

# Online Appendix for Inferring Latent Social Networks from Stock Holdings

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# 1 Robustness

In this section, we repeat our main analysis for three sets of robustness studies. In the first one, we drop micro-cap funds from our mutual fund sample. In the second one, we include the next 10 smaller cities (MSAs) into our study. In the third one, we carry out our tests on a hedge fund sample. Our data on hedge fund stock holdings come from the Investment Company Common Stock Holdings Database provided by Thomson Reuters for the period of 1998–2015, which sources from the filings of investment companies and professional money managers to the SEC on a quarterly basis. For the first two sets of robustness analysis, the estimation is done under our extended model with covariates. For the hedge fund analysis, the estimation is done under our baseline model.<sup>1</sup>

## 1.1 Excluding Micro-Cap Funds

### 1.1.1 Estimates of Model Parameters

In this set of robustness analysis, we exclude micro-cap funds from our sample. The summary statistics of the estimates of gregariousness parameters  $\delta_i$ , group-size parameters  $b_k$ , overdispersion parameters  $\omega_k$ , and portfolio choice parameters  $\{\alpha, \beta_{\text{size}}, \beta_{\text{btm}}, \beta_{\text{mom}}, \lambda_0, \lambda_1\}$  are shown in Table A1 to A5 respectively under “(A) Excl MicroCap”. The estimates are very close to those from the full sample shown in the main result section, since micro-cap funds constitute a very small part of the full mutual fund sample.

### 1.1.2 Predicting Alumni Connections

As before, using the parameter estimates, we filter out the number of friends  $y_{i,k}$  for each fund in each city, and then we construct the RPC measure  $\eta_{i,k}$  in the same way. We then use these RPC

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<sup>1</sup>The reason that we use our baseline model for the hedge fund sample is because we have very limited data on the demographic and educational information of hedge fund managers. Furthermore, because of such limited data, we will not conduct the alumni prediction exercise on the hedge fund sample. However, we aim to explore more on this in future research.

measures to predict alumni connections of fund managers out of sample. This alumni-prediction results are shown in Table A6 under “(A) Excl MicroCap”.

The results are similar to the ones in Table 12 of our main paper with the full sample. Specifically, the RPC measure (in terms of  $\log(\eta_{i,k})$ ) has high and statistically significant predictive power for the number of alumni connections a manager has in a city, i.e. our RPC measure is informative about the out-of-sample alumni connections of fund managers.

### 1.1.3 Portfolio Returns

Panel (A) “Excl Micro Cap” of Table A7 reports the value-weighted returns of the portfolios constructed using our RPC measure  $\eta_{i,k}$  at the quarterly level. The portfolios are constructed in the same way as before (Table 13 of our main paper). As can be seen, our RPC measure has significant forecasting power for returns, whether it is pure return or Carhart 4-factor alpha. The  $\eta_{i,k} > 1$  portfolio outperforms the  $\eta_{i,k} \leq 1$  portfolio by about 1.6% per year, which is similar to before.

## 1.2 Including Smaller Cities

### 1.2.1 Estimates of Model Parameters

In this set of robustness analysis, we include the next 10 smaller cities (MSAs) into our sample. The names of the 10 cities are stated in Table A2. The summary statistics of the estimates of gregariousness parameters  $\delta_i$ , group-size parameters  $b_k$ , overdispersion parameters  $\omega_k$ , and portfolio choice parameters  $\{\alpha, \beta_{\text{size}}, \beta_{\text{btm}}, \beta_{\text{mom}}, \lambda_0, \lambda_1\}$  are shown in Table A1 to A5 respectively under “(B) Incl Smaller MSAs”. The estimates are comparable to those from the full sample. Recall that since we need to normalize  $\sum_k b_k = 1$  for identification purposes, the estimates of  $b_k$  for the top 20 cities have gone down as we have more cities now. However, because of more cities, the estimates of gregariousness parameters (expected total number of friends from all cities) have gone up. Therefore, on net the expected number of friends in each city does not

change much and is close to that from the main sample.

### 1.2.2 Predicting Alumni Connections

As before, we construct RPC measures in the same fashion and use them to predict alumni connections of fund managers out of sample. This set of alumni-prediction results are shown in Table A6 under “(B) Incl Smaller MSAs”. We can see that the results are similar to those from the main sample, and the out-of-sample predictive power of our RPC measure for alumni linkages of fund managers remains strong.

