trading measures for our sample. We calculate the local trading biases for each institution within each quarter and then report the averages across all quarters. Excess local trading frequency is reported in the first column, while excess local trading intensity measures are reported in the last two columns. Panel B reports the dollar-weighted averages of local trading measures, where the institutions are weighted by their quarterly dollar trading volume.

The results in the first column are consistent with a local trading bias: institutions trade local stocks disproportionately more often than nonlocal stocks. When we weight all institutions equally, the average excess local trading frequency is 2.099 percent during the 1999–2010 sample period. Similar to the estimates obtained using equal-weights, Panel B reports that institutional investors display local trading frequency bias of 4.414 percent during the 1999–2010 period. This evidence of higher local trading bias estimates using dollar-weighting is consistent with larger institutions trading local stocks more actively, presumably because they have better (short-term) information about those firms. This positive correlation between institution size and local trading bias is in contrast to the existing holdings-based evidence in the local bias literature, in which smaller institutions tend to display stronger local holdings bias.

[16] Our results are very similar when we follow an alternative method where we average returns across all institutions within each quarter and then compute the time-series average and the associated test statistic over all quarters.

The second and third columns report the results of our trading intensity analysis. These results indicate that institutional investors also have a local trading intensity bias: their trading (dollar) volume in local stocks is abnormally high. The equal-weighted average excess local trading intensity is 1.123 percent over the full sample period. We obtain similar inference using the alternative volume-based benchmark.

More importantly in our context, we find that local trading bias persists throughout our sample. Whereas the equal-weighted averages seem to decline over time, the dollar-weighted averages are more persistent, again suggesting that large institutions are more active in trading local stocks, regardless of the regime. As reported in Table IA-5 of the Internet Appendix, the excess local trading is significantly positive in every year after 2000.

Overall, the local trading bias estimates suggest that institutional investors trade local stocks more heavily, potentially due to their proximity-based information advantage. Both local trading bias measures portray a consistent picture. Moreover, the intensity-based local trading bias estimates are considerably lower than the corresponding frequency-based local trading bias estimates. This evidence is consistent with local investors breaking up their trades into small orders to reduce the price impact of their potentially information-driven trades. This effect is salient throughout various sample periods.

The results in this table extend the prior evidence of institutional local bias, which is obtained using mandated quarterly snapshots of portfolio holdings. With the availability of more efficient communication technologies (e.g., the SEC's EDGAR system during our sample period) as well as more stringent corporate disclosure rules, analyses based on quarterly portfolio snapshots are unlikely to capture the full extent of the local information advantage and detect the resulting trading activity. More specifically, combining the evidence in this table and the decline in quarterly holdings' local bias indicates that the life of the local information advantage may have shortened over time. To shed more light on this issue, we next directly examine the performance of local and nonlocal trades.

6.2. Location-Conditional Short-Term Trading Performance

In this section, we examine the intraquarter performance of institutional trades conditional on investors' proximity to firms whose stocks they trade. Before focusing on the location-conditional performance estimates, we present the average *total* intraquarter performance of institutional trades to facilitate comparisons with existing studies. We follow the method in Puckett and Yan (2011) and analyze the performance of trades in the quarter in which these trades are executed. This method allows us to break down the trading performance into a short-term component (intraquarter) and a long-term component (interquarter). The interquarter performance measure allows us to corroborate the performance estimates obtained using quarterly snapshots (Table 2), while the intraquarter performance estimates allow us to identify the performance component that cannot be captured using the coarser approach (i.e., the interim trading performance). We will focus on the latter in this section, and examine the former in the next section.

The first column ("All Trades") in Table 8 reports the full-sample average intraquarter performance. We use the averaging method and statistical tests used in Puckett and Yan (2011). In particular, we average returns across all institution-quarters, and use two-way clustered standard errors.[17] The sample period is from 1999 to 2010.

We find that stocks that institutions buy outperform those they sell by about 50.5 basis points (33.2 bps) when we use equal-weighted (principal-weighted) averages and control for characteristics-based performance benchmarks (Daniel, Grinblatt, Titman, and Wermers 1997). This DGTW characteristics-adjusted performance difference remains positive when we account for trading commissions (= 12.8 bps), but it is statistically significant only when we use equal-weights in Panel A (t-statistic = 1.98). These intraquarter performance patterns are similar to the evidence in Puckett and Yan (2011). There are some differences in the magnitude of our estimates because we extend the sample period by several years and exclude trades for which we cannot identify the institution location or for which the institution is not domiciled in the U.S.

To estimate the intraquarter performance of local and nonlocal trades, we again follow the

[17] Our results are very similar when we follow an alternative method where we average returns across all institutions within each quarter and then compute the time-series average and the associated test statistic over all quarters.

Puckett and Yan (2011) method described above. We report the proximity-based performance decomposition estimates in the last three columns of Table 8. The "Local Trades" column in Table III reports the average interim trading performance in local stocks, while the "Nonlocal Trades" column reports the average interim trading performance in the remaining nonlocal stocks. When we compute equal-weighted (principal-weighted) averages, local stocks that institutions buy outperform local stocks they sell by 70.1 bps (50.2 bps) after controlling for stock characteristics. Even when we account for trading commissions, the average equal-weighted (principal-weighted) intraquarter performance differential between local buys and sells is significant, 33.9 bps (20.9 bps), and larger than for "All Trades".[18]

To provide an economic interpretation of these results, we obtain rough estimates of annualized performance. Assuming that trades are uniformly distributed within the quarter, the average horizon of intraquarter return is half quarter. Therefore, the annualized buy minus sell (buy–sell) performance differential is about eight times the averages reported in Table III. Specifically, the equal-weighted and principal-weighted annualized buy–sell performance differentials of local trades translate to 2.71 and 1.67 percentage points, respectively, net of transactions costs.

In contrast to the superior performance of local trades, the magnitudes of the average estimates in the "Nonlocal Trades" column are lower than those in the "All Trades" column. In particular, the buy–sell characteristics-adjusted return differential after accounting for trading commissions is not significantly different from zero, whether we use equal-weighted or principal-weighted averages: −2.6 bps or −7.7 bps, respectively. When comparing local and nonlocal trades, we find that the local buy−sell intraquarter performance is significantly higher than its nonlocal counterpart (see the last column of Table 8), both for the equal-weighted and principal-weighted averages.

Moreover, when we divide the sample into three subperiods of four years (1999–2002, 2003–2006, and 2007–2010; in the last three rows of each panel), the difference between local and nonlocal trades' interim performance is positive and statistically significant in each subperiod.

[18]We also examine the trading activity of local and nonlocal investors prior to earnings announcements in an attempt to identify the potential source of local short-term information advantage. We report the results of this analysis in Table IA-6 in the Internet Appendix. The results indicate that local traders are more active ahead of earnings surprises and are able to execure more profitable trades, consistent with their informational advantage coming from superior access to local private information.

This evidence indicates that local institutional investors have superior ability to time their trades within a quarter than their nonlocal counterparts.

