Location Overconfidence

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ABSTRACT

In this paper we provide new evidence relating geographic location, information quality, and investor behavior by comparing the performance of mutual funds located in and outside of financial centers. Since financial centers produce information, funds located there may have informational advantage over other funds. This advantage must be limited to domestic companies since information on foreign firms is generated primarily in overseas financial centers. However, the perception of an advantage from being in a financial center can make fund managers overconfident and negatively impact their performance because overconfident investors trade too much. Using U.S. mutual fund data on domestic and international funds, we initially observe that domestic (international) funds with longer (shorter) history located in financial centers outperform (underperform) funds located in other areas. We then examine differences in turnover and risk-adjusted returns and document several novel facts. First, consistent with the argument of Daniel, Hirshleifer and Subramanyam (1998) on the importance of private rather than public information in forming investor overconfidence, funds in financial centers, especially newer ones, trade more often and hold more concentrated portfolios than other funds. Second, consistent with Gervais and Odean (2001) who argue that overconfidence should decline overtime, the turnover of funds in financial centers significantly decreases with the funds' age. Third, the risk-adjusted returns of domestic (international) funds in financial centers are positively (negatively) related to their turnover, implying that their trading is (is not) based on information. Thus, since managers of domestic and international funds are different, our results suggest that the informational advantage of financial centers makes managers of *all* new funds located there overconfident, but, with the decrease of overconfidence over time, it allows the managers of *domestic* funds to benefit from the potential access to private information.

JEL Classification: G14; G23

Keywords: Asymmetric information; Localized conformity; Mutual funds; Performance differential; Financial centers

1. Introduction

> *... Yet it was a wealthy city, being situated at the junction of several important roads and trade routes. The connection between Sardis and money – easy money – was well known in the ancient world. ... The people of Sardis had always had a tendency to become soft and complacent. They lived in luxury and splendor, and were a proud, arrogant, and overconfident people...* [The Holy Bible, Revelation 3:1-6, Commentaries.]

There is mounting evidence relating geographic location, information quality, and investor behavior. For instance, Huberman (1999) and Coval and Moskowitz (1999) find investment preferences for local assets. Coval and Moskowitz (2001) document that mutual funds generate abnormal returns on assets close to their headquarters, suggesting an information asymmetry when making local investments. They also find that funds from U.S. metropolitan areas do not exhibit significant local biases in portfolio holdings and argue that this result is due to greater competition for information among funds in larger cities compared to smaller communities. Yet fund managers in large cities may be more knowledgeable about distant assets and thus have no particular preference in investing locally.

Metropolitan areas, particularly financial centers, are potentially more effective places for dissemination of information, especially private, because professional money managers are more likely to interact with people affiliated with leading investment houses and corporate managers who often visit financial centers. Financial hubs therefore expand the set of familiar assets beyond those located in close proximity to investors.[1]

In this paper, we study whether access to information in financial centers affects the behavior and performance of professional money managers. While investors in financial centers can have certain informational advantages, residing in a financial center has its disadvantages as well since it may lead to investor overconfidence. This overconfidence is

[1] For example, the Seattle Post-Intelligencer on 03/21/2001 writes that according to Mr. Phil Condit, the Boeing's CEO, the company's headquarters are moving out of Seattle because he feels the need "...to be in a location central to operating units, customers and the financial community..." In a related note, according to the Denver Mayor's Office Press Release on 05/09/2001, Phil Condit "... is tired of flying 3,000 miles to visit the Wall Street bankers and the Washington lawmakers..." In addition, Grinblatt and Keloharju (1999) find that foreign investors outperform Finnish investors in Finnish stocks. The authors explain this result as supportive of superior knowledge of foreign investors. Informational advantage is related to overall sophistication of investors, which can be linked to the financial sophistication of places where these investors reside, such as, large financial centers.

likely to be pervasive in locations where professional traders have some reason to believe they have access to private or more precise information. In recent papers, Daniel, Hirshleifer and Subramanyam (1998, 2001) argue that investors are overconfident about their private information, rather than general public information. Odean (1998) and others show that overconfidence leads to excessive trading and, in the absence of private information or when information is costly, to lower returns.[2] Thus, the benefits to fund managers in financial centers from potentially having an access to private information may be diminished because the existence of this information can make all investors in those places think that their signals can be traded on, although this is not always the case. We discuss in detail a possible link between living in a financial hub and confidence level, formulating the hypothesis of *location overconfidence*.

To analyze these issues, we compare the performance and turnover of mutual funds located in and outside of financial centers.[3] We focus on mutual funds in the United States examining two distinct fund categories that hold information-sensitive securities: domestic and international. Domestic funds are comprised of growth and growth & income funds that include also value funds. These fund types differentiate between the cases where, we believe, either information asymmetry or overconfidence can have a primary influence on the performance differential between funds located in and outside of financial centers. If financial centers provide informational advantage to fund managers, then it can be detected more easily in funds that invest in domestic, more familiar assets. However, if financial centers increase the overconfidence level of investors, then it should be detected easier in international funds where information asymmetry may not play a major role.

The paper contributes to the literature by providing the first direct and indirect empirical tests of several theoretical papers. First, our findings are consistent with the

[2] The negative relation between overconfidence and average performance is well documented in the literature. For example, Odean (1998) and Daniel, Hirshleifer and Subramanyam (1998) argue that investor overconfidence leads to more frequent trading which may not offset on average the costs of trading. Odean (1999) and Barber and Odean (2000, 2001) document that more frequent trading results in underperformance for individual investors. See Hirshleifer's (2001) for an excellent review of the literature.

[3] Unlike our study, many papers have focused on either the time-series characteristics of fund returns, or cross-sectional differences linking them to fund managers' characteristics. See Grinblatt and Titman (1992), Goetzmann and Ibbotson (1994), and Carhart (1997) as examples of mutual fund performance studies based on unconditional asset pricing models or Ferson and Schadt (1996) and Christopherson, Ferson and Glassman (1998) as those bases on conditional models. Chevalier and Ellison (1999a,b)) examine differences in the performance of funds across a range of personal characteristics of managers.

argument of Daniel, Hirshleifer and Subramanyam (1998, 2001) that investor overconfidence is formed based on private rather than public information. Second, we base our tests of overconfidence on the model of Gervais and Odean (2001) showing that turnover increases with initial successes but then decreases overtime as traders realize their true ability. Third, we also provide indirect empirical support for the models of behavioral herding or informational cascades (e.g., see, Banerjee (1992), Bikhchandani, Hirshleifer, and Welch (1992), or Welch (1992)). These models discuss localized conformity in behavior; that is, a situation where people in a group make the same choices after observing each others behavior.[4] The paper also has clear practical implications on individual investors and mutual fund industry.

Managers of international funds located in financial centers are less likely to find systematic ways to acquire private information on overseas assets because this information is collected by financial centers outside the U.S. (e.g., London, Tokyo, Hong Kong, etc.). Although information is shared with offices in the U.S., the U.S. remains distant and brokers in these foreign offices may first contact clients closer to them, making any shared information with the U.S. less valuable. [5] We consider whether a manager is better able to extract private information if they are located close to where it is collected, analyzed, and traded.

Our empirical tests are divided into three categories. First, we compare turnover data between funds in and outside of financial centers. Next, we analyze differences in performance between these funds. Finally, we examine the relation between returns and turnover. In the first set of tests, we find that turnover is higher for funds in financial centers and that for these funds it significantly decreases with the age of a fund. We also condition on the fund's past performance and find that the relation between turnover and age is significantly negative for high-performing funds in financial centers. All these findings support Gervais and Odean's (2001) model.

[4] We thank Ivo Welch for pointing this out to us.

[5] For instance, the sources from a reputable investment bank in London indicate that their analysts produce forecasts of returns for stocks in the U.K. and Europe and send them automatically to the U.S. each day for portfolio managers who run international funds. Clearly, they do not send their forecasts exclusively to managers of funds in financial centers. In fact, one cannot call the analysts' information private once it is disseminated in the U.S.

In the second set of tests, we examine performance differences between funds located in and outside of financial centers. We find that domestic funds located in financial centers outperform funds located outside while international funds in financial centers underperform. Our rationale for these performance differences is that information in financial centers benefits fund managers of domestic funds but not international fund managers. These performance differentials also have a time horizon pattern. Recalling our results relating turnover and age, international funds located in financial centers underperform other funds at short horizons where overconfidence is likely to be the greatest, dragging performance. [6]

In the last set of tests, we tie our performance findings with turnover. In regressing raw returns and risk-adjusted returns on turnover, we find that the abnormal returns of domestic funds in financial centers are positively related to their turnover. This implies that at least a portion of their trading is based on some informational advantage as found in Grinblatt and Titman (1994). In contrast, there is a strong negative relation between turnover and returns among international funds in financial centers, suggesting that overconfident trading contributes to the observed return differentials.

Our overall interpretation of the findings is that the enhanced financial sophistication and the opportunities for acquiring private information on domestic assets translate into higher overconfidence. In this respect, we offer empirical support for the importance of private rather than public information in forming investor behavior, in line with theoretical predictions of Daniel, Hirshleifer and Subramanyam (1998, 2001). However, since managers of different fund categories are different, our main conclusion is that superior informational advantage and performance of *some* fund managers who reside in particular locations can induce not only their own overconfidence but also that of *other* fund managers working in the same places. This pattern is a reflection of locational contagion in behavior and is consistent with the informational cascades literature.