### 1.2.3 Portfolio Returns

Next, we use the RPC measure  $\eta_{i,k}$  to construct portfolios at the quarterly level and their value-weighted returns are reported in Panel (B) “Incl Smaller MSAs” of Table A7. Similar to before, our RPC measure has significant forecasting power for returns. Moreover, by including the additional smaller cities, the forecasting power of the RPC measure increases slightly compared to our main sample with the top 20 cities. The value-weighted  $\eta_{i,k} > 1$  portfolio outperforms the  $\eta_{i,k} \leq 1$  portfolio by about 1.8% per year in terms of alpha, which is about 0.1% higher than the one from the main sample.

## 1.3 Results for Hedge Funds

### 1.3.1 Estimates of Model Parameters

In this set of robustness analysis, we estimate our baseline model on a hedge fund sample. The summary statistics of the estimates of gregariousness parameters  $a_i$ , group-size parameters  $b_k$ , overdispersion parameters  $\omega_k$ , and portfolio choice parameters  $\{\alpha, \beta_{\text{size}}, \beta_{\text{btm}}, \beta_{\text{mom}}, \lambda_0, \lambda_1\}$  are shown in Table A1 to A5 respectively under “(C) Hedge Funds”. The results have several features compared to our mutual fund sample results. First, hedge funds have a smaller expected total number of friends (around 50). Nevertheless, their networks exhibit a higher degree of

overdispersion in the 20 cities in general. Second, hedge funds tend to load more heavily on growth stocks and less heavily on market caps, and moreover they are momentum chasers. Third, hedge funds rely more heavily (put a larger weight) on private information, as seen by the bigger estimates of  $\lambda_0$  and  $\lambda_1$ .

### 1.3.2 Portfolio Returns

Panel (C) “Hedge Funds” of Table A7 reports the value-weighted returns of the portfolios constructed using our RPC measure  $\eta_{i,k}$  at the quarterly level for our hedge fund sample. Noticeably, the forecasting power of the RPC measure has increased for hedge funds. The  $\eta_{i,k} > 1$  portfolio now outperforms the  $\eta_{i,k} \leq 1$  portfolio by close to 3% per year in terms of pure return, and by about 2.7% in terms of Carhart alpha. Furthermore, the outperformance numbers have also become more statistically significant, as shown by the higher  $t$ -statistics. The return results thus demonstrate the robustness and usefulness of our RPC measure in predicting returns. This speaks to our goal that we laid out in the beginning, which is that our methodology is applicable to a wide range of investors, not just mutual funds.

Table A1: Robustness: gregariousness parameters

The table shows the summary statistics of the estimated values of the gregariousness parameters in the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”). Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model. We first compute the time-series average of the quarterly gregariousness estimates for each individual fund  $i$ , then we report the summary statistics of these time-series averages.

	Mean	S.D.	Median
(A) Excl MicroCap	74.87	25.25	69.75
(B) Incl Smaller MSAs	89.88	27.97	80.61
(C) Hedge Funds	49.72	19.80	48.68

Table A2: Robustness: prevalence (group size) parameters

This table shows the summary statistics of the quarterly estimates of the relative group size parameters  $\{b_k\}$  for the cities in the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”). Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model. The full names for the city abbreviations are as follows. NY: New York, LA: Los Angeles, Bos: Boston, Chi: Chicago, SJ: San Jose, Dal: Dallas, Hou: Houston, Phi: Philadelphia, Was: Washington, Mia: Miami, Atl: Atlanta, Min: Minnesota, Den: Denver, SD: San Diego, Stfd: Stamford, Sea: Seattle, Phx: Pheonix, SL: St. Louis, Det: Detroit, Bal: Baltimore, Pit: Pittsburgh, Cle: Cleveland, Por: Portland, Tam: Tampa, Aus: Austin, Nas: Nashville, Cin: Cincinnati, Kan: Kansas, Mil: Milwaukee.