6.3. Firm Attributes and Short-Term Trading Performance

In this section, we investigate whether the superior intraquarter performance of institutional trades is concentrated among stocks with certain characteristics. Our conjecture is that if superior local performance is due to opportunistic access to private information, those profitable opportunities could arise for all types of stocks. Consequently, institutions would earn higher intraquarter trading profits in local stocks even among large and relatively liquid stocks. This conjecture is in contrast to prior literature examining local performance using holdings snapshots that report superior local performance among smaller and less liquid stocks (see, for example, Coval and Moskowitz (2001) and Baik, Kang, and Kim (2010)). However, stock prices of larger firms and more liquid stocks are likely to be more efficient, and therefore it may be difficult to capture local information advantage in those stocks using quarterly snapshots. The ANcerno trading data allow us to capture local information advantage even in liquid stocks. Indeed, trading in stocks with higher liquidity may allow informed local traders to benefit from their informational advantage without incurring too much price impact.

Table 9 reports the average intraquarter performance of institutional trades in various subsamples sorted by stock characteristics. This set of characteristics includes firm size, stock price, idiosyncratic volatility and skewness, and two liquidity measures (i.e., average relative spread and the Amihud illiquidity measure). We classify stocks into two groups, High (above the NYSE median) and Low (below the NYSE median), using each of these characteristics separately and compare the institutional trading performance among local and nonlocal stocks. In particular, we calculate the mean return difference between buy and sell trades in local and nonlocal stocks within each characteristics-based subsample.

We find that local buys outperform local sells in *all* subsamples. Although the magnitude of local performance varies across subsamples, the difference in local performance estimates between High and Low subsamples is never statistically significant for any firm characteristic. This evidence is consistent with institutions having access to valuable short-term information among all types of local stocks. In contrast, nonlocal buys do not significantly outperform nonlocal sales in all characteristics-based subsamples. In particular, the differences are not significant among large and low skewness subsamples. Further, the difference between local and nonlocal performance estimates is significant even for subsamples of more liquid stocks, e.g., low Amihud or low relative spread stocks.

These results indicate that local short-term information advantage is not related to stock characteristics and that, unlike nonlocal trades, local trades are informative even when the market is relatively liquid. This evidence is consistent with local channels of short-term information that allow better timed and more profitable trades across all types of stocks. In contrast, while institutions earn significant nonlocal trading profits in the subset of less liquid stocks, their nonlocal trading profits are significantly smaller in relatively more liquid stocks. This evidence is consistent with skilled investors having difficulty extracting rents in liquid stocks for which market prices are likely to be more efficient.

6.4. Implied Net Quarterly Trades

We next examine the profitability of institutional investors' local and nonlocal trades in the longer run. In particular, we investigate whether the (implied) net quarterly trades of institutional investors in our sample have the ability to predict stock returns in the subsequent quarter. Again, our performance estimation method closely follows Puckett and Yan (2011) who refer to the buy minus sell return difference as "implied quarterly trading performance." For each institution-stock pair, we calculate the cumulative net trading between the start and end of each quarter. We then calculate the DGTW equal- and principal-weighted abnormal returns for buys (i.e., stocks with positive net quarterly trading) and sells (i.e., stocks with negative net quarterly trading) portfolios separately over the subsequent quarter. We finally compute the return difference between the buy and sell portfolios.

Table 10 presents the implied quarterly trading performance estimates for all stocks, local stocks, and nonlocal stocks. We find that none of the buy–sell return differential is significant, including among local stocks. Specifically, during the subsequent quarter, local stocks in which institutions increase positions do not outperform local stocks in which they reduce positions. This evidence corroborates our earlier analysis using the net changes in quarterly holdings (Panel B of Table 2) and indicates that the superior local performance of the average institutional trader in our sample is driven by short-lived local information. The results here highlight the importance of using trading data rather than coarser quarterly portfolio snapshots for accurately measuring the potential local information advantage of institutional investors.

Overall, the location-conditional intraquarter performance estimates in Tables 8 and 9 suggest that the superior average trading performance of institutional investors documented in Puckett and Yan (2011) is mostly due to local trading. Moreover, consistent with Puckett and Yan, the estimates in Table 10 show that the superior local performance of institutional investors' intraquarter trades is short-lived. Combined with the local trading patterns documented in the previous section, the evidence suggests that local institutional investors retain a significant informational advantage at short horizons in the new information environment. Therefore, albeit at shorter horizons, geography can still play an important role for aggregate market outcomes.

7. Summary and Conclusion

This study examines whether exogenous shocks to the information environment induced by regulatory changes and technological progress reduce the local bias and local information advantage of capital market participants – i.e., institutional investors and equity analysts. We find that in the new information environment, the average firm-level local bias is cut by about half and firm ownership becomes more diffused geographically. Further, the local information advantage of institutional investors around corporate headquarters declines sharply. The decline in local institutional ownership is more salient among firms that had more opaque information environments prior to the regulatory changes. The local information advantage of sell-side equity analysts exhibits a similar declining pattern and disappears after the turn of the millennium.

However, geographic proximity between firms and investors appears to still be relevant. The evidence on intraquarter trading activities indicates that institutional investors continue to display a higher propensity to trade local stocks and obtain superior local short-term performance, even in large and liquid stocks. This suggests that investors continue to enjoy local informational rents, albeit short-lived, and local investors are still likely to play a key role in the price discovery process of financial assets.

Beyond the contribution to the local bias literature, our findings may have important policy implications. Specifically, Puckett and Yan (2011) argue that the informational advantage of skilled investors would be eroded by higher frequency of portfolio disclosures that could allow other investors to reverse-engineer skilled traders' investment strategies. However, it is not obvious that a short-lived local information advantage would be negatively affected by regulations mandating a higher frequency of portfolio disclosures. Such requirements may in fact be beneficial to the typical local institutional investor, if they allowed such investor to capitalize on local information more quickly. In addition, the higher disclosure frequency would increase the speed with which local information is incorporated into market prices and thus make them more efficient.

