Geography and Local (Dis)advantage: Evidence from Muni Bond Funds

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(Abstract)

We use the geographically-constrained holdings of single-state municipal-bond mutual funds in order to compare the performance of local and non-local mutual fund managers. In general, we find that local managers display worse performance and significantly different risk profiles than non-local fund managers. Despite their lower returns overall, locally-managed muni bond funds display a relative advantage in markets that are financially illiquid, spatially compact, and with more population. Overall, locally-managed muni bond funds may survive in a competitive market for investment management because they provide a product that is relatively low-cost, more financially stable, and with distinct benefits in certain regional markets.

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Existing studies that relate economic geography[1] to investment performance typically consider "location" and financial performance in three different contexts. First, there are studies that examine the location of the underlying retail investor and how this is related to investment allocation or performance (Seasholes and Zhu, 2010; Massa and Simonov, 2006; Ivkovic and Weisbenner, 2005; Hau, 2001). A second approach is to consider the location of the fund manager (or other intermediary, such as an underwriter, broker, or financial analyst) and how this is associated with financial performance (Coval and Moskowitz, 1999 and 2001; Teo, 2009; Christoffersen and Sarkissian 2009; Butler, 2008; Dvořák, 2005; Malloy, 2005).[2] Third, one could examine the location of the underlying investment (such as stock) and how this relates to investment performance (Hong, Kubik, and Stein, 2008).

A popular extension to the analysis of economic geography is to consider the effect of synchronization between the locations of any two of the entities involved in financial management. For example, one could consider the impact of when both the underlying firm's operations and the investors are in the same location. When any of these entities inhabit the same geographic location, it is common to refer to them as being "local" relative to one another. Coval and Moskowitz (1999 and 2001), Teo (2009), Ivkovic and Weisbenner (2005), Dvořák (2005), Hau (2001), Malloy (2005), Massa and Simonov (2006), and Cashman and Deli (2009) all find evidence suggesting that investors or fund managers perform better when they are closer to the location of the underlying equity securities in which they invest. Grinblatt and Keloharju

[1] A wide range of studies examine the more complex relationship between international geographic characteristics and investment performance. In an attempt to hold constant the overall macroeconomic, cultural, currency, and legal structure across locations, we focus only on within-country geographic variation for US-based open-end mutual funds.

[2] There are also studies examining firm location and corporate policy, such as dividend payout policy (John, Knyazeva, and Knyazeva, 2011), stock option plans (Kedia, and Rajgopal, 2009), dividend clienteles (Becker, Ivkovic, and Weisbenner, 2011), equity issuance (Loughran, 2008), and acquisitions (Almazan, Motta, Titman, and Uysal, 2010).

(2001) and Seasholes and Zhu (2010), among others, document a related condition dubbed "local bias", where investors have an asset allocation preference for local investments, even though they do not necessarily perform better.

In this study, we employ municipal bond mutual funds as a unique laboratory to examine the relationship between the geographic location of mutual fund managers and fund performance. US tax laws have led to a large industry of state-focused municipal bond funds that invest only in a strictly defined geographic area (a single US state). We can therefore clearly observe the geographic investment range of each fund manager and classify managers as local or non-local based on whether or not they are located in the same geographic area in which they invest. Pirinsky and Wang (2011) study this bond-market segmentation between US states and show how this influences muni bond yields. We focus our analysis on whether local muni-bond fund managers have different investment performance compared to their non-local counterparts.

According to the SEC, as of December 31, 2011, there were over one million different municipal bonds outstanding, with an aggregate principal amount of more than $3.7 trillion.[3] Despite the large number and volume of municipal bonds, muni bond mutual funds have been scarcely studied. The vast majority of studies of mutual fund performance focus on equity funds, and the few that include fixed-income funds often exclude muni-bond funds (e.g., Comer, Larrymore, and Rodriguez, 2009; Ferson, Henry, and Kisgen, 2009). Muni bond funds provide us with several advantages in designing a study of whether the location of muni-bond fund managers matters for fund performance. First, a muni bond issuer has a well-defined location, while a corporate bond or stock issuer might have numerous and geographically disperse operations which poses a challenge for studies that use the headquarter location of the firm as the firm location. Second, we know accurately the location of the funds' underlying investments,

[3] U.S. Securities and Exchange Commission. Report on the Municipal Securities Market. July 31, 2012.

which makes it possible for us to test very cleanly how the location characteristics of the securities held by the fund are related to the fund performance.

Our empirical results indicate that, in the case of municipal-bond mutual funds, local (i.e., in-state) fund managers have lower raw returns and risk-adjusted returns relative to their out-of-state competitors. Local managers also are less risky in their investments, with more assets-under-management and lower expense ratios. Local fund managers also display a relative advantage in states with smaller muni bond markets, more population, and less geographic area. Local managers' performance is unrelated to our measures of the local investment climate in a state (i.e. corruption and tax burden). Overall, these results suggest that local fund managers are positioned as a low-cost, low-risk, low-performance, and large-scale choice for investors. In the market for portfolio management, local fund managers appear to offer stability to investors, while out-of-state fund managers specialize in practices and strategies that involve more variability and factor exposure.

The local underperformance in risk-adjusted performance we document is in sharp contrast to the existing literature regarding the outperformance of both local equity fund managers and individual investors (Coval and Moskowitz, 1999 and 2001; Teo, 2009; and Ivkovic and Weisbenner, 2005; Massa and Simonov, 2006). One plausible explanation is that stock (excess) returns depend largely on firm-specific factors, such as operations and cash flow, which a fund manager legitimately could gain valuable insights about if they are geographically proximate to the firm and thus have superior access to information and a monitoring advantage. However, bond returns may depend more on macro-economic factors such as interest rates, risk premiums, and inflation expectations (especially over our sample period when there are

relatively few firm-specific defaults). Therefore, any geographic advantage previously documented for equity management may not apply to fixed-income investments.

