# Past Performance and Changes in Local Bias

JAMES P. SINCLAIR*

**ABSTRACT**

Recent research suggests investors actively skew their portfolios toward local stocks. I investigate whether fund managers increasingly shift their holdings toward local stocks when underperforming external benchmarks. Using a unique dataset of detailed securities transactions and daily portfolio holdings of four large state retirement plans, I find evidence that past fund performance is negatively associated with changes in local bias. This finding is consistent with fund managers favoring local stocks while deemphasizing geographic diversification during underperformance periods. I also find evidence consistent with fund managers possessing a relative information advantage in local stocks; however this advantage varies with contractual incentives.

* Sinclair is with University of Connecticut. I greatly appreciate comments and suggestions from Sanjeev Bhojraj, Paul Fischer, Dan Givoly, Alok Kumar, Ben Lansford, Rick Laux, Tom Miller, Karl A. Muller III, Adrienne Rhodes, Dan Russomanno, Kristy Schenck, Arun Upneja, Jim Vincent, Luke Watson and seminar participants at Michigan State University, The Ohio State University, The Pennsylvania State University, University of Connecticut, and University of Miami. This research was supported in part by a grant from the Smeal College of Business

This study examines the role of past fund performance on the demand for local securities. First, I examine whether state pension funds' local bias varies predictably with year-to-date performance relative to a benchmark portfolio. Prior research documents that investment managers respond to changes in relative performance by altering their stock selection and portfolio risk profile (e.g., Haugen and Lakonishok (1987); Cohen and Starks (1988); Grinblatt and Titman (1989); Brown, Harlow, and Starks (1996); Chevalier and Ellison (1997); Elton, Gruber, and Blake (2003)); however little is known regarding the method by which fund managers adapt their investment behavior given past fund performance. I expect this change in investment behavior to lead to shifts in the mix of local and non-local securities in fund managers' portfolios. The same behavioral biases that lead investors to skew their portfolios toward local securities seem likely to also affect trading activity. Therefore, I also investigate the influence of past performance on trading volume differences between local and non-local securities.

I expect shifts in the demand for local stocks to originate from two sources. First, consistent with the risk-incentive problem investigated in Grinblatt and Titman (1989), performance-based contracts are likely to induce portfolio managers to alter their investment strategies conditional on relative past performance. Specifically, during periods of relative underperformance, portfolio managers operating under a performance-based contract face an incentive to further deviate from the benchmark portfolio. Conversely, during periods of superior relative performance, a cap on bonus payouts provides portfolio managers an incentive to reduce deviations from the benchmark portfolio. This behavior is symptomatic of the principal-agent dilemma discussed in prior literature. Additionally, as suggested by French and Poterba (1991)

and Huberman (2001), investors are most optimistic (expect higher returns) for domestic, or familiar, securities. This optimism may result from real or perceived information-based advantages, or from behavioral biases, such as overconfidence, wishful-thinking, and loyalty. I expect local bias and local trading activity to increase (decrease) as portfolio managers shift their portfolios further away from (toward) the benchmark in response to past performance.

Investigating the relationship between past fund performance and the demand for local securities in the state pension plan setting offers several advantages. First, I have hand-collected detailed securities transactions and complete daily portfolio holdings of four large state pension plans from 2003 through 2009. This extensive dataset allows for examination into the method by which fund managers adapt their investment behavior to past performance, without suffering from limitations inherent in prior studies that rely on quarterly holdings data or anonymous transactions.

Additionally, the investment objectives of state pension funds are clearly stated and publicly available. Generally, state pension fund managers are expected to achieve a long-term rate of return that exceeds a composite benchmark while controlling risk through acceptable diversification strategies.[1] Unlike their counterparts in the mutual fund and hedge funds industries, state pension fund managers are typically not rewarded for increasing assets under management, other than through investment performance. In other words, the standard

[1] Adapted from the Teachers' Retirement System of Texas Investment Policy Statement found at http://www.trs.state.tx.us/investments/documents/investment_policy_statement.pdf. Similar statements are found for other state pension funds.

compensation contract in this setting offers a base rate plus performance-driven bonus payouts up to a pre-determined maximum award. Additional consideration is not offered for contributions, as these inflows are sufficiently predictable and (usually) independent of fund performance. By reducing the personal economic incentives to attract new fund flows, the state pension plan setting offers an arguably richer setting to examine fund managers' response to past fund performance than the mutual fund or hedge fund environments.[2]

Despite the inability to directly measure a fund manager's familiarity with a particular asset, the combination of a simple performance-based compensation contract and well-established behavioral biases leads to the following empirical predictions. First, I expect the proportion of a state pension fund portfolio invested in local securities to be negatively associated with the fund's past performance. In addition, I expect this negative relation to be stronger in the final quarter of the fund manager's annual evaluation period. Furthermore, I expect state pension funds to increase (decrease) the proportion of daily trading activity in local securities during periods of relatively poor (superior) performance.

Consistent with fund managers shifting the mix of local and non-local securities in their portfolios in response to past performance, I find a negative relationship between past

[2] State pension plan fund managers are likely to be motivated by strong political incentives, which may substitute for purely economic incentives, to maximize rates of return on pension assets. The two key distinctions between the state pension setting and other fund manager settings, as it relates to this study, are: (i) state pension fund managers' maximum compensation is capped at amounts significantly lower than their counterparts in other settings, and (ii) fund flows are less sensitive to performance records in the state pension fund setting than in other fund manager settings.

performance and changes in local bias for state pension fund managers' portfolios. This negative relationship is more pronounced during the final quarter of the fund managers' annual evaluation period. Together, these results suggest that fund managers respond to their performance-based compensation plan by shifting their investment portfolios toward local stocks when they are most likely to miss the bonus pool, and away from local stocks (toward a more diversified portfolio) following superior relative performance. Similar findings persist when examining local and non-local trading volume. The shift toward local securities is accomplished by more active trading (proportionally) in local securities, as opposed to a passive investment strategy with respect to geographic diversification, thus reducing the concern that local economic shocks are driving the mix of local and non-local securities in the portfolio.

Additional analyses suggest that fund managers have superior stock-picking skills in local securities, relative to non-local securities, when underperforming their benchmark; however this advantage disappears if managers are underperforming their benchmark during the final quarter of their annual evaluation period. Coupled with the earlier result that fund managers increase their local bias when underperforming in the final quarter, the results are consistent with fund managers exhibiting overconfidence in their local trading activity.

The results found in this paper extend the existing local bias literature in at least two important ways. First, this study extends prior research examining the determinants of local bias (e.g., Coval and Moskowitz (1999); Hau (2001); Coval and Moskowitz (2001); Huberman (2001); Grinblatt and Keloharju (2001); Ayers, Ramalingegowda, and Yeung (2011)). These

prior studies show that, on average, both institutional and individual investors have a tendency to overweight their portfolios in local stocks. By introducing past fund performance as a determinant of local bias, this study is the first attempt to explain changes in the observed level of local bias for a particular investor over time. Specifically, I find that state pension fund managers increase (decrease) their exposure to local stocks, relative to non-local stocks, following periods of underperformance (outperformance). These findings are interesting because of the potential costs of portfolio under-diversification (e.g., risk of underperformance leading to pension plan underfunding or increased taxes).

Further, this study provides new evidence on the debate surrounding the link between geographic proximity and information asymmetry (e.g., Choe, Kho, and Stulz (2005); Dvorak (2005); Malloy (2005); Bae, Stulz, and Tan (2008); Baik, Kang, and Kim (2010)). Consistent with Coval and Moskowitz (2001), I find evidence that suggests fund managers possess a limited relative information advantage in local stocks. Specifically, I find that during periods of poor portfolio performance, fund managers exhibit superior stock-picking ability in local stocks (local transactions outperform non-local transactions by 25 basis points over one month). Similar results hold during the final quarter of the fund manager's annual evaluation period (local transactions outperform non-local transactions by 30 basis points over one month). However, when fund managers are underperforming their benchmark in the final quarter of their annual evaluation period, the local information advantage disappears. These results are consistent with managers exhibiting overconfidence when trading in local stocks, or possibly moving toward a

longer-term outlook in selecting stocks when they are no longer able to meet their benchmark in the current year.

This study is subject to several limitations. First, the sample is restricted to four state pension funds. While each fund is located in a distinct economic region, the results may not generalize to the universe of state pension plans or to investment managers outside the state pension plan setting. However, the four state plans in this study manage over $300 billion in total assets and are consistently ranked among the largest pension plans in the world (Pensions & Investments (2010)). This study also does not explore important cross-sectional differences in the management of the funds. Each fund varies in its use of internal and external managers. I code each trade as local or non-local to be consistent with the location of the manager executing the trade. Additionally, I am unable to identify when each manager has reached the maximum allowable bonus payout. I attempt to overcome this limitation by partitioning past performance into quartiles. The largest reduction in local bias comes from the fund-years exhibiting the highest past relative performance, consistent with managers increasing diversification once they have reached the maximum allowable bonus payout.

Section I provides background information and discusses prior research. Section II develops the hypotheses and outlines the research design. Results are presented in Section III. Additional analyses are conducted in Section IV. Section V concludes the paper.

## I. Background

### *A. Prior Evidence on Local Bias*

There is a growing debate in the academic literature concerning investors' apparent preference for locally headquartered firms. While we know fund managers pursue excess returns by deviating from the market portfolio, portfolio theory suggests these deviations should be uncorrelated with geography. Contrary to this expectation, several academic studies have demonstrated a strong link between the location of a firm's headquarters and the investor.

French and Poterba (1991) investigate the link between investors and geography in a broad context and find evidence consistent with investors exhibiting greater optimism for domestic stocks. Kilka and Weber (2000) support this result in an experimental setting, by demonstrating that subjects feel more competent about domestic stocks and show that higher competence levels are associated with higher expected returns and lower expected dispersion of returns.[3] This 'home bias' also appears to persist within several countries.[4] Morse and Shive (2011) posit that patriotism explains at least part of the home bias puzzle, as more patriotic countries exhibit greater home bias. Concentrating on U.S. investment managers, Coval and Moskowitz (1999) discard potential barriers to international stockholdings (i.e., language/cultural

[3] High investor competence has also been linked to increased trade frequency (Graham, Harvey, and Huang (2009)).

[4] Using transaction-level data, Hau (2001), Dvorak (2005), Grinblatt and Keloharju (2000), and Choe, Kho, and Stulz (2005) find evidence of home bias in Germany, Indonesia, Finland, and Korea, respectively. Massa and Simonov (2006) find evidence of home bias among Swedish investors and Feng and Seasholes (2004) find that Chinese investors overweight local companies.

differences, tax effects, political risk, investor protection concerns) and still find that investors overweight domestic securities located in close proximity to the investor.[5] Similarly, Huberman (2001) finds that investors are more likely to invest in their local Regional Bell Operating Company than non-local bell companies, and concludes that this evidence suggests that people look favorably (i.e., expect higher returns and lower stock-specific risks) upon familiar stocks.

Several studies have shown that this optimistic bias favoring local stocks yields positive abnormal returns. Coval and Moskowitz (2001) find that fund managers in their sample earn 1.18% more per year from their local holdings compared to their non-local holdings, and that their local holdings outperform the local stocks they avoided by 3% per year. Ivkovic and Weisbenner (2005) document a 3.2% return advantage for local holdings relative to non-local holdings for their sample of individual investors. Looking at hedge funds, Teo (2009) finds that funds with a physical presence in an investment region outperform other hedge funds investing in the same region by a significant margin. Hau (2001), Dvorak (2005), and Baik, Kang, and Kim (2010) each support these earlier results by documenting superior performance for local investors relative to non-local investors.[6]

[5] Coval and Moskowitz (1999) suggest that local investors may have an information advantage relative to non-local investors via personal contact with employees, executives, and suppliers, as well as cheaper access to local media outlets. Petersen (2004) discusses other forms of 'soft information' that may lead to local investors gaining an information advantage relative to non-local investors.

[6] To be clear, not all evidence points toward local investment superiority. Zhu (2002); Grinblatt and Keloharju (2000); Ferreira, Matos, and Pereira (2009); and Seasholes and Zhu (2010) all provide evidence consistent with investors not having an information advantage in local stocks. In light of these studies, I remain agnostic on whether or not the fund managers in my setting

Geographic performance superiority is not isolated to equity investors. Malloy (2005) and Bae, Stulz, and Tan (2008) document that local analysts possess an information advantage over foreign analysts. Uysal, Kedia, and Panchapagesan (2008) find that when target and acquirer firms are located in close proximity to each other, the acquirer returns are more than twice that in non-local transactions. Ayers, Ramalingegowda, and Yeung (2010) find that geographic distance between a firm and its institutional investors impacts the cost of monitoring, leading to systematic differences in financial reporting discretion. Also consistent with distance affecting monitoring costs, Degryse and Ongena (2005) document that loan rates decrease with the distance between the firm and its lending bank, while Butler (2008) shows that investment banks with a local presence have a comparative advantage in placing difficult bond issues. Geographic proximity also appears to positively affect venture capital performance by lowering monitoring costs (Tian 2008).

Together, these studies point toward geography playing an important role in investor decisions. While many investors consciously overweight their portfolios in local stocks, this paper is the first study to document a determinant of changes in local bias. I show that past performance drives changes in local bias in a systematic and predictable manner. Fund managers actively shift their exposure to local stocks in response to their own past performance relative to an exogenous benchmark. This result is consistent with fund managers exhibiting a 'flight to familiarity' by actively increasing their local holdings when underperforming their benchmark.

---

possess a real information advantage in local stocks. I conjecture that managers *believe* they have an information advantage in local stocks relative to non-local stocks. To what degree managers exploit this perceived advantage and realize abnormal returns is tested in subsequent analyses.

*B. Data Limitations – Prior Research*

Prior research on local bias has been unable to investigate detailed investor behavior due to several data limitations. To investigate fund managers' reactions to past performance, three essential data elements are required: detailed transactions, portfolio holdings, and trader identity. Popular data sources, including quarterly equity holdings reported on 13f filings and compiled by *CDA/Spectrum* and *Factset/LionShares* (used in Ferriera, Matos, and Pereira (2009) and Baik, Kang, and Kim (2010)), individual investor monthly holdings and daily transactions from a single brokerage firm (used in Barber and Odean (2000); Seasholes and Zhu (2010) and Miller and Shanthikumar (2010)), and transaction-level data in Germany, Indonesia, Finland, and Korea (Hau (2001); Dvorak (2005); Grinblatt and Kelharju (2000); Choe, Kho, and Stulz (2005)) all contain a subset of the data necessary to perform a thorough analysis of investor reaction to past performance. The transaction data used in prior studies cannot be matched with a particular institutional investor to track portfolio holdings over time. This limiting feature of the existing data sources has prevented prior research from examining the trading activity of institutional investors to examine whether past performance influences trading behavior in and portfolio exposure to local stocks.

