

Man vs. Machine: Quantitative and Discretionary Equity Management

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Abstract

I use machine learning to categorize US active equity mutual funds as quantitative (reliant on computer models and fixed-rules) or discretionary (reliant on human judgment). I then formulate hypotheses of how their holdings and performance might differ, based on the conjecture that quantitative funds might have more learning capacity but less flexibility to adapt to changing market conditions than discretionary funds. Consistent with those hypotheses, I find that quantitative funds hold more stocks, specialize in stock picking, and engage in more overcrowded trades. Discretionary funds hold lesser-known stocks, switch between picking and timing and outperform quantitative funds in recessions.

Keywords: Investment Management, Quantitative Mutual Funds, Machine Learning, Rational Inattention.

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INTERNET APPENDIX

Contents

A Training Sample	3
A.1 Expert Selection	3
B Classification	4
B.1 Random Forest Algorithm	4
B.2 Examples of Classified PIS sections	7
C Switchers	8
D Rater Disagreement	9
E Accuracy in the Wild	10
F Training Sample Alternative Threshold	12
G Placebo Classifications	23
G.1 Construction	23
G.2 Regressions	23
H Dynamic high-ability measures	39
I Technological Changes	40
I.1 Analysis	40
I.2 Results	40
J Alternative performance measurement	47
J.1 Monthly frequency	47
J.2 Alpha constructed from after fee returns	50
J.3 Alpha Measured as the intercept of the rolling regressions	53

A Training Sample

The following section contains details regarding the collection of the pre-classified PIS sample utilized for training the random forest algorithm to recognize quantitative or discretionary strategy descriptions. The sample classifications were collected through IRB # AAAS3044, which contains the full procedure utilized in selecting classifiers, explaining the task at hand and handling the collected data.

A.1 Expert Selection

Students interested in participating in the training sample labeling had to provide answers to the following list of questions:

1. Which degree are you currently enrolled in?
2. How many Finance courses have you taken in your Academic career?
 - List the most relevant courses
3. Have you ever participated in a Research Project in Finance?
 - If yes, what project (if more than one, mention the most relevant)?
4. Have you ever worked in the Finance industry for an investment company or another related job?
 - If yes, what was your role (if more than one, mention the most relevant)?
5. Are you an English language native speaker?
6. If not, please answer the following questions:
 - Have you completed a degree in an English-speaking country?
 - If yes, what type of degree (e.g. High School, Bachelor, Masters, ...)?
 - If not, have you studied for at least 3 years in an English-speaking country? What type of degree were you studying for (e.g. High School, Bachelor, Masters, ...)?

- Have you ever worked in an English-speaking country?
 - If yes, for how long?

B Classification

B.1 Random Forest Algorithm

The random forest is a type of decision tree classifier, specifically it is an ensemble of decision trees, whose final classification is decided by majority voting.

Binary decision tree classifiers consist in breaking down the data into subsets by asking a series of questions inferred from the training sample. More specifically at the root of the tree the algorithm computes the information gain obtained by splitting the data according to each feature in the features matrix. The feature that determines the highest information gain is chosen and the training sample is split into two sub-samples according to the chosen feature. The second iteration includes two nodes, for each of the two nodes the same procedure is repeated and so on iteratively until all samples at each node belong to the same class. In order to avoid overfitting a limit to the maximum depth of the tree is usually set – this is referred to as pruning. In a binary tree the information gain which is maximized at every split is defined as the difference in impurity between the parent node and the two children nodes:

$$IG(Node_{parent}, f) = I(Node_{parent}) - \frac{N_{left}}{N_p} I(Node_{leftchild}) - \frac{N_{right}}{N_p} I(Node_{rightchild})$$

where $IG(Node_{parent}, f)$ is the information gain at the parent node for feature f and N_p , N_{right} and N_{left} are the number of samples in the parent node, the right and the left children nodes respectively.

The impurity measure $I(node)$ used in this paper is entropy:

$$I(node) = - \sum_{i=1}^{class} p(i|node) \log_2 p(i|node)$$

where $p(i|node)$ is the proportion of samples in the node that belong to class i – hence entropy is 0 when all samples in a node belong to the same class and it is maximum when

samples are uniformly distributed across classes.

Figure B.1 represents graphically a single decision tree pruned at 3 branches. The representation was created utilizing all pre-classified samples (training and testing).¹

When utilizing a single decision tree, strong overfitting issues are generally encountered. A way to minimize these issues is to employ a random forest.

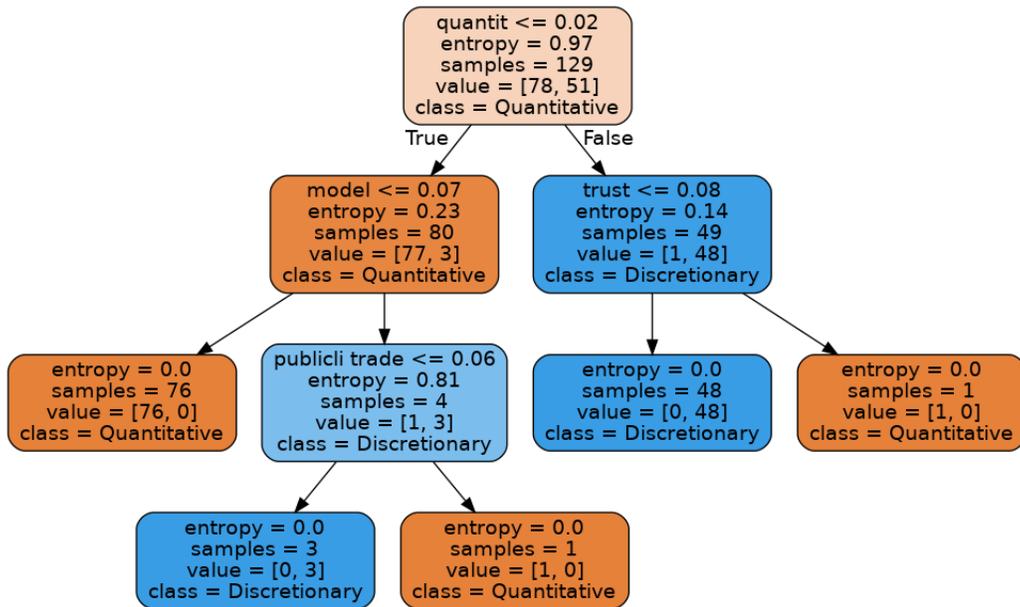
The random forest algorithm can be described in four steps:

1. Randomly choose a sample of size n from the training sample with replacement
2. Grow a decision tree from the selected sample. At each node:
 - (a) Randomly select f features from the features matrix without replacement
 - (b) Among the selected subset of features (f) choose the one that maximizes the information gain and split the node according to that feature
3. Repeat the above 2 steps k times and record the classification of each item in the training sample by each of the k trees
4. Use majority voting to assign a final classification to each item in the training sample

The key parameter to be chosen is the number of trees in the random forest (k), the larger the number the better the prediction but the higher the computational burden. In this paper 1,000 trees were used.

¹This was created for illustration purposes only. This tree was not used in creating the classification.

Figure B.1: **Single decision tree example:** Graphical illustration of the decision making process of a single decision tree. The tree was constructed using the 129 pre-classified sections utilized in training the random forest algorithm (78 pre-classified as *Discretionary* and 51 pre-classified as *Quantitative*)—i.e. it excludes the pre-classified sections belonging to the test sample. Each box displays the stemmed feature (word or bi-gram) with the highest entropy, on the bases of which splitting is decided. Each box additionally displays the computed entropy (to be minimized), the number of total samples, and the number of samples assigned a quantitative or discretionary label. The tree is pruned to have a depth of 3. This tree is just for illustration purposes. This specific tree was not utilized in the creation of the classification utilized in the paper.



B.2 Examples of Classified PIS sections

Excerpt from a PIS section categorized as belonging to a *Quantitative* fund.²

The Fund will be broadly diversified across companies and industries and will invest in companies that the Adviser has identified to have stable businesses with low leverage, low earnings-per-share variability and other measures of risk and high profitability. The Adviser believes that the stocks of these types of companies tend to be lower "beta" stocks and that lower "beta" stocks generally are less volatile than higher "beta" stocks (that is, their value has a lower sensitivity to fluctuations in the securities markets). The Adviser expects low "beta" stocks to produce higher risk-adjusted returns over a full market cycle than high "beta" stocks. The Fund is actively managed and the Adviser will vary the Fund's exposures to issuers and industries based on the Adviser's evaluation of investment opportunities. In constructing the portfolio, the Adviser uses quantitative models, which combine active management to identify quality companies and statistical measures of risk to assure diversification by issuer and industry. (AQR US Defensive Equity Fund. September 2014)

Excerpt from a PIS section categorized as belonging to a *Discretionary* fund.

Sentinel attempts to identify companies that are expected to grow as a result of the potential long-term return from their investment in research, development, capital spending and market expansion. In addition, Sentinel looks for companies that it perceives to be attractively valued relative to their future growth prospects, as well as to that of the market as a whole. Sentinel utilizes a blended "top-down" and "bottom-up" approach. In top-down analysis, focus is on such macroeconomic factors as inflation, interest and tax rates, currency and political climate. In bottom-up analysis, focus is on company-specific variables, such as competitive industry dynamics, market leadership, proprietary products and services, and management expertise, as well as on financial characteristics, such as returns on sales and equity, debt/equity ratios and earnings and cash flow growth. (Sentinel Capital Growth Fund. March 2008)

²The full strategy descriptions were utilized for the categorization. I am reporting excerpts for brevity.

C Switchers

In order to show that classification changes reflect changes in behavior, I focus on switching funds (funds that change *Quant* status in their lifetime). I then check whether the similarity in portfolio allocation between switching funds and the average *Quantitative* fund is greater in months in which they receive a *Quantitative* assignment, through the following regressions:

$$D_{jt} = \alpha + \beta_1 Quant_{jt} + \beta_2 Quant_{jt} \times Recession_t + \gamma X_{jt} + \eta_t + \theta_j + \epsilon_{jt} | Switcher = 1 \quad (1)$$

for $D_{jt} = [Comm_{jt}^Q, AComm_{jt}^Q, \ln(Disp^Q)_{jt}]$, indicating the portfolio commonality or dispersion of fund j relative to all funds classified as quantitative in month t . *Switcher* is an indicator variable equal to 1 for funds that at any point in time change classification. θ_j indicates fund fixed-effects. All other regression specifications are equivalent to those described for Eq. ?? in the main body of the paper. The outcome of those regressions is displayed in Table C.1, which shows a significant β_1 in all models, providing support to the assumption that changes in language reflect changes in behavior.³

³ β_1 is positive (negative) when using commonality (dispersion) as dependent variable—Models 1-2 (3).

Table C.1: **Switchers:** Dependent variables: holdings commonality ($Comm^Q$), active commonality ($AComm^Q$) and dispersion ($\ln(Disp^Q)$) of switching funds relative to the average quantitative fund. Independent variables and all regression specifications are the same as described in Table ??, in the paper’s body. Control variables are omitted for brevity.

	(1) $Comm^Q$	(2) $AComm^Q$	(3) $\ln(Disp^Q)$
<i>Constant</i>	15.832*** (35971.83)	8.541*** (31645.54)	0.215*** (2289.03)
<i>Quant</i>	0.607*** (3.82)	0.412** (2.27)	-0.175*** (-5.04)
<i>Quant</i> × <i>Recess</i>	0.191 (1.00)	0.188 (0.95)	-0.053 (-1.06)
Adjusted R^2	0.87	0.78	0.44
Obs	87,529	87,529	87,529
Controls	Yes	Yes	Yes
FE: Month+Fund	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D Rater Disagreement

As a further robustness test of rater agreement I re-train the machine learning algorithm by splitting the sample to include 75% and 25% of students (8 and 2 students respectively).