This paper proceeds as follows: Section 1 explains the methodology and sample construction. Section 2 presents the empirical results from our analysis of local status and fund performance. Section 3 considers geographic factors related to fund managers' performance. Section 4 examines the robustness of our findings and section 5 concludes.

1. Sample and Methodology

Our basic methodology is straightforward. We collect data on funds' performance, fund managers' location, and other fund characteristics from the CRSP mutual fund database. We use fund names and investment objectives to identify single-state muni bond funds, as well as the state in which they invest. Performance and risk measures are then regressed on fund characteristics, including a *Local* indicator variable which captures whether or not the fund manager is located in the same state in which the fund invests. We then perform a variety of extensions to our analysis in order to identify the sources of variation in fund performance that are related to location.

1.1 Sample construction

We collect data on single-state municipal bond funds primarily from the Center for Research in Security Prices (CRSP) mutual fund database. From CRSP we obtain data on each fund manager's name and address, as well as each fund's investment objective, fees, turnover, and size from January 2000 to year-end 2012. Monthly return data is then collected from January 1997 to year-end 2012. We use the CRSP style variables to identify single-state municipal bond funds. Because the style codes change over time, we use multiple variables to

confirm our classification, encompassing all of the investment style codes given in the CRSP "Fund Style" file, with additional checks from Morningstar's Principia Pro used to confirm our classifications. For each fund, we use the investment style, as well as the fund name, to identify the state in which the fund invests. If these variables do not make clear the location of investment then we consult the fund prospectus online.

We aggregate share classes of the same fund, with all appropriate characteristics (returns, turnover, fees, etc.) weighted by the total assets of each share class. Once we have generated our sample of single-state muni bond funds, we use CRSP to identify the city, state, and zip code of the fund manager. For each fund we then check with the SEC's N-SAR filings to see if portfolio management is contracted out to a 3rd party advisor or sub-advisor in a different state (please see Cashman and Deli (2009) for details on the importance of advisor locations). We discard any funds (less than 2% of the sample) where we find that portfolio management is delegated to an advisor or sub-advisor in a different state. Including these funds makes little difference to our results, but would raise questions about the accuracy of our location variable.

Since the proceeds from municipal bonds are often invested throughout the state, there is not a precise "headquarters" location for the underlying security, as there is a distinct headquarters location for a corporation that issues stock (as in the equity-focused analyses of Coval and Moskowitz, 2001; Malloy, 2005; Gao, Ng, and Wang, 2011; and Ivkovic and Weisbenner, 2005). In addition, muni bonds are not issued by just the state government, but more often by county and city governments. This prevents us from using the state capital as a precise location for single-state bond funds. Following Butler (2008)[4], we therefore define a *Local* indicator, which equals 1 if a fund manager is located in the same state in which the fund

[4] Butler (2008) defines *Local* as a dummy variable that takes the unit value if the lead bookrunner for a municipal bond underwriting has an office in the state.

invests, and zero otherwise. Relative to studies of stock location centered on a corporate headquarters, our measure of location sacrifices precision in return for much greater accuracy.

Using data from CRSP, we construct non-overlapping, rolling, 3-year periods of monthly fund returns to compute several measures of fund performance. Our basic measure is the total return earned by the fund over the 3-year period (*Return*). We then develop a 4-factor model of risk-adjusted performance that is appropriate for muni bond funds. For this model we take the monthly change in muni bond yields, along with the three fixed-income factors suggested by Fama and French (1993). The change in muni bond yields is taken from the Federal Reserve's monthly municipal bond aggregate yield index[5]. The three fixed-income factors are the yield on Treasury Bills (*TBill Yield*), a term structure factor (*Term Spread*), computed as the yield on 10-year T-Bonds minus the yield on 3-month T-Bills, and a default risk factor (*Default Spread*), computed as the yield on 10-year AAA corporate bonds minus the yield on 10-year US T-Bonds. The factor inputs are downloaded from the Federal Reserve Bank of St. Louis's FRED database. The first stage regression model for each fund *i* is:

$$Return_{i,t} = \alpha + \beta_1 (\Delta MuniYields_t) + \beta_2 (TBill\ Yield_t) + \beta_3 (Term\ Spread_t) + \beta_4 (Default\ Spread_t) + e_{i,t,} \quad (1)$$

where *t* indicates monthly observations over a 3-year period. Fund-specific performance is measured each period by the intercept (α) from this model.

We report results for two specifications of this model: the intercept for the full 4-factor model (*4-factor* α), and a 3-factor model (*3-factor* α) with only the fixed-income factors of Fama and French (1993). To measure risk, we use the standard deviation of monthly returns (*SD Return*), as well as the coefficient estimates (β's) from our 4-factor model (*ΔMuniYield* β, *TBill* β, *Term* β, and *Default* β).

[5] Series ID MSLB20 from the St. Louis Fed's FRED database.

Performance is computed for each non-overlapping, 3-year period for each fund, yielding a panel of 3-year performance-measurement periods (the use of overlapping periods yield similar results but with predictably inflated significance levels). We require at least 30 valid monthly return observations for a fund to be included in a 3-year performance observation. Fund performance is computed first for the later years of our sample, with individual funds reappearing in the sample if they have sufficient data from earlier three-year periods.