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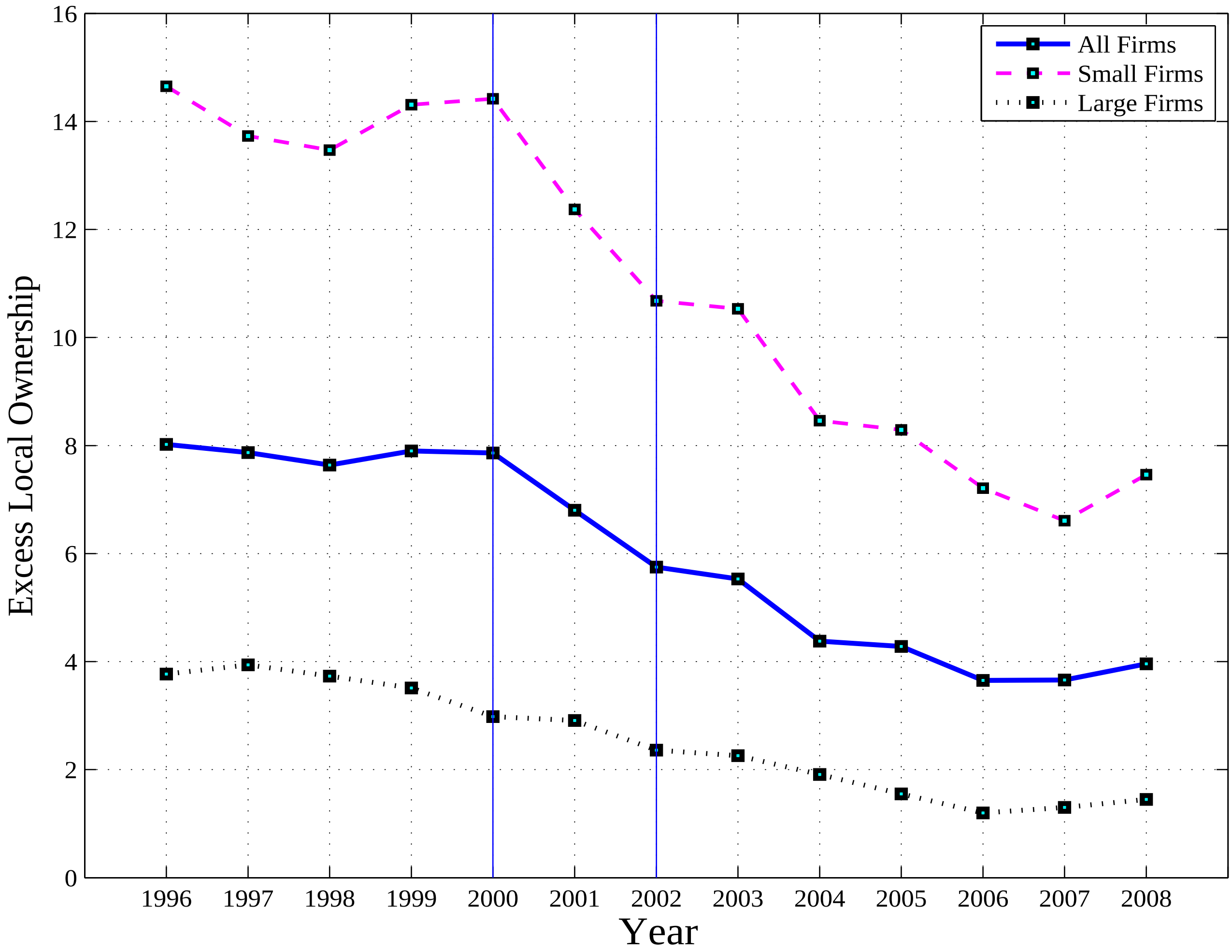

Figure 1. Excess local ownership around firm headquarters. This figure shows the mean excess equal-weighted local ownership time series for the full sample of firms. Excess local ownership is the state institutional ownership of a firm's HQ state minus that state's average state institutional ownership. Small and large firms subsamples contain firms in the lowest and highest firm size quartiles, respectively. Additional details about the variables are available in the Appendix.

Table 1. Local Bias at Institutional Level: Subperiod Estimates

This table reports the abnormal fraction of institutional investors' equity holdings invested in local stocks. Excess Local Weight is the percentage of the investor's portfolio invested in stocks located in the investor's state (local stocks) minus the percentage of the "market portfolio" located in the investor's state. We take the average of excess weights across all institutions each quarter, and then report the time-series average of those quarterly averages. The quarterly averaging across institutions is either weighted equally (first row) or weighted by the total dollar value of the institution's holdings at the beginning of the quarter (second row). The sample period is from 1996 to 2008.

	Excess Local Portfolio Weight	
	1996-1999	2000-2008
Equal-Weighted Average	2.63%	1.41%
Holdings-Weighted Average	0.97%	-0.17%

Table 2. Performance of Institutional Investors in Local and Non-Local Stocks: Subperiod Estimates

This table reports the average performance of institutional investors' local and non-local holdings and trading, for different subperiods of our sample. For each institution with non-zero portfolio weight in local stocks, we calculate the monthly characteristics-adjusted returns of its non-local portfolio, as well as the performance differential between the local and non-local sub-portfolios. We divide each institutional investor's quarterly portfolio into 3 mutually exclusive categories: Local HQ, Local ER1−3, and Non-Local. We exclude Local ER stocks in this table. Panel A reports the holdings-based performance of the non-local portfolio and the performance differential between local HQ portfolio and the non-local portfolio. Panel B reports the corresponding trading-based performance; trading- based performance is defined as the difference in monthly returns of the holdings snapshot at the end of the preceding quarter minus the holdings snapshot at the beginning of the preceding quarter. We report mean portfolio characteristic-adjusted returns based on Daniel, Grinblatt, Titman, and Wermers (1997) method. We compute the average values of the portfolio performance estimates across all institutions each month, and then report the time-series averages of the monthly averages. The monthly averaging across institutions is value-weighted by the total dollar value of the institution's holdings at the beginning of the quarter (for Panel A) or by the total dollar value of holdings that experience net change in portfolio position (for Panel B). The non-local (NL) performance is reported in the first row of each panel, while the differences in performance between local HQ and non-local are reported in the remaining rows. The t -statistics reported in parentheses below the Non Local performance estimates (i.e., the first row in each panel) are for the null hypothesis of zero Non-Local performance. The t -statistics below the performance differential estimates between the local HQ and non-local stocks are for the null hypothesis of no difference in mean performance across local HQ and non-local institutional sub-portfolios. Both types of t -statistics are adjusted for autocorrelation and heteroscedasticity following Newey-West (1987).

Panel A. Holding Performance

Sample Period:	All	1996-1999	2000-2008
	(1)	(2)	(3)
Non-Local (NL)	0.096	0.113	0.088
(t-stat)	(1.11)	(1.04)	(0.84)
<u>Difference in Performance between Local and Non-Local</u>			
Local HQ minus NL	-0.004	0.129	-0.064
(t-stat vs. NL)	(-0.03)	(1.06)	(-0.52)

Panel B. Trading Performance

Sample Period:	All	1996-1999	2000-2008
	(1)	(2)	(3)
Non-Local (NL)	0.076	0.148	0.044
(t-stat)	(1.57)	(1.78)	(0.52)
<u>Difference in Performance between Local and Non-Local</u>			
Local HQ minus NL	0.017	0.154	-0.044
(t-stat vs. NL)	(0.44)	(1.87)	(-0.30)

Table 3. Firm-level Return Regression

This table reports the regression of stock returns on the ownership of local and non-local institutional investors, for different subperiods of our sample. We perform Fama-MacBeth regression of quarterly stock returns on various firm characteristics, including *Local Ownership %*, the share ownership of local institutional investors, and Non-Local Ownership %, the share ownership of non-local institutional investors. Control variables include firm size (market capitalization), market-to-book ratio, lagged stock return, two measures of liquidity (Amihud illiquidity measure and effective spread), idiosyncratic volatility, and skewness. T-statistics are adjusted for autocorrelation and heteroscedasticity following Newey-West (1987).