To measure local bias at a primitive level, I construct a database of the daily portfolio holdings of four large state retirement pension plans, whose combined total assets were $330 billion in 2010. Contained within this dataset are detailed records of over one million domestic

equity securities transactions from 2003 to 2009.[7] Each transaction record includes a trade date, asset class, transaction type, security identifier, shares traded, price, commissions, expenses, broker, cost/proceeds, and other details. The transactions data, coupled with periodic portfolio holdings for each fund in my sample, allows me to create rolling daily portfolios to derive measures of local bias in each fund's portfolio.

This detailed dataset offers several advantages over prior studies using quarterly portfolio holdings or detailed trade data provided by single brokerage houses, exchanges, or the *Trade and Quote* (*TAQ*) database. First, unlike quarterly portfolio holdings, which are susceptible to window dressing and other reporting manipulations, daily trade data permits a direct investigation of institutional investors' trading behavior as information is released into the marketplace. Second, most transaction-level datasets are limited in scope; only containing a few stocks, covering short time periods, or concentrated on a single exchange or brokerage house.[8] Lastly, while the *TAQ* database provides daily trade activity for all securities listed on NYSE, AMEX, NASDAQ, and Small Cap issues, it does not allow the researcher to clearly identify the investor.[9] Prior research has inferred the type of investor engaging in a particular trade using trade size, but this methodology has weakened over time and cannot clearly identify the investor. This anonymity limits the researcher's ability to address investor-specific questions. Recently, other proprietary data sets, such as that made available by the Abel Noser Corporation, also

[7] The dataset contains over three million transactions across all asset classes. See Supplemental Table 1 for an abbreviated example of available data elements used in this study.
[8] See Appendix for examples of recent datasets used in the literature.
[9] Many other transaction-level databases used in the prior literature suffer from this shortcoming as well.

provide daily transaction data, but suffer from the same inability to accurately identify the investor. [10] The dataset assembled for this study addresses these shortcomings by enhancing the holdings data to a daily frequency, while also maintaining the trader identity, precise trader location, and past performance history.

*C. Investment Practices of State Retirement Systems*

State retirement system pension assets totaled $1.601 trillion in 2008.[11] Roughly two-thirds (66.8%) of these assets were allocated toward equities (including real estate and private equity), with the remaining one-third allocated toward debt instruments.[12] Most plans outsource their asset management to external managers, however according to Brown, Pollet, and Weisbenner (2009), almost half of all pension assets are managed internally. Because most state pension funds are held in defined benefit plans, beneficiaries have limited incentives to monitor investment policies. Instead, it is local taxpayers that bear the burden of investment shortfalls (Coronado, Engen, and Knight (2003)). As such, states have established laws and statutes to govern the investment behavior of plan assets.

[10] The Abel Noser data has been used extensively in Irvine, Lipson, and Puckett (2007), Chemmanur, He, and Hu (2009), Puckett and Yan (2011), and Goldstein et al. (2009). Other high-frequency proprietary trade data used in prior studies are often limited by the number of stocks it covers, trade restrictions, or short time periods.

[11] 2010 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation dated March 3, 2010. The listed asset value was derived from the 107 state retirement systems reporting actuarial data for 2008.

[12] These numbers represent 2009 allocations as represented in Exhibit 13 of the 2010 Wilshire Report on State Retirement Systems.

Historically, state laws and statutes have imposed important investment restrictions on fund investments. Examples of such limitations include an 1895 South Carolina state law prohibiting pension funds from investing in equities[13], an 1851 article in the Indiana Constitution outlawing state pension fund investment in bank stocks[14], and a Minnesota state law prohibiting investment in international securities and venture capital.[15] While most of the provisions prohibiting investment in entire asset classes have been relaxed, many state pension plans currently restrict investments in companies that have dealings with Iran, Northern Ireland, and Sudan. Additionally, several states have restricted plan investments in tobacco companies. Offsetting these standard restrictions, state funds typically allow for short-selling, derivative use, and 'penny-stock' trading.

Generally, a board of trustees or an investment committee determines the portfolio allocation of state pension funds (Coronado, Engen, and Knight (2003)). Board members can be elected officials or political appointees. The board or committee members have a fiduciary responsibility to manage plan assets prudently. For example, the Florida State Board of Administration states that it must "act with the care, skill, prudence and diligence under the prevailing circumstances that a prudent person familiar with such matters would use in making

[13] The 'Investment Safeguards Act', introduced in 1996, amended this law to allow investment in U.S. equities. Interestingly, two Representatives voted 'nay' on this resolution. A subsequent bill was ratified in 2005 to allow for international investments.
[14] The Indiana state law actually prohibited investment in any corporation's stock, but specifically highlighted banks. This law was amended in 1996 to exclude the public employee retirement fund from this prohibition. The amendment to allow investment in equities had previously been rejected twice, once in 1986, and again in 1990 (Indiana Fiscal Policy Report No. 12, 1996).
[15] Law was amended in 1998.

investments" and that it must "make decisions based on an investment strategy of diversification, balancing such investments with risk tolerance."[16]

To motivate managers to uphold these investment strategies, state retirement systems often implement incentive compensation plans, comparable to those found among mutual fund managers.[17] The typical fund manager in this setting receives a base salary plus performance-based incentive compensation. The incentive-pay component rewards a manager for outperforming a benchmark. For domestic equities, the benchmark is usually a market index, such as the Russell 3000 or S&P 1500. The manager must outperform the benchmark to be considered in the bonus pool; however a cap on the maximum possible bonus payout restricts the manager from receiving additional compensation beyond a predetermined performance goal. By including a maximum payout, the compensation contract is likely to provide the manager with a perverse incentive to alter their investment behavior upon reaching their performance goals.

[16] Excerpt taken from "Overview of the State Board of Administration" accessed from http://www.sbafla.com/fsb/Home/tabid/706/Default.aspx on 10/25/2010.

[17] For example, the Performance Incentive Pay Plan for the Teacher Retirement System of Texas outlines the salary and bonus structure of the investment staff. The plan identifies benchmark performance and peer-group performance as two components of incentive compensation. The incentive award opportunity ranges from 5-125% of the employee's base salary. Similar compensation plans exist for other retirement systems.

## II. Hypothesis Development and Research Design

### *A. Hypothesis Development*

Boyle et al. (2012) suggests that when investors possess different degrees of familiarity across assets, the optimal portfolio consists of both familiar and unfamiliar assets.[18] The investor chooses to hold a diversified portfolio, but also biases the portfolio toward familiar assets (i.e. the relative degree of ambiguity is lower for familiar assets than for other assets). Given that fund managers are typically evaluated against a market index and that time constraints prevent managers from collecting and processing all available information (i.e. limited attention), I rely on the intuition presented in Boyle et al. (2012) for my hypotheses.

Fund managers are likely to hold diversified portfolios, but also trade off a piece of this diversification by overweighting their portfolios toward familiar assets, searching for higher returns. The portfolio weights afforded to familiar assets may be adjusted as circumstances change. For example, when the fund manager is underperforming the market index, the manager may choose to further deviate from the market portfolio by increasing the portfolio weight of familiar assets in order to rebound from prior losses. Similarly, during periods of superior performance, the fund manager is likely to move closer toward the market portfolio to lock in gains.

[18] In the extreme cases of sufficiently high (low) ambiguity between familiar and unfamiliar assets, Boyle et al. (2012) argues that the optimal portfolio holds only (no) familiar assets. This extreme difference in ambiguity is unlikely to occur in practice.

It is unclear *ex ante* whether fund managers actually adjust their portfolios in this manner and whether geography is a valid proxy for asset familiarity. Prior research on the influence of past fund performance on investor behavior has focused on changes in the riskiness of the overall portfolio following periods of relative over/under performance. Brown, Harlow, and Starks (1996) find that mid-year underperformance drives mutual funds to search for higher expected returns, thereby leading to increased fund volatility in the second half of the year.[19] Likewise, Chevalier and Ellison (1997) find similar results, but additionally find a relation between performance incentives and investor risk taking.[20] Although the general finding that portfolio risk is intentionally altered by investors is robust in these settings, there is no prior empirical evidence documenting whether past fund performance leads investors to trade off diversification in favor of familiar assets.

Furthermore, it is unlikely that fund managers intentionally increase risk simply to amass more volatile returns. The underlying assumption is that, absent the fund manager possessing private information about future stock returns, the only way to increase expected returns is to increase the risk profile of the entire portfolio. Relaxing this assumption, analytical models suggest that when investors hold both familiar and unfamiliar assets, the optimal portfolio

[19] Several papers have questioned the results of Brown, Harlow, and Starks (1996). Taylor (2003) argues that fund managers will increase risk following superior returns in response to underperforming managers who also increase their risk. Busse (2001) questions the methodology of using monthly returns to estimate fund volatility, and finds results opposite of Brown, Harlow, and Starks (1996).

[20] Comprix and Muller (2006) also find evidence consistent with past performance influencing risk-taking behavior. However, in their setting, the driving force appears to stem from contribution risk, rather than a performance-sensitive compensation contract.

depends upon the relative degree of uncertainty, risk preferences, and the correlation between assets (Boyle et al. (2012)). Following this logical progression, if investors are relatively better informed (or simply, more optimistic) about local assets, then *ceteris paribus* as investors seek to increase expected return the optimal portfolio should skew more toward familiar assets.

Recent research has provided mixed evidence concerning the impetus behind the 'local bias' phenomenon. Several reasons have been postulated in the literature, including cultural/language barriers to diversification; transaction impediments; familiarity with local stocks; lack of awareness of non-local stocks; sense of loyalty to the local community; hubris; optimism; overconfidence; and lastly, actual private information, that would explain why investors hold portfolios skewed toward local stocks.[21] For past performance to be correlated with changes in local bias, managers need only to *believe* that they possess a greater understanding of local stocks compared to non-local stocks. Actual private information is not necessary, as overconfident uninformed investors are expected to behave in the same manner as informed investors; both groups are expected to increase the local bias of their portfolios during periods of relative underperformance, and decrease local bias during periods of relative outperformance.

Fund managers can shift their exposure to local assets in two ways. First, fund managers could allow price movements to naturally shift their exposure in a particular market segment. For example, absent rebalancing, if stocks located in Illinois outperform the rest of the market, fund

[21] Brennan and Cao (1997); Hau (2001); Huberman (2001); Coval and Moskowitz (1999, 2001); Grinblatt and Keloharju (2001); Hong, Kubik, and Stein (2008)

managers will experience a shift in their portfolio exposure toward Illinois stocks. It may be counterintuitive to consider the absence of rebalancing as an active trading strategy, but given the high frequency of fund managers' normal trading activity, the option to not trade in a particular stock or sector could be considered an active decision. On the other hand, fund managers could take a more proactive stance by increasing the proportion of local trading activity. Prior research indicates that the proportion of informed trading is directly influenced by the investor's risk aversion (Easley and O'Hara (2004)). Although fund managers do not necessarily change their risk aversion following recent fund performance, an incentive contract that rewards superior performance and punishes underperformance likely influences fund managers to trade off diversification in favor of specialization following adverse fund conditions. I expect the proportion of informed (local) trade activity to increase as diversification becomes a less attractive option. The above discussion leads to the following hypotheses (both stated in alternative form).

HYPOTHESIS 1 (H1): Change in local bias is negatively related to fund managers' past performance.

HYPOTHESIS 2 (H2): The proportion of local to non-local trade volume is negatively related to fund managers' past performance.

*B. Research Design*

To test whether investors adapt their investment behavior to changes in past fund performance, I use the following OLS model:

$$\text{LocalBias} = \alpha_0 + \beta_1 \text{PastPerf} + \beta_2 \text{FinalQ} + \beta_3 \text{PastPerf*FinalQ} + \beta_4 \text{DailyFlow} + \beta_5 \text{MktRet} + \beta_6 \text{FundSize} + \beta_7 \text{VIXindex} + \beta_8 \Delta\text{StateRev} + \varepsilon \quad (1)$$

*LocalBias* represents the local bias dependent variable. In testing H1, *LocalBias* is the daily change in the fund's local bias. Local bias is calculated by dividing the fraction of the fund's portfolio that is invested in in-state securities by the fraction of the market portfolio comprised of in-state securities, and then subtracting one. For H2, *LocalBias* is the proportion of local daily trade volume to total daily trading volume; calculated as local trade volume / total trade volume.

Other variables are defined as follows:

| | |
|---|---|
| *PastPerf* = | the fund's cumulative benchmark-adjusted return starting on the first day of the annual evaluation period |
| *FinalQ* = | an indicator variable equal to one if the date falls within the final quarter of the investor's annual performance evaluation period |
| *DailyFlow* = | daily dollar difference between buys and sells for each fund |
| *MktRet* = | 22-trading day lagged market return (from Eugene Fama's website) |
| *FundSize* = | total domestic equity assets of the fund (calculated as the sum of all domestic equity holdings for each day) |
| *VIXindex* = | adjusted closing price of the VIX index |

*ΔStateRev* = percentage change in total (fund's home) state revenues (measured quarterly)

*C. Change in Local Bias*

To test whether investors respond to changes in past performance by shifting the weight of local assets in their portfolios, I first consider how the balance of local to non-local assets might be affected in the absence of any conscious effort to alter the mix. When local asset prices do not mirror general market movements, the local bias of the portfolio is likely to become more volatile, unless the investor actively chooses to rebalance the portfolio. In the absence of rebalancing, the market-adjusted returns to local stocks could have a positive impact on the change in local bias. To control for this absence of rebalancing, I adjust the change in *LocalBias* for the change in the market portfolio.

Additionally, investors may choose a more passive investment style when further removed from a performance evaluation. Chevalier and Ellison (1997), find evidence consistent with this wait-and-see approach to investing by documenting that mutual funds alter the riskiness of their portfolio in the second half of the year, following a mid-year performance assessment. If investors wait until they are closer to their evaluation period to respond to recent performance, then the effect of past performance on changes in local bias will be muted. To account for this potential delay, I include an indicator variable representing the final quarter of the fund manager's annual evaluation period.

I include the flow of capital into the fund to control for the possibility of non-information-based trading. Coval and Stafford (2007) find that mutual funds tend to increase (decrease) existing positions following large inflows (outflows) of capital. To control for the influence of general market conditions on portfolio composition, I include both the 30-day market return and the level of the VIX index. The benefits derived from diversification are likely augmented during bull markets, when non-information based trades are still expected to yield positive returns. Similarly, diversification could be seen as less costly during periods of relatively low market uncertainty. Fund size is included as a control variable to account for the relative difficulty large funds have in altering their portfolio weights. To control for the likelihood of receiving timely contributions to the plan, I include the change in state revenue on the right-hand side. As state revenues decline, managers could feel forced to increase the actual return of the pension plan to compensate for the lower expected contributions.

Consistent with Hypothesis 1, I expect a negative coefficient on *PastPerf*. I also expect a negative coefficient on *PastPerf***FinalQ*, as fund managers are likely to grow more sensitive to cumulative performance closer to the end of their annual evaluation period.

*D. Proportion of Trading in Local Stocks*

To test Hypothesis 2 on the relative trading activity of local versus non-local stocks during periods of varying fund performance, I create a measure of the daily proportion of local trade volume (Local trade volume / Total trade volume). This measure captures fund managers' willingness to trade more or less aggressively in local stocks compared to non-local stocks.