Our procedure yields a sample of 1,884 portfolio-period observations, drawn from 747 unique funds. This represents about 145 fund observations, on average, for each period. As described in Table 1, there are 153 unique locally-managed funds and the remaining 594 are non-locally managed funds. A total of 43 states represented, either as states in which funds invest, or where fund managers are located. California is the largest market for muni bond funds in our sample (112 funds invest there) although there are relatively few fund managers located in-state (only 68 fund managers). In contrast, New York has the largest concentration of fund managers (185 managers), closely followed by Massachusetts with 171 managers. Wisconsin is the only state where all funds are locally managed, while 8 states have no local managers of their state's funds. Six states have resident muni bond fund managers, but no state-focused funds in our sample. Fifteen states have neither resident fund managers, nor funds which invest there. Although Puerto Rico and Washington, DC, have both resident fund managers and "state" focused funds, they are dropped from our sample due to missing data for several variables in our later analysis.

*****Table 1. Geographic distribution of funds and fund managers *****

1.2 Model specification

The following model is employed to explore the factors that are associated with location, fund performance and risk:

$$Performance_{i,t} \text{ or } Risk_{i,t} = \beta_0 + \beta_1 (Local_{i,t}) + \beta_2 (Size_{i,t}) + \beta_3 (Expenses_{i,t}) + \beta_4 (Turnover_{i,t}) + \sum_{k=5}^{16} \beta_k \, Year\ Dummies + e_{i,t} \quad (2)$$

where *t* indicates non-overlapping, three-year periods. The dependent variables include the three measures of fund performance: *Return*, *4-factor α,* and *3-factor α*. In addition, we also examine five measures of fund risk as dependent variables: the standard deviation of monthly returns (*SD Returns*) and the coefficient estimates for our 4-factor model: Muni bond yield (*⊿Muni Yield β)*, *TBill β*, *Term β*, and *Default β*. With the exception of our *Return* and *SD Return* models, we therefore have a two-stage regression procedure, with the first stage using monthly returns to estimate the factor model of performance, and the second stage relating these performance and risk measures to our *Local Indicator* and control variables during each 3-year period.

The primary independent variable of interest is the *Local* indicator, which equals to 1 if a fund manager is located in the same state in which the fund invests, and zero otherwise. In addition to the *Local* indicator as an independent variable, we also include a set of fund-specific control variables: *Size*, the *Turnover* ratio, the *Expense* ratio, and a set of year-dummies for 2001-2012 (2000 is the base year), to control for time fixed-effects. *Size* is entered as the log of total portfolio assets across all share classes; *Turnover* is the fund turnover ratio as reported by CRSP; and *Expenses* is the share-class-weighted expense ratio.

2. Analysis of local status and the performance of muni bond funds

2.1 Descriptive statistics

Table 2 presents the sample descriptive statistics. Average (median) annualized total returns are approximately 4.06% (3.84%) for locals and 4.35% (4.11%) for non-locals with the differences being statistically significant. The risk-adjusted returns are also lower for local than for non-local managers with the difference are being significant for our 3-factor model. Locals also manage funds that are significantly larger, with lower expenses and higher turnover. Overall, the descriptive statistics suggests that there are systematic differences between locally and non-locally managed funds, and that local fund managers exhibit worse performance than non-local fund managers.

*****Table 2. Sample descriptive statistics*****

Local fund managers appear to take on less risk than non-local managers according to most of the measures that we have available. The average annualized standard deviation of returns is significantly higher for non-local managers than their local counterparts (12.47% compared to 11.66%). In our 4-factor model, non-locally-managed funds exhibit significantly stronger exposures both to changes in muni bond yields ($\Delta Muni\ Yields\ \beta$) and to the overall level of interest rates ($TBill\ \beta$). However, there is marginally-significant evidence that the returns of local managers are more correlated with the default spread ($Default\ \beta$) than non-local managers. There is no significant difference in exposure to the term spread ($Term\ \beta$) across local and nonlocal managers.

One should be careful in interpreting the magnitude of coefficient estimates from fixed-income factor models, especially when comparing these to the commonly used factor models of stock returns (Fama and French, 1992). The level of the estimated intercept in our performance models represents the fund return that would be expected in a world where yields, changes in yields, and spreads are all zero. Although these conditions are unlikely to apply in realistic

markets, we can still use this estimate to measure the relative performance of one fund compared.

2.2 Regression results

Table 3 presents the empirical results from our regression analysis. Consistent with our univariate results, the coefficient on the *Local* indicator is negative and significant in explaining each of our performance measures. Local fund management has a negative impact on *Total Returns* of about 35 basis points per year. For our risk-adjusted performance models, the magnitude of these coefficient estimates are about 5%-20% of the size of the estimated intercepts. Our initial regression results therefore suggest that, relative to non-local fund managers, local fund managers display performance differences that are negative, statistically significant, and of moderate economic magnitude.

Among the control variables, *Size* is positively and significantly related to each measure of performance, while the coefficients on *Expenses* are positive and significant in explaining risk-adjusted performance. This is consistent with high-fee funds achieving higher returns only once we have corrected for the correlation of returns with T-Bill yields, the term spread, and the default spread. The coefficient estimate on turnover is positive and significant in the 3- and 4-factor models, but insignificant in raw return model. This suggests that higher turnover funds have less exposure to fixed income risk factors per unit of return relative to low turnover funds. Overall, our initial models are consistent with muni fund management exhibiting positive economies of scale and with both fees and trading activity being reflected in the active management of exposure to fixed-income risk factors. The fact that local fund managers have lower fees and higher turnover but manage more assets (see Table 2), justifies a multivariate regression approach in explaining performance, rather than relying only on univariate tests.