Dependent Variable:	Quarterly Stock Return, in%		
Sample Period:	1996-2008	1996-1999	2000-2008
Local Ownership %	1.786	2.998	0.877
	(2.46)	(2.44)	(0.84)
Non-Local Ownership %	0.071	0.022	0.107
	(1.23)	(0.45)	(1.09)
Size	-0.025	0.270	-0.247
	(-0.13)	(2.83)	(-0.92)
M/B Ratio	-0.084	-0.069	-0.095
	(-4.02)	(-2.07)	(-3.79)
Lagged Return	0.918	1.682	0.346
	(2.80)	(5.17)	(0.76)
Amihud Illiquidity	0.890	1.384	0.519
	(4.90)	(4.10)	(4.75)
Effective Spread	-0.208	-0.350	-0.101
	(-0.85)	(-1.49)	(-0.28)
Volatility	-0.600	0.169	-1.177
	(-1.54)	(0.17)	(-1.57)
Skewness	0.094	-0.054	0.206
	(1.53)	(-0.58)	(5.25)
Intercept	3.680	5.368	2.415
	(2.71)	(6.03)	(1.05)
Average R^2	0.041	0.036	0.045
Average N	3,178	3,131	3,214

Table 4. Local Analyst Coverage Analysis

This table presents equity analysts' coverage of local stocks. Panel A reports the average excess coverage of local stocks. The excess coverage is defined as the difference between the fraction of local stocks in an analyst's stock coverage portfolio and the fraction of local stocks that the analyst can potentially cover within the CRSP universe. Panel B reports the estimates from local coverage regressions of sell-side equity analysts. The dependent variable is excess coverage of local stocks. In the first two columns, we use equal-weighted fractions, while in the last two columns, we use value-weighted fractions. The independent variables include indicator variable for Post 2000 (year 2000 onward), analyst characteristics (tenure, past performance, and number of firms covered), and an indicator variable for analysts employed by prestigious brokerage houses. All specifications include state fixed effects. The definitions of all variables are provided in the Appendix. Following Petersen (2009), the t-statistics reported in parentheses are based on standard errors clustered by year and state. The sample period is from 1996 to 2008.

Panel A. Excess Local Coverage

	Mean of Excess Coverage of Local Stocks	
	Equal-weighted	Value-weighted
1996-2008	9.61%	6.28%
1996-1999	11.38%	8.17%
2000-2008	8.83%	5.44%

Panel B. Regression Estimates

	Dependent Variable: Excess Coverage of Local Stocks (in %)			
	Equal-weighted		Value-weighted	
Independent Variable	(1)	(2)	(3)	(4)
Post 2000	−3.48	−4.76	−3.07	−4.48
	(−5.23)	(−6.25)	(−4.91)	(−6.84)
PBroker	−1.62	−4.14	−1.25	−4.02
	(−2.59)	(−4.20)	(−1.8)	(−5.28)
PBroker × Post 2000		3.77		4.14
		(3.70)		(3.98)
High Performance	0.09	0.10	0.90	0.92
	(0.10)	(0.11)	(0.91)	(0.93)
Tenure	−0.06	−0.06	0.11	0.12
	(−0.3)	(−0.27)	(0.37)	(0.4)
Number of Firms Covered	−0.18	−0.18	−0.15	−0.15
	(−5.41)	(−5.46)	(−4.27)	(−4.31)
State FE	Yes	Yes	Yes	Yes
N	23,518	23,518	23,516	23,516
Adj. R^2	0.205	0.206	0.231	0.232

Table 5. Local Forecast Accuracy Regression Estimates

This table reports the estimates from forecast accuracy and market reaction regressions. The dependent variable is one of the measures of analyst quarterly earnings forecast error. The independent variables include an indicator variable *Local* and its interaction with Post 2000 (year 2000 onward). *Local* is set to one if the analyst and the firm headquarters are in the same state. We do not include the stand-alone regime variables since they are subsumed by the time-varying analyst fixed effects. The definitions of all variables are provided in the Appendix. Following Petersen (2009), the t-statistics reported in parentheses are based on standard errors clustered by firm and quarter. The sample period is from 1996 to 2008.

Dependent Variable:	ERRMDN	ERRPCTL	DAFE		
Sample Period:	Full	Full	Full	1996-1999	2000-2008
	(1)	(2)	(3)	(4)	(5)
Independent Variables					
Local	0.92	−0.35	−0.44	−0.44	−0.02
	(2.67)	(−2.47)	(−1.65)	(−1.65)	(−0.10)
Local × Post 2000	−1.06	0.22	0.42		
	(−2.46)	(1.20)	(1.32)		
Analyst × Quarter FE	Yes	Yes	Yes	Yes	Yes
N	811,669	811,669	786,605	276,729	509,876
Adj. R2	0.156	0.164	0.121	0.103	0.149
P-value					
(Local + Local×Post 2000)	0.628	0.303	0.918		

Table 6. Trading Data Coverage

This table provides the summary statistics of the sample. Panel A reports the summary statistics of ANcerno database by subsample periods, while Panel B reports the geographical distribution of ANcerno funds and local trades. The columns under "Full ANcerno Sample" report the summary statistics for the set of common stocks appearing in both the CRSP and *ANcerno* databases without imposing stock and fund location filter. The columns under "With Location Data" report the summary statistics for the subset of observations with identifiable stock and fund locations. Local trades are those executed by ANcerno funds headquartered within the same state as firm headquarter state. Institutional trading data are obtained from *ANcerno* Ltd. *ANcerno* fund headquarter location data are hand collected from SEC filings using the EDGAR. The sample includes only common stocks (those with a share code of 10 or 11 in the CRSP database). Sample period is from January 1999 to December 2010.

Panel A. Summary Statistics

	Full ANcerno Sample			*With Location Data*		
	1999-2002	2003-2006	2007-2010	1999-2002	2003-2006	2007-2010
Total number of funds	3,235	2,780	2,096	2,916	2,535	1,871
Total number of institutions	565	545	552	490	488	478
Total number of stocks	7,590	6,044	5,365	6,895	5,482	4,613
Total number of trades (millions)	32.50	76.96	113.43	25.36	60.21	89.00
Total share volume (billion)	400.78	496.11	468.34	311.49	341.60	277.74
Total dollar volume ($trillion)	10.77	13.20	13.03	8.34	8.80	7.69
Average share volume / trade	12,331	6,446	4,129	12,284	5,673	3,121
Median share volume / trade	1,600	320.56	193.57	1,600	243.63	131.63
Average dollar volume / trade	331,252	171,473	114,869	328,958	146,132	86,426
Median dollar volume / trade	40,000	10,170	5,278	39,494	5,926	3,709