I build a summary classification based on a 50% level of agreement for both samples (i.e., based on the classification of 8 randomly selected students and on that of the remaining 2 students). I chose a 50% level of agreement given the small size of the 2-students sample. I then randomly select 75% of prospectuses to belong to the training set and 25% to the test set. I train the random forest algorithm on the 8-students summary classification, for the prospectuses in the training set. I then test the accuracy of the algorithm in classifying the sections in the test set, based on the summary classification provided by the 2 remaining students. I achieve a test accuracy of 91.07%, which corresponds to a 94% precision and 92% recall for discretionary sections and an 85% precision and 89% recall for quantitative sections. Results are comparable to those obtained in the baseline model, as described in the papers main Appendix, alleviating concerns of high disagreement among classifiers.

E Accuracy in the Wild

In order to assess the accuracy of the classification in the wild—i.e. among PIS sections that did not belong to the training sample—I asked three students to classify a random selection of 250 PIS sections that had been previously classified (*test sample (wild)*) following the methodology outlined in the paper’s main Appendix. The experiment was run similarly to the one utilized to obtain the training sample.⁴ Students were provided the same set of instructions as those provided to the original classifiers and were asked to categorize as *Quantitative* or *Discretionary* the PIS sections in the *test sample (wild)*. Importantly, they were not made aware of how the random forest algorithm had previously categorized those same sections. The *test sample (wild)* was chosen randomly among all classified sections as follows: first, I excluded the 500 sections that belonged to the training sample; next, I randomly selected one PIS section per fund; finally, among the remaining sections, I randomly selected 125 that the random forest had classified as *Quantitative* and 125 that it had classified as *Discretionary*.

All students agreed on a *Discretionary* assignment for 128 sections, 115 of which had been classified as *Discretionary* by the random forest algorithm. At least two of the three students then agreed on a *Quantitative* assignment for the majority of the remaining sections. To assess the goodness of the random forest in the *test sample (wild)* I built two summary classifications from the answers of the three students to utilize as ground truth: method (1) I consider as *Quantitative* those sections that at least one student classified as such; method (2) I consider as *Quantitative* those sections that at least two students classified as such. I then compute the overall accuracy, recall, precision, Fleiss Kappa and Gwet’s gamma of the random forest classification relative to these summary classifications.

Utilizing method (1) the random forest classification displays a 90.8% level of observed agreement (Accuracy), an 81.6% Fleiss Kappa, and an 81.6% Gwet’s gamma with respect to the summary classification.⁵ That corresponds to a 92% precision and a 90% recall (90% precision and a 92% recall) for the *Discretionary* (*Quantitative*) assignments (confusion matrix in Panel 1 of Table E.1). Utilizing Method (2) the random forest classification

⁴Students were all Master Students at Columbia University, coming from a variety of programs and were fluent in the English language.

⁵Here Fleiss Kappa and Gwet’s gamma have the same score as there is no skewness in the classification distribution by construction (I selected 125 sections classified as quantitative and 125 as discretionary).

displays an 84% level of observed agreement (Accuracy), a 67.65% Fleiss Kappa, and a 67.99% Gwet’s gamma with respect to the summary classification. That corresponds to a 94% precision and a 78% recall (74% precision and a 93% recall) for the *Discretionary* (*Quantitative*) assignments (confusion matrix in Panel 2 of Table E.1).

Given the small scale of this experiment and the fact that the outcome is still quite close to that obtained in the training sample; I assume the accuracy of the classification in the full sample to be comparable to that obtained in the training sample.

Table E.1: **Confusion Matrices:** Confusion matrices in assessing the quality of the random forest classification in the wild, utilizing method (1) to construct a summary classification (Panel 2) and utilizing method (2) (Panel 3). Rows indicate Random Forest assignments, columns indicate human assignments; 0 indicates *Discretionary* assignments, 1 *Quantitative*.

	<i>Method (1)</i>				<i>Method (2)</i>		
	<i>Human</i>				<i>Human</i>		
	0	1		0	1		
<i>Random Forest</i>	0	115	10	<i>Random Forest</i>	0	118	7
<i>Random Forest</i>	1	13	112	<i>Random Forest</i>	1	33	92

F Training Sample Alternative Threshold

I replicate the paper’s key results by utilizing a 50% agreement threshold for training sample construction. In baseline results I construct a summary classification utilizing a 75% agreement threshold—i.e., I consider as quantitative those sections for which at least 8 out of the 10 reliable classifiers agree on a quantitative assignment. Here I lower that threshold to 50%—i.e. I construct a summary classification by considering as quantitative those sections for which at least 6 out of the 10 reliable classifiers agree on a quantitative assignment.

Table F.1: **Age, Size and Style:** Dependent variables: funds’ age ($\ln(\text{Age})$), size ($\ln(\text{TNA})$), turnover ratio (Turnover), the amount of cash held in percentage of TNA (Cash), and style (Market , Size , Value , Mom , Invest. and Profit.). Independent variables: a dummy identifying quantitative funds (Quant); the interaction between Quant and a dummy identifying NBER recession dates ($\text{Quant} \times \text{Recess}$); expense ratio (Expenses); turnover ratio (Turnover); growth in net fund flows (FlowsGrowth); the volatility in net fund flows growth (FlowsVol); total fund loads (Loads); fund style, size and age as listed above. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. All explanatory variables are de-measured such that the Constant can be interpreted as the unconditional mean of the dependent variable for Discretionary funds. Control variables have been omitted for brevity. Each regression excludes the control variable corresponding to the dependent variable. All regressions include month fixed-effects (FE); standard errors are clustered at the month and fund level (Cl).

	ln(Age) (1)	ln(TNA) (2)	Turnover (3)	Cash (4)	Market (5)	Size (6)	Value (7)	Mom (8)	Investment (9)	Profitability (10)
Constant	4.88*** (396.53)	5.61*** (198.45)	80.26*** (83.63)	3.01*** (70.10)	0.73*** (783.04)	0.16*** (31.34)	0.04*** (18.11)	-0.02*** (-15.35)	-0.06*** (-32.37)	-0.05*** (-27.99)
Quant	-0.09*** (-3.45)	-0.32*** (-5.41)	26.16*** (10.60)	-0.49*** (-5.22)	0.01** (2.42)	-0.02* (-1.73)	0.01** (2.10)	0.01*** (4.31)	0.01** (2.56)	0.03*** (6.21)
Quant X Recess	-0.03 (-1.18)	0.07 (1.23)	-4.53 (-1.58)	-0.32** (-2.14)	0.01 (1.55)	-0.01 (-0.59)	0.01 (1.00)	0.01 (1.56)	0.00 (0.45)	-0.01 (-0.73)
R2	0.28	0.31	0.14	0.08	0.94	0.15	0.36	0.18	0.16	0.30
Obs	331,660	331,660	331,660	314,850	331,660	331,660	331,660	331,660	331,660	331,660

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.2: **Flows and Fees:** Dependent variables: growth in net fund flows (*FlowGrowth*), the volatility of net fund flows growth (*FlowVol*), funds' expense ratio (*Expenses*), management fees (*Mgmt*), Actual 12b1 fees (*12b1*) and fund loads (*Loads*). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables and all regression specifications are the same as described in Table F.1. Control variables are omitted for brevity.