These results suggest that local fund managers are positioned as a low-cost, low-risk, low-performance, and high-scale choice for investors.

*****Table 3. Local status, performance and risk *****

The difference between local and non-local managers are further illustrated when we examine the sensitivity to measures of risk, presented in Table 4. Because the coefficient estimates from our 3-factor model are similar to those from our 4-factor model, we limit reporting of coefficient estimates to those from the 4-factor model. In our first column of estimates in Table 4, local fund management is associated with a significantly smaller standard deviation of returns (*SD Returns*). Using the terms from our 4-factor model, the *Local* indicator takes a significant positive coefficient in explaining sensitivity to the change in muni bond yields (*ΔMuniYields β)*. The local indicator takes a marginally significant coefficient estimate in explaining the sensitivity to T-Bill yields (*TBill β)*. Because these coefficient estimates tend to have negative values (see Table 2), a positive coefficient on the *Local* indicator is consistent with less risk exposure for local managers to these factors. That is, muni bond fund returns tend to be lower when muni bond yields increase and T-Bill yields are higher, but locally-managed funds are less sensitive to this. However, the *Local* indicator is positive and significant in explaining the exposure to the default risk premium (*Default β)*. This is consistent with locally-managed funds being somewhat more exposed to muni bonds with higher default risks. Local status is not significantly related to exposure to the term spread (*Term β)*.

3. Spatial variation in the performance of local and nonlocal fund managers

Thus far, we have held constant the investment objectives (single-state municipal bonds) and corrected for basic fund characteristics in our analysis. However, it is possible that there

exist systematic patterns in the spatial distribution of local and non-local fund managers that are correlated with fund performance. We take several different approaches to examine the potential impact of geographic location on fund performance. First, we construct several matched samples that attempt to hold location constant when comparing local and nonlocal managers. Second we incorporate geographic-based variables into our models in order to examine how the regional characteristics of each US state are related to relative performance of local and non-local fund managers.

3.1 Matched Sample Approach

One explanation for consistent differences in the performance of local and non-local fund managers is that the characteristics of certain locations are correlated with both the preference for local management and with fund performance. To correct for this, our approach is to sort and match local and non-local managers by year, location (state), and fund size. The matching process is repeated for both the state in which the fund invests and the state in which the fund manager operates. Not all states have both local and non-local managers, but we are able to construct 352 matching dyads based on the state in which a fund invests and 314 dyads matched by the location of the fund manager. The 352 pairs matched by the state in which the fund invests represent pairs of local and non-local managers who both manage funds of similar size, investing in the same state over the same 3-year period. The 314 pairs matched by the manager location represent pairs of fund managers who are located in the same state and who manage funds of similar size over the same 3-year period, but where one manager invests in out-of-state securities and the other manager invests in in-state securities. We then compute the differences in performance and fund characteristics for each dyad. The average local minus non-local differences are displayed in Table 5.

The results in Table 5, Panel A, show that even when two fund managers invest on similar scales in the same state and in the same year, we continue to find differences in performance, with the local manager performing worse. However, possibly due to the weaker power of these tests, only some of the differences are significant. We find that when two fund managers both invest in the same state, the median local fund manager has raw returns that are significantly less than her out-of-state competitor, while both mean and median returns from our 3-factor model are lower for local managers. Locals also manage significantly larger funds (despite our attempt to match based on size) with lower expenses.

Panel B of Table 5 presents results that are generally consistent with Panel A. That is, when two fund managers share the same location but one invests locally and one invests out-of-state, the local manager consistently has worse performance, with the significance of this difference varying across performance measures.

3.2 Geographic characteristics of US states and Local Performance

Our matched samples of local and non-local managers in the section above suggest that the difference in performance between local and nonlocal managers is not fully explained by the distribution of fund managers across well-performing and poorly-performing US states. Therefore, we now incorporate more details on each state-level muni bond market in order to examine how variation in state-level market conditions are correlated with the relative performance of local and non-local fund managers. We include several measures that capture different aspects of the size, scale, or capacity of each state-level muni bond market. We collect US Census data on the total *Population* and *Area* for each state. From our sample data we compute the assets-under-management (*State Market Size*) of all sample funds within each state.

In addition to our measures of the size and scale of each state muni bond market, we also collect data on two indicators of the politico-economic climate of each state. Butler, Fauver, and Mortal (2009) document that the number of per-capita political corruption convictions (*Corruption*) in a state provides a good proxy for state economic governance in the context of muni-bond markets. We measure this variable by state rankings, from 1 to 50, where a rank of 50 implies the most corruption. We also include the overall state corporate tax rate (*State Tax*) as a measure of the business climate fostered by the state government. Local managers may earn a premium for investing in markets that are otherwise undesirable due to the local business environment. Alternatively, good business conditions may lower costs for local managers relative to their out-of-state competitors and allow them to pass higher returns on to their investors. We do not present an *ex ante* hypothesis as to the direction of association between *Corruption* or *State Taxes* and local performance; instead we are interested to see if a fund manager's local status remains significant in explaining performance after controlling for the state-level investment climate.

*****Table 6. Descriptive statistics of state characteristics *****

Table 6 provides descriptive statistics on our state-level characteristics. We observe little difference in *Corruption* or *Area* for local and non-local fund managers, but we do see significant differences for our other state-level variables. Locally managed funds tend to be in states with larger muni bond markets (*State Size*), more *Population*, and with higher *State Tax* burdens. This is consistent with local managers preferring deeper, rather than more obscure, markets.