Panel B. Geographical Distribution

State	# of Unique Funds	# of Local Trades	State	# of Unique Funds	# of Local Trades	State	# of Unique Funds	# of Local Trades
AK	6	4	KS	18	470	NY	1,300	10,942,792
AL	2	0	KY	15	105	OH	75	119,383
AR	1	116	LA	5	58	OR	59	9,934
CA	634	3,380,523	MA	675	1,964,493	PA	288	125,347
CO	116	22,775	MD	109	24,329	RI	2	0
CT	168	46,628	MI	20	2,869	TN	47	1,082
DC	15	170	MN	83	29,127	TX	128	134,561
DE	62	1,827	MO	63	170,726	UT	22	819
FL	72	69,651	MT	3	0	VA	59	9,089
GA	117	39,211	NC	61	90,793	VT	1	0
HI	2	0	NH	2	0	WA	fs89	74,365
IA	2	468	NJ	173	233,007	WI	114	23,138
IL	394	503,343	NM	13	0	WY	14	0
IN	1	90	NV	12	66			

Table 7. Local Trading Bias

This table presents fund-level local trading bias estimates. Local trading frequency bias (*XLocalTrdFreq*) is defined as the ratio of the number of trades in stocks headquartered in the fund headquarter state to all trades made by the funds, minus the ratio of the number of stocks headquartered in the fund headquarter state to number of all stocks in both the ANcerno universe and the CRSP database with identifiable headquarter locations. Local trading intensity bias (*XLocalTrdInt*) is defined as the ratio of dollar trading volume of stocks headquartered in the fund headquarter state to the fund's total dollar trading volume, minus the ratio of total market capitalization of stocks headquartered in the fund headquarter state to that of all stocks with identifiable headquarter locations. The benchmark in the alternative local trading intensity bias (*XLocalTrdInt*, *Alt*) uses total dollar volume rather than market capitalization. We then take the average across funds and quarters, either as simple average (in panel A) or as weighted average using the fund's total trading volume to weight the fund-level local bias observations. All measures are reported in percentage. Numbers in parentheses are t-statistics, which are computed based on two-way clustered standard errors. Institutional trading data are obtained from ANcerno Ltd. Firm headquarter location data are from SEC Analytic Suite. ANcerno fund headquarter location data are hand collected from SEC filings using the EDGAR. Local trades are those executed by ANcerno funds headquartered within the same state as firm headquarter state. Nonlocal trades are those executed by ANcerno funds headquartered outside the firm headquarter state. The sample includes only common stocks (those with a share code of 10 or 11 in the CRSP database). Sample period is from January 1999 to December 2010.

	Local Trading Frequency Bias (*XLocalTrdFreq*), in %	Local Trading Intensity Bias (*XLocalTrdInt*), in %	Alternative Local Trading Intensity Bias (*XLocalTrdInt, Alt*), in %
Panel A. Equal Weighted			
All	2.099	1.123	0.535
	(8.94)	(4.16)	(2.27)
1999-2002	2.842	1.699	0.542
	(7.37)	(3.89)	(1.24)
2003-2006	1.814	0.927	0.601
	(6.86)	(3.02)	(2.00)
2007-2010	1.632	0.734	0.464
	(8.25)	(2.97)	(1.67)
Panel B. Weighted by Dollar Amount of Principal			
All	4.414	2.523	1.793
	(4.95)	(2.60)	(3.52)
1999-2002	4.075	2.958	0.472
	(2.73)	(2.19)	(0.73)
2003-2006	5.230	2.396	2.798
	(5.18)	(1.76)	(2.91)
2007-2010	3.815	2.283	1.836
	(6.65)	(3.97)	(3.26)

Table 8. Local and Nonlocal Intraquarter Trading Performance

This table reports the average intraquarter trading performance of local and non-local trades. For each trade, we calculate the raw return from the execution price until the end of the quarter. Specifically, raw trade return = (CRSP quarter-end price – *ANcerno* price)/ *ANcerno* price. We adjust these holding-period return calculations using both stock splits and dividend distributions. The characteristic-adjusted returns are computed using the Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997) method. In particular, we calculate characteristic-adjusted trade return by subtracting the DGTW benchmark return within the same time period (from trade date to the quarter-end date). For each fund in each quarter, we compute the equal-weighted and the principal-weighted DGTW adjusted returns separately for buys and sells. We take the difference in DGTW adjusted returns between buys and sells. We then compute the average across all funds and quarters. Panel A presents equal-weighted returns, and Panel B presents principal-weighted returns. Institutional trading data are obtained from *ANcerno* Ltd. Firm headquarter location data are from SEC Analytic Suite. *ANcerno* fund headquarters location data are hand collected from SEC filings using the EDGAR. Local trades are those executed by *ANcerno* funds headquartered within the same state as firm headquarter state. Nonlocal trades are those executed by *ANcerno* funds headquartered outside the firm headquarter state. The sample includes only common stocks (those with a share codeof 10 or 11 in the CRSP database). All trade returns are reported in percentage. Numbers in parentheses are *t*-statistics, which are computed based on two-way clustered standard errors.

		DGTW-Adjusted Returns			
Sample Period	Trade Directions	All	Local	Non-Local	Local minus Non-Local
		Panel A. Equal Weighted			
All	*Buy*	0.626	0.736	0.547	0.189
		(4.73)	(4.85)	(3.43)	(2.12)
All	*Sell*	0.121	0.035	0.185	-0.150
		(1.40)	(0.28)	(2.17)	(-1.54)
All	*Buy-Sell*	0.505	0.701	0.362	0.340
		(7.99)	(5.62)	(4.98)	(3.21)
All	*Buy-Sell after Commissions*	0.128	0.339	-0.026	0.365
		(1.98)	(2.69)	(-0.41)	(3.48)
1999-2002	*Buy-Sell after Commissions*	0.230	0.458	-0.024	0.482
		(3.78)	(3.05)	(-0.26)	(2.35)
2003-2006	*Buy-Sell after Commissions*	0.079	0.150	0.039	0.111
		(0.77)	(1.96)	(0.35)	(1.98)
2007-2010	*Buy-Sell after Commissions*	0.301	0.450	0.103	0.347
		(2.67)	(3.38)	(0.93)	(2.45)

Table 8. Local and Nonlocal Intraquarter Trading Performance
(Continued)

		DGTW-Adjusted Returns			
Sample Period	Trade Directions	All	Local	Non-Local	Local minus Non-Local
Panel B. Weighted by Dollar Amount of Principal					
All	*Buy*	0.443	0.514	0.331	0.183
		(3.93)	(4.63)	(3.26)	(2.05)
All	*Sell*	0.111	0.012	0.123	-0.111
		(1.22)	(0.11)	(1.88)	(-1.28)
All	*Buy-Sell*	0.332	0.502	0.208	0.294
		(5.28)	(4.02)	(3.51)	(3.07)
All	*Buy-Sell after Commissions*	0.043	0.209	-0.077	0.286
		(0.69)	(2.37)	(-0.92)	(2.67)
1999-2002	*Buy-Sell after Commissions*	0.133	0.362	-0.082	0.444
		(2.01)	(2.84)	(-0.62)	(2.24)
2003-2006	*Buy-Sell after Commissions*	-0.113	0.020	-0.182	0.202
		(-1.49)	(0.14)	(-7.92)	(1.70)
2007-2010	*Buy-Sell after Commissions*	0.275	0.372	0.105	0.267
		(1.46)	(1.70)	(0.86)	(2.03)