Consistent with H2, I expect a negative coefficient on *PastPerf*. If fund managers grow more sensitive to their incentive contracts during the final quarter of their annual evaluation periods, then the interaction term, *PastPerf*FinalQ*, could subsume some of the effect of past performance on the tradeoff between local and non-local trade volume.

The motivation for including the control variables in this regression is similar to the previous discussion. While additional controls for the determinants of trading volume, such as the number of stocks experiencing extreme capital gains and losses and monthly stock price highs and lows, were considered, it is not clear that these factors would be different between local and non-local stocks, or why the mix would be expected to change in relation to these variables.

## III. Empirical Results

### *A. Descriptive Data*

I collect transaction-level and portfolio holdings data from four large state pension plans: the New Jersey Division of Investment (NJDOI), the Teachers Retirement System of Illinois (IL TRS), the Florida State Board of Administration (FL SBA), and the Teachers Retirement System of Texas (TX TRS). Together these systems manage over $330 billion in assets as of June 30, 2010.[22] The data set employed in this study includes all of the U.S. domestic equity securities transactions executed by these institutions from the third quarter of 2003 through the first quarter

[22] Data for TX TRS is as of 03/30/10.

of 2009.[23] In addition, holdings information has been computed for every firm-day combination throughout the entire sample period.

The data set includes 21 variables for domestic equity transactions. The variables used in this study include: transaction type, trade date, CUSIP, shares traded, price, and cost/proceeds. I use the 'stocknames' file from the Center for Research in Security Prices (*CRSP*) on the Wharton Research Data Services (*WRDS*) platform to match the CUSIP with the appropriate PERMNO. I then used the PERMNO to append firm-location variables from *Compustat* and daily stock data from *CRSP*. I use corporate headquarters to partition the sample into local and non-local stocks, using state boundaries.[24] Summary statistics are presented in Table I.

Panel A shows the total number of purchase and sale transactions for each state retirement plan over the 23 quarters represented in the sample. The NJDOI averaged 2,340 transactions per quarter; whereas the IL TRS, FL SBA, and TX TRS averaged 26,211; 23,005; and 6,125 transactions per quarter, respectively.[25] Roughly 50% of the NJDOI's transactions were purchases. The IL TRS and FL SBA plans both slightly skewed their executed transactions

[23] The FL SBA changed custodians in 2005, therefore only provided data from July 1, 2005 onward.

[24] Alternative classification systems, such as the distance from the fund to the firm's headquarters, were considered. However, given the nature of the funds examined (state pension plans) I chose to use state boundaries rather than distance to partition the sample. Firm headquarters was chosen to be consistent with the prior literature and partially due to the difficulty in calculating the true economic nexus for each firm.

[25] The large disparity in trading activity between the NJDOI and TX TRS and the other two funds in the sample is likely due to the use of external managers by IL TRS and FL SBA over this time period. The NJDOI and TX TRS internally managed their US equity portfolio throughout most of the sample period.

toward purchases (52% and 58%, respectively), while the TX TRS plan executed more sales (57% of total transactions) during the examined time period. All plans substantially increased their trading activity over the sample period. The number of transactions executed in 2008 was 25-80% more than those executed in 2006.[26]

Panel B outlines the total dollar value of purchase and sale transactions for each state retirement plan by quarter. The NJDOI executed over $3.3 billion of domestic equity trade activity per quarter; whereas the IL TRS, FL SBA, and TX TRS averaged $4.6 billion, $14.8 billion, and $13.1 billion per quarter, respectively. Despite the relative matching of the number of purchase and sale transactions across funds, the dollar volume breakdown shows greater variance. Figure 1 illustrate the cumulative dollar amount of purchases and sales for each fund over time. Although, the NJDOI were net sellers over the entire sample period, averaging over $800 million more in sales than purchases per quarter, this difference stems from the latter half of the sample period. A similar pattern emerges for the FL SBA, as purchase and sale volume remain relatively equal until mid-2007, when they become net sellers. Conversely, the IL TRS and TX TRS are net buyers over the same time period.

Table II provides a quarterly breakdown of the local and non-local securities held in each fund. Panel A shows the number of unique securities held by each fund at a given time. Over the entire sample period, the NJDOI held 1,914 unique domestic equities, however on average, the fund held only 1,290 securities in a single quarter. The IL TRS held 5,721 unique securities over

[26] The financial crisis of 2008 undoubtedly played a role in the trading behavior of these funds. I leave this analysis for future research.

the same sample period, but only 2,758 securities on average per quarter. The FL SBA and TX TRS held an average of 3,250 and 1,540 securities per quarter. Roughly 3-8% of the securities held in each fund's portfolio were located in the fund's home state.

Panel B discloses the local bias of each fund by quarter. Surprisingly, the funds in this sample do not exhibit widespread local bias in their portfolios. In fact, two funds exhibit a negative average local bias per quarter. There is, however, great variation in local bias throughout the sample period. Local bias is calculated by dividing the fraction of the fund's portfolio that is invested in in-state securities by the fraction of the market portfolio comprised of in-state securities, and then subtracting one. The NJDOI exhibits a positive local bias in 15 out of 23 quarters, with a local bias ranging from 0.15-0.55 in every quarter since 2007. Interestingly, the IL TRS and FL SBA exhibit a negative local bias in all but one quarter of the sample. The TX TRS exhibits greater fluctuation in their local bias, ranging from -0.09 to 0.08 during the time period.[27] Figure 2 presents *Local Bias* by quarter graphically.

*B. Results*

Table IV presents the OLS regression analysis examining the effect of fund managers' past performance on changes in local bias. The dependent variable is calculated as the raw change in local bias from one trading day to the next. This variable captures the fund manager's

[27] To understand the economic magnitude of a shift in local bias, consider the following example. On 08/31/2006, the TX TRS held approximately $45 billion in domestic equities. Given the market value of Texas firms compared to the size of the overall market on that day, a local bias shift of 0.01 would require the TX TRS plan to shift $50 million into local stocks.

decision to increase or decrease the concentration of local stocks in the portfolio. When considered alone, the coefficient *PastPerf* is negative and significant (t-statistic = -3.93). The negative coefficient is consistent with fund managers increasing the local bias of their portfolios during periods of sub-par performance. The coefficient (and significance level) remains relatively unchanged after including several control variables into the model. I next consider whether this effect is exacerbated in the final stages of the fund manager's annual evaluation period. The coefficient on the interaction term, *PastPerf*FinalQ*, is negative and significant (t-statistic = -3.57). This result is consistent with fund managers responding to their contractual incentives by foregoing diversification benefits in favor of local stocks during the 'worst' of times (cumulative underperformance near the end of their evaluation period). Likewise, fund managers appear to reduce their local holdings during periods when the benefits of diversification are highest.

The coefficient on *DailyFlow* is negative, but insignificant (t-statistic = -1.58). A negative relationship may emerge if fund managers instinctively invest unexpected inflows of capital into the benchmark index, thus reducing any positive local bias. However, an insignificant coefficient on *DailyFlow* is consistent with fund managers indiscriminately increasing/decreasing existing positions with unexpected flows (Coval and Stafford (2007)). *FundSize* is expected to be negatively associated with changes in local bias, as large funds likely face more difficulty in shifting overall portfolio composition. The coefficient on *FundSize* is negative and marginally significant. *MktRet, VIXindex,* and *ΔStateRev* are insignificant at conventional levels.

Table V presents results from multivariate regressions estimating equation (1) for all transactions, and then separately for buys and sells. The dependent variable measures the proportion of total daily trading volume transacted in local stocks. An increase in this measure indicates that managers focus relatively more of their trading activity on local stocks. I expect *PastPerf* to be negatively associated with the proportion of local trading volume if managers actively contract their investment set during periods of underperformance. Additionally, I expect this negative association to be augmented during the final quarter of the fund manager's annual evaluation period. As expected, the coefficient on *PastPerf* is negative and significant across all regression models (t-statistics = -4.87, -3.98, and -3.57 for all transactions, buys, and sales, respectively). The coefficient on *PastPerf***FinalQ* is negative, but insignificant at conventional levels. The results are consistent with managers increasing the concentration of their trading activity in local stocks during periods of cumulative underperformance.

Figure 3 illustrates these findings by partitioning transaction days by performance and evaluation period. As a baseline comparison, when all transactions are considered, 5.23% of all transactions occur in local stocks. The trading concentration in local stocks increases during periods of poor performance, as almost 6% of all funds' transactions during these periods are executed in local stocks. Funds appear to shift their trading activity toward local stocks during the final quarter of fund managers' annual evaluation periods in both good and bad times, but this shift is more pronounced during relatively bad times.

## IV. Additional Analyses

*A. Returns Analysis*

Until now, this paper has focused on how fund managers adapt their investment behavior to past performance. In this section, I discuss the consequences of fund managers' actions. Table VI considers the one-month buy minus sell abnormal return for all transactions in the sample.[28] I partition the transactions into local and non-local, based on the location of the securities' corporate headquarters. For each traded security, only two options are present: the security is marked as non-local for all four funds, or the security is marked as local for one fund in the sample and as non-local for the other three funds. Given that the four funds in the sample represent four different states, no security is identified as local for two different funds.

Table VI Panel A partitions the transactions into those occurring during a period when the fund's cumulative year-to-date benchmark-adjusted performance is negative and those when year-to-date performance is positive. While there is little difference between the returns generated by local and non-local transactions during periods of good performance, stock selection appears to improve during periods of poor performance, especially for local transactions. On average, local transactions executed during periods of poor fund performance outperform local transactions during periods of good past performance by 42 basis points over a one-month horizon. Further, local transactions outperform non-local transactions by 25 basis points during periods of poor past performance. Surprisingly, during periods of good past

[28] For a more detailed breakdown of returns for buys and sells, see Supplemental Table 2

performance, funds perform worse in their local stock transactions than other funds competing in the same state market, however this imbalance disappears as the funds' overall performance worsens.

Panel B compares returns from local and non-local transactions occurring during the first three quarters of the fund manager's annual evaluation period together with those achieved during the final quarter. These results complement those found in Panel A, as there is little difference between local and non-local returns during the first three quarters, but local transactions significantly improve during the final quarter of fund managers' annual evaluation periods. Overall, stock selection appears to improve during the final quarter. On average, local transactions executed during the final quarter outperform the market (non-local stocks) by 41 (30) basis points over a one-month horizon. Again, when compared to other funds' transactions in a fund's home state, the local fund's performance lags the other funds' performance in their home state during the first three quarters, but reverses during the final quarter of the fund manager's annual evaluation period. This evidence is consistent with fund managers strategically exploiting a limited information advantage in local stocks.

Panel C paints a different picture. When funds are performing poorly during the final quarter of the fund manager's annual evaluation period, one-month returns on local transactions significantly decline. Fund managers underperform the market (non-local stocks) by 59 (47) basis points during this time. Likewise, fund managers' stock selection in their local stocks lags other funds' performance in the same subset of stocks by 45 basis points. Given that fund

managers typically increase their exposure to local stocks during this time, this underperformance is curious. Possible explanations include overconfidence and politically influenced investing during the final quarter.

*B. Time Horizon*

While the prior research on local bias asks whether or not investors possess an information advantage in local stocks, relatively little is known regarding the nature of the information advantage. Coval and Moskowitz (2001) document that managers trade non-local stocks far more frequently than local stocks; a finding consistent with managers adopting long-term beliefs for local stocks and more volatile views about non-local stocks. Still, it is unclear whether the private information managers possess in local firms, if any, is long-lived or short-lived. Several recent papers conclude that local investors/investments outperform non-local investors/investments over various time thresholds, suggesting that investors possess private information in geographically proximate securities.[29] On the other hand, Seasholes and Zhu (2010) find that individual investors' portfolios of local holdings do not generate superior returns over a one-year holding period and Ferreira, Matos, and Pereira (2009) find that foreign money managers outperform local money managers, using monthly excess returns to measure performance. The mixed evidence regarding the performance of local versus non-local investment decisions implies that the nature of the private information in local firms is likely to be time-sensitive.

[29] See Hau (2001), Coval and Moskowitz (2001), Ivkovic and Weisbenner (2005), Dvorak (2005), and Baik, Kang, and Kim (2010)

Investors may be able to implicitly derive short-term information from relationships with local executives; or, they could gather more fundamental information affecting long-term value, such as plans for expansion into new markets. If investors possess an information advantage in local securities, and this information contains both long-term and short-term components, we should expect investors to exploit long-lived private information early in their evaluation period, and short-lived private information later in their evaluation period. Furthermore, investors' performance relative to a benchmark likely influences the degree to which they choose to exploit any short-term information advantage, as underperforming investors are more willing to forego fundamental analyses in favor of short-term price movements.

To test whether investment managers shift their focus toward short-term returns following poor past fund performance, I first calculate six-month future returns for each stock for which the fund engaged in a transaction during the sample period, starting on the first trading day following the transaction. The raw returns are then partitioned into one-month returns and the subsequent five-month returns. The reason for this partition is to isolate any short-lived information the fund manager may have possessed at the time of the trade. Raw returns serve as the dependent variable, while indicator variables for past fund performance; in-state securities; the final quarter of fund managers' annual evaluation periods; and all interaction terms, are included as independent variables. Separate regressions are run for purchases and sales. Additional interaction terms in the regression allow for the joint effect of the evaluation period, geographic proximity, and past fund performance on the distribution of future returns. I remain

agnostic on the signs of the variables of interest, as little is known concerning the nature of the information advantage possessed by local fund managers.

$$\begin{aligned}\text{Returns} = 1\text{MonthRet}*\Big[ & \alpha_0 + \alpha_1\, \text{D\_PastPerf} + \alpha_2\, \text{Local} + \alpha_3\, \text{FinalQ} + \\ & \alpha_4\, \text{D\_PastPerf}*\text{Local} + \alpha_5\, \text{D\_PastPerf}*\text{FinalQ} + \\ & \alpha_6\, \text{Local}*\text{MidYearD} + \alpha_7\, \text{D\_PastPerf}*\text{Local}*\text{FinalQ} \Big] \\ + 6\text{MonthRet}*\Big[ & \beta_0 + \beta_1\, \text{D\_PastPerf} + \beta_2\, \text{Local} + \beta_3\, \text{FinalQ} + \\ & \beta_4\, \text{D\_PastPerf}*\text{Local} + \beta_5\, \text{D\_PastPerf}*\text{FinalQ} + \\ & \beta_6\, \text{Local}*\text{MidYearD} + \beta_7\, \text{D\_PastPerf}*\text{Local}*\text{FinalQ} \Big] + \varepsilon \end{aligned} \quad (2)$$

*Returns* = Future one-month (or subsequent five monthly) raw buy-and-hold return for stock i.