Our next step is to estimate whether the above state-level geographic variables are relevant in explaining the relative performance of local and non-local muni fund managers. To

do this we interact the *Local* indicator with the state-level variables. This will show if local managers are impacted disproportionately by state-level factors relative to non-local managers. Fund-level control variables are the same as in previous sections. Our models take the following form:

$$Performance_{i,t} = \beta_0 + \beta_1 (Local_{i,t}) + \beta_2 (State\ Market\ Size_{i,t}) + \beta_3 (Population_{i,t})$$
$$+ \beta_4 (Area_{i,t}) + \beta_5 (Corruption_{i,t}) + \beta_6 (State\ Tax_{i,t})$$
$$+ \sum_{k=7}^{11} \beta_k\ Local{*}State\ Characteristic_{k,i,t} + \beta_{12}(Fund\ Size_{i,t}) + \beta_{13} (Turnover_{i,t})$$
$$+ \beta_{14} (Expenses_{i,t}) + \sum_{k=15}^{26} \beta_k\ Year\ Dummies_{i,t} + e_{i,t,} \qquad (2)$$

*****Table 7. State characteristics and fund performance *****

The results from these regressions are displayed in Table 7. Across our sample, fund risk-adjusted performance is positively associated with total *State Market Size, Area*, *State Taxes*, and *Corruption*, but negatively associated with *Population*. Raw returns are not significantly related to any of our geographic variables. The negative coefficient estimates on our interaction terms for *State Market Size* and *Area* suggest that muni fund managers are at a relative disadvantage when investing in financially deep or geographically dispersed markets. The positive coefficient on the interaction term for *Population* indicates that although fund managers in general do worse in more populous states, the local fund managers do not do as badly as the non-local managers.

The positive overall associations of *State Taxes* and *Corruption* with risk-adjusted performance is consistent with the findings of Butler, Fauver, and Mortal (2009). They document that worse state level investment conditions are associated with higher municipal bond yields, and imply that fund managers should earn a premium for investing in markets that score weakly on these scores. We do not observe a relative difference between locals and nonlocal in sensitivity to *Corruption* or *State Taxes*.

Overall, our state-level geographic variables appear to explain some of the relative performance differences between local and non-local fund managers. The significant interaction terms on *State Market Size*, *Area*, and *Population* are consistent with the scale and depth of local muni bond markets being driving factors behind the relative differences in local and non-local performance. The lack of significance for the pure *Local* indicator in these models, implies that much of the explanatory power of the *Local* indicator displayed in previous models is captured by these geographic interaction terms.

4. Robustness Checks

We conduct a battery of tests to check the robustness of our results. First, we examine in detail a potential endogeneity problem between the local status of a fund manager and fund performance. In other words, would poorly-performing managers choose to focus only on local securities? Although our earlier matched-sample approach should largely address this issue, we also perform an instrumental-variables analysis. Since local status is a binary variable, we follow Bharath, et al. (2011) and use a first-stage probit model to estimate the predicted probability of a fund manager being local, and then use this predicted probability of being local from stage-one in the second-stage model. Lagged values of our fund characteristics (*size*, *turnover*, and *expenses*) are used as instruments. The results (not reported for brevity) are consistent with earlier findings, in that the estimated coefficients for the *Local* indicator are significant and negative in all model specifications. Control variables also display similar signs as before.

Next, we enlarge the concept of "local" by redefining fund managers in neighboring states as locals where it is reasonable to expect commuting by financial managers between states. These include assigning fund managers in NJ and CT as locals for NY; DE and NJ for PA; ME,

RI, and NH for MA; and NY and PA for NJ. The results are qualitatively similar to what we obtained before and therefore we do not report them in detail.

Our dependent variables (performance) are measured during non-overlapping 3-year periods. Therefore we repeat the analysis with models estimated year-by-year. Our coefficient estimates are generally of the same sign and magnitude, although with lower significance levels due to the substantial loss of power.[6] Overlapping 3-year periods lead to similar results but with predictably-inflated significance levels. Alternate year-fixed-effects and clustering of standard errors by year also make very little difference to our results. As a final check, performance measures computed over full sample period, rather than during our three-year periods, also lead to similar results. Again, we report non-overlapping annual observations in order to allow the best matching to annual state-level geographic data in the sections above.

Several additional modifications further confirm the robustness of our initial findings. A separate examination of explicitly tax-free funds makes almost no difference to our results. This is unsurprising, as any tax benefits should be reflected in investors' realized returns, but not in those reported by the fund manager. Fixed-effects for individual states (those that have at least 20 observations) do not greatly change the results; nor does clustering by fund or by state. We also confirm that our results are not driven by managers from a single state (a potential concern considering the concentration of managers in NY and MA). Alternative tests, such as analyzing well-performing and poorly-performing states separately, or including alternative indicators for the percentage or number of local managers in a state, also preserve our finding of lower performance for local managers.

[6] The *Local* indicator remains negative and at least marginally significant in explaining performance for all years except 2001, where it is still negative but insignificant.

5. Conclusions

In this study, we find that locally managed (i.e., in-state) muni bond funds underperform non-locally managed muni bond funds. This is the opposite result of what has been previously documented for equity fund management (Coval and Moskowitz, 1999, and 2001; Ivkovic and Weisbenner, 2005). The first possible explanation for the apparent discrepancy is that our relatively straight-forward methodology allows a more accurate (but less precise) measurement of investment location. Other studies generally utilize a continuous measure of distance, such as a measurement in miles between a fund manager's location and the headquarters of each firm that fund invests in (Coval and Moskowitz, 1999 and 2001). We take a more direct approach, because our muni bond funds are operationally-restricted to a single US state, with the caveat that the resulting geographic areas vary greatly in size. A further benefit of our approach is that the underlying investments of our funds are strictly restricted to this geographic area, while the underlying operations of firms with equity securities used in earlier studies may not be restricted to a distinct geographic area. The simplicity and directness of our method suggests that our results are not due to a methodological anomaly, but also do not imply that the findings of past research are suspect, as the underlying fixed-income investments that we analyze are different from those in prior studies.