The rest of the paper is organized as follows. Section 2 describes the data and gives the summary statistics. In Section 3, we formulate our two competing hypotheses

[6] In a recent paper, Hau (2001) finds no performance differences between traders in Frankfurt, the German financial center, and those outside that city, including traders outside Germany. These results however are likely to be affected by at least two facts: first, distances in Germany are smaller than in the U.S., making it more difficult to clearly identify the financial center relative to the other areas, and, second, investors in that study are separated by political and cultural boundaries. More importantly, Hau does not consider a possibility of overconfident trading in financial centers.

(information asymmetry and location overconfidence) for the performance differential between mutual funds located in and outside of financial centers. Section 4 constitutes the main part of the paper. We first show the relation between funds turnover and their location and age. Then, we present results from the performance differential tests with gross and risk-adjusted returns and relate these findings to turnover. Section 5 discusses various robustness issues. In this section, we also propose an alternative "rational" explanation to our empirical observations. Section 6 concludes.

2. Data and initial evidence of performance differential

Our data on equity fund performance and portfolio turnover comes from Lipper Analytical Services. In the Lipper Data, the sample contains all equity funds. It provides monthly gross performance (before expenses are subtracted) data from January 1988 to December 1996 and annual portfolio turnover between 1988 and 1995. Annual portfolio turnover is defined as the assets traded as a percent of the net asset size of the fund over the year. In addition, Lipper also provides the city where the headquarters for the fund are located. The Lipper Data is a rich data source in terms of the types of funds and variables it has available; however, it suffers from the inherent problem of survivorship bias discussed in several papers including Carhart (1997) and Brown, Goetzmann, Ibbotson, and Ross (1992). The short time horizon minimizes the survivorship bias by reducing the number of funds dropped from the sample. Also, 1995 contains no survivorship bias since all funds are included, so the cross-sectional test results can be verified in this sample. As a result of survivorship bias and growth in the mutual fund industry, the cross-sectional samples decreases as we move back in time. We select the equity funds with the following objectives: growth and growth & income funds and international funds.[7] These fund groups are proxies for investment in domestic and foreign risky securities with sufficient amount of data. In 1995, there are approximately 2,000 of these funds. We combine growth and growth & income funds into one group and, for the sake of simplicity, call it domestic funds.

The following six cities are defined to be financial centers: Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. We classify a fund to be in one of

[7] Notice that, unlike the CRSP mutual fund database, the database from Lipper Analytical classifies value funds within the growth & income category.

these financial centers if its distance from the city proper is no more than 50 miles or about one hour driving time. In this paper, we also compare the performance of mutual funds across financial centers. For this purpose, we group Los Angeles and San Francisco into one center and Chicago and Philadelphia into another. We consider Boston and New York separately. These groupings allow us to have a reasonable data sample for each financial center. They also correspond to certain established criteria for identifying a financial center (e.g., see Gehrig (1998) and references therein). The survivorship issues across fund types and locations are discussed in Section 5.

Table 1 shows the summary statistics of the mutual fund data for two categories of funds separately for those funds located in and outside our six financial centers. There are substantially more domestic funds than international. However, the number of funds within and outside of financial centers in each category is approximately split in half simplifying the subsequent statistical analysis of the data. As one can see from the numbers for the mean total net assets, funds in financial centers tend to be larger. The statistics for the return data are the averages of the average monthly performance across all funds in the sample; that is, the average return for each fund is calculated based on the fund's entire available return history. The most striking feature of the table is the difference in the grand mean returns (average across time and across funds) for mutual funds located in financial centers and those located outside for both domestic and international funds. Surprisingly, these differences are not only statistically significant and economically sizable, constituting respectively 60 and about 100 basis points on average annually, but also they have opposite signs. Mutual funds located in financial centers outperform those located in other places in the growth category but underperform in the international.

Figure 1 shows simple cross-sectional comparison of mutual fund performance in our data. It depicts the number of months when the difference in average monthly returns across mutual funds located in financial centers and those outside is positive or negative. Between 1988-1996, domestic funds located in financial centers outperformed non-financial centers 68 out of 108 months (about 2/3). Similar statistics are shown for two five year subsamples 1988-1992 and 1992-1996. We calculated the difference in returns for each month and find that financial centers outperform non-financial centers by 0.06% or more than 70 basis point annually. This difference is not statistically significant due to the generally high variation in

returns over the 108 months. However, when we simulate our data characteristics using the bootstrap procedure, we find strong evidence that the out-performance of domestic funds in financial centers is systematic and significant. We see that international funds underperform in financial centers and this is only present in the second sub-sample, which includes the vast majority of funds in this category. Thus, it seems that there are some systematic differences in performance between funds depending on their location and style. We relate these patterns to asymmetric information and location overconfidence in the following sections.

3. Performance differential hypotheses

In this section, we formulate the two competing hypotheses for the potential impact of financial centers on the behavior of professional investors. The first is that financial centers may help investors acquire private information. The second is that living in a financial center may enhance investors' overconfidence. Based on these hypotheses, we outline our empirical predictions. In the next sections we essentially perform a "horse-race" between the two alternative hypotheses.

3.1. Information asymmetry hypothesis

Financial centers can be defined as geographical locations with an extensive representation of banks and other financial institutions (e.g., see Kindleberger (1974)). A large number of financial intermediaries can facilitate communication among economic agents. The geographic proximity to financial centers thus can lower the cost of acquisition of news about information sensitive securities such as common stocks. Gehrig (1998) discusses different forms of possible information spillovers in financial centers. Therefore, although investors in every city may be better informed about local firms, we argue that financial centers provide additional asymmetric information because of the presence of large financial intermediaries with a broader knowledge base and links to the corporate world. Professional investors not individual ones have more means in acquiring any private information and thus can potentially benefit from strategically locating themselves in or around financial centers. In this respect, the mutual fund data has an advantage over data from individual traders since in the former case we deal with professional managers.

Thus, if asymmetric information is a major factor in the return differentials between mutual funds located in financial centers and other places, we expect to observe better performance for investments in domestic (more familiar) firms for which private information may exist. Therefore, we expect the effect of information asymmetry to be more prevalent in domestic funds than international.

3.2. Location overconfidence hypothesis

The link between the status (prestige) of the city and the general attitude of its inhabitants goes as far back as to The Holy Bible. In the Book of Revelation (e.g., see Commentaries of Scott (1906)), we find that self-confident people of the once wealthy ancient city of Sardis were twice the victims of their own arrogance. In a modern world where financial centers are often considered to be the Meccas of financial information, investors in those locations are likely to believe that the information they receive is accurate and can be traded on. This indeed might help *some* investors to benefit from the existence of private information in financial centers but make *all* investors working in those places overconfident. One can relate this behavior to the idea of informational cascades. Bikhchandani, Hirshleifer, and Welch (1992) define informational cascades as the process by which "...it is optimal for an individual, having observed the actions of those ahead of him, to follow the behavior of the preceding individual without regard of his own information," (p. 994). Thus, informational cascades literature argues that there should be location contagions in behavior. On the other hand, traders from a smaller city who are more removed from financial activity are less likely to trade unnecessarily on information because they are less certain of its accuracy.

Since overconfidence results in excessive trading, hence if our hypothesis about fund managers in financial centers being overconfident is correct, the turnover of funds located in financial centers should on average exceed that of funds located in other places.[8] In addition, according to Gervais and Odean's (2001) model, initial successes in trading enhance overconfidence and cause investors to trade more frequently. Overtime, investors realize their true ability, so their overconfidence and, consequently, the frequency of trading decreases.

[8] In general, this might not necessarily hold. Grinblatt, Titman and Wermers (1995), Ferson and Khang (2000) and others find that fund style matters in trading patterns: value funds tend to be "contrarian," while growth funds are primarily "momentum" chasers. Thus, an overconfident value fund manager might trade less than a

This results in a hump-shaped relation between age and turnover. If financial centers increase overconfidence, we expect that both the hump and the following decrease in turnover is more profound for funds located in financial centers. As Odean (1999) and Barber and Odean (2000, 2001) find, the overconfidence in trading leads to underperformance. Thus, we assume that, *ceteris paribus*, overconfidence leads to more frequent trading and lower returns.[9]

Thus, if overconfidence is a major factor in the return differentials between mutual funds located in financial centers and outside, we expect to observe worse performance for investments in more distant assets, e.g., international, where information asymmetry is less likely. We also expect overconfidence to decrease with the age of the fund.

3.3. Empirical predictions

In comparing returns in financial centers and other places, we isolate the effects of informational asymmetry and overconfidence by comparing returns across fund types. Note that international funds in financial centers do not benefit from information asymmetry because the information gained in a financial center relates only to domestic assets rather than international ones. The table below describes the fund category in terms of the underlying hypotheses.

	DOMESTIC FUNDS	INTERNATIONAL FUNDS
FINANCIAL CENTERS	Information Asymmetry & Location Overconfidence	Location Overconfidence
OTHER PLACES	None	None

From this general construct and our description of the hypotheses, we outline several alternative hypotheses that are tested against the null hypothesis that there is no location overconfidence or information asymmetry between financial centers and other locations. Our tests can be divided into three general categories: (i) analysis of turnover differentials, (ii)

non-overconfident growth fund manager. However, since we compare performance of funds within the same broad category, this issue is not of concern.