*1MonthRet* = Indicator variable equal to 1 when the dependent variable is one-month returns; 0 otherwise

*6MonthRet* = Indicator variable equal to 1 when the dependent variable is the subsequent five monthly returns (monthly returns from 2-6 months following the transaction); 0 otherwise

*D_PastPerf* = Indicator variable equal to 1 when the fund's 30-day lagged return is negative; 0 otherwise

*Local* = Indicator variable equal to 1 if the securities' corporate headquarters are located in the same state as the fund; 0 otherwise

*FinalQ* = Indicator variable equal to 1 if the transaction occurred within the final quarter of the fund manager' annual evaluation period; 0 otherwise

Equation 2 represents the stacking of two regressions: the first where the dependent variable is one-month raw returns, and the second where the dependent variable is six-month raw returns (less the returns from the first month). Thus, *1MonthRet* is an indicator variable equal to 1 when

the dependent variable is one-month returns (0 otherwise), and the α coefficients measure the association between investor trading behavior/past fund performance and future one-month stock performance. Likewise, *6MonthRet* is an indicator variable equal to 1 when the dependent variable is the subsequent five monthly returns (0 otherwise), and the β coefficients measure the same associations with the subsequent five monthly returns.

Table VII presents the equal-weighted raw returns for all transactions in the sample, partitioned by transaction type, locality, cumulative fund performance and time horizon. Fund managers appear to perform better on their local buys, relative to non-local buys, during periods of poor past performance and during the final quarter of their annual evaluation period. The one-month returns for a local stock that was sold exhibits negative future one-month returns, whereas the subsequent five months yield a positive return. This evidence is consistent with managers exploiting a short-term information advantage in local stocks. This evidence is supported in Table VIII, which presents results from a stacked regression assessing the effect of past performance on trading behavior. The difference in the coefficients on *PastPerf_D*Local*FinalQ* in Panel B is significant, with the one-month returns exhibiting more negative returns.

*C. Final Quarter Analysis*

Throughout this paper, changes in local bias have been calculated on a daily basis. To determine if the results hold when examining less fine time intervals, I partitioned the sample into performance quartiles based on year-to-date benchmark-adjusted performance through the

first three quarters of each fund-year, and measured the fund's total change in local bias during the final quarter of the fund manager's annual evaluation period. Figure 4 illustrates the association between past fund performance and changes in local bias. The best (worst) performing funds reduce (increase) their local bias the most. To aide in economic interpretation, consider the following example. In Q3 2008 (the final quarter of their annual evaluation period), the TX TRS increased the fund value of their domestic equity portfolio by $5.99 billion. Despite this increase, the fund's domestic equity investments in Texas fell by $684 million during the same period. After accounting for the overall market portfolio, this decline in Texas investments resulted in a 0.096 decline in *Local Bias* for the period. The evidence presented in Figure 4 is consistent with the earlier finding of a negative association between a fund's past performance and the proportion of local stocks held in a fund manager's portfolio.

*D. Negative Local Bias*

Several papers document that investors' portfolios are overexposed to local stocks, when compared to the overall market portfolio (i.e. Coval and Moskowitz (1999); Zhu (2002); Baik, Kang, and Kim (2010) among many others). It is interesting to note that the fund managers found in this paper's setting, at times, exhibit negative local bias. One of the unique features of the state pension fund setting is that the state's finances are intertwined with the retirement system. For example, states can, and have, cut or deferred pension funding to ease fiscal difficulties. Conversely, states have at their disposal the ability to raise tax revenue to support a faltering pension plan. Given how closely intertwined the state's finances are to the local economy, some

may argue that it is in the state's best interest to hedge against adverse local economic times by underweighting local stocks in the pension's portfolio. The optimal allocation of local stocks in a state's pension fund is beyond the scope of this paper, but it is fair to say that state pension funds have incentives to hold less than the market portfolio's share of local stocks. The analyses in this paper are unharmed by this unique feature of the state pension fund setting, as the incentives to underweight local stocks are time invariant. That is, the interaction between a state's financial health and the pension plan will likely affect the average *level* of local bias, and not necessarily *changes* in local bias.

## V. Conclusion

This paper investigates the association between a fund's past performance and changes in local bias. While much of the prior literature has examined the potential origins of local bias, data limitations have prevented researchers from examining the role of a fund's past performance on the decision to trade off diversification in favor of a greater share of local stocks. The empirical analyses reveal that past performance is negatively associated with changes in local bias. This effect is amplified during the final quarter of the fund manager's evaluation period. This result suggests that managers respond to their incentive compensation contracts by gravitating toward their comfort zone, in this case local stocks, when underperforming their benchmark, especially when their evaluation period is approaching. The change in local bias appears to be driven, in part, by the decision to trade more actively in local stocks during periods

of relative underperformance. The relative increase in trading volume appears in both buying and selling activities.

Additional analyses reveal that fund managers' local investments outperform their non-local investments during most periods. However, when fund managers increase their exposure to local stocks the most (i.e., during periods of underperformance in the final quarter of their annual evaluation period), any previous information advantage disappears. Fund managers appear to overexpose their portfolio to local stocks by making poor investment decisions during this time. Further analysis offer some support for fund managers selectively exploiting short-term information in times of need.

Overall, the results suggest that fund managers respond to contractual incentives by changing their investment strategy and trading behavior during periods of differential past performance. This change manifests itself in a tradeoff between local and non-local stocks. Additionally, this paper presents evidence that fund managers shift their demand preferences in predictable ways. By considering the impact of past performance on local bias, researchers gain a further understanding of the changing nature of investor demands. As a result, it may be fruitful for future research to examine whether firm managers respond to these demand shifts through voluntary managerial actions.

**References**


Ayers, Benjamin C., Santhosh Ramalingegowda, and P. Eric Yeung, 2011, Hometown advantage: the effects of monitoring institution location on financial reporting discretion, *Journal of Accounting and Economics* 52, 41-61.

Bae, Kee-Hong, Rene Stulz, and Hongping Tan, 2008, Do local analysts know more? A cross-country study of the performance of local analysts and foreign analysts, *Journal of Financial Economics* 88, 581–606.

Baik, Bok, Jun-Koo Kang, and Jin-Mo Kim, 2010, Local institutional investors, information asymmetries, and equity returns, *Journal of Financial Economics* 97, 81-106.

Barber, Brad M., and Terrance Odean, 2000, Trading is hazardous to your wealth: the common stock investment performance of individual investors, *Journal of Finance* 55, 773-806.

Bonafede, Julia K., Steven J. Foresti, and Russell J. Walker, *2010 Wilshire Report on State Retirement Systems: Funding Levels and Asset Allocation* Wilshire Consulting www.wilshire.com/BusinessUnits/Consulting/Investment/2010_State_Retirement_Funding_Report.pdf.

Boyle, Phelim, Lorenzo Garlappi, Raman Uppal, and Tan Wang, 2012, Keynes meets Markowitz: The trade-off between familiarity and diversification, *Management Science* 58, 253-272.

Brennan, Michael, and Henry Cao, 1997, International portfolio investment flows, *Journal of Finance* 52, 1851–1880.

Brown, Jeffrey R., Joshua Pollet, and Scott Weisbenner, 2009, The investment behavior of state pension plans, Working paper, University of Illinois.

Brown, Keith, W. Van Harlow, and Laura Starks, 1996, Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry, *Journal of Finance* 51, 85–110.

Busse, Jeffrey A., 2001, Another look at mutual fund tournaments, *Journal of Financial and Quantitative Analysis* 36, 53–73.

Butler, Alexander W., 2008, Distance still matters: Evidence from municipal bond underwriting, *Review of Financial Studies* 21, 763-784.

Chemmanur, Thomas J., Shan He, and Gang Hu, 2009, The role of institutional investors in seasoned equity offerings. *Journal of Financial Economics* 94, 384-411.

Chevalier, Judith A., and Glenn Ellison, 1997, Risk taking by mutual funds as a response to incentives, *Journal of Political Economy* 105, 1167-1200.

Choe, Hyuk, Bong-Chan Kho, and Rene M. Stulz, 2005, Do domestic investors have an edge? The trading experience of foreign investors in Korea, *Review of Financial Studies* 18, 795-829.

Cohen, Susan I., and Laura Starks, 1988, Estimation risk and incentive contracts for portfolio managers, *Management Science* 34, 1067-1079.

Comprix, Joseph, and Karl A. Muller III, 2006, Pension funding rules and sponsor firms' risk taking with defined benefit pension plan assets, Working paper, The Pennsylvania State University.

Coronado, Julia L., Eric M. Engen, and Brian Knight, 2003, Public funds and private capital markets: the investment practices and performance of state and local pension funds, *National Tax Journal* 56, 579-594.

Coval, Joshua D., and Tobias J. Moskowitz, 1999, Home bias at home: Local equity preference in domestic portfolios, *Journal of Finance* 54, 2045-2073.

Coval, Joshua D., and Tobias J. Moskowitz, 2001, The geography of investment: Informed trading and asset prices, *Journal of Political Economy* 109, 811-841.

Coval, Joshua D., and Erik Stafford, 2007, Asset fire sales (and purchases) in equity markets, *Journal of Financial Economics* 86, 479-512.

Degryse, Hans, and Steven Ongena, 2005, Distance, lending relationships, and competition, *Journal of Finance* 60, 231-266.

Dvorák, Tomas, 2005, Do domestic investors have an information advantage? Evidence from Indonesia, *Journal of Finance* 60, 817-839.

Easley, David, and Maureen O'Hara, 2004, Information and the cost of capital, *Journal of Finance* 59, 1553–1583.

Elton, Edwin J., Martin J. Gruber, and Christopher R. Blake, 2003, Incentive fees and mutual funds, *Journal of Finance* 58, 779–804.

Feng, Lei, and Mark S. Seasholes, 2004, Correlated trading and location, *Journal of Finance* 59, 2117-2144.

Feng, Lei, and Mark S. Seasholes, 2005, Do investor sophistication and trading experience eliminate behavioral biases in financial markets? *Review of Finance* 9, 305-351.

Ferreira, Miguel A., Pedro Matos, and João Pereira, 2009. Do foreigners know better? A comparison of the performance of local and foreign mutual fund managers, Working paper, University of Southern California.

French, Kenneth, and James Poterba, 1991, Investor diversification and international equity markets, *American Economic Review* 81, 222-226.

Goldstein, Michael A., Paul Irvine, Eugene Kandel, and Zvi Wiener, 2009, Brokerage commissions and institutional trading patterns, *Review of Financial Studies* 22, 5175-5212.

Graham, John, Campbell Harvey, and Hai Huang, 2009, Investor competence, trading frequency, and home bias, *Management Science* 55, 1094-1106.

Grinblatt, Mark, and Matti Keloharju, 2000, The investment behavior and performance of various investor types: a study of Finland's unique data set, *Journal of Financial Economics* 55, 43-67.

Grinblatt, Mark, and Matti Keloharju, 2001, How distance, language, and culture influence stockholdings and trades, *The Journal of Finance* 56, 1053-1073.

Grinblatt, Mark, and Sheridan Titman, 1989, Adverse risk incentives and the design of performance-based contracts, *Management Science* 35, 807-822.

Hau, Harald, 2001, Location matters: An examination of trading profits, *Journal of Finance* 56, 1959-1983.

Haugen, Robert, and Josef Lakonishok, 1987, *The Incredible January Effect* (Dow Jones-Irwin, Homewood, IL).

Hong, Harrison, Jeffrey D. Kubik, and Jeremy C. Stein, 2008, The only game in town: Stock price consequences of local bias, *Journal of Financial Economics* 90, 20–37.

Huberman, Gur, 2001, Familiarity breeds investment, *Review of Financial Studies* 14, 659-680.

Indiana Fiscal Policy Institute, 1996, *Does equity investing pose an unacceptable risk for Indiana pension funds?* Fiscal policy report no. 12.

Irvine, Paul, Marc Lipson, and Andy Puckett, 2007, Tipping, *Review of Financial Studies* 20, 741-768.

Ivkovic, Zoran, and Scott Weisbenner, 2005, Local does as local is: Information content of the geography of individual investors' common stock investments, *Journal of Finance* 60, 267-306.

Kaniel, Ron, Gideon Saar, and Sheridan Titman, 2008, Individual investor trading and stock returns, *Journal of Finance* 63, 273-310.

Kilka, Michael, and Martin Weber, 2000, Home bias in international stock return expectations, *Journal of Psychology and Financial Markets* 1, 176-192.

Malloy, Christopher, 2005, The geography of equity analysis, *Journal of Finance* 60, 719-755.

Massa, Massimo, and Andrei Simonov, 2006, Hedging, familiarity and portfolio choice, *Review of Financial Studies* 19, 633-685.

Miller, Greg, and Devin Shanthikumar, 2010, Geographic location, media coverage, and investor reactions, Working paper, University of Michigan.

Morse, Adair, and Sophie Shive, 2011, Patriotism in your portfolio, *Journal of financial markets* 14, 411-440.

Pensions & Investments, 2009-2010, *Top 1,000 largest retirement plans* (Chicago, IL: Crane Communications Inc.).

Puckett, Andy, and Xuemin Yan, 2011, The interim trading skills of institutional investors, *Journal of Finance* 66, 601-633.

Seasholes, Mark S., and Ning Zhu, 2010, Individual investors and local bias, *Journal of Finance* 65, 1987-2010.

Taylor, Jonathan, 2003, Risk-taking behavior in mutual fund tournaments, *Journal of Economic Behavior and Organization* 50, 373–383.

Teo, Melvyn, 2009, The geography of hedge funds, *Review of Financial Studies* 22, 3531–3561.

Tian, Xuan, 2008, Geography, staging, and venture capital financing, Ph.D. dissertation, Boston College.

Uysal, Vahap B., Simi Kedia, and Venkatesh Panchapagesan, 2008, Geography and acquirer returns, *Journal of Financial Intermediation* 17, 256-275.

Zhu, Ning, 2002, The local bias of individual investors, Working Paper, Yale University.

**Appendix: Selected datasets used in prior research on investor trading**

| PAPER | DATA SET | LIMITATIONS |
|---|---|---|
| Barber and Odean (2000) | Individual transactions from large brokerage house from 1991-1996 | -Average household holds only 3 stocks<br>-Single large brokerage house (cannot recreate entire portfolio) |
| Grinblatt and Keloharju (2000) | Shareholdings in Finnish Central Securities Depository stocks for all Finnish investors from 1994-1996. Daily stock trades are also included. | -Focus only on 16 largest Finnish stocks<br>-Difficult to disentangle indirect and foreign shareholdings<br>-Brief time period |
| Hau (2001) | Transactions from Electronic trading system Xetra from the Trading Surveillance Unit of the Frankfurt Security Exchange from Sept 1998-Dec 1998 | -Trader is anonymous<br>-Short time span (4-months)<br>-Only 11 stocks in sample |
| Choe, Kho, and Stulz (2001) | Transactions on Korean Stock Exchange from 1996-1998 | -Trader identification is limited to type of institution (e.g. mutual fund, bank, insurance company)<br>-Cannot recreate portfolio holdings<br>-Most trading done by individuals |
| Feng and Seasholes (2005) | Transactions from individual brokerage accounts in the People's Republic of China from 1999-2000 | -Only selected trades<br>-Unknown portfolio holdings<br>-Low trading activity per account |
| Dvorak (2005) | Transactions from the Jakarta Stock Exchange in Indonesia from 1998-2001 | -Trader identification only domestic/foreign (cannot separate institution and individual)<br>-Cannot recreate portfolio holdings<br>-Sample restricted to only 30 stocks |
| Massa and Simonov (2006) | Individual portfolio holdings of Swedish investors from 1995-2000. Demographic and personal income data is also included. | -Does not include detailed transaction history |
| Kaniel, Saar, and Titman (2008) | Buy and sell orders by individual investors from NYSE's Consolidated Equity Audit Trail Data files from 2000-2003 | -Does not include portfolio holdings |
| Puckett and Yan (2011) | Institutional trading data from ANcerno from 1999-2005* | -Does not include portfolio holdings<br>-Cannot identify investor<br>-Only contains subset of investor's trade activity |

*Note – TX TRS reports that Abel Noser (now ANcerno) accounted for only 0.39% of all of their domestic shares traded during fiscal year ending 08/31/09.