Table 9. Intraquarter Trading Performance, Conditional on Stock Characteristics

This table reports the local and nonlocal institutional interim trading performance by stock characteristics. *Market Cap* is defined as the number of shares outstanding times the share price. *Price* is the share price of the stock traded. Firm size and price are as of the end of the previous quarter. *Relative Spread* is the difference between daily closing ask and bid prices divided by the midpoint of the bid-ask spread. Amihud illiquidity measure is the daily ratio of the absolute stock return to its dollar volume. The two liquidity variables are measured during the twelve month period until the end of the previous quarter. *Idiosyncratic Volatility* (*Idiosyncratic Skewness*) is defined as the standard deviation (skewness) of the residuals from three-year rolling-regressions of monthly returns on the Fama-French (1993) three factors plus the momentum factor. For each stock characteristic, we group all stocks into two categories, those below the NYSE median (the Low group) and those above the NYSE median (the High group). For each trade, we calculate the characteristic-adjusted return using the execution price and the end of quarter price, following Table 8. For each fund in each quarter, we compute the principal-weighted returns separately for buys and sells. We take the difference in returns between buys and sells. For each stock characteristic category, we report the simple average across all fund-quarters of the abnormal local and non-local trading performance as well as the difference between local and non-local trading performance. Local trades are those executed by *ANcerno* funds headquartered within the same state as firm headquarter state. Nonlocal trades are those executed by *ANcerno* funds headquartered outside the firm headquarter state. Detailed data description is provided in Table 8. Numbers in parentheses are *t*-statistics, which are computed based on two-way clustered standard errors. All trade returns are reported in percentage. Sample period is from January 1999 to December 2010.

		Abnormal Trading Performance, in %		
		Local (L)	Non-Local (NL)	L-NL
Market Cap	Low	0.323 (2.27)	0.294 (2.86)	0.029 (0.33)
	High	0.389 (3.30)	0.135 (1.55)	0.254 (1.72)
	Low-High	-0.067 (-0.41)	0.159 (1.23)	
Price	Low	0.408 (3.27)	0.331 (3.15)	0.077 (0.56)
	High	0.299 (2.57)	0.152 (1.93)	0.147 (1.18)
	Low-High	0.109 (0.85)	0.179 (1.74)	
Relative Spread	Low	0.473 (3.23)	0.132 (1.71)	0.341 (2.10)
	High	0.268 (2.35)	0.352 (3.48)	-0.084 (-0.61)
	Low-High	0.205 (1.14)	-0.220 (-2.21)	
Amihud Illiquidity	Low	0.438 (3.46)	0.149 (1.80)	0.290 (2.22)
	High	0.304 (2.14)	0.388 (3.98)	-0.084 (-0.53)
	Low-High	0.134 (0.81)	-0.239 (-2.11)	
Idiosyncratic Volatility	Low	0.327 (3.31)	0.244 (2.95)	0.083 (0.61)
	High	0.423 (2.66)	0.203 (1.94)	0.220 (1.95)
	Low-High	-0.096 (-0.53)	0.041 (0.35)	
Idiosyncratic Skewness	Low	0.281 (2.16)	0.064 (0.79)	0.217 (1.56)
	High	0.486 (3.43)	0.382 (3.95)	0.104 (0.70)
	Low-High	-0.205 (-1.31)	-0.317 (-3.79)	

Table 10. Implied Quarterly Trading Performance

This table presents implied quarterly local and non-local trading performance of funds. For each fund and each stock in quarter *t*, we calculate the net trading position by subtracting total shares sold from total shares bought over the quarter. We then calculate the Daniel, Grinblatt, Titman, and Wermers (DGTW) equal- and principal-weighted abnormal return performance for buys (positive net trading imbalance) and sells (negative trading imbalance) separately over the subsequent quarter and compute the difference between buys and sells. We then compute a simple average across all funds and quarters. Panel A presents equal-weighted returns, and Panel B presents principal-weighted returns. Local trades are those executed by *ANcerno* funds headquartered within the same state as firm headquarter state. Nonlocal trades are those executed by *ANcerno* funds headquartered outside the firm headquarter state. Detailed data description is provided in Table 8. All returns are reported in percentage. Numbers in parentheses are *t*-statistics, which are computed based on two-way clustered standard errors. Sample period is from January 1999 to December 2010.

	DGTW-Adjusted Returns			
	All	Local	Non-Local	Local minus Non-Local
Panel A. Equal Weighted				
Buy	-0.742	-0.662	-0.753	0.091
	(-2.58)	(-2.35)	(-2.59)	(0.22)
Sell	-0.558	-0.523	-0.600	0.077
	(-2.04)	(-1.87)	(-2.24)	(0.20)
Buy-Sell	-0.185	-0.139	-0.153	0.014
	(-1.52)	(-0.99)	(-1.32)	(0.08)
Panel B. Weighted by Dollar Amount of Principal				
Buy	-0.901	-0.803	-0.907	0.104
	(-2.85)	(-2.87)	(-2.84)	(0.24)
Sell	-0.651	-0.471	-0.721	0.249
	(-2.15)	(-1.69)	(-2.40)	(0.60)
Buy-Sell	-0.249	-0.331	-0.186	-0.145
	(-2.07)	(-2.54)	(-1.54)	(-0.81)

Internet Appendix to

"Has Local Informational Advantage Disappeared?"

April 2016

Abstract

This internet appendix provides supplementary material to the paper "*Has Local Informational Advantage Disappeared?*" This document contains tables that are referenced in the paper, but are not reported in the main tables.

Table IA-1. Information Environment and Excess Local Ownership

This table reports pooled cross-sectional regression coefficient estimates and corresponding *t*-statistics for the relation between firm-level excess local ownership (LOCOWN) and the characteristics of the firm information environment conditional on the regulatory regime. LOCOWN is the excess local ownership, measured as the ownership ratio of institutional investors in the firm's HQ state minus the average of those investors' ownership ratio in other firms in that state. We include time-varying firm and state characteristics in the regression, as well as state fixed effects. The ownership variable is measured as of the fiscal year end, and all explanatory variables are measured during the same fiscal year. Post-2000 is an indicator variable equal to one for fiscal years ending in 2000 and onward. The local ownership variable in Column (3) is recalculated after excluding institutional investors that are classified as public or corporate pension funds, university endowments, or miscellaneous. The results in Columns (4) through (6) are based on samples excluding stocks priced below $2, firms located in California or New York states, and high-tech firms, respectively. Following Petersen (2009), the *t*-statistics reported in parentheses are based on standard errors clustered by year and state. The sample period is from 1996 to 2008.