[9] Note that if overconfident investors have access to private signals, their profits can exceed those of fully rational investors. For example, Kyle and Wang (1997) and Hirshleifer and Luo (2001) show that by trading more aggressively on an accurate (private) information, overconfident traders are likely to outperform those who

evaluation of performance differentials, and (iii) examination of the relation between performance and turnover differentials.

Turnover differentials:

P1. Turnover should be higher for funds located in financial centers.

P2. Turnover and fund age should be negatively related and this relation should be more pronounced in financial centers.

P3. Conditioning on high performance, the negative relationship between fund age and turnover should be more pronounced in financial centers while there is not expected to be any difference when conditioning on low performance.

Performance differentials:

P4. The raw and risk-adjusted returns (alphas) should be lower for international funds located in financial centers than in other places.

P5. As overconfidence decreases overtime, the return differential for international funds located in and outside of financial centers should become less negative at longer horizons. The return differential for domestic funds located in and outside of financial centers should become positive at longer horizons due to the additional impact of information asymmetry.

P6. Financial centers with better information also have more overconfident traders since an access to private information leads traders to believe they have more accurate information. A city with higher estimated informational benefits in domestic funds should also exhibit more overconfident trading in international funds.

Performance-turnover differentials:

P7. High turnover should result in lower returns among international funds located in financial centers because of overconfidence, but it can lead to higher returns in domestic funds because of information-induced trading.

4. Tests of empirical predictions

4.1. Turnover differentials

In this sub-section, we focus on portfolio turnover data across funds located in and outside of financial centers and test our hypotheses P1–P3. Portfolio turnover is a relatively good proxy

trade less frequently. However, in this case there is an interaction of two effects: private information on the one

for the frequency of trading by fund managers because it measures the minimum of total sales or total purchases made over the asset size of the fund. For instance, a fund that had 100% growth in new purchases but did not sell anything would have reported a zero turnover. Since the turnover data is available only annually, we create a new set of annual gross returns by compounding monthly returns for each fund over each corresponding year. The new set of mutual funds is a little smaller than our original set because not all mutual funds report portfolio turnover data.

Figure 2 shows the relation between funds turnover and their actual age. The fund's age is the difference in days between the last day of the year (between 1989 and 1995) and the IPO date for that find. We can observe that the maximum turnover decreases with the fund age for our entire sample of funds, although one cannot make a similar argument regarding the average or median turnover. Therefore, Figure 3 shows the relation between the median portfolio turnover and the log of the fund's age depending on its location in or outside of financial centers. We can now see that there is a negative trend between the turnover and the fund age for funds located in financial centers but not for those located in other places. Turnover rates tend to decrease after an initial increase in the first two-three years after going public. [10]

We can assess the statistical properties of the patterns observed in Figure 3 using regression analysis. In the regression model, the dependent variable is the fund's turnover; the independent variables are the dummy for funds located in financial centers, F, the log age of the fund, and the interaction variable composed of the log age of the fund and the fiancial center dummy. The results of the regression are as follows:

$$\underset{}{Turnover_i} = \underset{}{67.86} + \underset{(5.68)}{35.32F} + \underset{(2.12)}{0.34Log(Age_i)} - \underset{(0.22)}{4.28F * Log(Age_i)} + \underset{(-2.00)}{e_i}, \text{ N = 4438.}$$

First, the positive and significant slope coefficient on the dummy implies that funds in financial centers have significantly higher turnover relative to other funds. Second, the

side and overconfidence on the other. Our paper addresses this issue.

[10] Dow and Gorton (1997) develop a model in which portfolio managers can trade simply to show to their clients that they are working. However, since mutual funds are competing for clients who are not necessarily local, our results preclude a possibility that mutual funds located in financial centers rebalance their portfolios more frequently because they face more rivalry than funds located in other places.

negative and significant slope on the interaction term implies that funds in financial centers trade significantly more when they are young than when they are old. [11]

Next, we perform a similar analysis but classify all funds based on their one-year past performance. We divide the subsamples of funds located in and outside of financial centers into high and low performance groups. The high (low) performing funds are those whose past one-year performance is above (below) the median. Figure 4 depicts the relation between the median portfolio turnover and the actual fund age (in deciles) located in and outside of financial centers for the high performing (plot A) and low performing (plot B) funds. Plot A shows that the high performing funds in financial centers exhibit a visible downward trend between turnover and age. The high performing funds located outside of financial centers do not exibit a significant downward trend in their turnover rates while their level is much lower than that for high performance younger funds. Plot B shows that there are no singificant differences between turnover and age for the low performing funds located either in or outside of financial centers.

Thus, the patterns of relation between funds turnover and their age presented in Figures 3 and 4 are consistent with predictions P1-P3 and the theoretical relation between investor overconfidence and age in the model of Gervais and Odean (2001). The next section provides a more detailed analysis of the relation between fund location and performance.

We conclude this sub-section with a brief illustration that differences between funds located in and outside of financial centers exist with respect to not only portfolio turnover rates but also concentration of portfolio holdings. For the only available to us data set of portfolio holdings for September 1996, Table 2 shows that mutual funds located in financial centers hold significantly more concentrated investments that those located in other places. The difference is the largest for the first segment, exceeding 2.0%, and, even though somewhat diminished, it is still present for other top investments. This result is consistent with the idea that more overconfident traders hold less diversified portfolios (e.g., see Odean (1998)).

4.2. Tests of performance differentials

[11] Regression model with log turnover as a dependent variable produces marginally even more significant results.

This sub-section has three tests. They deal with a more detailed performance comparison of funds located in and outside of financial centers and cover differences in gross, risk-adjusted returns, and market timing ability.

4.2.1. Further differences in gross returns

Table 3 shows the differences in the mean monthly returns and compounded returns as well as their statistical significance for our categories of mutual funds for the following four time horizons: the last year of the sample, last three years, last five years, and the entire sample. Panel A depicts these differences for the clusters of funds located in and outside of financial centers. We observe that the out-performance of mutual funds in financial centers within the growth category comes primarily at longer horizons: difference in both the average and compounded returns for five years and up are economically sizable and statistically significant. On average, these funds earn an additional 0.05% per month or 60 basis points annually. The difference in compounded returns is even more impressive: funds in financial centers have earned 18% more over the nine year period than those located outside of financial centers. More interestingly, the performance differential in the category of international funds again has an opposite sign to that of domestic funds. Not only funds in this category located in financial centers under-perform those located outside but also we observe a wider performance differential at shorter time horizons. This underperformance is both statistically and economically significant: international funds in financial centers earn on average 0.13% less a month or 1.56% annually. We account for many international funds precisely in the last years of our sample, so the above inference is based on statistically viable sample size.[12]

After observing substantial performance differences across funds depending on their location, it is interesting to examine whether these differences present in all financial centers or only in particular ones. Panel B shows similar statistics when the group of funds in financial centers is broken into city locations. We see that the best outperforming funds in the growth category are in Boston followed by those in the Los Angeles – San Francisco area.

[12] Note that our findings preclude the argument that financial centers simply attract fund managers with superior education and skill level.

Paradoxically, across international funds, these very Boston and California funds appear among the worst performers.

4.2.2. Differences in risk-adjusted returns

So far, we have provided evidence on the cross-sectional differences in performance between mutual funds located in and outside of financial centers using gross returns. We are now interested whether the performance differences arise from systematic risk (beta) of fund portfolios or their respective alphas. We use the monthly returns on the S&P 500 index as a performance benchmark for domestic funds and the monthly returns on the MSCI world market index as a performance benchmark for international funds. Both these returns are measured in excess of the one-month Treasury bill return from Ibbotson Associates.

Table 4 shows the differences in the alphas and betas for our categories of mutual funds again over the four time horizons: the last year of the sample, last three years, last five years, and the entire sample. Panel A presents these differences for the two groups of funds: located in and outside of financial centers. We can see that within the growth category, funds in financial centers take marginally more risk – the difference in the betas across time horizons varies between 0.15 and 0.26. There are no statistical differences in the alphas at any significance level. However, it is important to observe that the difference in alphas is steadily increasing with horizon. In economic terms, the difference in alphas is 0.034% per month or about 40 basis points annually for funds that were present in the sample through the entire sample period. The insignificant difference in the alphas in domestic funds is not surprising given that informational asymmetry and overconfidence offset each other. The difference in the betas is somewhat surprising and could indicate that managers know more about riskier projects or it could be picking up some ability to time the market, which we investigate in the next test.

In the category of international funds, we see a clear risk-adjusted underperformance of mutual funds in financial centers at a one-year horizon. These funds do worse on average 0.14% per month (1.68% annually) than funds located outside of financial centers. Notice however that this underperformance does not come as a result of taking less risk: the difference in the estimates of betas is not statistically significant at any significance level. Also, consistent with our hypotheses, we observe that the difference in the alphas becomes

smaller over time as overconfidence disappears. Thus, our results are consistent with empirical predictions P4 and P5.[13]

Notice that in a same mutual fund company usually different people manage different categories of funds. Therefore, a higher success rate of a domestic fund manager cannot directly lead to an increase in the overconfidence level of a manager responsible for an international fund. One however should not exclude the possibility that the common working environment may have a similar effect on the beliefs of managers of different fund categories.