**Figure 1: Time series of the cumulative trading volume (in $millions) by quarter for each fund in the sample**

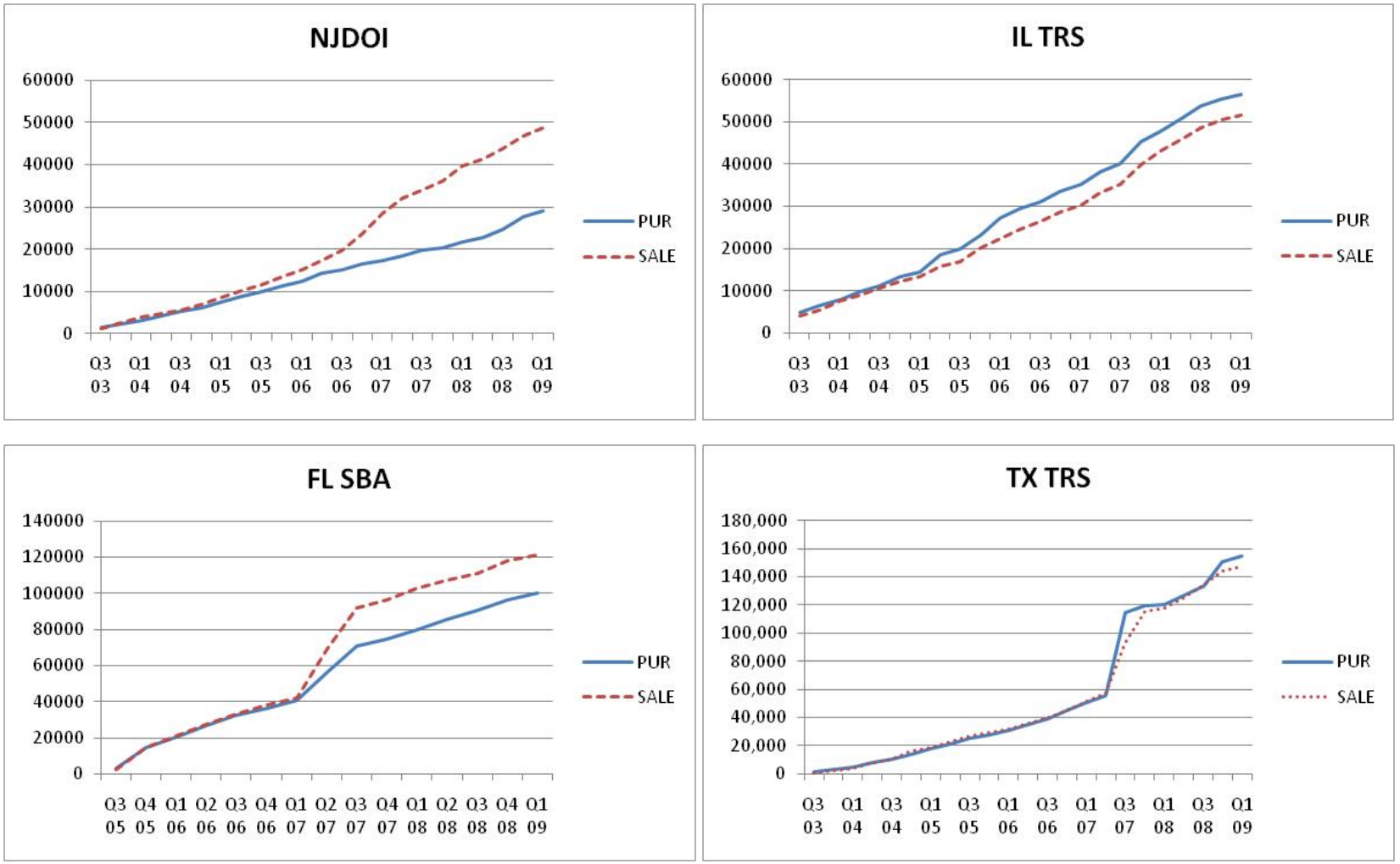
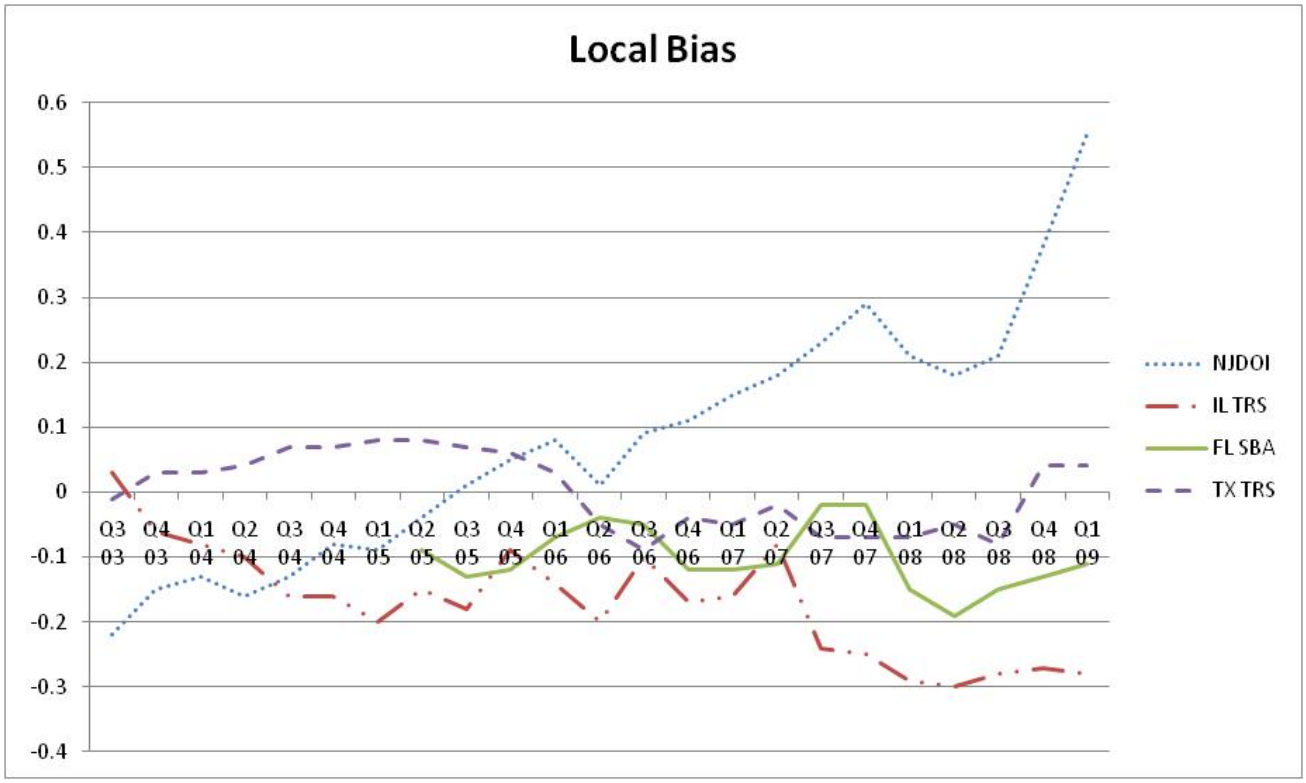
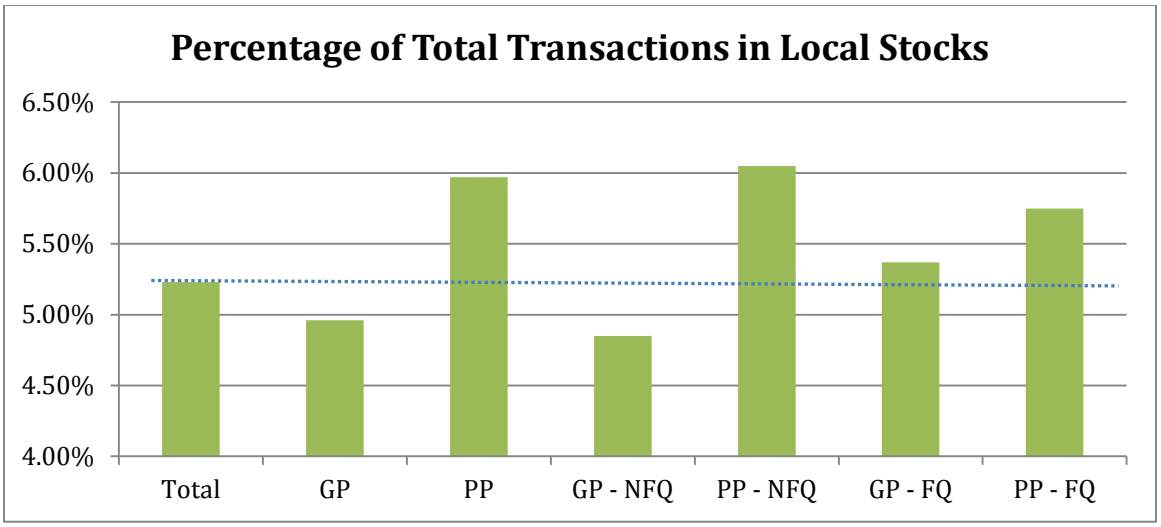


**Figure 2: Local Bias by Quarter**




*Local Bias* is calculated by dividing the fraction of the fund's portfolio that is invested in in-state securities (local fund value) by the fraction of the market portfolio comprised of in-state securities, and then subtracting one. Local bias is measured quarterly, by equally weighting each day's total and local fund value. Daily fund values are calculated by multiplying the holdings of each portfolio stock by the respective stock's closing price each trading day. The subset of total holdings that are located within the fund's home state comprise the daily local fund value. The market portfolio is comprised of all stocks listed in the *CRSP* database.

**Figure 3: Percentage of Total Transactions in Local Stocks**

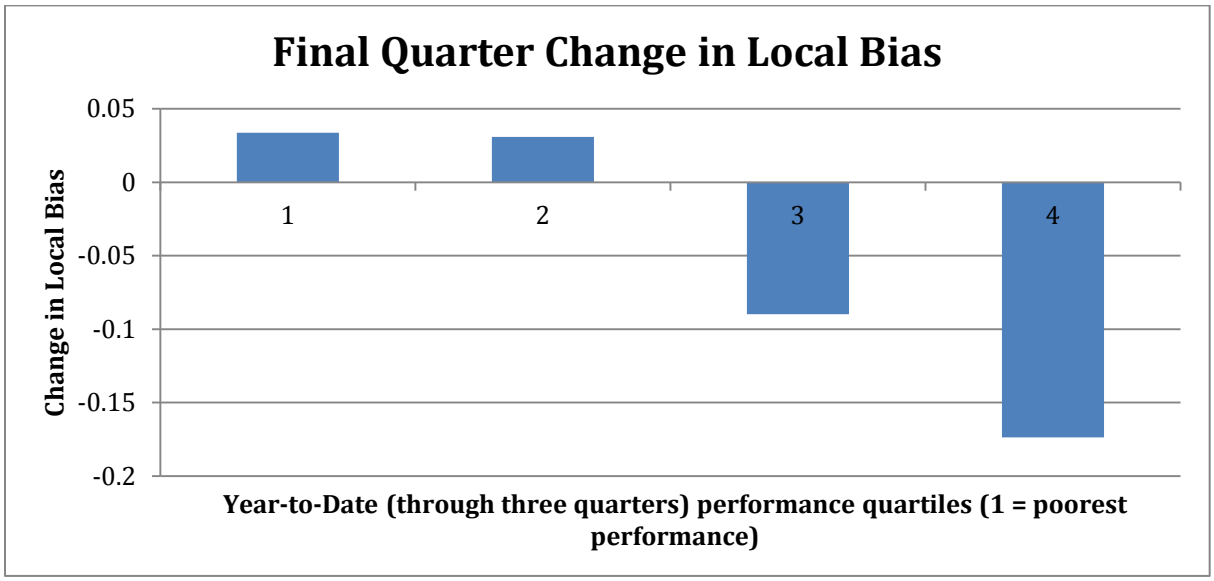



| | Percentage of Total Transactions in Local Stocks | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Total** | **GP** | **PP** | **GP - NFQ** | **PP - NFQ** | **GP - FQ** | **PP - FQ** |
| Buy | 5.03% | 4.76% | 5.78% | 4.72% | 5.84% | 4.93% | 5.60% |
| Sell | 5.43% | 5.17% | 6.17% | 4.98% | 6.26% | 5.78% | 5.91% |
| Total | 5.23% | 4.96% | 5.97% | 4.85% | 6.05% | 5.37% | 5.75% |

*GP*: Good Performance
*PP*: Poor Performance
*NFQ*: First three quarters of the fund manager's annual evaluation period
*FQ*: Final quarter of the fund manager's annual evaluation period

Figure 3 illustrates the percentage of funds' transactions occurring in local stocks. Column 1 aggregates all transaction days in the sample. Columns 2 and 3 partition the transaction days by cumulative past fund performance (GP and PP). Columns 4-7 partition the transaction days by performance and each fund manager's annual evaluation period. In particular, Column 4 indicates that 4.85% of all transactions occurring during the first three quarters of fund managers' annual evaluation periods when the fund was outperforming the benchmark were made in local securities.

**Figure 4: Total change in local bias in the fourth quarter by cumulative performance quartiles**




---

This figure is based on 17 fund-year observations. Fund-years are grouped according to year-to-date benchmark-adjusted performance through the first three quarters of the fund managers' annual evaluation period. Group 1 contains the five worst performing fund-years. Groups 2-4 each contain four fund-years, with Group 4 consisting of the four best performing fund-years.

*Scale example*: To interpret the economic magnitude of the *Change in Local Bias*, consider the following example:

In Q3 2008 (the final quarter of their annual evaluation period), the TX TRS increased the fund value of their domestic equity portfolio by $5.99 billion. Despite this increase, the fund's domestic equity investments in Texas fell by $684 million during the same period. After accounting for the overall market portfolio, this decline in Texas investments resulted in a 0.096 decline in *Local Bias* for the period.