	(A) Excl MicroCap			(B) Incl Smaller MSAs			(C) Hedge Funds		
	Mean	S.D.	Median	Mean	S.D.	Median	Mean	S.D.	Median
NY	0.119	0.042	0.132	0.089	0.036	0.098	0.121	0.052	0.132
LA	0.065	0.024	0.075	0.048	0.017	0.058	0.072	0.036	0.077
Bos	0.066	0.024	0.068	0.050	0.018	0.057	0.086	0.038	0.088
SF	0.049	0.021	0.054	0.037	0.018	0.041	0.069	0.024	0.067
Chi	0.063	0.026	0.064	0.047	0.023	0.052	0.046	0.010	0.055
SJ	0.056	0.028	0.062	0.042	0.025	0.046	0.058	0.013	0.061
Dal	0.053	0.019	0.054	0.039	0.013	0.047	0.047	0.014	0.049
Hou	0.057	0.045	0.056	0.043	0.029	0.041	0.081	0.045	0.081
Phi	0.050	0.021	0.050	0.036	0.018	0.040	0.056	0.027	0.060
Was	0.042	0.017	0.042	0.031	0.014	0.036	0.039	0.021	0.040
Mia	0.039	0.040	0.028	0.029	0.030	0.022	0.042	0.040	0.034
Atl	0.041	0.021	0.036	0.029	0.016	0.029	0.028	0.014	0.026
Min	0.044	0.024	0.041	0.033	0.018	0.031	0.028	0.016	0.027
Den	0.035	0.022	0.030	0.026	0.021	0.021	0.057	0.044	0.048
SD	0.030	0.021	0.029	0.022	0.017	0.022	0.040	0.025	0.035
Stfd	0.049	0.050	0.029	0.037	0.039	0.023	0.026	0.023	0.015
Sea	0.037	0.033	0.026	0.027	0.023	0.021	0.026	0.020	0.018
Phx	0.037	0.036	0.023	0.027	0.031	0.020	0.031	0.027	0.021
SL	0.033	0.029	0.025	0.025	0.019	0.019	0.023	0.014	0.019
Det	0.034	0.041	0.025	0.025	0.031	0.019	0.023	0.016	0.020
Bal				0.026	0.021	0.020			
Pit				0.023	0.018	0.017			
Cle				0.031	0.026	0.024			
Por				0.025	0.024	0.021			
Tam				0.029	0.023	0.023			
Aus				0.028	0.027	0.022			
Nas				0.026	0.024	0.020			
Cin				0.022	0.019	0.018			
Kan				0.024	0.021	0.017			
Mil				0.023	0.021	0.017			

Table A3: Robustness: overdispersion parameters

The table shows the summary statistics of the quarterly estimates of the overdispersion parameters  $\{\omega_k\}$  for the cities in the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”). Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model. The  $t$ -statistics are Newey-West adjusted. They test the null hypothesis of  $\omega_k = 1$  (Poisson) against the alternative of  $\omega_k > 1$  (overdispersion). For an explanation of the abbreviated city names, please refer to the note in Table A2.

	(A) Excl MicroCap			(B) Incl Smaller MSAs			(C) Hedge Funds		
	Mean	S.D.	$t$ -stat ( $\omega_k > 1$ )	Mean	S.D.	$t$ -stat ( $\omega_k > 1$ )	Mean	S.D.	$t$ -stat ( $\omega_k > 1$ )
NY	2.044	0.808	10.54	2.132	0.779	12.84	2.889	0.799	15.87
LA	1.666	0.338	11.71	1.787	0.477	10.66	1.614	0.354	14.40
Bos	1.500	0.369	11.19	1.493	0.569	8.50	2.519	0.441	14.62
SF	1.593	0.337	11.53	1.739	0.557	9.00	2.503	0.616	13.86
Chi	1.611	0.391	14.20	1.731	0.586	9.27	1.660	0.283	18.67
SJ	1.918	0.658	7.16	1.951	0.628	7.88	2.430	0.360	26.94
Dal	1.373	0.376	8.89	1.527	0.524	7.52	2.133	0.494	13.33
Hou	1.542	0.406	12.08	1.574	0.608	7.08	4.025	0.898	17.52
Phi	1.554	0.546	10.55	1.502	0.402	10.06	2.067	0.627	13.57
Was	1.315	0.329	13.88	1.447	0.504	13.43	1.720	0.279	22.20
Mia	1.972	0.567	12.87	1.813	0.345	15.42	2.267	0.395	30.56
Atl	1.670	0.344	10.70	1.589	0.376	10.53	1.587	0.541	12.05
Min	1.680	0.482	8.73	1.553	0.438	8.28	1.708	0.367	13.52
Den	1.675	0.439	17.03	1.588	0.339	18.76	2.312	0.682	14.16
SD	1.909	0.340	21.90	1.851	0.214	34.41	2.018	0.369	31.14
Stfd	1.624	0.388	15.49	1.665	0.430	10.31	2.248	0.596	10.85
Sea	1.644	0.415	25.25	1.524	0.475	17.63	1.524	0.402	10.40
Phx	1.501	0.390	14.75	1.544	0.518	8.51	1.683	0.323	17.40
SL	1.682	0.326	9.43	1.603	0.210	14.07	1.749	0.466	14.66
Det	1.741	0.466	15.60	1.722	0.483	19.73	2.392	0.731	11.75
Bal				1.699	0.382	13.05			
Pit				1.450	0.302	11.74			
Cle				1.769	0.389	12.25			
Por				1.541	0.353	14.42			
Tam				1.653	0.313	20.71			
Aus				1.637	0.447	12.80			
Nas				1.549	0.385	16.90			
Cin				1.434	0.248	12.61			
Kan				1.477	0.186	16.61			
Mil				1.515	0.227	15.49			