	<i>Flow</i>		<i>Fees</i>			
	<i>Growth</i> (1)	<i>Vol</i> (2)	<i>Expenses</i> (3)	<i>Mgmt</i> (4)	<i>12b1</i> (5)	<i>Loads</i> (6)
Constant	-0.076*** (-4.45)	0.039*** (82.94)	1.212*** (214.52)	0.718*** (148.05)	0.244*** (45.98)	0.009*** (41.10)
Quant	-0.067 (-1.18)	0.001 (0.66)	-0.060*** (-4.97)	-0.016 (-1.47)	0.005 (0.43)	-0.000 (-1.02)
Quant X Recess	-0.336*** (-2.97)	0.003 (0.91)	-0.008 (-0.55)	-0.023* (-1.78)	0.003 (0.32)	-0.001 (-1.62)
R2	0.06	0.08	0.35	0.07	0.31	0.19
Obs	331,660	331,660	331,660	331,320	227,653	331,660

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table F.3: **Investment Style:** Dependent variables: funds' excess return (*ExcessRet*), for quantitative (Model (1)) or discretionary (Model (2)) funds; Fama-French 6-factor idiosyncratic volatility (*IVol - ff6*). Models (1)-(2) include all control variables as described in Table F.1 plus factor returns as per Fama-French 6 factor model (*MKT*, *HML*, *SMB*, *UMD*, *RMW*, *CMA*). Models (3)-(4) include the same independent variables as described in Table F.1. Control variables are omitted for brevity. All regression specifications are the same as detailed in Table F.1. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body.

	<i>ExcessRet</i>		<i>ln(IVol - ff6)</i>	
	<i>Quant</i> (1)	<i>Discretionary</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	-0.216*** (-6.19)	-0.072* (-1.85)	-0.062*** (-9.90)	0.046*** (7.12)
Quant			-0.092*** (-6.09)	-0.091*** (-5.96)
Quant X Recess			0.033* (1.88)	0.033* (1.93)
MKT	101.726*** (73.76)	101.562*** (68.28)		
HML	1.715 (0.64)	1.007 (0.42)		
SMB	21.452*** (9.65)	20.988*** (10.93)		
UMD	3.896*** (3.13)	0.929 (0.76)		
RMW	4.397* (1.95)	2.215 (1.24)		
CMA	-5.698* (-1.90)	-3.554 (-1.25)		
R2	0.836	0.796	0.474	0.495
Obs	52,122	279,490	314,100	291,782

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.4: **Hp. ??: High Ability Funds:** Graphical representation of regression coefficients. Panel 1 Dependent variables: macro-timing in recessions with respect to innovations in industrial production ($IndPro (R)$) or non-farm payrolls ($NFPay (R)$); and characteristic-timing in recessions ($DGTW (R)$). Panel 2 Dependent variables: stock picking in recessions and macro-timing in expansions with respect to earning surprises ($Picking (R)$) and innovations in industrial production ($IndPro (E)$) or non-farm payrolls ($NFPay (E)$) respectively; and characteristic-timing in expansions ($DGTW (E)$). Independent variables: a dummy identifying quantitative funds ($Quant$), dummy variables identifying the top $q\%$ of funds with the highest timing ability in recessions ($TopT_R$) or picking ability in expansions ($TopP_E$); and the interaction between the $Quant$ dummy (in interactions abbreviated with: Q) and the high-ability dummies ($TopP_ExQ$, $TopT_RxQ$). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Coefficients are estimated using high-ability cut-offs of $q = 10\%$ to $q = 25\%$. Bars indicate 10% confidence intervals. Control variables and all regression specifications are the same as described in Table F.1. Control variables are omitted for brevity.