4.2.3. Differences in market timing

One of the main observations of the preceding section is that the difference in alphas between funds in financial centers and outside increases in value for funds that stayed in business relatively long time. For domestic funds this difference goes from negative and statistically insignificant values to positive insignificant, while for international funds the difference goes from negative significant to less negative and insignificant. There are two potential explanations for this pattern. One possibility is that over time mutual funds are able to acquire more private information and make more knowledgeable decisions about stock selection. Another possibility is that over time mutual funds managers become wiser and better time the market. To decompose the effects of selectivity and market timing differences between mutual funds located in and outside of financial centers, we use the Treynor and Mazuy (1966) model, namely:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \gamma_i r_{m,t}^2 + e_{i,t},$$

where $r_{i,t}$ and $r_{m,t}$ are the fund i and market returns at time t respectively, while α_i, β_i, and γ_i are the alpha, beta, and market timing measure of fund i respectively. [14]

Table 5 shows the estimation results. As before, we observe that domestic funds located in financial centers take substantially more risk than those located in other places. However, unlike the results in Table 4, these funds in financial centers now show a better,

[13] We make our inference about managers' knowledge based on the time a given mutual fund had a history in our sample rather than explicitly on the managers' age and experience. However, we believe that managers of more established funds are more experienced on average. Therefore, a fund's age in the sample should be a reasonable proxy for the fund manager's experience and networking capability.

albeit statistically insignificant, selection ability: the difference in the alphas is positive at all time horizons. Most interestingly, mutual funds in financial centers appear to be worse market timers than those located in other places. The difference is particularly profound for newer funds. There are no significant differences in risk taking or market timing ability for international funds located in and outside of financial centers, and there are no qualitative changes in estimates of their alphas in comparison to those reported in Table 4. Again, funds in financial centers dramatically underperform other funds in this category.

We also perform these tests at the city level. We find that funds that have higher difference in the alphas in the category of domestic funds have lower difference in the alphas in the category of international funds (for the sake of for brevity we do not report these results in a separate table). The inverse performance differential in the selection ability between growth and international funds is markedly shown in Figure 5: the correlation coefficient is –0.49. These findings strongly support our prediction P6.

Thus, consistent with intuition, the out-performance of mutual funds in the growth category that are located in financial centers is a result of both higher risk taking and possibly better stock selection ability. Both these factors can speak in favor of substantial private information gains. However, as we pointed out earlier, the differences in betas may be attributed to an industry-specific investment and therefore may not be related to the informational advantage of financial centers. On the other hand, the underperformance of mutual funds in the international category that are headquartered in financial centers is purely the result of inferior risk-adjusted performance. The most likely reason for these findings is investor overconfidence that can be very costly (e.g., see Odean (1999)). In the next section we link our results to the frequency of trading more explicitly.

4.3. Performance-turnover differentials

In this sub-section, we examine directly the informational advantage of financial centers by linking funds' turnover rates with their returns and stock selection ability. Table 6 shows the estimated slopes and their corresponding t-statistics from the contemporaneous regression of fund returns on portfolio turnovers for all years together and separately for each year. For

[14] Another widely used market timing model is that of Henriksson and Merton (1981). However, performance differentials between mutual funds located in and outside of financial centers based on this model are analogous

domestic funds in financial centers, the estimated slopes are positive in seven out of the eight years of our sample and statistically significant. Markedly, their values are noticeably higher for the early years of our sample that can be consistent with the intuition that funds that stayed in business relatively long time are able to conduct a greater share of their trading on asymmetric (private) information. For example, between 1989 and 1991, these firms earned annually on average 0.038% per 1% of their portfolio turnover, while between 1993 and 1995 – only 0.006%. As for international funds in financial centers, we can see that the slope coefficients are mostly negative, especially in the last years when many new funds joined the industry. For instance, in 1995, these funds lost annually on average 0.023% per 1% of their turnover. These differences are shown more profoundly using the pooled cross-sectional time-series regression results. Thus, the asymmetry in the return-turnover relation between growth and international funds located in financial centers supports earlier results. In comparison, there is no significant relationship across funds with different objectives located outside of financial centers. All these findings support our prediction P7.

We have shown that the relation between the returns and turnover for domestic funds located in financial centers is positive implying that these funds are able to trade on private information. However, Tables 4 and 5 show that the out-performance of mutual funds in the growth category appears to be largely related to the differences in risk taking, while the differences in the stock selectivity measure, the alphas, is although positive but insignificant. There is a potential problem with the interpretation of a statistically insignificant difference in the alphas for funds located in and outside of financial centers as a sign that financial centers provide no informational advantages. The impact of information asymmetry is likely to be washed out by location overconfidence since the two push in opposite directions. As a result, the potential impact of asymmetric information on the overall performance and selection ability of domestic funds in financial centers could be larger than that that can be inferred from the results reported in Tables 4 or 5.

A more relevant test of the informational advantage of financial centers can be conducted using the regression of the fund alphas on its turnover and an interaction term between turnover and a dummy for a financial center, F. The regression models are:

$$\hat{\alpha}_i = c + c_1 Turn_i + c_2 F * Turn_i + e_i$$

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to those obtained using the Treynor and Mazuy (1966) measure. Therefore we do not report them in the paper.

and

$$\hat{\alpha}_i = c + c_1 Turn_i + c_2 Boston * Turn_i + c_3 ChPh * Turn_i + c_4 NY * Turn_i + c_5 LASF * Turn_i + e_i,$$

where $\hat{\alpha}_i$ is the annualized estimated alpha for fund *i* at time *t*, while Boston, ChPh, NY, and LASF are dummies that stand for the cities of Boston, Chicago-Philadelphia, New York, and Los Angeles-San Francisco, respectively. If the domestic funds in financial centers have superior selection ability then the coefficient on the interaction term must be positive and significant.

Table 7 reports the results of the estimation. The estimated alphas are obtained by regressing funds' gross returns on the market portfolio and the square of the market portfolio over the 36-month period ending in December of the given year. Panel A presents the results for the entire group of domestic funds located in financial centers. The coefficient on the interaction term is statistically significant at the 5% or 10% level in every year from 1990 to 1995 except 1994 but always positive. The results from a pooled cross-sectional time-series regression across all years in the sample show that the slope coefficient on the interaction term is 0.010 with a t-statistic of 4.64.[15] This means that on average every 10% percent of additional turnover among domestic funds located in financial centers increases alpha by about 10 basis points a year. Panel B reports the results of the similar estimation with the city breakout. Here, funds located in Boston and New York show a positive and statistically significant relation between the turnover and alphas on the entire sample of data. Thus, domestic funds located in some of the most important financial centers to a certain extent change their portfolio composition in response to information that may not be available to funds located in other places.

5. Robustness issues

5.1. Variations in samples and performance evaluation models

Our results above can be subject to several robustness checks. First of all, to rule out the possibility of the survivorship bias impact on our results and analysis, Figure 6 depicts the

[15] Since we estimate alphas every year on a 3-year time window, we have overlapping data problem when we perform our pooled cross-sectional time-series regression. Nevertheless, potential biases in estimation that the

proportion of funds located inside and outside of financial centers for each month of our sample of 108 months. The plots are shown for both domestic and international funds. As one can see from the pictures, there are no trends in the fractions of these funds in and outside of financial centers. Therefore, we conclude that the birth and death process among all funds is practically in a steady-state regime, so that the performance differential between funds located in and outside of financial centers is not an artifact of their birth or death rate difference.

Next, the out-performance of funds in financial centers within the growth category can be a sole artifact of the proximity preference documented by Coval and Moskowitz (1999). For instance, many high-tech companies are located in or around large cities, especially Boston and San Francisco. If investors prefer investing in locally, then those funds that are located close to high-tech industry centers (not necessarily financial hubs) will likely to have better performance than other funds in the 1990's. However, as we mentioned earlier, Coval and Moskowitz (2001) do not find substantial preference for local stocks among mutual funds from metropolitan areas. Moreover, performance differential tests based on the Fama and French three-factor asset pricing model (see Fama and French (1993)) lead to the qualitatively same results.

Another question is whether our finding of asymmetric information advantage of mutual funds located in financial centers is limited only to growth and growth and income funds funds. We conducted similar estimations with small growth funds data and find again that those small growth funds that are located in financial centers do better than those located outside. However, the major difference between these funds and growth and growth & income is that their superior performance occurs in the last year in our sample. This is not surprising because for this type of funds, local investment in small start-up high-tech companies must be more important that for other growth funds. As a result, we are likely to pick up mainly the "high-tech" industry out-performance rather than the out-performance related to an informational advantage of financial centers. Importantly, there is not sufficient amount of data for small growth funds before 1993.

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overlapping may induce cannot be essential since qualitatively similar results are obtained on the individual year-to-year regressions.

In a similar vein, we want to know whether the underperformance of international funds in financial centers is limited only to a particular type of foreign funds. We conducted all our experiments also with a sample consisting, besides international funds, of all funds that invest in foreign markets. These funds are Canadian, international small company, Emerging markets, European, global, global small company, Pacific region, Japanese, Pacific region excluding Japan, and Latin American. We obtain analogous results. However, some funds in this category (e.g., European funds) have disproportionate representation in financial centers, while others, such as global and global small company funds, may also have substantial investments in domestic (U.S.) assets. Thus, we conduct our main tests with international funds only to preclude any biases in estimation that can potentially be induced by the unequal sample breakout within a given fund category or the inclusion if close-to-home assets into the fund portfolio.