Table A4: Robustness: factor loadings for portfolio weights

This table reports, for the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”), the summary statistics of the factor loadings parameters  $\beta = (\beta_{\text{size}}, \beta_{\text{btm}}, \beta_{\text{mom}})$  on stock characteristics and the constant  $\alpha$  in the optimal portfolio choice condition of equation (14) of our main paper where  $\alpha + \beta X_j$  is the part coming from the prior and  $X_j$  are the stock characteristics. Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model. The characteristics include size (log of the market cap), book-to-market (log of one plus the book-to-market ratio), and momentum (past 12-month return) respectively.

	(A) Excl MicroCap			(B) Incl Smaller MSAs			(C) Hedge Funds		
	Mean	S.D.	Median	Mean	S.D.	Median	Mean	S.D.	Median
$\beta_{\text{size}}$ (size)	0.004	0.024	-0.003	0.005	0.023	-0.001	0.001	0.017	0.001
$\beta_{\text{btm}}$ (book-to-market)	-0.080	0.188	-0.009	-0.075	0.176	-0.015	-0.103	0.195	-0.044
$\beta_{\text{mom}}$ (momentum)	-0.011	0.033	-0.006	-0.016	0.043	-0.002	0.008	0.036	0.003
$\alpha$ (constant)	-0.159	0.267	-0.049	-0.165	0.261	-0.054	-0.307	0.345	-0.248

Table A5: Robustness:  $\lambda_0$  and  $\lambda_1$  for the weight  $\lambda_{i,k} = \lambda_0 + \lambda_1 y_{i,k}$  on the private signal

This table reports, for the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”), the summary statistics of the weight parameters  $\lambda_0$  and  $\lambda_1$  in the optimal portfolio choice condition of equation (14) of our main paper, where  $\lambda_{i,k} = \lambda_0 + \lambda_1 y_{i,k}$  is the weight on the private signal that a fund manager receives in city  $k$  and  $y_{i,k}$  is the number of (latent) friends the manager has in that city. Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model.

	(A) Excl MicroCap			(B) Incl Smaller MSAs			(C) Hedge Funds		
	Mean	S.D.	Median	Mean	S.D.	Median	Mean	S.D.	Median
$\lambda_0$	0.101	0.069	0.071	0.098	0.061	0.065	0.109	0.076	0.090
$\lambda_1$	0.020	0.008	0.014	0.018	0.011	0.019	0.029	0.016	0.018