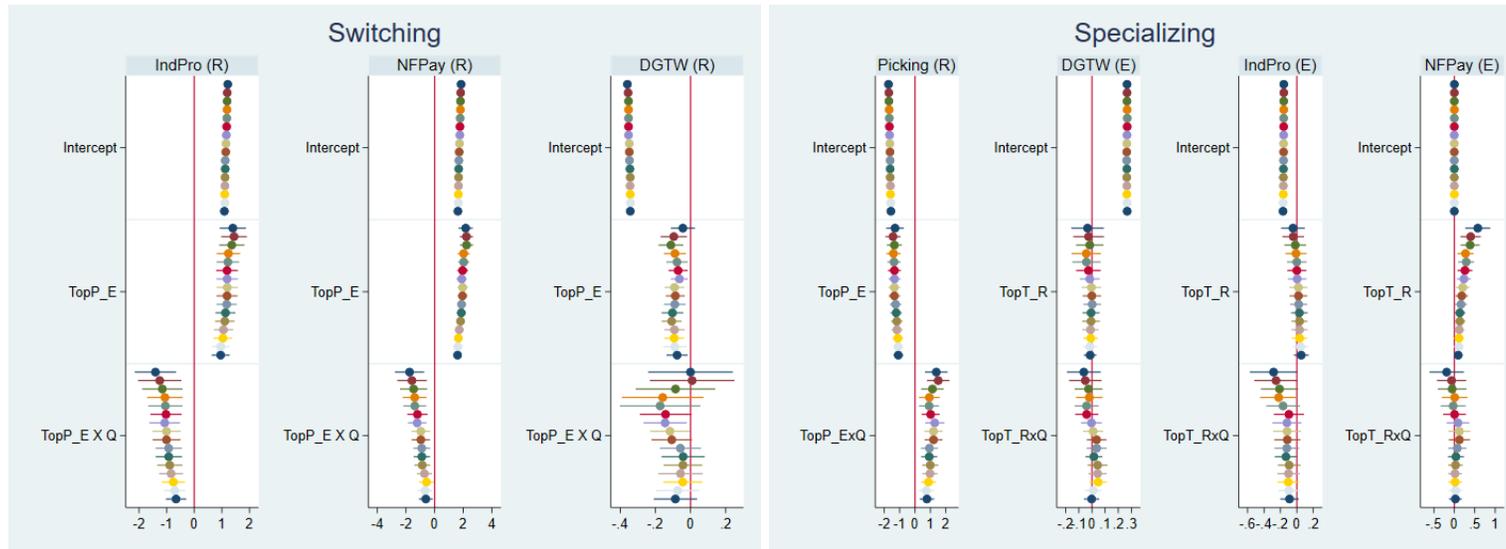


Table F.5: **Hp. ??: Average Picking and Timing Abilities:** All Models in Panel 1 (2) are run using only observations from NBER recession (expansion) months. Dependent variables: stock picking (SP_SUE), macro-timing (MT_IndPro , MT_NFPay) and characteristics-timing (CT_DGTW) abilities. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Independent variables and all regression specifications are the same as described in Table F.1. Control variables are omitted for brevity.

<i>Recessions</i>				
	SP_SUE	MT_IndPro	MT_NFPay	CT_DGTW
	(1)	(2)	(3)	(4)
Constant	-1.7805*** (-53.83)	1.2776*** (53.92)	1.9447*** (60.31)	-0.3612*** (-288.52)
Quant	0.4878*** (5.19)	-0.3311*** (-3.84)	-0.4915*** (-5.04)	0.0156 (0.45)
R2	0.14	0.42	0.21	0.79
Obs	37,874	37,874	37,874	37,874
<i>Expansions</i>				
	SP_SUE	MT_IndPro	MT_NFPay	CT_DGTW
	(1)	(2)	(3)	(4)
Constant	0.0635*** (7.89)	-0.1617*** (-29.93)	0.0143** (2.06)	0.2654*** (397.75)
Quant	-0.0462* (-1.67)	0.0162 (0.96)	0.0256 (1.18)	0.0064 (0.36)
R2	0.14	0.22	0.33	0.38
Obs	255,930	255,930	255,930	255,930
Controls	Yes	Yes	Yes	Yes
FE: Month	Yes	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.6: **Hp. ??: Portfolio Diversification:** Dependent variables: the natural log of the number of stocks held ($\ln(NStocks)$), and of the volatility of fund returns ($\ln(RetVol)$). Independent variables and all regression specifications are the same as described in Table F.1; control variables are omitted for brevity. Model (6) also controls for the percentage of cash held ($Cash$). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body.

	$\ln(NStocks)$		$\ln(RetVol)$	
	(1)	(2)	24m (3)	36m (4)
Constant	4.451*** (341.53)	4.457*** (328.12)	1.489*** (636.47)	1.527*** (627.97)
Quant	0.211*** (7.09)	0.220*** (7.25)	-0.023*** (-4.09)	-0.025*** (-4.39)
Quant X Recess	0.022 (0.73)	0.017 (0.53)	0.021*** (2.78)	0.027*** (3.60)
Cash		-0.021*** (-9.44)		
R2	0.19	0.16	0.77	0.77
Obs	331,660	314,850	314,100	291,782
Controls	Yes	Yes	Yes	Yes
FE: Month	Yes	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.7: **Hp. ??: Information Gap:** Dependent variables: TNA-weighted average of the natural log of market capitalization ($\ln(MktCap)$), of the natural log of monthly media mentions ($\ln(News)$); of age in months (Age), and of the number of analysts following the stocks held ($Analysts$). Independent variables are the same as described in Table F.1. Control variables are omitted for brevity. Models (3)-(8) also control for the illiquidity of stocks held—measured using Amihud ratio—($Illiquidity$). Models (4), (6), and (8) additionally control for $\ln(MktCap)$. Model (1) excludes from the control variables set the size style ($Size$). All regression specifications are the same as described in Table F.1. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	<i>Stock Characteristics</i>							
	$\ln(MktCap)$		Age		$\ln(News)$		$Analysts$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Constant</i>	9.713*** (277.97)	9.713*** (609.07)	316.063*** (253.40)	316.063*** (319.38)	4.371*** (408.41)	4.371*** (882.84)	8.055*** (307.08)	8.055*** (536.90)
<i>Quant</i>	0.102 (1.38)	0.028 (0.81)	11.457*** (4.04)	10.119*** (4.59)	0.037 (1.54)	0.019 (1.51)	-0.033 (-0.52)	-0.071* (-1.87)
<i>Quant</i> \times <i>Recess</i>	-0.016 (-0.25)	-0.040 (-1.09)	-0.727 (-0.19)	1.229 (0.41)	-0.033 (-1.21)	-0.008 (-0.44)	-0.068 (-1.00)	-0.012 (-0.21)
<i>Size</i>		-4.000*** (-125.02)	-200.835*** (-52.17)	-6.761 (-1.32)	-2.301*** (-67.05)	0.101** (2.13)	-6.361*** (-26.12)	-0.839** (-2.38)
<i>Illiquidity</i>			7.187** (2.41)	22.662*** (5.35)	-0.050*** (-2.72)	0.142*** (3.47)	-0.428*** (-4.45)	0.012 (0.17)
$\ln(MktCap)$				48.670*** (42.52)		0.602*** (61.15)		1.385*** (18.91)
Adjusted R^2	0.10	0.60	0.50	0.69	0.52	0.85	0.63	0.76
Obs	331,656	331,656	331,656	331,656	331,510	331,510	331,656	331,656
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE: Month	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.8: **Hp. ?? Commonality:** Dependent variables: holdings commonality ($Comm$), active commonality ($AComm$), and the natural log of dispersion ($Log(Disp)$). Independent variables and all regression specifications are the same as described in Table F.1. Control variables are omitted for brevity. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	$Comm$ (1)	$AComm$ (2)	$ln(Disp)$ (3)
Constant	12.076*** (188.33)	6.534*** (132.27)	0.243*** (17.23)
Quant	2.537*** (16.51)	1.311*** (11.82)	-0.090*** (-2.88)
Quant X Recess	0.521** (2.32)	0.434** (2.26)	-0.139*** (-3.40)
R2	0.58	0.54	0.16
Obs	331,660	331,660	331,656
Controls	Yes	Yes	Yes
FE: Month	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.9: **Hp. ??: Performance:** Dependent variables: performance measured as the 24-months (Models (1) – (3)) and 36-months (Models (4) – (6)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *Alpha* is constructed monthly and then averaged across all months in a quarter. *VA* is obtained by multiplying those quarterly *Alphas* by beginning of quarter $\ln(TNA)$. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Regressions are run separately for recession (Models (1) – (2)) and expansion (Models (3) – (4)) quarters, identified using NBER business cycle dates. Independent variables are the same as described in Table F.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects (*FE*); standard errors are clustered at the quarter and fund level (*Cl*).