**TABLE I**

*Quarterly Domestic Equity Trade Statistics*

**PANEL A: Total count of purchase and sale transactions for each quarter from 2003Q3-2009Q1**

| | | NJDOI | | | IL TRS | | | FL SBA | | | TX TRS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | QUARTER | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* |
| 2003 | 3 | 970 | 952 | 1,922 | 13,054 | 14,054 | 27,108 | | | | 1,467 | 854 | 2,321 |
| 2003 | 4 | 826 | 940 | 1,766 | 7,782 | 5,473 | 13,255 | | | | 1,112 | 1,200 | 2,312 |
| 2004 | 1 | 1,043 | 873 | 1,916 | 6,318 | 6,041 | 12,359 | | | | 1,235 | 3,273 | 4,508 |
| 2004 | 2 | 939 | 574 | 1,513 | 5,007 | 5,905 | 10,912 | | | | 1,144 | 4,239 | 5,383 |
| 2004 | 3 | 774 | 639 | 1,413 | 14,785 | 6,272 | 21,057 | | | | 957 | 2,182 | 3,139 |
| 2004 | 4 | 831 | 741 | 1,572 | 18,049 | 24,220 | 42,269 | | | | 1,136 | 2,960 | 4,096 |
| 2005 | 1 | 1,059 | 661 | 1,720 | 6,216 | 6,752 | 12,968 | | | | 1,625 | 1,406 | 3,031 |
| 2005 | 2 | 1,094 | 803 | 1,897 | 10,553 | 8,728 | 19,281 | | | | 2,587 | 6,246 | 8,833 |
| 2005 | 3 | 984 | 974 | 1,958 | 7,840 | 7,389 | 15,229 | 9,720 | 4,453 | 14,173 | 2,307 | 2,700 | 5,007 |
| 2005 | 4 | 1,139 | 975 | 2,114 | 12,729 | 10,848 | 23,577 | 11,252 | 6,854 | 18,106 | 2,422 | 3,615 | 6,037 |
| 2006 | 1 | 959 | 955 | 1,914 | 11,193 | 9,051 | 20,244 | 6,072 | 6,080 | 12,152 | 5,217 | 5,569 | 10,786 |
| 2006 | 2 | 1,248 | 1,191 | 2,439 | 13,844 | 10,518 | 24,362 | 9,171 | 5,561 | 14,732 | 4,306 | 3,368 | 7,674 |
| 2006 | 3 | 1,095 | 1,293 | 2,388 | 10,369 | 10,356 | 20,725 | 11,527 | 6,596 | 18,123 | 2,585 | 2,320 | 4,905 |
| 2006 | 4 | 1,071 | 1,580 | 2,651 | 11,234 | 12,458 | 23,692 | 10,614 | 6,241 | 16,855 | 2,140 | 2,240 | 4,380 |
| 2007 | 1 | 1,291 | 1,737 | 3,028 | 9,882 | 11,360 | 21,242 | 13,369 | 5,964 | 19,333 | 1,789 | 2,499 | 4,288 |
| 2007 | 2 | 1,181 | 1,670 | 2,851 | 24,537 | 15,265 | 39,802 | 12,520 | 23,226 | 35,746 | 812 | 1,345 | 2,157 |
| 2007 | 3 | 1,301 | 1,068 | 2,369 | 12,618 | 10,546 | 23,164 | 14,369 | 20,656 | 35,025 | 5,034 | 1,818 | 6,852 |
| 2007 | 4 | 1,348 | 1,353 | 2,701 | 18,070 | 19,357 | 37,427 | 9,837 | 6,517 | 16,354 | 1,829 | 12,200 | 14,029 |
| 2008 | 1 | 1,311 | 1,539 | 2,850 | 16,256 | 15,476 | 31,732 | 10,549 | 6,307 | 16,856 | 554 | 1,188 | 1,742 |
| 2008 | 2 | 1,143 | 1,409 | 2,552 | 19,637 | 23,587 | 43,224 | 10,361 | 6,528 | 16,889 | 3,389 | 5,134 | 8,523 |
| 2008 | 3 | 1,591 | 1,502 | 3,093 | 23,959 | 17,248 | 41,207 | 18,076 | 9,964 | 28,040 | 6,818 | 6,994 | 13,812 |
| 2008 | 4 | 2,144 | 1,990 | 4,134 | 22,402 | 18,377 | 40,779 | 28,816 | 21,116 | 49,932 | 6,193 | 4,616 | 10,809 |
| 2009 | 1 | 1,686 | 1,368 | 3,054 | 17,997 | 19,235 | 37,232 | 23,485 | 9,271 | 32,756 | 4,198 | 2,044 | 6,242 |
| **AVERAGE:** | | **1,175** | **1,165** | **2,340** | **13,667** | **12,544** | **26,211** | **13,316** | **9,689** | **23,005** | **2,646** | **3,479** | **6,125** |

**TABLE I**

*Quarterly Domestic Equity Trade Statistics*

**PANEL B: Total dollar value (in $millions) of purchase and sale transactions for each quarter from 2003Q3-2009Q1**

| | | NJDOI | | | IL TRS | | | FL SBA | | | TX TRS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | QUARTER | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* | *PUR* | *SALE* | *TOTAL* |
| 2003 | 3 | 1,379 | 1,057 | 2,436 | 4,816 | 3,938 | 8,754 | | | | 1,479 | 1,005 | 2,484 |
| 2003 | 4 | 818 | 1,596 | 2,414 | 1,549 | 1,538 | 3,087 | | | | 1,299 | 1,094 | 2,393 |
| 2004 | 1 | 984 | 1,140 | 2,124 | 1,442 | 2,089 | 3,531 | | | | 2,012 | 1,948 | 3,960 |
| 2004 | 2 | 1,050 | 939 | 1,989 | 1,987 | 1,314 | 3,301 | | | | 2,923 | 3,581 | 6,504 |
| 2004 | 3 | 983 | 926 | 1,909 | 1,261 | 1,670 | 2,931 | | | | 2,952 | 2,896 | 5,848 |
| 2004 | 4 | 889 | 1,303 | 2,192 | 2,298 | 1,716 | 4,014 | | | | 2,896 | 5,572 | 8,468 |
| 2005 | 1 | 1,363 | 1,213 | 2,576 | 1,080 | 1,076 | 2,156 | | | | 4,204 | 2,940 | 7,144 |
| 2005 | 2 | 1,434 | 1,517 | 2,951 | 4,159 | 2,384 | 6,543 | | | | 3,509 | 3,753 | 7,262 |
| 2005 | 3 | 917 | 1,352 | 2,269 | 1,295 | 1,208 | 2,503 | 2,997 | 2,710 | 5,707 | 4,219 | 3,806 | 8,025 |
| 2005 | 4 | 1,361 | 1,710 | 3,071 | 3,232 | 3,357 | 6,589 | 11,885 | 12,008 | 23,893 | 2,468 | 2,509 | 4,977 |
| 2006 | 1 | 1,272 | 1,735 | 3,007 | 4,073 | 1,994 | 6,067 | 5,289 | 6,382 | 11,671 | 3,361 | 3,078 | 6,439 |
| 2006 | 2 | 1,743 | 1,993 | 3,736 | 2,316 | 2,178 | 4,494 | 6,764 | 6,085 | 12,849 | 3,948 | 3,687 | 7,635 |
| 2006 | 3 | 1,052 | 2,547 | 3,599 | 1,651 | 1,893 | 3,544 | 5,374 | 6,226 | 11,600 | 4,130 | 3,980 | 8,110 |
| 2006 | 4 | 1,178 | 3,502 | 4,680 | 2,282 | 2,248 | 4,530 | 4,128 | 4,602 | 8,730 | 5,372 | 4,919 | 10,291 |
| 2007 | 1 | 919 | 5,059 | 5,978 | 1,683 | 1,741 | 3,424 | 4,095 | 4,144 | 8,239 | 6,215 | 6,655 | 12,870 |
| 2007 | 2 | 941 | 3,587 | 4,528 | 3,118 | 2,971 | 6,089 | 15,637 | 26,673 | 42,310 | 4,723 | 5,721 | 10,444 |
| 2007 | 3 | 1,454 | 1,719 | 3,173 | 1,741 | 1,847 | 3,588 | 14,387 | 23,381 | 37,768 | 58,839 | 36,522 | 95,361 |
| 2007 | 4 | 582 | 2,250 | 2,832 | 3,788 | 3,842 | 7.630 | 3,814 | 4,271 | 8,085 | 5,117 | 21,644 | 26,761 |
| 2008 | 1 | 1,309 | 3,545 | 4,854 | 2,668 | 3,122 | 5,790 | 5,600 | 6,200 | 11,800 | 539 | 2,670 | 3,209 |
| 2008 | 2 | 1,148 | 1,713 | 2,861 | 2,930 | 2,864 | 5,794 | 5,471 | 4,441 | 9,912 | 6,517 | 7,300 | 13,817 |
| 2008 | 3 | 1,979 | 2,401 | 4,380 | 2,868 | 2,764 | 5,632 | 4,897 | 4,212 | 9,109 | 6,427 | 8,662 | 15,089 |
| 2008 | 4 | 2,927 | 2,961 | 5,888 | 1,773 | 1,696 | 3,469 | 5,735 | 6,673 | 12,408 | 17,643 | 10,577 | 28,220 |
| 2009 | 1 | 1,398 | 2,064 | 3,462 | 1,177 | 1,165 | 2,342 | 4,292 | 3,077 | 7,369 | 4,144 | 2,580 | 6,724 |
| **AVERAGE:** | | **1,264** | **2,080** | **3,344** | **2,399** | **2,201** | **4,600** | **6,691** | **8,072** | **14,763** | **6,736** | **6,396** | **13,132** |

**TABLE II**

*Quarterly Breakdown of Local and Non-Local Securities*

**PANEL A: Number of unique securities held in portfolio for each quarter from 2003Q3-2009Q1**

| | | NJDOI | | | IL TRS | | | FL SBA | | | TX TRS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | QUARTER | *Local* | *Non-Local* | *TOTAL* | *Local* | *Non-Local* | *TOTAL* | *Local* | *Non-Local* | *TOTAL* | *Local* | *Non-Local* | *TOTAL* |
| 2003 | 3 | 77 | 1,375 | 1,452 | 152 | 3,375 | 3,527 | | | | 104 | 1,194 | 1,298 |
| 2003 | 4 | 77 | 1,361 | 1,438 | 71 | 1,444 | 1,515 | | | | 103 | 1,198 | 1,301 |
| 2004 | 1 | 78 | 1,331 | 1,409 | 77 | 1,615 | 1,692 | | | | 104 | 1,201 | 1,305 |
| 2004 | 2 | 75 | 1,333 | 1,408 | 78 | 1,576 | 1,654 | | | | 106 | 1,201 | 1,307 |
| 2004 | 3 | 75 | 1,330 | 1,405 | 110 | 2,186 | 2,296 | | | | 109 | 1,200 | 1,309 |
| 2004 | 4 | 76 | 1,331 | 1,407 | 191 | 4,249 | 4,440 | | | | 107 | 1,208 | 1,315 |
| 2005 | 1 | 78 | 1,315 | 1,393 | 117 | 2,320 | 2,437 | | | | 108 | 1,207 | 1,315 |
| 2005 | 2 | 80 | 1,316 | 1,396 | 124 | 2,474 | 2,598 | 114 | 2,808 | 2,922 | 106 | 1,209 | 1,315 |
| 2005 | 3 | 79 | 1,308 | 1,387 | 108 | 2,319 | 2,427 | 117 | 2,874 | 2,991 | 107 | 1,213 | 1,320 |
| 2005 | 4 | 77 | 1,291 | 1,368 | 134 | 2,592 | 2,726 | 118 | 2,926 | 3,044 | 107 | 1,216 | 1,323 |
| 2006 | 1 | 76 | 1,287 | 1,363 | 140 | 2,613 | 2,753 | 117 | 2,956 | 3,073 | 109 | 1,231 | 1,340 |
| 2006 | 2 | 72 | 1,265 | 1,337 | 142 | 2,694 | 2,836 | 124 | 3,214 | 3,338 | 109 | 1,226 | 1,335 |
| 2006 | 3 | 71 | 1,242 | 1,313 | 134 | 2,426 | 2,560 | 121 | 3,204 | 3,325 | 109 | 1,238 | 1,347 |
| 2006 | 4 | 68 | 1,219 | 1,287 | 133 | 2,467 | 2,600 | 116 | 3,106 | 3,222 | 109 | 1,238 | 1,347 |
| 2007 | 1 | 67 | 1,193 | 1,260 | 118 | 2,061 | 2,179 | 115 | 3,136 | 3,251 | 110 | 1,252 | 1,362 |
| 2007 | 2 | 65 | 1,153 | 1,218 | 153 | 3,113 | 3,266 | 115 | 3,217 | 3,332 | 111 | 1,256 | 1,367 |
| 2007 | 3 | 64 | 1,136 | 1,200 | 152 | 2,996 | 3,148 | 112 | 3,125 | 3,237 | 149 | 1,705 | 1,854 |
| 2007 | 4 | 62 | 1,122 | 1,184 | 151 | 3,009 | 3,160 | 109 | 3,135 | 3,244 | 161 | 1,824 | 1,985 |
| 2008 | 1 | 59 | 1,091 | 1,150 | 145 | 2,937 | 3,082 | 110 | 3,171 | 3,281 | 141 | 1,565 | 1,706 |
| 2008 | 2 | 53 | 1,017 | 1,070 | 149 | 3,165 | 3,314 | 116 | 3,400 | 3,516 | 144 | 1,580 | 1,724 |
| 2008 | 3 | 53 | 1,011 | 1,064 | 145 | 2,972 | 3,117 | 111 | 3,294 | 3,405 | 195 | 2,011 | 2,206 |
| 2008 | 4 | 55 | 1,036 | 1,091 | 144 | 2,931 | 3,075 | 109 | 3,302 | 3,411 | 205 | 2,145 | 2,350 |
| 2009 | 1 | 54 | 1,027 | 1,081 | 141 | 2,894 | 3,035 | 109 | 3,305 | 3,414 | 205 | 2,184 | 2,389 |
| **AVERAGE:** | | **69** | **1,221** | **1,290** | **131** | **2,627** | **2,758** | **114** | **3,136** | **3,250** | **127** | **1,413** | **1,540** |