Dependent Variable: LOCOWN, Excess Local Ownership (in %)						
			No PF	Pr>$2	No CA/NY	No Tech
Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Post-2000	-2.46	-5.23	-5.05	-4.63	-5.35	-4.36
	(-4.6)	(-2.8)	(-2.4)	(-2.4)	(-2.6)	(-2.3)
Turnover		-0.69	-0.75	-0.58	-1.13	-0.73
		(-2.8)	(-2.6)	(-2.7)	(-3.6)	(-2.8)
Post-2000 x Turnover		0.42	0.41	0.36	0.77	0.5
		(1.6)	(1.3)	(1.5)	(2.3)	(1.7)
Idio. Volatility		0.21	0.21	0.18	0.21	0.2
		(3.4)	(3.3)	(3.1)	(2.8)	(3.1)
Post-2000 x Idio. Volatility		-0.24	-0.23	-0.22	-0.25	-0.21
		(-3.6)	(-3)	(-3.4)	(-2.9)	(-3.1)
Idio. Skewness		0.07	0.1	0.1	0.06	-0.11
		(0.3)	(0.4)	(0.4)	(0.3)	(-0.4)
Post-2000 x Idio. Skewness		0.05	0.04	0.02	0.14	0.34
		(0.2)	(0.1)	(0.1)	(0.5)	(1.1)
Major Auditor		-7.15	-7.32	-6.28	-8.83	-6.38
		(-5.6)	(-5.7)	(-4.8)	(-4.8)	(-6.2)
Post-2000 x Major Auditor		5.03	5.16	4.33	5.24	3.87
		(3.8)	(3.7)	(3.1)	(2.7)	(3.4)
Analyst Indicator		-4.28	-4.08	-3.56	-4.76	-4.7
		(-5.8)	(-5.5)	(-4.7)	(-6.5)	(-5.2)
Post-2000 x Analyst Indicator		1.2	0.84	0.75	2.89	1.39
		(1.1)	(0.8)	(0.7)	(3.3)	(1.2)
Discretionary Accrual Rank		0.27	0.11	0.27	0.09	0.11
		(1.3)	(0.6)	(1.3)	(0.5)	(0.5)
Post-2000 x Discretionary Accrual Rank		-0.17	0.04	-0.16	-0.03	-0.05
		(-0.7)	(0.2)	(-0.6)	(-0.1)	(-0.2)
Local Analyst Indicator		0.64	0.81	0.57	1.19	0.8
		(1.6)	(2.2)	(1.5)	(3.5)	(2.2)
Post-2000 x Local Analyst Indicator		-0.96	-1.22	-0.65	-0.92	-0.96
		(-2.1)	(-2.8)	(-1.5)	(-2.2)	(-2.2)
Firm Controls	No	Yes	Yes	Yes	Yes	Yes
State Controls	No	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	40,640	36,558	36,558	34,846	24,940	25,695
R^2	0.062	0.128	0.116	0.126	0.147	0.125

Table IA-2. Geographic Concentration of Institutional Ownership

This table reports annual averages for geographic concentration measures of institutional ownership. We report the mean state-level ownership concentration indices. Specifically, the first two columns report the Herfindahl-Hirschman concentration index (HHI) of state-level institutional ownership across all U.S. states. The first column reports concentration index calculated using all states, while the index in the second column excludes the headquarters state. The last column reports the geographical concentration index (GCI) of state-level institutional ownership across all U.S. states adjusted for the "natural" level of ownership concentration resulting from the geographical clustering of institutional investors.

	Ownership Concentration Measures × 100		
Year	HHI	HHI, excluding HQ state	GCI
1996	27.76	32.96	15.92
1997	26.56	31.37	14.97
1998	27.15	32.16	16.12
1999	27.44	32.00	16.23
2000	27.90	32.26	17.14
2001	26.01	30.61	15.64
2002	25.70	29.99	14.77
2003	23.39	26.57	13.38
2004	23.84	27.22	11.50
2005	23.64	27.16	11.20
2006	22.73	25.84	10.22
2007	23.09	26.30	10.54
2008	23.72	27.81	11.34

Table IA-3. Local Ownership and Informed Trading Measures

This table reports pooled cross-sectional regression coefficient estimates and corresponding t-statistics for the relation between firm-level measures of informed trading in the year following the fiscal year end and the level of excess local institutional ownership as of the fiscal year end. LOCOWN is the excess local ownership, measured as the ownership ratio of institutional investors in the firm's HQ state minus the average of those investors' ownership ratio in other firms in that state. We control for time-varying firm and state characteristics and include year as well as state fixed effects. Post-2000 (Post-2003) is an indicator variable equal to one for fiscal years ending in calendar years 2001 and 2002 (2003 and onward). We interact these indicator variables with LOCOWN, but do not include the standalone variables since they are subsumed by the year fixed effects. PIN is the probability of private information related trade from Easley, Hvidkjaer, and O'Hara (2002) model. ADJPIN and PSOS are PIN's components from Duarte and Young (2009). ADJPIN is the probability of private information related trade from the extended model in Duarte and Young (2009), while PSOS is the probability that a given trade happens during a symmetric order flow shock. Following Petersen (2009), the t-statistics reported in parentheses are based on standard errors clustered by year and state. The sample is restricted to 1996 to 2004 period due to the availability of PIN components.

	Dependent Variable: Subsequent Year PIN		
	PIN	ADJPIN	PSOS
Independent Variables	(1)	(2)	(3)
LOCOWN	3.59	2.24	3.23
	(4.2)	(4.6)	(6.2)
LOCOWN×FDSOX	2.20	−0.43	−0.22
	(1.6)	(−0.6)	(−0.3)
LOCOWN×POSTSOX	4.40	−1.43	0.25
	(3.0)	(−1.7)	(0.3)
Firm Controls	Yes	Yes	Yes
State Controls	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	12,406	12,406	12,406
Adj. R^2	0.326	0.507	0.495

Table IA-4. Local Bias and Local Performance: Institution-Level Estimates, Conditional on Local Analyst Presence

This table reports the local bias and local performance of institutional investors, sorted by the presence of local equity analysts. States are sorted into three groups based on the number of local analysts in the state: top 5 states, 6th-20th states, and the rest of the states. Panel A reports the excess local holdings. *Excess Local Holdings* is the percentage of the investor's portfolio invested in stocks whose HQ are located in the investor's state minus the percentage of the ``market portfolio" located in the investor's state. Panel B reports the average performance of institutional investors' local and non-local holdings. For each institution with non-zero portfolio weight in local stocks, we calculate the quarterly characteristics-adjusted returns of its local and non-local portfolios, as well as the performance differential (local minus non-local). *Local Portfolio* is comprised of stocks in the institutional investor's portfolio whose HQ are located in the investor's state, while *Non-Local Portfolio* is comprised of the rest of the institution's holdings. The portfolio returns are adjusted for the following three stock characteristics using the Daniel et al. (1997) method: size, book-to-market, and past 12-month return. We take the average of excess weights and adjusted returns across all institutions each quarter, and then calculate the time-series average of those quarterly averages. The quarterly averaging across institutions is weighted by the total dollar value of the institution's holdings at the beginning of the quarter. The figures reported in Panel B is the difference between the performance of local and non-local portfolios. The *t*-statistics reported in parentheses are adjusted for autocorrelation and heteroscedasticity following the Newey-West (1987) method. The sample period is from 1996 to 2008.