	<i>Alpha – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	1.011*** (201.75)	0.995*** (455.18)	1.121*** (473.92)	1.098*** (489.11)
Quant	-0.118*** (-3.38)	-0.108*** (-3.29)	-0.024* (-1.97)	-0.027** (-2.28)
R2	0.19	0.18	0.30	0.28
Obs	13,527	12,499	86,974	80,996

	<i>VA – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	5.525*** (165.55)	5.508*** (269.91)	6.164*** (336.46)	6.132*** (339.91)
Quant	-0.506** (-2.59)	-0.457** (-2.40)	-0.064 (-0.97)	-0.084 (-1.23)
R2	0.20	0.18	0.31	0.29
Obs	13,527	12,499	86,974	80,996

Controls	Yes	Yes	Yes	Yes
FE: Quarter	Yes	Yes	Yes	Yes
Cl: Quarter+Fund	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.10: **Hp. ??: Performance and Information Gap:** Dependent variable: performance measured as the 24-months (Models (1)-(3)), and 36-months (Models (4)-(6)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural logarithm of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(News)$), the natural logarithm of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables are the same as described in Table F.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects (*FE*); standard errors are clustered at the quarter and fund level (*Cl*).

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.081*** (348.71)	6.082*** (340.43)	6.081*** (338.91)	6.051*** (345.65)	6.052*** (338.06)	6.052*** (337.11)
Quant	-0.620*** (-3.57)	-0.498** (-2.42)	-0.780** (-2.46)	-0.666*** (-3.72)	-0.505** (-2.45)	-0.762** (-2.39)
Quant X Recess	-0.343* (-1.93)	-0.374** (-2.20)	-0.341* (-1.98)	-0.416** (-2.28)	-0.446** (-2.48)	-0.414** (-2.29)
Age	-0.003*** (-2.88)			-0.002** (-2.31)		
Age X Quant	0.002*** (4.09)			0.002*** (4.11)		
$\ln(News)$		-0.197** (-2.04)			-0.138 (-1.41)	
$\ln(News)$ X Quant		0.104** (2.35)			0.105** (2.36)	
$\ln(MktCap)$			-0.166** (-2.27)			-0.139* (-1.98)
$\ln(MktCap)$ X Quant			0.073** (2.41)			0.071** (2.33)
R2	0.29	0.29	0.29	0.27	0.27	0.27
Obs	99,758	99,718	99,757	92,799	92,768	92,798
Controls	Yes	Yes	Yes	Yes	Yes	Yes
FE: Month	Yes	Yes	Yes	Yes	Yes	Yes
Cl: Month+Fund	Yes	Yes	Yes	Yes	Yes	Yes

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.11: **Hp. ??: Performance and Commonality or Overcrowding:** Dependent variable: performance measured as the 24-months (Models (1) and (3)), and 36-months (Models (2) and (4)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. All other independent variables are the same as described in Table F.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects (*FE*); standard errors are clustered at the quarter and fund level (*Cl*).

	<i>VA – ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
<i>Constant</i>	6.08*** (339.36)	6.05*** (337.14)	6.08*** (340.12)	6.05*** (337.68)	6.08*** (340.20)	6.05*** (338.08)	6.08*** (341.30)	6.05*** (338.93)
<i>Quant</i>	-0.20 (-1.54)	-0.21 (-1.62)	-0.07 (-0.68)	-0.07 (-0.64)	-0.39** (-2.65)	-0.39*** (-2.72)	-0.18 (-1.55)	-0.18 (-1.62)
<i>Quant</i> × <i>Recess</i>	-0.35** (-2.00)	-0.42** (-2.35)	-0.34* (-1.94)	-0.42** (-2.34)	-0.28 (-1.59)	-0.36* (-1.96)	-0.32* (-1.90)	-0.40** (-2.18)
<i>Comm</i>	-0.04** (-2.01)	-0.03 (-1.59)						
<i>Comm</i> × <i>Quant</i>	0.02** (2.15)	0.02* (1.95)						
<i>AComm</i>			-0.05** (-2.46)	-0.04** (-2.01)				
<i>AComm</i> × <i>Quant</i>			0.01 (0.89)	0.01 (0.66)				
<i>OC</i>					-0.02** (-2.27)	-0.02* (-1.92)		
<i>OC</i> × <i>Quant</i>					-0.04 (-0.57)	-0.02 (-0.23)		
<i>AOC</i>							-0.03*** (-2.89)	-0.03** (-2.51)
<i>AOC</i> × <i>Quant</i>							-0.17 (-1.37)	-0.13 (-1.10)
Adjusted R^2	0.29	0.27	0.29	0.27	0.29	0.27	0.29	0.27
Obs	99,759	92,800	99,759	92,800	99,759	92,800	99,759	92,800
Controls	Yes							
FE: Month	Yes							
Cl: Month+Fund	Yes							