**TABLE II**

*Quarterly Breakdown of Local and Non-Local Securities*

**PANEL B: Local bias for each quarter from 2003Q3-2009Q1**

| | | NJDOI | | | IL TRS | | | FL SBA | | | TX TRS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | QUARTER | *Port %* | *Mkt %* | *Local Bias* | *Port %* | *Mkt %* | *Local Bias* | *Port %* | *Mkt %* | *Local Bias* | *Port %* | *Mkt %* | *Local Bias* |
| 2003 | 3 | 4.23 | 5.40 | -0.22 | 5.55 | 5.40 | 0.03 | | | | 8.43 | 8.49 | -0.01 |
| 2003 | 4 | 4.28 | 5.04 | -0.15 | 5.20 | 5.51 | -0.06 | | | | 8.68 | 8.45 | 0.03 |
| 2004 | 1 | 4.35 | 4.99 | -0.13 | 5.14 | 5.56 | -0.08 | | | | 8.84 | 8.61 | 0.03 |
| 2004 | 2 | 4.23 | 5.01 | -0.16 | 5.15 | 5.73 | -0.10 | | | | 9.18 | 8.82 | 0.04 |
| 2004 | 3 | 4.38 | 5.03 | -0.13 | 4.59 | 5.45 | -0.16 | | | | 9.85 | 9.25 | 0.07 |
| 2004 | 4 | 4.40 | 4.76 | -0.08 | 4.62 | 5.51 | -0.16 | | | | 10.19 | 9.50 | 0.07 |
| 2005 | 1 | 4.45 | 4.91 | -0.09 | 4.42 | 5.55 | -0.20 | | | | 10.76 | 9.96 | 0.08 |
| 2005 | 2 | 4.89 | 5.09 | -0.04 | 4.83 | 5.68 | -0.15 | 1.47 | 1.62 | -0.09 | 11.11 | 10.26 | 0.08 |
| 2005 | 3 | 4.91 | 4.88 | 0.01 | 4.74 | 5.75 | -0.18 | 1.46 | 1.68 | -0.13 | 11.58 | 10.84 | 0.07 |
| 2005 | 4 | 5.00 | 4.78 | 0.05 | 5.20 | 5.69 | -0.09 | 1.48 | 1.69 | -0.12 | 11.42 | 10.76 | 0.06 |
| 2006 | 1 | 5.10 | 4.72 | 0.08 | 4.94 | 5.72 | -0.14 | 1.58 | 1.71 | -0.07 | 11.32 | 11.01 | 0.03 |
| 2006 | 2 | 4.73 | 4.70 | 0.01 | 4.69 | 5.87 | -0.20 | 1.61 | 1.68 | -0.04 | 10.54 | 11.06 | -0.05 |
| 2006 | 3 | 5.26 | 4.83 | 0.09 | 5.35 | 5.93 | -0.10 | 1.51 | 1.59 | -0.05 | 10.23 | 11.21 | -0.09 |
| 2006 | 4 | 5.30 | 4.77 | 0.11 | 4.82 | 5.80 | -0.17 | 1.40 | 1.60 | -0.12 | 10.50 | 10.88 | -0.04 |
| 2007 | 1 | 5.45 | 4.72 | 0.15 | 4.82 | 5.76 | -0.16 | 1.38 | 1.58 | -0.12 | 10.57 | 11.07 | -0.05 |
| 2007 | 2 | 5.60 | 4.77 | 0.18 | 5.45 | 5.90 | -0.08 | 1.37 | 1.54 | -0.11 | 11.82 | 12.03 | -0.02 |
| 2007 | 3 | 5.79 | 4.72 | 0.23 | 4.53 | 5.97 | -0.24 | 1.41 | 1.43 | -0.02 | 11.63 | 12.49 | -0.07 |
| 2007 | 4 | 6.29 | 4.89 | 0.29 | 4.44 | 5.94 | -0.25 | 1.35 | 1.38 | -0.02 | 11.78 | 12.60 | -0.07 |
| 2008 | 1 | 5.94 | 4.92 | 0.21 | 4.23 | 5.98 | -0.29 | 1.19 | 1.40 | -0.15 | 11.98 | 12.90 | -0.07 |
| 2008 | 2 | 5.55 | 4.71 | 0.18 | 4.15 | 5.91 | -0.30 | 1.18 | 1.45 | -0.19 | 13.06 | 13.76 | -0.05 |
| 2008 | 3 | 6.04 | 5.00 | 0.21 | 4.29 | 5.98 | -0.28 | 1.25 | 1.47 | -0.15 | 12.11 | 13.10 | -0.08 |
| 2008 | 4 | 7.58 | 5.49 | 0.38 | 4.43 | 6.09 | -0.27 | 1.22 | 1.40 | -0.13 | 13.18 | 12.69 | 0.04 |
| 2009 | 1 | 9.04 | 5.84 | 0.55 | 4.52 | 6.29 | -0.28 | 1.32 | 1.47 | -0.11 | 13.81 | 13.22 | 0.04 |
| **AVERAGE:** | | **5.34** | **4.95** | **0.07** | **4.79** | **5.78** | **-0.17** | **1.39** | **1.54** | **-0.10** | **10.98** | **11.00** | **0.0** |

**TABLE III**
Pearson Correlations

| **Variable** | ***ΔLocalBias*** | **LocalTradeP** | **PastPerf** | **DailyFlow** | **MktRet** | **FundSize** | **VIXindex** |
|---|---|---|---|---|---|---|---|
| LocalTradeP | 0.114 | | | | | | |
| PastPerf | -0.044 | -0.089 | | | | | |
| DailyFlow | -0.008 | 0.001 | -0.191 | | | | |
| MktRet | -0.001 | 0.040 | -0.075 | -0.041 | | | |
| FundSize | -0.024 | 0.199 | 0.079 | -0.091 | 0.157 | | |
| VIXindex | -0.002 | -0.015 | 0.104 | 0.026 | -0.628 | -0.180 | |
| *ΔStateRev* | 0.011 | 0.076 | -0.094 | -0.030 | 0.111 | 0.143 | -0.548 |

***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively. N=3,566.

The table presents Pearson correlations for the variables

Variable definitions:

*ΔLocalBias* = Daily change in the fund's local bias. Local bias is calculated by dividing the fraction of the fund's portfolio that is invested in in-state securities by the fraction of the market portfolio comprised of in-state securities, and then subtracting one.
*LocalTradeP* = proportion of local daily trade volume to total daily trading volume, calculated as local trade volume / total trade volume
*PastPerf* = the fund's cumulative benchmark-adjusted return starting on the first day of the annual evaluation period
*DailyFlow* = daily dollar difference between buys and sells for each fund
*MktRet* = 22-trading day lagged market return (from Eugene Fama's website)
*FundSize* = total domestic equity assets of the fund (calculated as the sum of all domestic equity holdings for each day)
*VIXindex* = adjusted closing price of the VIX index
*ΔStateRev* = percentage change in total (fund's home) state revenues (measured quarterly)

**TABLE IV**
Effect of fund managers' past performance and compensation contract on changes in local bias

$$\Delta LocalBias_{it} = \alpha + \beta_1 PastPerf_{it} + \beta_2 FinalQ_{it} + \beta_3 PastPerf_{it}*FinalQ_{it} + \beta_4 DailyFlow_{it} + \beta_5 MktRet_{it} + \beta_6 FundSize_{it} + \beta_7 VIXindex_{it} + \beta_8 \Delta StateRev_{it} + \varepsilon \quad (1)$$

| Variable | Pred Sign | (1) | (2) | (3) |
|---|---|---|---|---|
| *Intercept* | *?* | *0.000909* | *0.00704* | *0.00956* |
| | | *(0.48)* | *(0.95)* | *(1.25)* |
| *PastPerf* | (-) | *-0.03676* | *-0.03786* | *-0.01845* |
| | | *(-3.93)*$^{***}$ | *(-3.98)*$^{***}$ | *(-1.68)*$^{*}$ |
| *FinalQ* | (+/-) | | | *-0.00371* |
| | | | | *(-0.81)* |
| *PastPerf * FinalQ* | (-) | | | *-0.07644* |
| | | | | *(-3.57)*$^{***}$ |
| *DailyFlow* | (+/-) | | *-0.00001* | *-0.00001* |
| | | | *(-1.45)* | *(-1.58)* |
| *MktRet* | (-) | | *-0.00891* | *-0.00889* |
| | | | *(-0.22)* | *(-0.22)* |
| *FundSize* | (-) | | *-0.00018* | *-0.00018* |
| | | | *(-1.67)*$^{*}$ | *(-1.73)*$^{*}$ |
| *VIXindex* | (+) | | *0.00000* | *-0.00006* |
| | | | *(0.00)* | *(-0.23)* |
| *$\Delta StateRev_i$* | (-) | | *-0.00001* | *-0.00011* |
| | | | *(-0.03)* | *(-0.36)* |
| *Adj. $R^2$* | | *0.0033* | *0.0030* | *0.0053* |

The table presents the results of an OLS regression testing whether investors shift the concentration of local assets in their portfolio in response to one-month fund returns and whether this effect is stronger in the final quarter of their annual evaluation period.

***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively. For all regressions, N=4,739.

Variable definitions:

| | |
|---|---|
| *ΔLocalBias* = | Daily change in the fund's local bias. Local bias is calculated by dividing the fraction of the fund's portfolio that is invested in in-state securities by the fraction of the market portfolio comprised of in-state securities, and then subtracting one. |
| *PastPerf* = | the fund's cumulative benchmark-adjusted return starting on the first day of the annual evaluation period |
| *FinalQ* = | an indicator variable equal to one if the date is within the final quarter of the investor's annual performance evaluation period |
| *DailyFlow* = | daily dollar difference between buys and sells for each fund. |
| *MktRet* = | 22-trading day lagged market return (from Eugene Fama's website) |
| *FundSize* = | total domestic equity assets of the fund (calculated as the sum of all domestic equity holdings for each day) |
| *VIXindex* = | adjusted closing price of the VIX index |
| *ΔStateRev* = | percentage change in total (fund's home) state revenues (measured quarterly) |

**TABLE V**
Effect of past performance and compensation contracts on proportion of total trading volume in local stocks

$$LocalTradeP_{it} = \alpha + \beta_1 PastPerf_{it} + \beta_2 FinalQ_{it} + \beta_3 PastPerf_{it}*FinalQ_{it} + \beta_4 DailyFlow_{it} + \beta_5 MktRet_{it} + \beta_6 FundSize_{it} + \beta_7 VIXindex_{it} + \beta_8 \Delta StateRev_{it} + \varepsilon \quad (2)$$

| | Pred | All Transactions | | Buys | | Sales | |
|---|---|---|---|---|---|---|---|
| Variable | Sign | (1) | (2) | (3) | (4) | (5) | (6) |
| *Intercept* | *?* | *0.08040* *(40.19)*$^{***}$ | *0.00302* *(0.43)* | *0.07779* *(32.62)*$^{**}$ | *0.01377* *(1.63)* | *0.08035* *(32.47)*$^{***}$ | *0.00093* *(0.11)* |
| *Past Perf* | (-) | *-0.03385* *(-3.76)*$^{***}$ | *-0.04306* *(-4.87)*$^{***}$ | *-0.03390* *(-3.16)*$^{***}$ | *-0.04266* *(-3.98)*$^{***}$ | *-0.03266* *(-2.93)*$^{***}$ | *-0.03939* *(-3.57)*$^{***}$ |
| *FinalQ* | (+/-) | 0.00202 (0.47) | *0.00479* *(1.14)* | *0.00483* *(0.95)* | *0.00811* *(1.59)* | *0.00092* *(0.17)* | *0.00296* *(0.56)* |
| *PastPerf * FinalQ* | (-) | -0.03129 (-1.74)$^{*}$ | *-0.01471* *(-0.84)* | *-0.03341* *(-1.56)* | *-0.01792* *(-0.84)* | *-0.03470* *(-1.56)* | *-0.01758* *(-0.80)* |
| *DailyFlow* | (+/-) | | *0.00001* *(1.62)* | | *0.00002* *(2.65)*$^{***}$ | | *0.00001* *(1.58)* |
| *MktRet* | (+/-) | | *0.13465* *(3.67)*$^{***}$ | | *0.03509* *(0.79)* | | *0.20972* *(4.58)*$^{***}$ |
| *FundSize* | (+/-) | | *0.00125* *(13.48)*$^{***}$ | | *0.00111* *(9.94)*$^{***}$ | | *0.00122* *(10.56)*$^{***}$ |
| *VIXindex* | (+/-) | | *0.00141* *(5.83)*$^{***}$ | | *0.00109* *(3.70)*$^{***}$ | | *0.00149* *(4.95)*$^{***}$ |
| *$\Delta StateRev_i$* | (+/-) | | *0.00210* *(6.90)*$^{***}$ | | *0.00151* *(4.08)*$^{***}$ | | *0.00242* *(6.35)*$^{***}$ |
| *Adj. $R^2$* | | *0.0080* | *0.0700* | *0.0059* | *0.0370* | *0.0049* | *0.0495* |

The table presents the results of an OLS regression testing whether investors shift the concentration of local assets in their trading activity in response to one-month fund returns and whether this effect is stronger in the final quarter of their annual evaluation period.

***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively. For all regressions, N=3,566.

Variable definitions:

| | |
|---|---|
| *LocalTradeP* = | proportion of local daily trade volume to total daily trading volume, calculated as local trade volume / total trade volume |
| *PastPerf* = | the fund's cumulative benchmark-adjusted return starting on the first day of the annual evaluation period |
| *FinalQ* = | an indicator variable equal to one if the date is within the final quarter of the investor's annual performance evaluation period |
| *DailyFlow* = | daily dollar difference between buys and sells for each fund. |
| *MktRet* = | 22-trading day lagged market return (from Eugene Fama's website) |
| *FundSize* = | total domestic equity assets of the fund (calculated as the sum of all domestic equity holdings for each day) |
| *VIXindex* = | adjusted closing price of the VIX index |
| *ΔStateRev* = | percentage change in total (fund's home) state revenues (measured quarterly) |

**TABLE VI**
Buy – Sell One-Month CAR for all transactions included in sample

Panel A: Cumulative Year-to-Date Fund Performance

| | Poor Past Perf | Good Past Perf |
|---|---|---|
| Local Transactions | 0.20% | (0.22%) |
| Non-Local Transactions | (0.05%) | (0.26%) |
| Other Funds' Transactions | 0.16% | 0.13% |

Panel B: Final Quarter of Funds' Annual Evaluation Period

| | Final Quarter | First Three Quarters |
|---|---|---|
| Local Transactions | 0.41% | (0.26%) |
| Non-Local Transactions | 0.11% | (0.30%) |
| Other Funds' Transactions | (0.05%) | 0.20% |

Panel C: Performance and Timing

| | Poor PP. in Final Q | All other transactions |
|---|---|---|
| Local Transactions | (0.59%) | (0.05%) |
| Non-Local Transactions | (0.12%) | (0.21%) |
| Other Funds' Transactions | (0.14%) | 0.12% |

_____

This table presents equal-weighted one month market-adjusted net (buy – sell) returns from transactions executed during the sample period.

*Local Transactions*: buy and sell transactions in stocks located in the funds' home state (e.g. IL TRS transactions in IL; TX TRS transactions in TX).

*Non-Local Transactions*: buy and sell transactions in stocks located outside the funds' home state.

*Other Funds' Transactions*: buy and sell transactions in stocks located in NJ, TX, IL, and FL, but outside the funds' home state.

Panel A partitions transactions by the cumulative past performance of the fund. Poor (Good) Past Performance indicates that the funds' year-to-date performance is below (above) their benchmark. Panel B partitions transactions into those executed during the final quarter of the funds' annual evaluation period and those executed during the first three quarters of the annual evaluation period. Panel C

combines the performance and timing attributes by separating the transactions executed during the final quarter of the funds' annual evaluation periods when the fund is below their benchmark.