When relating age and turnover, we have also controlled for size and turnover caused by investor redemption. Since young funds also tend to be small, we re-estimated the regressions in Figure 3 with size included and the results are unchanged. We also tried a first pass at controlling for turnover caused by investor redemption by excluding funds who decreased in size and may have been forced to liquidate assets causing a higher turnover. Again the results are unchanged from those reported in Figure 3.

We have obtained our results using gross returns. The question is whether performance differences between funds located in and outside of financial centers also matter for individual investors. In other words, do the patterns that we observed with the data persist for the fee-adjusted, net returns? We analyze mutual fund net returns and find that all our findings hold in this case too.

Finally, an important issue is whether the strong out-performance of domestic funds located in Boston is driven solely by the largest and the most known funds there – Fidelity. After excluding Fidelity from the sample, our estimation results remain qualitatively the same. The test results of all these exercises are available on request.

5.2. An alternative "rational" explanation

For the skeptical reader, we did try to think of an alternative "rational" hypothesis that would also be consistent with our findings. We consider whether fund managers located in financial

centers will more often pay for their information using softdollars. In using softdollars, the mutual fund manager pays excessive brokerage commissions to cover both execution costs and research costs so the two products are bundled together (see Blume (1993)). There is currently great debate in the press regarding softdollars because high brokerage commissions lower returns while many question whether shareholders benefit from the information. We consider whether managers in financial centers use softdollars more often to access information from their broker. Higher softdollar brokerage in financial centers may benefit domestic assets where information is valuable but drive down returns in international funds where the information is less valuable. We match data from Lipper on brokerage commissions and find no evidence that total brokerage commissions and brokerage commissions per trade are higher than they are in non-financial centers. These test results are also available on request.

6. Conclusion

There has been a recent surge in the behavioral finance literature. Some studies have documented the link between location, asymmetric information, and investor performance; others have observed the relation between investor performance and overconfidence. Yet, at the empirical level, a little however is known about the interrelation between private information and overconfidence. We approach this problem by identifying locations where these effects can potentially be more profoundly represented and thus detected easier. In this paper we document that location in or outside of a financial center has an important impact on mutual fund behavior and that it can have both positive and negative effects on fund performance. The positive effect is related to the potential existence of private information in financial centers, the negative – to overconfidence that arises due to the feeling of being in an area that produces financial information.

Our paper makes several important contributions to the literature. First, our findings are consistent with the argument of Daniel, Hirshleifer and Subramanyam (1998, 2001) on the importance of private rather than public information in forming investor overconfidence, funds in financial centers, especially newer ones, trade more often and hold more concentrated portfolios than other funds. Since financial centers generate information, these

results imply a higher level of overconfidence among professional money managers living in those places.

We further show that the impact of overconfidence on mutual fund performance is different across funds with different objectives. It shows itself most profoundly in the performance of international funds, for which we believe the informational advantage of a fund's location in a financial center is minimal. For domestic funds, such as growth and growth & income, for which the information asymmetry can certainly be substantial, we observe that funds located in financial centers outperform those located in other places and the performance differential increases over time partially. Moreover, the returns and stock selection ability of these funds located in financial centers is positively related to their frequency of trading implying that at least a portion of their turnover is based on private information.

Second, we confirm in the data the theoretical predictions of the model of investor overconfidence studied in Gervais and Odean (2001). We observe that the turnover of funds in financial centers is negatively related to their age. We also find, conditional on a fund's past performance, that the relation between turnover and age is significantly more negative for high-performing funds in financial centers.

Finally, we provide the first empirical support, albeit indirect, for the theoretical models of herding or informational cascades, such as those of Banerjee (1992) or Welch (1992). These models argue in favor if locational contagion in behavior. Our main conclusion is that since managers of different fund categories are different, superior informational advantage and performance of *some* fund managers who reside in particular locations can induce not only their own overconfidence but also that of *other* fund managers working in the same places, thus resulting in a similar behavior among both more and less successful managers.

Our results also have practical implications on individual investors and mutual fund industry. The implicit advice that we can make based on our findings is that individual investors should always look for more established funds. In particular, if they consider investing in domestic firms, *ceteris paribus*, they should probably put their money into recognized funds located in prominent financial cities. However, if investors desire to hold an international portfolio of securities, they should be indifferent to fund location.

Investigation of all the aforementioned issues can be taken further. For example, it is interesting to examine performance differentials between mutual funds located in and outside of financial centers using conditional approach. This will allow us to more explicitly disentangle the effects of private information from public. Another fruitful avenue for research is to identify those fund managers who have changed their place of residence from smaller cities to large financial centers and analyze their pre- and post-move performance.

References:

Banerjee, A.V., 1992, A simple model of herd behavior, *Quarterly Journal of Economics* 107, 797-818.

Barber, B. and T. Odean, 2000, Trading is hazardous to your wealth: The common stock investment performance of individual investors, *Journal of Finance* 55, 773-806.

Barber, B. and T. Odean, 2001, Boys will be boys: gender, overconfidence, and common stock investment, *Quarterly Journal of Economics* 116, 261-292.

Bikhchandani, S., D. Hirshleifer, and I. Welch, 1992, A theory of fads, fashion, custom, and cultural change as informational cascades, *Journal of Political Economy* 100, 992-1026.

Blume, M. E., 1993, Soft dollars and the brokerage industry, *Financial Analysts Journal* 49, 36-44.

Brown, S.J, W.N. Goetzmann, R.G. Ibbotson, and S.A. Ross, 1992, Survivorship bias in performance studies, *Review of Financial Studies* 5, 553-580.

Carhart, M.M., 1997, On persistence in mutual fund performance, *Journal of Finance* 52, 57-82.

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

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

Chevalier, J. and G. Ellison, 1999a, Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance, *Journal of Finance* 54, 875-899.

Chevalier, J. and G. Ellison, 1999b, Career concerns of mutual fund managers, *Quarterly Journal of Economics* 114, 389-432.

Chrisopherson, J.A., Ferson W., and D. Glassman, Conditioning manager alphas on economic information: Another look at the persistence of performance, *Review of Financial Studies* 11, 111-142.

Dow, J. and G. Gorton, 1997, Noise trading, delegated portfolio management, and economic welfare, *Journal of Political Economy* 105, 1024-1050.

Fama, E. and K. French, 1993, Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33, 3-56.

Ferson, W. and K. Khang, 2002, Conditional performance measurement using portfolio weights: Evidence for pension funds, forthcoming in *Journal of Financial Economics*.

Daniel, K., D. Hirshleifer, and A. Subramanyam, 1998, Investor psychology and security market under- and overreactions, *Journal of Finance* 53, 1839-1885.

Daniel, K., D. Hirshleifer, and A. Subramanyam, 2001, Overconfidence, arbitrage, and equilibrium asset pricing, *Journal of Finance* 56, 921-965.

Gehrig, T., 1998, Cities and the geography of financial centers, CERP DP 1894.

Gervais S. and T. Odean, 2001, Learning to be overconfident, *Review of Financial Studies* 14, 1-27.

Goetzmann, W.N. and R.G. Ibbotson, 1994, Do winners repeat? Patterns in mutual fund performance, *Journal of Portfolio Management* 20, 9-18.

Grinblatt, M. and M. 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, M. and S. Titman, 1992, The persistence of mutual fund performance, *Journal of Finance* 47, 1977-1984.

Grinblatt, M. and S. Titman, 1994, A study of monthly mutual fund returns and performance evaluation techniques, *Journal of Financial and Quantitative Analysis* 29, 419-444.

Grinblatt, M., S. Titman, and R. Wermers, 1995, Momentum investment strategies, portfolio performance, and herding: A study of mutual fund behavior, *American Economic Review* 85, 1088-1105.

Hau, H., 2001, Location matters: An examination of trading profits, forthcoming *Journal of Finance*.

Henrikson, R. and R. Merton, 1981, On market timing and investment performance II: Statistical procedures for evaluating forecasting skills, *Journal of Business* 54, 513-534.

Hirshleifer, D., 2001, Investor psychology and asset pricing, *Journal of Finance* 56, 1553-1597.

Hirshleifer D. and L. G. Ying, 2001, On the survival of overconfident traders in a competitive securities market, *Journal of Financial Markets* 4, 73-84.

Hong H., J.D. Kubik, and J. Stein, 2001, Social interaction and stock-market participation, Working paper, Harvard University.

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

Kindleberger, C.P., 1994, *The formation of financial centers: A study of comparative history*, Princeton University Press.

Kyle, A. and F.A. Wang, 1997, Speculation duopoly with agreement to disagree: Can overconfidence survive the market test?, *Journal of Finance* 52, 2073-2090.

Odean, T. 1998, Volume, volatility, price, and profit when all traders are above average, *Journal of Finance* 53, 1887-1934.

Odean, T., 1999, Do investors trade too much?, *American Economic Review* 89, 1279-1298.

Scott, C.A, 1905, *The book of the revelation*, Hodder and Stoughton, London.

Treynor, J. and K. Mazuy, 1966, Can mutual funds outguess the market? *Harvard Business Review* 44, 131-136.

Welch, I., 1992, Sequential sales, learning, and cascades, *Journal of Finance* 47, 695-732.