Table A6: Robustness: using RPC measure to predict alumni connections

This table reports the estimation result in the regression model  $\log(Alumni_{ik}) = \alpha + \gamma \log(\eta_{i,k}) + x'_i \beta + v'_k \rho + \epsilon_i$  for the robustness analysis of (A) excluding micro-cap funds from our sample (“Excl MicroCap”) and (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”). Both (A) and (B) are estimated under our extended model with covariates. The dependent variable is the log of one plus the number of alumni connections a fund manager  $i$  has in city  $k$ .  $Alumni_{ik}$  and  $\eta_{i,k}$  are averaged across time for each fund manager  $i$  in city  $k$ . \*, \*\* and \*\*\* denote statistical significance at the 10%, 5% and 1% levels respectively. School-Degree stands for the case where the alumni connection is based on a portfolio manager and a senior official of a firm (Chairman, CEO or CFO) having attended the same school and received the same degree, and School-Degree-Year stands for the other case where the alumni connection is based on a portfolio manager and a senior official of a firm having graduated within a year from the same school and received the same degree. The main explanatory variable is  $\log(\eta_{i,k})$ , the log of one plus the RPC measure  $\eta_{i,k}$  of manager  $i$  in city  $k$ .  $x_i$  denotes the vector of controls for fund manager demographics. For a given manager,  $logSAT$  is the log of the median SAT score (in 2005) of the undergraduate school that the manager attended,  $Adv$  and  $Female$  denote whether the manager holds a graduate degree and whether the manager is a female,  $Age$  is the age of the manager, and  $Rep$  denotes whether the manager is Republican-affiliated.  $v_k$  is the vector of controls for city attributes. For a given city,  $\hat{b}_k$ ,  $logIncome_k$ ,  $logPop_k$ ,  $NonWhite_k$ ,  $SexRatio_k$  and  $OldRatio_k$  denote, respectively, the estimated value of the relative city size parameter, the log of the per capita income, the log of the population per square mile of land area, the fraction of the population that is not white, the male-to-female sex ratio, and the fraction of the population that is above 55 years old. These city attributes are obtained from the 2000 U.S. Census data.  $const$  is the constant term.

	(A) Excl MicroCap		(B) Incl Smaller MSAs	
	School-Degree	School-Degree-Year	School-Degree	School-Degree-Year
$\log(\eta_{i,k})$	0.168*** (3.94)	0.119** (2.41)	0.159*** (3.71)	0.105** (2.19)
$logSAT$	0.214*** (8.32)	0.173*** (6.15)	0.199*** (8.01)	0.149*** (5.72)
$Adv$	0.177*** (7.81)	0.136*** (6.48)	0.165*** (7.60)	0.125*** (6.07)
$Female$	0.010 (0.72)	0.007 (1.03)	0.013 (0.71)	0.010 (0.95)
$Age$	0.001*** (7.14)	0.000 (1.16)	0.004*** (7.26)	0.000 (1.03)
$Rep$	0.056*** (4.90)	0.024** (2.33)	0.077*** (4.76)	0.036** (2.38)
$\log(\hat{b}_k)$	0.475*** (10.74)	0.244*** (7.80)	0.468*** (10.98)	0.253*** (7.99)
$logIncome_k$	0.340** (2.30)	0.260** (2.51)	0.314** (2.30)	0.251** (2.58)
$logPop_k$	0.105** (2.16)	0.048*** (3.10)	0.090* (1.87)	0.081** (2.32)
$NonWhite_k$	0.100 (0.87)	-0.051 (-0.80)	0.096 (0.39)	-0.087 (-0.54)
$SexRatio_k$	-0.476 (-0.95)	-0.436 (-1.37)	-0.469 (-1.00)	-0.456 (-1.53)
$OldRatio_k$	-0.099 (-0.15)	0.306 (0.49)	-0.108 (-0.12)	0.385 (1.09)
$const$	-2.184*** (-4.71)	-1.313*** (-4.23)	-2.139*** (-4.46)	-1.280*** (-3.95)