A second explanation is that it is the unique characteristics of the muni bond market that drive our results. Because muni bonds are issued by a political authority, they necessarily entail different agency conflicts and asymmetric-information interactions than other investments. In other words, perhaps local muni fund managers have different political, social, or legal concerns regarding their investment strategy, relative to equity fund managers. Alternatively, perhaps local muni fund managers gain some political, social, or economic benefits that are not reflected

in our performance measures. Our results are consistent with both of these explanations, in that locally-managed funds perform worse, but partially compensate for this with several measures of stability. The fact that expense ratios are significantly lower for local managers suggests that local managers are delivering a product with very different characteristics than non-local fund managers, and which cannot simply be characterized in terms of realized returns. In terms of local bias and market equilibrium, the fact that locally-managed funds survive despite having lower returns suggests that (some) investors may be willing to accept worse performance in order to satisfy a preference for local bias in fund management.

Our study suggests several interesting avenues for further research. Importantly, are our results unique to muni bond funds, or are they generalizable to all fixed-income funds? If our results are due to socio-political considerations on the part of local fund managers, then the results may be unique to municipal bond funds, and possibly other politically-influenced securities, such as shares in municipally-owned or affiliated companies. Second, how can we further quantify the non-performance differences between local and non-local fund managers? Our analysis provides a starting point for future research into these interesting questions, which should eventually disentangle the question how information, geographic proximity, and socio-political considerations influence performance differences in investment management.

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Table 1. Geographic Distribution of Funds and Fund Managers

This table presents the number of state-specific municipal bond fund managers and the states in which those funds invest. The first column lists the number of fund managers located in each state. The remaining columns describe the number of locally and non-locally managed funds that invest in each state. A fund is classified as local if the fund manager's address is in the state in which the fund invests.

	Fund Managers in State	Funds Investing in the state: Local Manager	Non-local	Total	% Local
Alabama	3	3	6	9	33%
Alaska	0	0	0	0	-
Arizona	0	0	22	22	0%
Arkansas	0	0	0	0	-
California	68	33	112	145	23%
Colorado	3	2	16	18	11%
Connecticut	1	0	17	17	0%
Delaware	0	0	0	0	-
Florida	4	1	22	23	4%
Georgia	6	2	17	19	11%
Hawaii	4	4	5	9	44%
Idaho	0	0	0	0	-
Illinois	67	0	0	0	-
Indiana	0	0	4	4	0%
Iowa	0	0	0	0	-
Kansas	2	2	8	10	20%
Kentucky	8	2	10	12	17%
Louisiana	1	1	7	8	13%
Maine	0	0	0	0	-
Maryland	22	8	20	28	29%
Massachusetts	171	18	22	40	45%
Michigan	0	0	22	22	0%
Minnesota	22	7	24	31	23%
Mississippi	0	0	0	0	-
Missouri	8	1	11	12	8%
Montana	0	0	5	5	0%
Nebraska	0	0	0	0	-
Nevada	0	0	0	0	-
New Hampshire	0	0	0	0	-
New Jersey	34	4	32	36	11%
New Mexico	4	0	0	0	-
New York	185	37	62	99	37%

Table 1. Geographic Distribution of Funds and Fund Managers (continued)

	Fund Managers in State	Funds Investing in the state: Local Manager	Non-local	Total	% Local
North Carolina	14	2	21	23	9%
North Dakota	4	0	0	0	-
Ohio	46	12	27	39	31%
Oklahoma	0	0	0	0	-
Oregon	2	2	11	13	15%
Pennsylvania	44	7	42	49	14%
Rhode Island	0	0	2	2	0%
South Carolina	0	0	6	6	0%
South Dakota	0	0	0	0	-
Tennessee	0	0	10	10	0%
Texas	9	0	0	0	-
Utah	0	0	0	0	-
Vermont	1	0	0	0	-
Virginia	3	3	31	34	9%
Washington	5	0	0	0	-
West Virginia	0	0	0	0	-
Wisconsin	4	2	0	2	100%
Wyoming	0	0	0	0	-
Totals	747	153	594	747	20%

Table 2. Descriptive Statistics

This table presents descriptive statistics for our sample of 1,884 portfolio-period observations, drawn from 747 unique funds over rolling 3-year estimation periods from 2000 to 2012. Performance is measured by the total 3-year holding period return (*Return*) and the intercepts (α) from two multifactor models of monthly returns. The 3-factor model uses the term spread (*Term*), default spread (*Default*), and T-bill yield (*TBill*), while the 4-factor model also adds a term for the change in muni bond yields (*⊿MuniYields*). Performance measures are in annualized percentages. Variables describing a fund's risk are the standard deviation of monthly returns (*SD Returns*) and the coefficient estimates (β) for each term in our 4-factor model. Control variables include the fund's *Turnover* ratio and the total *Expense* ratio, each given in percent and weighted by share-class size. *Size* is the sum of total net assets of all share classes, in millions of dollars. In t-tests and z-scores (Wilcoxon Rank test), * , **, and *** represent differences significant at the 10%, 5%, and 1%, respectively.