**TABLE VII**
Equal-weighted average raw returns for all transactions included in sample

Panel A: Buys

| | One-Month | | | Five-Month | | |
|---|---|---|---|---|---|---|
| | Local | | Non-Local | Local | | Non-Local |
| Poor Past Performance | 0.0511 | > | -0.2894 | -0.2296 | > | -0.5474 |
| Good Past Performance | -0.2248 | | -0.0511 | -0.5663 | | -0.3986 |
| ********** | | | | | | |
| Final Quarter | -0.1582 | > | -0.3074 | -2.0201 | > | -2.1927 |
| Other 3 Quarters | -0.1375 | | -0.0588 | -0.0624 | | 0.0252 |

Panel B: Sales

| | One-Month | | Five-Month | |
|---|---|---|---|---|
| | Local | Non-Local | Local | Non-Local |
| Poor Past Performance | -0.4673 | -0.5584 | 0.3982 | -0.5400 |
| Good Past Performance | 0.9933 | 0.9677 | 0.0295 | -0.2620 |
| ********** | | | | |
| Final Quarter | -0.6900 | -0.2341 | -1.6165 | -2.4181 |
| Other 3 Quarters | 0.9651 | 0.8080 | 0.6637 | 0.2494 |

The table presents the equal-weighted average future returns of all transactions included in the sample. The One-Month returns are the raw 22-trading day returns commencing on the trade date. The Five-Month returns are the average monthly raw returns from the subsequent 100 trading days commencing on the 23rd trading day following the transaction. In short, the Five-Month returns capture future monthly returns from months 2-6 following the trade date. The Local – Non-Local partition is based on whether the firm's corporate headquarters are located within the same state as the fund. The same firm could be identified as local for one fund and non-local for the other funds in the sample. Poor (Good) past performance is identified as underperformance (over-performance) relative to the fund's benchmark. Final Quarter (Other 3 Quarters) indicates that the transaction occurred within (outside) the final quarter of the fund manager's annual evaluation period.

N=1,035,162

**TABLE VIII**
Stacked Regression: Effect of past performance and compensation contract on trading behavior

Panel A: Buys

| Variable | One-Month Returns % (1) | Five-Month Returns % (2) | Test Across Diff. (F-test) (3) |
|---|---|---|---|
| *Intercept* | *-0.00134* | *-0.00767* | |
| *PastPerf_D * Local * FinalQ* | *-0.01220* *(-2.00)*** | *-0.01538* *(-2.46)*** | *0.13* |
| *Past Perf_D* | *0.00976* *(13.04)**** | *0.01351* *(17.76)**** | *12.37**** |
| *Local* | -0.00222 (-0.95) | *-0.00679* *(-2.88)**** | *1.90* |
| FinalQ | -0.00537 (-5.25)*** | *-0.12290* *(-116.04)**** | *6377.38**** |
| *PastPerf_D * Local* | *0.00534* *(1.27)* | *0.00481* *(1.14)* | *0.01* |
| *PastPerf_D * FinalQ* | *-0.01628* *(-11.83)**** | *-0.09147* *(-64.58)* | *1449.52**** |
| *Local * FinalQ* | *0.00693* *(1.44)* | *0.01952* *(3.87)**** | *3.26** |
| *System Weighted $R^2$* | | *0.0167* | |

***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively. For all regressions, N=526,727.

The table presents the results of a stacked OLS regression testing the future returns from trading activities under varying conditions. Parameter estimates are based on the following model:

$$\text{Returns} = 1\text{MonthRet}^* \left[ \begin{array}{l} \alpha_0 + \alpha_1\ \text{D\_PastPerf} + \alpha_2\ \text{Local} + \alpha_3\ \text{FinalQ} + \\ \alpha_4\ \text{D\_PastPerf*Local} + \alpha_5\ \text{D\_PastPerf*FinalQ} + \\ \alpha_6\ \text{Local*MidYearD} + \alpha_7\ \text{D\_PastPerf*Local*FinalQ} \end{array} \right]$$

$$+ 6\text{MonthRet}^* \left[ \begin{array}{l} \beta_0 + \beta_1\ \text{D\_PastPerf} + \beta_2\ \text{Local} + \beta_3\ \text{FinalQ} + \\ \beta_4\ \text{D\_PastPerf*Local} + \beta_5\ \text{D\_PastPerf*FinalQ} + \\ \beta_6\ \text{Local*MidYearD} + \beta_7\ \text{D\_PastPerf*Local*FinalQ} \end{array} \right] + \varepsilon$$

**TABLE VIII (cont.)**
Stacked Regression: Effect of past performance and compensation contract on trading behavior

Panel B: Sales

| Variable | One-Month Returns % (1) | Five-Month Returns % (2) | Test Across Diff. (F-test) (3) |
|---|---|---|---|
| *Intercept* | *0.00641* | *0.02028* | |
| *PastPerf_D * Local * FinalQ* | *-0.02908* *(-4.87)*$^{***}$ | *-0.00225* *(-0.37)* | *9.83*$^{***}$ |
| *Past Perf_D* | *0.01475* *(22.50)*$^{***}$ | *0.01043* *(15.58)*$^{***}$ | *21.27*$^{***}$ |
| *Local* | -0.00320 (-1.22) | *0.02103* *(7.81)*$^{***}$ | *41.60*$^{***}$ |
| FinalQ | -0.01611 (-14.07)$^{***}$ | *-0.14634* *(-121.25)*$^{***}$ | *6129.86*$^{***}$ |
| *PastPerf_D * Local* | *0.01871* *(3.99)*$^{***}$ | *-0.00990* *(-2.08)*$^{**}$ | *18.32*$^{***}$ |
| *PastPerf_D * FinalQ* | *-0.02945* *(-17.26)*$^{***}$ | *-0.12526* *(-69.51)*$^{***}$ | *1490.38*$^{***}$ |
| *Local * FinalQ* | *0.00615* *(1.19)* | *0.02706* *(4.90)*$^{***}$ | *7.63*$^{***}$ |
| *System Weighted $R^2$* | | *0.0199* | |

***, ** and * indicate statistical significance at the 1%, 5% and 10% levels respectively. For all regressions, N=498,438.

The table presents the results of a stacked OLS regression testing the future returns from trading activities under varying conditions. Parameter estimates are based on the following model:

$$\begin{aligned}\text{Returns} = 1\text{MonthRet}*&\left[\begin{array}{l}\alpha_0 + \alpha_1\ \text{D\_PastPerf} + \alpha_2\ \text{Local} + \alpha_3\ \text{FinalQ} + \\ \alpha_4\ \text{D\_PastPerf*Local} + \alpha_5\ \text{D\_PastPerf*FinalQ} + \\ \alpha_6\ \text{Local*MidYearD} + \alpha_7\ \text{D\_PastPerf*Local*FinalQ}\end{array}\right] \\ + 6\text{MonthRet}*&\left[\begin{array}{l}\beta_0 + \beta_1\ \text{D\_PastPerf} + \beta_2\ \text{Local} + \beta_3\ \text{FinalQ} + \\ \beta_4\ \text{D\_PastPerf*Local} + \beta_5\ \text{D\_PastPerf*FinalQ} + \\ \beta_6\ \text{Local*MidYearD} + \beta_7\ \text{D\_PastPerf*Local*FinalQ}\end{array}\right] + \varepsilon\end{aligned}$$

Variable definitions:

| | |
|---|---|
| *Returns* = | Future one-month (or subsequent five monthly) raw buy-and-hold return for stock i. |
| *1MonthRet* = | Indicator variable equal to 1 when the dependent variable is one-month returns; 0 otherwise |
| *6MonthRet* = | Indicator variable equal to 1 when the dependent variable is the subsequent five monthly returns (monthly returns from 2-6 months following the transaction); 0 otherwise |
| *D_PastPerf* = | Indicator variable equal to 1 when the fund's 30-day lagged return is negative; 0 otherwise |
| *Local* = | Indicator variable equal to 1 if the securities' corporate headquarters are located in the same state as the fund; 0 otherwise |
| *FinalQ* = | Indicator variable equal to 1 if the transaction occurred within the final quarter of the investor's performance evaluation period; 0 otherwise |

**Supplemental Table 1A: Example of Data - Transactions**

| TRXN/ INVNT# | TRADE/ DELIVERY | CUSIP/ DOCUMENT | SECURITY DESCRIPTION/ BROKER/SERVICER OF RECORD | RATE/ MATURITY | PAR-OR-SHARES | YIELD/ PRICE | EXPENSE/ COMMISSION | COST/PROCEEDS | GAIN-OR-LOSS |
|---|---|---|---|---|---|---|---|---|---|
| SALE | 10/04/10 | 77273920 | ROCK-TENN COMPANY-CL A | | | | 25.24 | | |
| 50799 | 10/07/10 | 424232 | SIDOTI & CO | | 30,000.00 | 49.781 | 1,200.00 | 1,492,204.76 | 105,182.47 |
| SALE | 10/05/10 | 77571110 | ROLLINS, INC. | | | | 30.08 | | |
| 33698 | 10/08/10 | 424236 | MORGAN KEEGAN | | 75,000.00 | 23.725 | 3,000.00 | 1,776,322.42 | 777,897.42 |
| SALE | 10/05/10 | 85811910 | STEEL DYNAMICS INC | | | | 48.63 | | |
| 30846 | 10/08/10 | 424236 | KEYBANC CAPITAL MKTS INC | | 200,000.00 | 14.387 | 6,000.00 | 2,871,311.37 | 452,736.20 |
| SALE | 10/21/10 | 85811910 | STEEL DYNAMICS INC | | | | 48.05 | | |
| 30846 | 10/26/10 | 424293 | UBS WARBURG LLC | | 200,000.00 | 14.213 | 6,000.00 | 2,836,631.95 | 418,056.78 |
| SALE | 10/07/10 | 87612E10 | TARGET CORP. | | | | 10.96 | | |
| 15577 | 10/13/10 | 424246 | SANFORD BERNSTEIN & CO. | | 12,000.00 | 54.041 | 480.00 | 648,002.24 | 322,596.21 |
| SALE | 10/08/10 | 87612E10 | TARGET CORP. | | | | 4.60 | | |
| 15577 | 10/14/10 | 424250 | LAZARD CAPITAL MARKETS | | 5,000.00 | 54.329 | 200.00 | 271,437.90 | 135,852.06 |
| PUR | 10/20/10 | 17243V10 | CINEMARK HOLDINGS | | | | | | |
| 50473 | 10/25/10 | 424288 | BARCLAYS CAPITAL (DOMESTIC) | | 20,000.00 | 17.322 | 800.00 | 347,234.00 | |
| PUR | 10/06/10 | 17275510 | CIRRUS LOGIC | | | | | | |
| 53355 | 10/12/10 | 424239 | JANNEY MONTGOMERY SCOTT | | 100,000.00 | 17.125 | 3,000.00 | 1,715,530.00 | |
| PUR | 10/12/10 | 87161C10 | SYNOVUS FINANCIAL CORP | | | | | | |
| 53635 | 10/15/10 | 424257 | SANFORD BERNSTEIN & CO. | | 200,000.00 | 2.602 | 8,000.00 | 528,380.00 | |
| PUR | 10/29/10 | 88579Y10 | 3M COMPANY | | | | | | |
| 54093 | 11/03/10 | 424318 | SANFORD BERNSTEIN & CO. | | 100,000.00 | 84.250 | 4,000.00 | 8,428,970.00 | |

**Supplemental Table 1B: Example of Data – Portfolio Holdings**

| Security ID | Shares/Par | Local Currency Code | Base Cost | Base Unrealized Gain/Loss |
|---|---|---|---|---|
| 1963107 | 21600 | USD | 842500.44 | 33163.56 |
| 4239109 | 47300 | USD | 735285.59 | 146859.41 |
| 7974108 | 70340 | USD | 1410317.00 | 14771.40 |
| 8492100 | 6200 | USD | 186806.00 | 744.00 |
| 20002101 | 1236006 | USD | 58246389.07 | 15604969.43 |
| 23135106 | 544974 | USD | 21542286.37 | -3514546.45 |
| 595112103 | 1075204 | USD | 12741167.40 | -1763334.56 |
| 615369105 | 604252 | USD | 15272628.89 | 11894541.03 |
| 651639106 | 739989 | USD | 34322072.15 | -5440301.48 |

**Supplemental Table 2:** *One-Month CAR for all transaction included in sample*

| Panel A: Past Fund Performance | buys | | sales | | buy - sell | |
|---|---|---|---|---|---|---|
| | Poor Past Perf | Good Past Perf | Poor Past Perf | Good Past Perf | Poor Past Perf | Good Past Perf |
| Local Transactions | 0.30% | 0.29% | 0.10% | 0.51% | 0.20% | -0.22% |
| Non-Local Transactions | -0.09% | 0.35% | -0.04% | 0.61% | -0.05% | -0.26% |
| Other Funds Transactions in Local State | 0.45% | 0.29% | 0.29% | 0.16% | 0.16% | 0.13% |

| Panel B: Final Quarter | buys | | sales | | buy - sell | |
|---|---|---|---|---|---|---|
| | Final Quarter | First Three Qtrs | Final Quarter | First Three Qtrs | Final Quarter | First Three Qtrs |
| Local Transactions | 0.20% | 0.32% | -0.21% | 0.59% | 0.41% | -0.26% |
| Non-Local Transactions | 0.11% | 0.27% | 0.00% | 0.57% | 0.11% | -0.30% |
| Other Funds Transactions in Local State | -1.26% | 0.79% | -1.22% | 0.59% | -0.05% | 0.20% |

| Panel C: Performance and Timing | buys | | sales | | buy - sell | |
|---|---|---|---|---|---|---|
| | PPerf * FQ | All other trans. | PPerf * FQ | All other trans. | PPerf * FQ | All other trans. |
| Local Transactions | -0.17% | 0.33% | 0.41% | 0.39% | -0.59% | -0.05% |
| Non-Local Transactions | -0.15% | 0.26% | -0.03% | 0.47% | -0.12% | -0.21% |
| Other Funds Transactions in Local State | -1.17% | 0.62% | -1.03% | 0.50% | -0.14% | 0.12% |

This table presents equal-weighted one month market-adjusted returns from transactions executed during the sample period.

*Local Transactions*: buy and sell transactions in stocks located in the funds' home state (e.g. IL TRS transactions in IL; TX TRS transactions in TX).

*Non-Local Transactions*: buy and sell transactions in stocks located outside the funds' home state.

*Other Funds' Transactions*: buy and sell transactions in stocks located in NJ, TX, IL, and FL, but outside the funds' home state.

Panel A partitions transactions by the cumulative past performance of the fund. Poor (Good) Past Performance indicates that the funds' year-to-date performance is below (above) their benchmark. Panel B partitions transactions into those executed during the final quarter of the funds' annual evaluation period and those executed during the first three quarters of the annual evaluation period. Panel C combines the performance and timing attributes by separating the transactions executed during the final quarter of the funds' annual evaluation periods when the fund is below their benchmark.