Table A7: Robustness: returns for portfolios constructed using RPC measure

This table reports the value-weighted returns of the portfolios constructed based on our RPC measure  $\eta_{i,k}$  at the quarterly level for the three sets of robustness analysis: (A) excluding micro-cap funds from our sample (“Excl MicroCap”), (B) including 10 smaller MSAs into our sample (“Incl Smaller MSAs”), and (C) estimating the model on the hedge fund sample (“Hedge Funds”). Both (A) and (B) are estimated under our extended model with covariates, while (C) is estimated under our baseline model. In each quarter, the  $\eta_{i,k} > 1$  portfolio of a manager  $i$  is the portfolio based on his stock holdings from those cities where he has  $\eta_{i,k} > 1$ , and the  $\eta_{i,k} \leq 1$  portfolio is the portfolio based on his stock holdings from those cities where he has  $\eta_{i,k} \leq 1$ . We then construct the value-weighted  $\eta_{i,k} > 1$  portfolio across all managers (the  $\eta_{i,k} > 1$  portfolio) by value-weighting all fund managers’  $\eta_{i,k} > 1$  portfolios, and similarly the  $\eta_{i,k} \leq 1$  portfolio. The  $\eta_{i,k} > 1$  portfolio and the  $\eta_{i,k} \leq 1$  portfolio are held for one quarter, and then the two portfolios are rebalanced based on the  $\eta_{i,k}$ ’s. The quarterly net returns of the two portfolios (net of risk-free rate), their return differences Diff (return of  $\eta_{i,k} > 1$  portfolio minus  $\eta_{i,k} \leq 1$  portfolio), and their associated Carhart 4-factor alphas are shown, together with their  $t$ -statistics (Newey-West adjusted).

(A) Excl MicroCap				
Portfolio	Net Return		Carhart Alpha	
	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.40%	2.45	0.99%	2.01
$\eta_{i,k} \leq 1$	0.98%	1.65	0.58%	1.16
Diff	0.42%	2.08	0.41%	2.21
(B) Incl Smaller MSAs				
Portfolio	Net Return		Carhart Alpha	
	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.44%	2.57	1.07%	2.11
$\eta_{i,k} \leq 1$	0.98%	1.68	0.63%	1.30
Diff	0.46%	2.26	0.44%	2.30
(C) Hedge Funds				
Portfolio	Net Return		Carhart Alpha	
	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.53%	3.18	1.21%	2.95
$\eta_{i,k} \leq 1$	0.79%	1.42	0.53%	1.07
Diff	0.74%	2.84	0.68%	2.40

## 2 Returns for Portfolios Constructed Using RPC Measure for Subgroups of Funds

Table B1: Returns for portfolios constructed using RPC measure for subgroups of funds

This table reports the value-weighted returns of the portfolios constructed based on our RPC measure  $\eta_{i,k}$  at the quarterly level for subgroups of funds based on their CRSP fund objective codes. Small-cap, Growth and Income denote small-cap funds, growth funds and income funds respectively. In each quarter, the  $\eta_{i,k} > 1$  portfolio of a manager  $i$  is the portfolio based on his stock holdings from those cities where he has  $\eta_{i,k} > 1$ , and the  $\eta_{i,k} \leq 1$  portfolio is the portfolio based on his stock holdings from those cities where he has  $\eta_{i,k} \leq 1$ . We then construct the value-weighted  $\eta_{i,k} > 1$  portfolio across all managers (the  $\eta_{i,k} > 1$  portfolio) by value-weighting all fund managers'  $\eta_{i,k} > 1$  portfolios, and similarly the  $\eta_{i,k} \leq 1$  portfolio. The  $\eta_{i,k} > 1$  portfolio and the  $\eta_{i,k} \leq 1$  portfolio are held for one quarter, and then the two portfolios are rebalanced based on the  $\eta_{i,k}$ 's. The quarterly net returns of the two portfolios (net of risk-free rate), their return differences Diff (return of  $\eta_{i,k} > 1$  portfolio minus  $\eta_{i,k} \leq 1$  portfolio), and their associated Carhart 4-factor alphas are shown, together with their  $t$ -statistics (Newey-West adjusted).

(A) Small-cap				
	Net Return		Carhart Alpha	
Portfolio	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.42%	2.42	0.99%	2.02
$\eta_{i,k} \leq 1$	1.01%	1.74	0.61%	1.36
Diff	0.41%	2.05	0.38%	2.12
(B) Growth				
	Net Return		Carhart Alpha	
Portfolio	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.46%	2.69	1.04%	2.31
$\eta_{i,k} \leq 1$	0.98%	1.69	0.60%	1.29
Diff	0.48%	2.34	0.44%	2.30
(C) Income				
	Net Return		Carhart Alpha	
Portfolio	Mean	$t$ -stat	Mean	$t$ -stat
$\eta_{i,k} > 1$	1.41%	2.48	1.00%	2.17
$\eta_{i,k} \leq 1$	0.99%	1.77	0.59%	1.27
Diff	0.42%	2.16	0.41%	2.25