	Total (N=1884)		Locals (N=361)		Non-Locals (N=1523)		Tests for differences	
Variable	Mean	Median	Mean	Median	Mean	Median	T-stat	Z-score
Performance								
Return	4.29	4.08	4.06	3.84	4.35	4.11	-2.19**	-1.81*
4-factor α	-2.81	-16.82	-5.42	-15.24	-2.19	-17.17	-1.31	1.23
3-factor α	30.80	4.97	25.16	3.90	32.14	5.14	-2.00**	-1.70*
Risk								
SD Returns (%)	12.31	11.82	11.66	11.17	12.47	11.93	-2.32**	-1.93*
⊿MuniYields β	-66.53	-63.61	-62.18	-60.52	-67.56	-64.14	3.22***	2.05**
TBill β	-2.00	0.86	-0.70	1.14	-2.31	0.82	1.92*	0.64
Term β	1.42	4.07	1.82	3.96	1.32	4.11	0.87	-0.53
Default β	0.74	0.37	1.38	0.99	0.58	0.22	1.73*	1.70*
Operations								
Size	340.34	124.39	538.12	150.08	293.46	117.80	2.94***	3.10***
Expense Ratio	0.89	0.86	0.82	0.79	0.91	0.88	-4.50***	-4.62***
Turnover Ratio	0.26	0.19	0.29	0.21	0.26	0.19	2.16**	2.52**

Table 3. Local Status and Performance

This table presents results of cross-sectional OLS regressions for our sample of 1,884 portfolio-period observations, drawn from 747 unique funds over 3-year estimation periods ending from 2000 to 2012. Our primary independent variable of interest is the *Local* indicator, which equals 1 if a fund manager is located in the same state in which she invests, and zero otherwise. Performance is measured by the total 3-year holding period return (*Return*) and the intercepts (α) from two multifactor models of monthly returns. The 3-factor model uses the term spread (*Term*), default spread (*Default*), and T-bill yield (*TBill*), while the 4-factor model also adds a term for the change in muni bond yields (Δ*MuniYlds*). Performance measures are in annualized percentages. Variables describing a fund's risk are the standard deviation of monthly returns (*SD Returns*) and the coefficient estimates (β) for each term in our 4-factor model. Control variables include the fund's *Turnover* ratio and the total *Expense* ratio, each given in percent and weighted by share-class size. *Size* is the sum of total net assets of all share classes, in millions of dollars. Year-specific fixed effects are also included in the regressions but not reported in the table. Coefficient estimates are presented with HAC consistent (White (1980)) t-statistics in parentheses. * , **, and *** represent differences significant at the 10%, 5% and 1% level, respectively.

	Return	*4-factor α*	*3-factor α*
Intercept	2.153***	-31.386***	-35.634***
	(5.56)	(-3.68)	(-3.53)
Local	-0.352***	-3.202**	-6.558***
	(-3.66)	(-2.02)	(-2.98)
Size	0.168***	1.672*	3.721***
	(3.16)	(1.82)	(3.26)
Turnover	-0.373	13.215***	20.085***
	(-1.9)	(3.51)	(4.18)
Expenses	-0.533	31.969***	31.9***
	(-1.16)	(2.68)	(2.69)
Year dummies	Yes	Yes	Yes
Adj. R^2	46.59%	62.41%	63.38%
F-value	103.66	196.42	204.71
# of obs.	1884	1884	1884

Table 4. Local Status and Risk

This table presents results of cross-sectional OLS regressions for our sample of 1,884 portfolio-period observations, drawn from 747 unique funds over rolling 3-year estimation periods ending from 2000 to 2012. Results are included for 5 models, each examining a different measure of risk as the dependent variable: *SD Returns* is the standard deviation of monthly returns; *⊿MuniYields β* is the coefficient estimate for the change in muni bond yields in a 4-factor model, *TBill β* is the coefficient estimate for the treasury bill yield in a 4-factor model of fund returns, *Term β* is the coefficient estimate for the term spread in the 4-factor model, and *Default β* is the coefficient estimate for the default spread in the 4-factor model. Control variables for fund characteristics include the fund's *Turnover* ratio and the total *Expense* ratio, each given in percent and weighted by share-class size. *Size* is the natural log of the sum of total net assets of all share classes, in millions of dollars. Year-specific fixed effects are also included in the regressions but not reported in the table. Coefficient estimates are presented with HAC consistent (White (1980)) t-statistics in parentheses. * , **, and *** represent differences significant at the 10%, 5% and 1% level, respectively.

	SD Returns	*⊿MuniYields β*	*TBill β*	*Term β*	*Default β*
Intercept	0.128***	-36.86***	-7.493**	6.21***	17.526***
	(11.01)	(-6.54)	(-2.46)	(3.67)	(7.05)
Local	-0.011***	5.661***	1.34*	0.374	1.012**
	(-3.70)	(4.04)	(1.76)	(1.13)	(2.24)
Size	0.006***	-2.583***	-0.259	-0.053	-1.111***
	(4.01)	(-3.81)	(-0.85)	(-0.30)	(-3.25)
Turnover	-0.012**	-14.918***	0.113	-2.552***	-4.667***
	(-2.08)	(-5.44)	(0.07)	(-3.36)	(-4.24)
Expenses	-0.026	-1.376	3.857	-6.018**	-6.122***
	(-1.87)	(-0.32)	(0.75)	(-2.47)	(-3.05)
Year dummies	Yes	Yes	Yes	Yes	Yes
Adj. R^2	28.73%	23.59%	31.38%	70.25%	18.94%
F-value	51.61	39.77	58.41	297.49	30.34
# of obs.	1884	1884	1884	1884	1884

Table 5. Matched samples of local and non-local managers

This table presents mean and median differences (local minus non-local) between fund managers for each state and time period where there are matched local and non-local observations. Differences for performance, *Expenses*, and *Turnover* are in annualized basis points; *Size* is in $millions. Panel A (N=352) matches locals and non-locals by the state in which they invest and Panel B (N=314) matches by the location of the fund manager. * , **, and *** represent significance differences from zero at the 10%, 5% and 1% level, respectively in t-tests and sign tests.