Table 1
Summary statistics

The table shows the summary statistics for the gross mean monthly returns (in percent) of mutual funds with their headquarters location in (F) and outside (O) financial centers. The whole sample period is 1988-1996 or 108 months. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. The mutual funds categories: DOM – domestic (growth and growth & income), and INT – international. The table also gives the number of observations (Obs) for each case, the difference between the average mean monthly returns for mutual funds in financial centers and other places (F–O) with the t-statistic in parentheses as well as the mean total net assets (TNA) in the millions of U.S. dollars. The values significant at the 5% level are shown in bold.

Fund	Place	Obs	TNA($M)	Mean	Median	St.D.	F–O
DOM	F	560	725	1.526	1.410	0.428	**0.054**
	O	601	350	1.472	1.386	0.372	(2.29)
INT	F	173	402	0.891	0.892	0.334	**-0.080**
	O	151	210	0.971	0.972	0.381	(-2.00)

Table 2
Portfolio holdings concentration differentials between funds located in and outside of financial centers

The table shows the average concentration (in percent) of top five portfolio holdings (segments) for all funds located in and outside of financial centers, (F) and (O) respectively, the difference between them (F–O) with the corresponding t-statistics. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. The data are the quarterly portfolio holdings as of September 1996. There are 498 funds in financial centers and 631 outside. For domestic (growth and growth & income) funds the segments are industries, for international – countries.

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5
F	20.55	13.33	10.39	8.37	7.05
O	18.31	12.26	9.38	7.75	6.58
F–O	2.25	1.07	1.01	0.62	0.47
t-stat	3.70	3.67	4.77	3.90	3.64

Table 3
Performance differentials in gross returns between funds located in and outside of financial centers

The table shows the differences (F–O) in the gross mean monthly returns (in percent) for mutual funds located in and outside of financial centers. The whole sample period is 1988-1996 or 108 months. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. These differences and corresponding t-statistics are shown for four time periods: the last year of the sample, last three years, last five years, and over the entire sample. The mutual funds categories: DOM – domestic (growth and growth & income), and INT – international. Panel A presents these results based on comparing the performance of funds in all financial centers with those outside. In Panel B, the performance of funds in a particular financial center is compared with those located outside of financial centers. The cities of Chicago and Philadelphia (ChPh) are combined into one group, and Los Angeles and San Francisco into another (LASF). The values significant at the 5% or 10% levels are shown in bold.

		DOM		INT	
Horizon	Location	F–O	t-stat	F–O	t-stat
		Panel A: Aggregate statistics			
1 Year		0.000	-0.01	**-0.135**	-2.62
3 Year		0.020	0.98	**-0.140**	-3.07
5 Year		**0.048**	2.03	-0.067	-1.46
All Year		**0.047**	1.96	-0.042	-0.70
		Panel B: City breakout			
1 Year	Boston	0.001	0.03	**-0.238**	-3.25
	ChPh	0.029	0.64	-0.017	-0.20
	NY	-0.036	-1.13	**-0.122**	-1.82
	LASF	0.053	1.21	-0.140	-1.53
3 Year	Boston	**0.077**	2.51	**-0.107**	-1.75
	ChPh	-0.012	-0.30	0.030	0.43
	NY	-0.029	-1.09	-0.053	-1.08
	LASF	**0.071**	1.90	-0.065	-0.97
5 Year	Boston	**0.102**	3.01	-0.075	-0.93
	ChPh	-0.052	-1.10	-0.078	-0.91
	NY	0.045	1.47	-0.071	-1.10
	LASF	0.042	0.97	**-0.148**	-1.99
All Years	Boston	**0.102**	2.84	-0.128	-0.74
	ChPh	-0.049	-1.01	-0.047	-0.20
	NY	0.032	1.04	-0.054	-0.49
	LASF	0.064	1.36	-0.055	-0.47

Table 4
Performance differentials in risk-adjusted returns between funds located in and outside of financial centers

The table shows the differences (F–O) in the alphas (Alpha) and betas (Beta) for mutual funds located in and outside of financial centers. The whole sample period is 1988-1996 or 108 months. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. These differences and corresponding t-statistics are shown for four time periods: the last year of the sample, last three years, last five years, and over the entire sample. The mutual funds categories: DOM – domestic (growth and growth & income), and INT – international. The alphas and betas for each fund are computed using the market portfolio return as a benchmark, namely:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + e_{i,t},$$

where $r_{i,t}$ and $r_{m,t}$ are the excess returns (in percent) on fund i and market portfolio, respectively. The market portfolio for domestic funds is the monthly return on the S&P 500 index measured in excess of the one-month T-bill return from Ibbotson Associates. The market portfolio for international funds is the return on the MSCI world market index again in excess of the one-month T-bill return. The values significant at the 5% or 10% levels are shown in bold.

		DOM		INT	
Horizon		F–O	t-stat	F–O	t-stat
1 Year	Alpha	-0.030	-1.05	**-0.139**	-2.60
	Beta	**0.022**	1.81	0.015	1.04
3 Year	Alpha	0.000	-0.01	-0.060	-1.43
	Beta	0.017	1.49	0.022	1.19
5 Year	Alpha	0.025	0.94	**-0.100**	-1.93
	Beta	**0.026**	1.73	0.028	1.18
All Years	Alpha	0.034	1.47	-0.057	-0.67
	Beta	0.015	0.74	**-0.047**	-1.76

Table 5
Performance differentials in risk-adjusted returns and market timing between funds located in and outside of financial centers

The table shows the differences (F–O) in the estimated alphas (Alpha), betas (Beta), and the market timing measures (Gamma) for mutual funds located in and outside of financial centers. The whole sample period is 1988-1996 or 108 months. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. These differences and corresponding t-statistics are shown for four time periods: the last year of the sample, last three years, last five years, and over the entire sample. The mutual funds categories: DOM – domestic (growth and growth & income), and INT – international. The market timing measure for each fund is estimated using the Treynor and Mazuy (1966) model, namely:

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \gamma_i r_{m,t}^2 + e_{i,t} ,$$

where $r_{i,t}$ and $r_{m,t}$ are the excess returns (in percent) on fund i and market portfolio, respectively. The market portfolio for domestic funds is the monthly return on the S&P 500 index measured in excess of the one-month T-bill return from Ibbotson Associates. The market portfolio for international funds is the return on the MSCI world market index again in excess of the one-month T-bill return. The values significant at the 5% or 10% levels are shown in bold.

		DOM		INT	
Horizon		F–O	t-stat	F–O	t-stat
1 Year	Alpha	0.024	0.74	**-0.163**	-2.44
	Beta	**0.038**	2.59	0.011	0.73
	Gamma	**-0.007**	-2.39	0.392	0.94
3 Year	Alpha	0.043	1.59	**-0.126**	-2.25
	Beta	**0.022**	1.85	0.019	1.01
	Gamma	**-0.006**	-2.28	0.930	1.58
5 Year	Alpha	0.030	0.92	**-0.146**	-2.27
	Beta	**0.026**	1.71	0.029	1.22
	Gamma	-0.001	-0.26	0.662	1.23
All Years	Alpha	0.031	1.06	-0.066	-0.71
	Beta	0.014	0.72	**-0.046**	-1.72
	Gamma	0.000	0.23	0.084	0.38

Table 6
Relation between returns and portfolio turnover

The table shows the estimated slope coefficients and their corresponding t-statistics from the contemporaneous regression of fund returns on portfolio turnovers for all years together and separately for each year in the sample. The returns are annualized. The funds are grouped into those in financial centers and other places. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. The mutual funds categories: DOM – domestic (growth and growth & income), and INT – international. The corresponding numbers for the entire sample are obtained by running a pooled cross-sectional time-series regression of compounded annual returns (in percent) on turnover (in percent) and year dummies. The values significant at the 5% level are shown in bold.

		DOM		INT	
	Year	Slope	t-stat	Slope	t-stat
Financial centers	1989	**0.019**	2.17	-0.068	-1.36
	1990	**0.025**	3.46	-0.033	-0.95
	1991	**0.071**	5.00	0.001	0.08
	1992	**0.017**	2.31	-0.007	-0.44
	1993	**0.028**	3.85	0.002	0.07
	1994	**-0.008**	-2.15	-0.020	-1.56
	1995	0.000	0.16	**-0.023**	-2.77
	1989-95	**0.007**	**3.85**	**-0.016**	**-2.65**
Other places	1989	0.006	0.42	-0.065	-1.39
	1990	0.009	1.44	-0.003	-0.12
	1991	**0.014**	2.85	-0.020	-0.66
	1992	-0.005	-0.69	0.016	0.70
	1993	0.014	1.69	0.046	1.59
	1994	**-0.008**	-2.78	-0.008	-0.56
	1995	**-0.016**	-3.51	-0.016	-1.92
	1989-95	0.003	1.61	-0.002	-0.32

Table 7
Relation between risk-adjusted returns and turnover for domestic funds

The table shows the estimated slope coefficients and their t-statistics from the regression of the alphas for domestic (growth and growth & income) funds on the portfolio turnover (Turn) and interaction terms composed of the portfolio turnover and a dummy for financial center (F). The funds are grouped into those in financial centers and those in other places. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. The cities of Chicago and Philadelphia (ChPh) are combined into one group, and Los Angeles and San Francisco into another (LASF). The regression models are:

$$\hat{\alpha}_i = c + c_1 Turn_i + c_2 F * Turn_i + e_i ,$$

$$\hat{\alpha}_i = c + c_1 Turn_i + c_2 Boston * Turn_i + c_3 ChPh * Turn_i + c_4 NY * Turn_i + c_5 LASF * Turn_i + e_i ,$$

where $\hat{\alpha}_i$ is the annualized estimate (in percent) of the fund i's alpha, obtained by regressing fund's gross returns on the market portfolio and the square of the market portfolio over the 36-month period ending in December of the given year. The market portfolio is the monthly return on the S&P 500 index measured in excess of the one-month T-bill return from Ibbotson Associates. The values (except for the intercept) significant at the 5% or 10% levels are shown in bold.