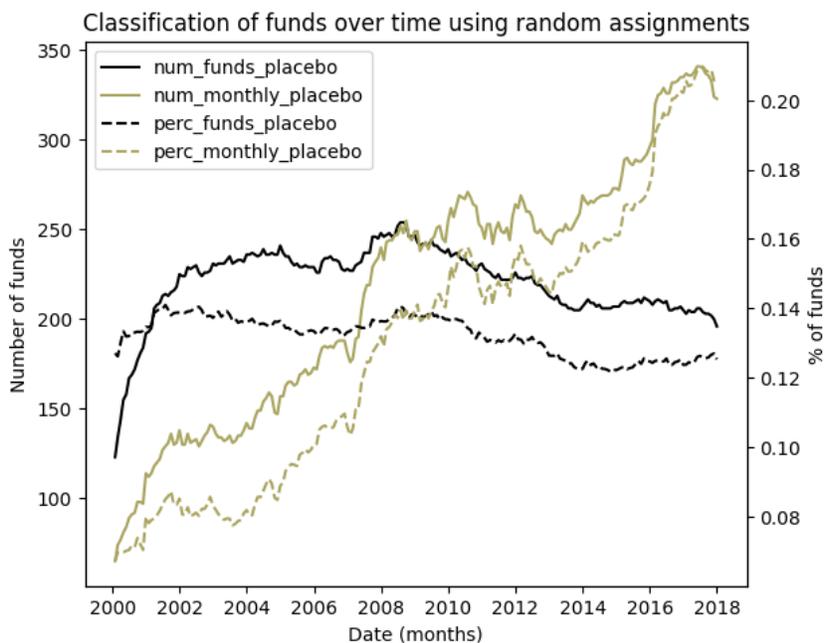
t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

G Placebo Classifications

G.1 Construction

The first placebo (*funds_placebo*) takes as input the overall percentage of observations classified as being quantitative (13.05%), then randomly selects 13.05% of funds from the overall sample (415 funds) and it permanently assigns a value of 1 to those funds (0 otherwise). The second (*months_placebo*) is constructed by randomly assigning a value of 1 every month to as many observations as those classified to belong to quantitative funds in that month (0 otherwise). Figure G.1 shows both the number of funds and the percentage of funds assigned to the two placebo classifications over time.

Figure G.1: **Placebo classifications:** Number of funds (left index) and percentage of funds (right index) belonging to the two placebo classifications over time.



G.2 Regressions

I replicate all regressions in the paper using the two placebo classifications instead of the quantitative classification constructed using the random forest algorithm. All results are included below.

Table G.1: **Age, size and style:** Dependent variables: funds' age ($\ln(\text{Age})$), size ($\ln(\text{TNA})$), turnover ratio (Turnover), the amount of cash held in percentage of TNA (Cash), and style (Market , Size , Value , Mom , Invest. and Profit.). Independent variables: funds_placebo (F – Panel 1) and months_placebo (M – Panel 2) dummies and their interaction with a dummy identifying NBER recessions periods (Recess); expense ratio (Expenses); turnover ratio (Turnover); growth in net fund flows (FlowsGrowth); the volatility in net fund flows growth (FlowsVol); total fund loads (Loads); fund style, size and age as listed above. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. All explanatory variables are de-measured such that the Constant can be interpreted as the unconditional mean of the dependent variable for Discretionary funds. Control variables have been omitted for brevity. Each regression excludes the control variable corresponding to the dependent variable. All regressions include month fixed-effects (FE); standard errors are clustered at the month and fund level (Cl).

	$\ln(\text{Age})$ (1)	$\ln(\text{TNA})$ (2)	Turnover (3)	Cash (4)	Market (5)	Size (6)	Value (7)	Mom (8)	Invest. (9)	Profit. (10)
Constant	4.88*** (396.50)	5.61*** (197.71)	80.26*** (81.92)	3.01*** (69.71)	0.73*** (781.55)	0.16*** (31.33)	0.04*** (18.09)	-0.02*** (-15.25)	-0.06*** (-32.36)	-0.05*** (-27.80)
F	0.06 (1.47)	-0.07 (-0.82)	1.83 (0.62)	0.02 (0.15)	-0.00 (-1.06)	0.00 (0.24)	0.00 (0.34)	-0.00 (-0.40)	-0.01 (-1.01)	-0.01 (-1.40)
F X Recess	0.04* (1.86)	0.03 (0.81)	-0.09 (-0.04)	0.07 (0.43)	-0.00 (-0.27)	0.01 (0.75)	-0.01 (-0.92)	-0.01* (-1.69)	0.00 (0.36)	0.00 (0.19)
R2	0.28	0.31	0.12	0.08	0.94	0.15	0.35	0.18	0.16	0.30
Obs	331,660	331,660	331,660	314,850	331,660	331,660	331,660	331,660	331,660	331,660
Constant	4.88*** (395.97)	5.61*** (197.69)	80.26*** (81.91)	3.01*** (69.70)	0.73*** (781.23)	0.16*** (31.33)	0.04*** (18.09)	-0.02*** (-15.25)	-0.06*** (-32.33)	-0.05*** (-27.77)
M	0.01 (1.55)	-0.01** (-2.18)	0.29 (0.89)	-0.03 (-1.63)	-0.00 (-0.31)	-0.00 (-1.44)	-0.00** (-2.39)	-0.00*** (-2.70)	0.00 (0.86)	0.00* (1.91)
M X Recess	-0.01 (-1.24)	0.04** (2.13)	0.02 (0.01)	-0.03 (-0.55)	-0.00* (-1.75)	0.00 (0.88)	-0.00 (-0.18)	-0.00 (-0.66)	-0.00 (-1.02)	-0.00 (-0.72)
R2	0.28	0.31	0.12	0.08	0.94	0.15	0.35	0.18	0.16	0.30
Obs	331,660	331,660	331,660	314,850	331,660	331,660	331,660	331,660	331,660	331,660

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.2: **Flows and Fees:** Dependent variables: growth in net fund flows (*FlowGrowth*), the volatility of net fund flows growth (*FlowVol*), funds' expense ratio (*Expenses*), management fees (*Mgmt*), Actual 12b1 fees (12b1) and fund loads (*Loads*). Variables construction is detailed in Table ??; summary statistics are reported in Table ??. Independent variables and all regression specifications are the same as described in Table G.1. Control variables are omitted for brevity.