	Panel A: Matched by state in which the fund invests		**Panel B: Matched by fund manager state**	
Variable	Mean	Median	Mean	Median
Return	-17.87	-18.86***	-14.04	-8.03**
4-factor α	-29.94	53.76	-467.97*	-58.31
3-factor α	-516.58*	-75.78*	-618.86*	-134.17**
Size	194.57***	1.80***	184.23***	2.50***
Expense Ratio	-3.92*	-4.77*	0.18	-2.13
Turnover	-1.43	0.79	0.24	0.42

Table 6: Descriptive Statistics of Geographic Characteristics

This table presents descriptive statistics of state-level geographic characteristics for our sample of 1,884 portfolio-period observations, drawn from 747 unique funds as of the end of each 3-year estimation period from 2000 to 2012. State characteristics include the state's ranking for political corruption convictions per resident (*Corruption)*, *Population* (in thousands), *Area* (in thousands of square miles), the average state and local tax burden per resident (*Tax Burden*), and *State Market Size* (the total net assets of all sample funds in the state, in $millions). In t-tests and z-scores (Wilcoxon Rank test), * , **, and *** represent differences significant at the 10%, 5%, and 1%, respectively.

	Total (N=1884)		Locals (N=361)		Non-Locals (N=1523)		Tests for differences	
Variable	Mean	Median	Mean	Median	Mean	Median	T-stat	Z-score
State Market Size	18,758.20	3,813.40	25,567.96	12,315.87	17,144.07	3,206.75	4.73***	5.65***
Population	14,525.06	9,879.25	16,311.49	12,334.89	14,101.61	9,336.88	3.33***	3.69***
Area	66,775.85	47,214.00	63,076.72	47,214.00	67,652.66	47,214.00	-1.56	-4.21***
Corruption	24.48	23.00	24.99	24.00	24.36	23.00	0.98	0.91
State Tax	6.26	6.05	6.52	6.70	6.19	6.00	2.78***	2.98***

Table 7: Regression Analysis with Geographic Characteristics

This table presents results of cross-sectional OLS regressions for our sample of 1,884 portfolio-period observations, drawn from 747 unique funds over 3-year estimation periods ending from 2000 to 2012. The *Local* indicator variable equals 1 if a fund manager is located in the same state in which she invests, and zero otherwise. State characteristics include the state's ranking for political corruption convictions per resident (*Corruption)*, log *Population* (in thousands), log *Area* (in thousands of square miles), the average state and local tax burden per resident (*Tax Burden*), and log *State Market Size* (the total net assets of all sample funds in the state, in $millions). Each state characteristic is also interacted with the *Local* indicator variable. Performance is measured by the total 3-year holding period return (*Return*) and the intercepts (α) from two multifactor models of monthly returns. The 3-factor model uses the term spread, default spread, and T-bill yield, while the 4-factor model also adds a term for the change in muni bond yields. Performance measures are in annualized percentages. Control variables include the fund's *Turnover* ratio and the total *Expense* ratio, each given in percent and weighted by share-class size. *Size* is the sum of total net assets of all share classes, in millions of dollars. Year-specific fixed effects are also included in the regressions but not reported in the table. Coefficient estimates are presented with HAC consistent (White (1980)) t-statistics in parentheses. * , **, and *** represent differences significant at the 10%, 5% and 1% level, respectively.

	Return	*4-factor α*	*3-factor α*
Intercept	1.996**	17.479	0.687
	(2.38)	(1.34)	(0.04)
Local	1.212	-6.658	-0.845
	(1.14)	(-0.40)	(-0.04)
State Market Size	0.001	3.591***	3.453***
	(0.01)	(3.34)	(2.61)
Population	-0.135	-20.358***	-16.75***
	(-0.36)	(-3.69)	(-2.75)
Area	0.097	8.065***	6.69**
	(0.57)	(3.33)	(2.44)
Corruption	0.008	0.368***	0.299**
	(0.90)	(3.09)	(2.11)
State Taxes	0.031	2.568***	2.157**
	(0.63)	(3.56)	(2.47)
*Local*StateMarketSize*	0.068	-4.296***	-4.428**
	(0.82)	(-3.31)	(-2.42)
*Local*Population*	0.058	12.783***	10.854*
	(0.18)	(2.73)	(1.79)
*Local*Area*	-0.205	-5.904**	-6.060*
	(-1.15)	(-2.20)	(-1.63)

Table 7: Regression Analysis with Geographic Characteristics (continued)

	Return	*4-factor α*	*3-factor α*
*Local*Corruption*	-0.010	-0.218	-0.086
	(-0.89)	(-1.34)	(-0.36)
*Local*StateTax*	-0.041	-1.440	-0.208
	(-0.60)	(-1.41)	(-0.14)
Size	.166***	1.411*	3.356***
	(3.32)	(1.66)	(3.02)
Expense Ratio	-.405**	11.677***	18.734***
	(-2.16)	(3.32)	(3.98)
Turnover	-0.547	29.288***	29.224***
	(-1.23)	(2.84)	(2.78)
Year dummies	Yes	Yes	Yes
Adj. R^2	46.49%	65.14%	64.33%
F-value	63.93	136.36	131.63
# of obs.	1884	1884	1884