Panel A: Aggregate statistics

	1990-95	1995	1994	1993	1992	1991	1990
Obs	2260	518	424	374	333	318	293
Const	1.636	0.878	2.341	3.287	1.850	0.739	0.038
	(10.32)	(2.74)	(6.34)	(7.55)	(5.18)	(1.77)	(0.11)
Turn	-0.001	**-0.011**	-0.003	0.004	**0.012**	**0.011**	0.001
	(-0.33)	(-3.00)	(-0.72)	(0.67)	(2.54)	(2.13)	(0.13)
F*Turn	**0.010**	**0.008**	0.003	**0.013**	**0.012**	**0.011**	**0.009**
	(4.64)	(1.90)	(0.68)	(2.16)	(2.33)	(1.85)	(1.94)

Panel B: City breakout

Const	1.683	0.864	2.449	3.427	1.783	0.699	-0.036
	(10.60)	(2.71)	(6.60)	(7.88)	(4.90)	(1.66)	(-0.10)
Turn	-0.001	**-0.011**	-0.003	0.003	**0.012**	**0.012**	0.001
	(-0.51)	(-2.99)	(-0.87)	(0.47)	(2.63)	(2.19)	(0.27)
Boston*Turn	**0.019**	**0.020**	**0.016**	**0.019**	**0.014**	**0.017**	**0.013**
	(6.23)	(3.16)	(2.02)	(2.31)	(2.12)	(2.28)	(2.10)
ChPh*Turn	-0.002	-0.004	-0.016	-0.018	0.005	**0.021**	0.010
	(-0.34)	(-0.43)	(-1.38)	(-1.42)	(0.47)	(1.71)	(1.08)
NY*Turn	**0.008**	0.005	0.004	**0.020**	0.009	0.000	0.002
	(2.84)	(0.94)	(0.60)	(2.72)	(1.47)	(-0.03)	(0.41)
LASF*Turn	0.000	0.003	-0.025	-0.011	**0.045**	**0.040**	**0.050**
	(-0.03)	(0.30)	(-1.55)	(-0.62)	(1.87)	(1.72)	(2.63)

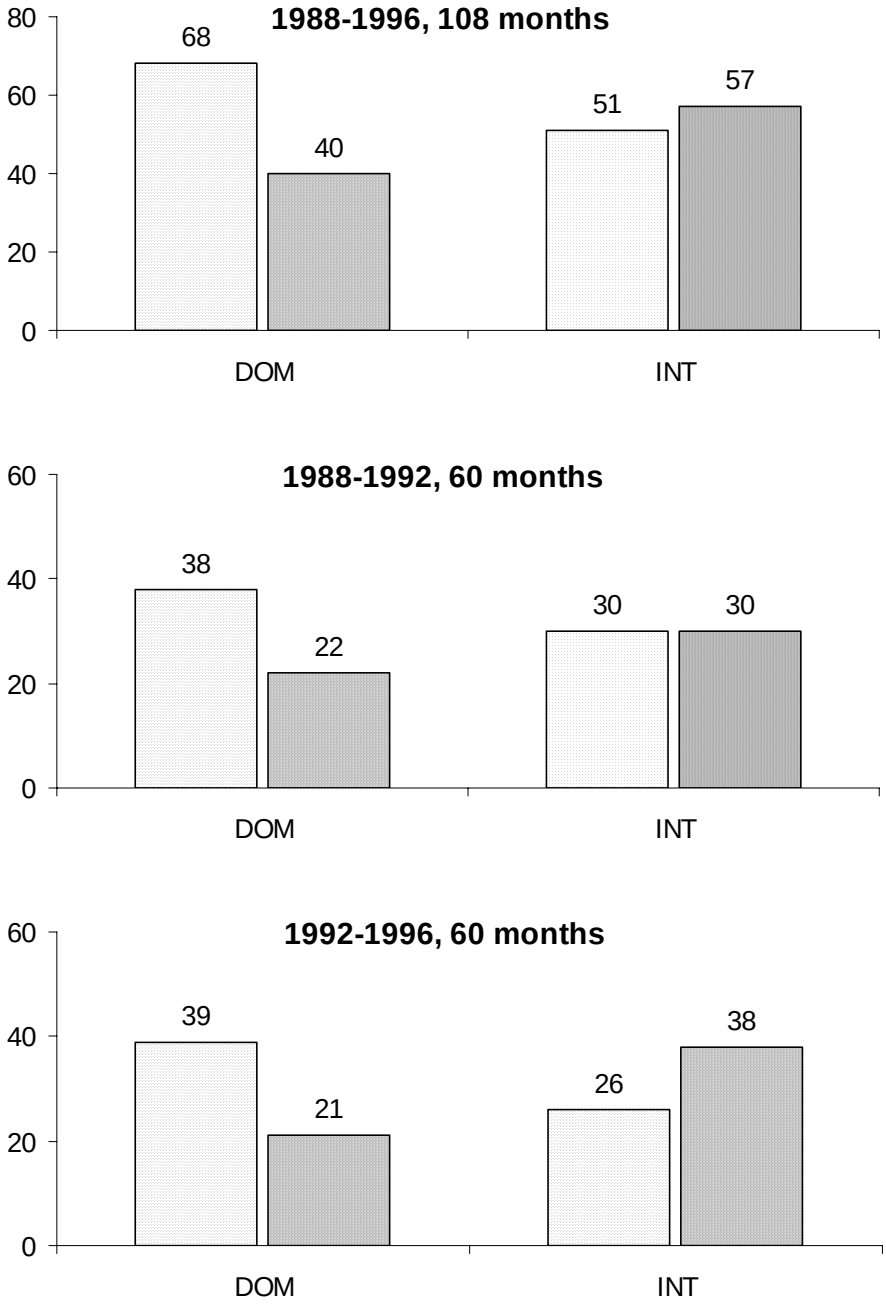


Figure 1. Relative performace of mutual funds by type and location. The pictures show the number of months when the difference in average monthly returns across mutual funds located in financial centers and those outside is positive (light texture) or negative (heavy texture). The mutual fund types are: DOM – domestic (growth and growth & income), INT – international. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco.

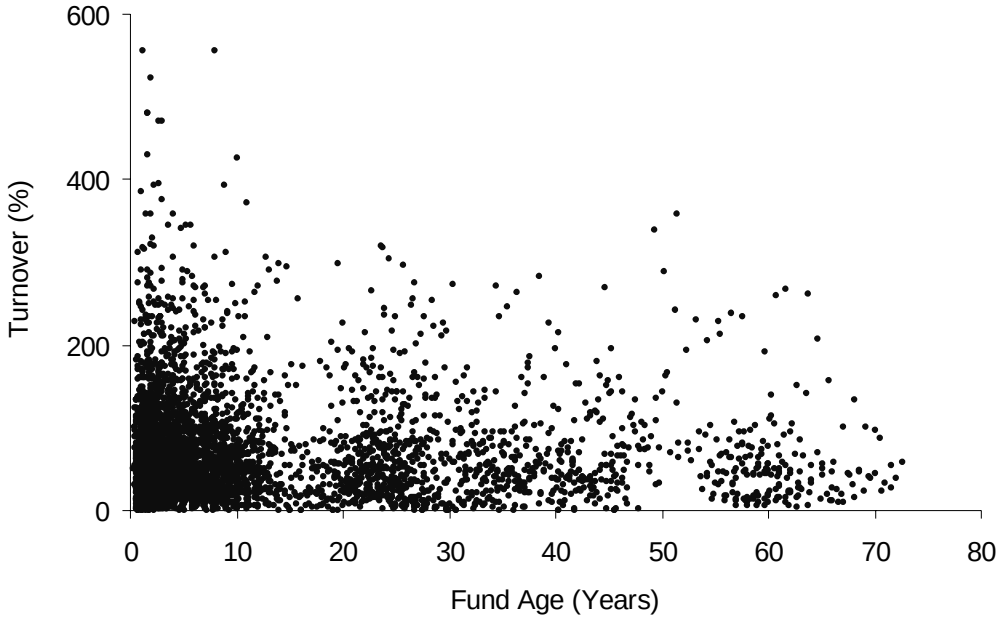


Figure 2. Relation between portfolio turnover and fund's age. The scatterplot shows the relation between the portfolio turnover and the actual age of a fund. The fund's age is measured as the difference in between the last day of the year (between 1989 and 1995) and the IPO date for that find.