Panel A. Excess Local Holdings

	1996-2000	2001-08
High (Top 5 States)	3.04	1.82
Medium (States 6-20)	3.32	2.28
Low (Other States)	3.01	2.15

Panel B. Local minus Non-Local Performance

	1996-2000	2001-08
High (Top 5 States)	−1.07 (−1.8)	−0.18 (−0.5)
Medium (States 6-20)	0.87 (1.2)	0.14 (0.6)
Low (Other States)	0.78 (2.9)	−0.60 (−1.3)

Table IA-5. Local Trading Bias, by Year

This table presents fund-level local trading bias estimates for each year of our trading sample. Local trade bias is defined as the ratio of number of trades in stocks headquartered in the same state as the fund headquarter state to all trades made by the funds minus the ratio of number of stocks headquartered in the same state as the fund headquarter state to number of all stocks in both the *ANcerno* universe and the CRSP database with identifiable headquarter locations. Local volume bias is defined as the ratio of trading volume of stocks headquartered in the same state as the fund headquarter state to total trading volume made by the funds minus the ratio of total number of shares outstanding of stocks headquartered in the same state as the fund headquarter state to that of all stocks in both the *ANcerno* universe and the CRSP database with identifiable headquarter locations. Local dollar volume bias is defined as the ratio of dollar trading volume of stocks headquartered in the same state as the fund headquarter state to total dollar trading volume made by the funds minus the ratio of total market capitalization of stocks headquartered in the same state as the fund headquarter state to that of all stocks in both the *ANcerno* universe and the CRSP database with identifiable headquarter locations. We calculate the local trading biases for each fund within each quarter and then report the equal-weighted averages across all funds and quarters for each year of the sample in panel A. In Panel B, each fund-quarter observation is weighted by the total dollar volume of the fund's trades in the quarter. All local trading biases are reported in percentage. The sample includes only common stocks (those with a share code of 10 or 11 in the CRSP database). Sample period is from January 1998 to December 2010.

Panel A: Equal Weighted

Year	Local Trade Bias	Local Volume Bias	Local Dollar Volume Bias
1998	0.541	-0.357	0.052
1999	2.918	2.206	2.242
2000	2.665	1.678	1.235
2001	2.650	1.476	1.162
2002	2.384	1.623	1.484
2003	2.125	1.156	1.190
2004	1.763	0.829	0.924
2005	1.364	0.657	0.498
2006	1.517	0.617	0.658
2007	1.646	0.844	0.728
2008	2.045	1.327	1.136
2009	1.436	0.632	0.681
2010	1.603	0.542	0.663

Panel B: Dollar Weighted

Year	Local Trade Bias	Local Volume Bias	Local Dollar Volume Bias
1998	3.710	5.859	4.105
1999	1.036	2.057	2.267
2000	1.254	0.917	1.029
2001	1.283	0.509	0.386
2002	1.176	0.762	0.588
2003	1.035	0.811	0.682
2004	2.885	0.739	0.566
2005	2.539	0.951	0.812
2006	2.082	1.098	0.932
2007	2.574	0.851	0.791
2008	1.942	1.397	1.285
2009	1.219	0.832	0.789
2010	1.634	0.548	0.914

Table IA-6. Trading Activity and Profitability around Earnings Announcements

This table reports the abnormal local trading activity and profits around quarterly earnings announcements. Panel A reports the abnormal local (buy minus sell) trading imbalance, which is the average of daily abnormal local trading imbalance within each window. Daily abnormal local trading imbalance is the daily local trading imbalance on each day minus the mean daily local trading imbalance during [-60, -20] window, where day 0 is the earnings announcement day. The daily local trading imbalance is the ratio of daily local buy minus local sell to the total trading (local buy plus local sell plus nonlocal buy plus nonlocal sell). We calculate two different abnormal local trading imbalance measures using the number of trades and the dollar trading volume, respectively. Panel A1 reports the abnormal local trading imbalance prior to positive earnings surprises, while Panel A2 reports the abnormal local trading imbalance prior to negative earnings surprises. Panel B reports the relative profitability of local and non-local trades. For each stock-quarter, we calculate the average raw return of local and non-local trades initiated in various windows ahead of the stock's earnings announcements in that quarter. For each trade, we calculate the raw return from the execution price to the closing price of each of three hypothetical liquidation dates: the announcement day, five trading days after the announcement, and ten trading days after the announcement. We take the difference between the average raw return of local trades and non-local trades for each trading window of each earnings announcement, and then report the simple average across all announcements for each trading window. Panel B.1 (B.2) presents the returns prior to positive (negative) earnings surprise. All trade returns are reported in percentage. The *t*-statistics in parentheses are computed based on two-way clustered standard errors. Institutional trading data are obtained from ANcerno Ltd. Firm headquarter location data are from SEC Analytic Suite. ANcerno fund headquarter location data are hand collected from SEC filings using the EDGAR. Local trades are those executed by ANcerno funds headquartered within the same state as firm headquarter state. Nonlocal trades are those executed by ANcerno funds headquartered outside the firm headquarter state. The sample includes only common stocks (those with a share code of 10 or 11 in the CRSP database). Sample period is from January 1999 to December 2010.

Panel A: Local Buy-Sell Imbalance Prior to Earnings Announcement		
Trading Window (centered at Earnings Announcement Day)	Abnormal Local Trading Imbalance (Buy minus Sell), in % of Total Trading	
	Number of Trades	Dollar Volume
Panel A1: Positive Earnings Surprise		
[-12, -8]	0.020 (2.61)	0.015 (1.94)
[-7, -3]	0.017 (2.18)	0.023 (2.74)
[-2, -1]	0.020 (2.42)	0.023 (2.49)
Panel A2: Negative Earnings Surprise		
[-12, -8]	-0.015 (-1.44)	-0.028 (-2.44)
[-7, -3]	-0.025 (-1.52)	-0.028 (-1.49)
[-2, -1]	-0.046 (-2.22)	-0.055 (-2.30)

Panel B: Local minus Non-Local Trade Returns Prior to Earnings Announcement			
	Principal-Weighted Profits, in %		
Liquidation Date:	Earnings Announcement Day	Earnings Announcement Day +5	Earnings Announcement Day +10
Panel B1: Positive Earnings Surprise			
[-12, -8]	0.082 (1.11)	0.181 (2.35)	0.290 (3.39)
[-7, -3]	0.041 (0.70)	0.143 (2.03)	0.230 (2.47)
[-2, -1]	-0.052 (-0.85)	-0.085 (-0.89)	0.007 (0.06)
Panel B2: Negative Earnings Surprise			
[-12, -8]	0.313 (2.45)	0.315 (1.38)	0.351 (1.46)
[-7, -3]	0.279 (2.99)	0.444 (3.72)	0.531 (3.80)
[-2, -1]	0.113 (1.12)	0.154 (0.92)	0.286 (1.61)