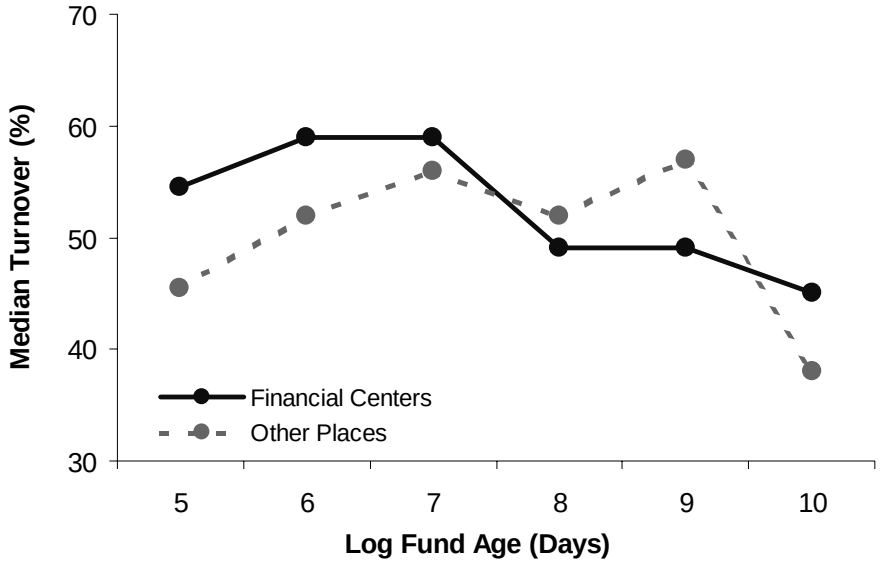


Figure 3. Relation between portfolio turnover and fund's age and location. The picture shows the relation between the median portfolio turnover and the actual age of a fund (in log scale) for funds located in financial centers and outside. The fund's age is measured as the difference in days between the last day of the year (between 1989 and 1995) and the IPO date for that find. The figure also depicts the regression results where the independent variable is the fund's logged age and the dependent variable is the fund's turnover rate in percent.

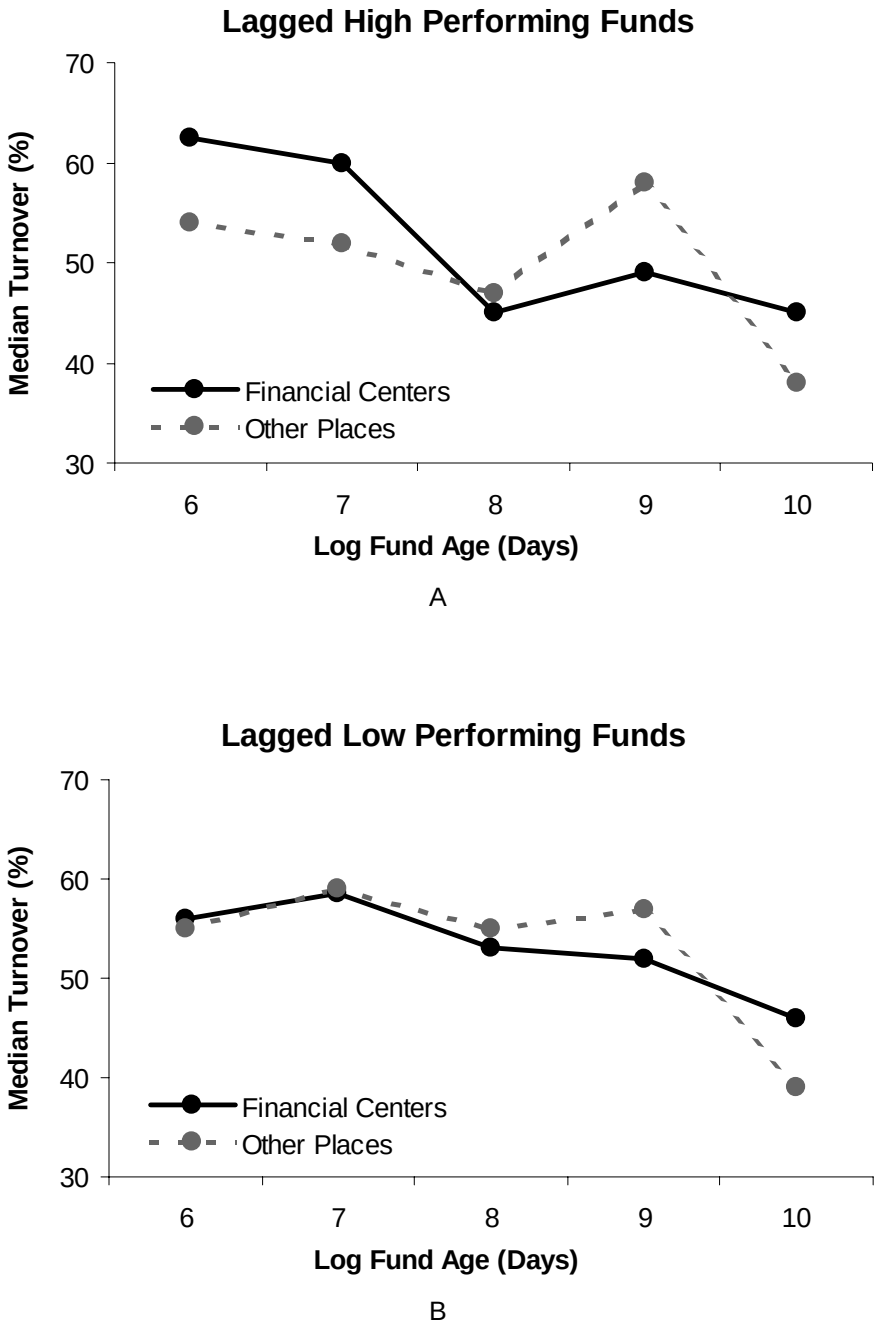


Figure 4. Median turnover by log of fund age for high and low performing funds. The picture shows the relation between the median portfolio turnover and the log of fund age (days) located in and outside of financial centers for high performing funds (plot A) and for low performing funds (plot B). The fund's age is measured as the difference in days between the last day of the year (between 1989 and 1995) and the IPO date for that fund. The high (low) performance funds are those whose past one year performance is above (below) the median for their specific objective category.

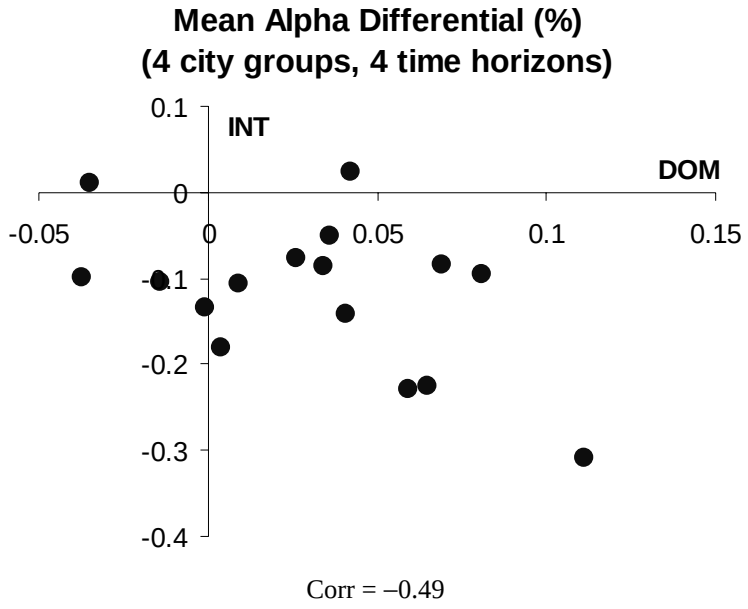
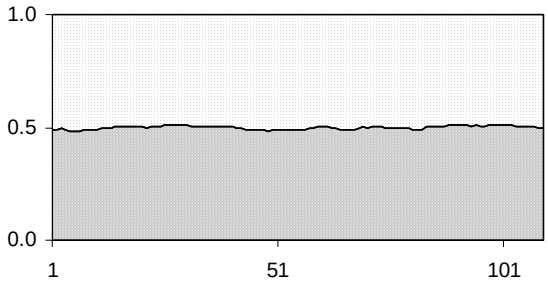
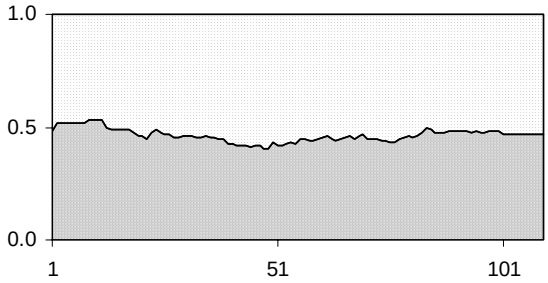


Figure 5. Relation between the selection ability of domestic and international funds across cities and time horizons. The scatterplot depicts the relation between the estimated differentials in the mean alphas across mutual funds located in and outside of financial centers. The financial centers are the cities of Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. The cities of Chicago and Philadelphia are combined into one group while Los Angeles and San Francisco into another. Domestic funds are composed of growth and growth & income funds.



Domestic funds



International funds

Figure 6. Proportion of funds in and outside of financial centers. The plots show the proportion of funds in (light texture) and outside (heavy texture) financial centers over the period 1988-1996 or 108 months in two categories: domestic (growth and growth & income) and international.