	<i>Flow</i>		<i>Fees</i>			
	<i>Growth</i> (1)	<i>Vol</i> (2)	<i>Expenses</i> (3)	<i>Mgmt</i> (4)	12b1 (5)	<i>Loads</i> (6)
Constant	-0.076*** (-4.44)	0.039*** (82.96)	1.212*** (213.86)	0.718*** (147.92)	0.244*** (45.98)	0.009*** (41.09)
F	0.068 (1.21)	-0.002 (-1.02)	-0.015 (-0.86)	-0.017 (-1.09)	-0.010 (-0.62)	-0.000 (-0.58)
F X Recess	0.052 (0.39)	0.007** (2.35)	0.003 (0.39)	0.001 (0.12)	-0.001 (-0.16)	0.000 (0.05)
R2	0.06	0.08	0.35	0.07	0.31	0.19
Obs	331,660	331,660	331,660	331,320	227,653	331,660
Constant	-0.076*** (-4.44)	0.039*** (82.96)	1.212*** (213.81)	0.718*** (147.94)	0.244*** (45.97)	0.009*** (41.09)
M	0.037 (1.50)	-0.000 (-0.80)	-0.001 (-0.87)	-0.002 (-1.22)	0.002 (1.49)	0.000*** (2.65)
M X Recess	-0.012 (-0.16)	-0.000 (-0.09)	0.003 (0.65)	-0.003 (-0.49)	0.003 (0.66)	-0.000* (-1.88)
R2	0.06	0.08	0.35	0.07	0.31	0.19
Obs	331,660	331,660	331,660	331,320	227,653	331,660

t statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.01

Table G.3: **Hp. ??: High Ability Funds—funds placebo:** Graphical representation of regression coefficients. Panel 1 Dependent variables: macro-timing in recessions with respect to innovations in industrial production ($IndPro (R)$) or non-farm payrolls ($NFPay (R)$); and characteristic-timing in recessions ($DGTW (R)$). Panel 2 Dependent variables: stock picking in recessions and macro-timing in expansions with respect to earning surprises ($Picking (R)$) and innovations in industrial production ($IndPro (E)$) or non-farm payrolls ($NFPay (E)$) respectively; and characteristic-timing in expansions ($DGTW (E)$). Independent variables: a dummy identifying the funds_placebo classification ($F_placebo$), dummy variables identifying the top $q\%$ of funds with the highest timing ability in recessions ($TopT_R$) or picking ability in expansions ($TopP_E$); and the interaction between the $F_placebo$ dummy (in interactions abbreviated with: F) and the high-ability dummies ($TopP_ExQ$, $TopT_RxQ$). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Coefficients are estimated using high-ability cut-offs of $q = 10\%$ to $q = 25\%$. Bars indicate 10% confidence intervals. Control variables and all regression specifications are the same as described in Table G.1. Control variables are omitted for brevity.

26

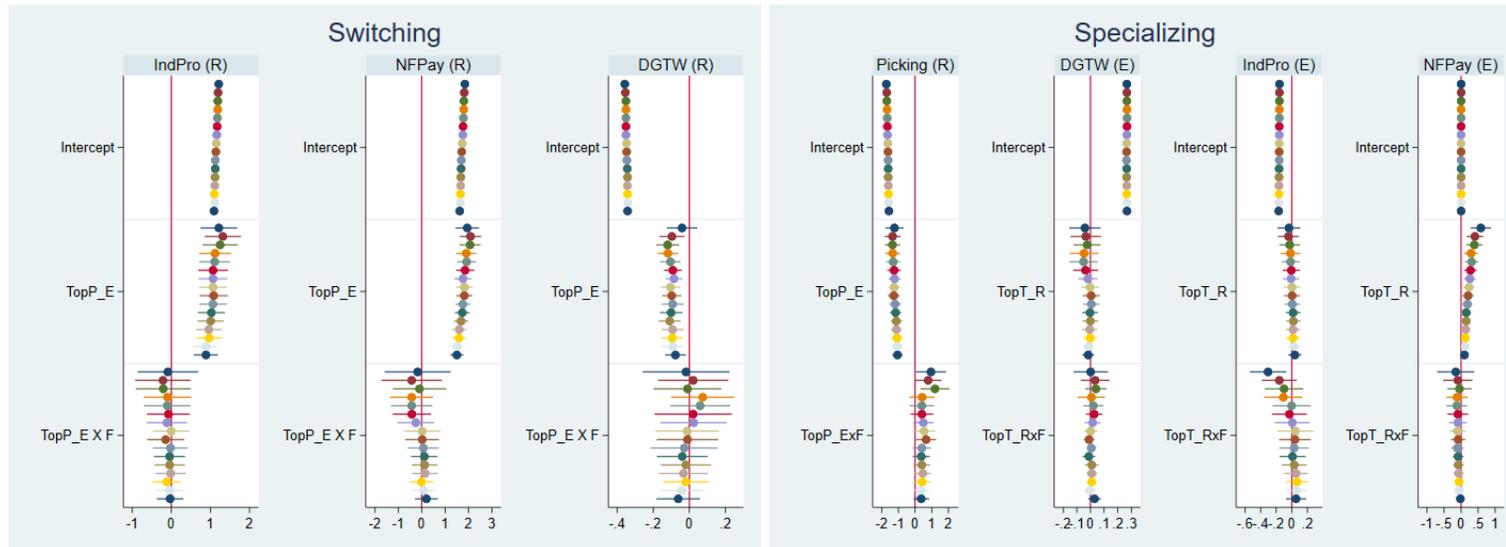


Table G.4: **Hp. ??: High Ability Funds—months placebo:** Graphical representation of regression coefficients. Panel 1 Dependent variables: macro-timing in recessions with respect to innovations in industrial production (*IndPro* (*R*)) or non-farm payrolls (*NFPay* (*R*)); and characteristic-timing in recessions (*DGTW* (*R*)). Panel 2 Dependent variables: stock picking in recessions and macro-timing in expansions with respect to earning surprises (*Picking* (*R*)) and innovations in industrial production (*IndPro* (*E*)) or non-farm payrolls (*NFPay* (*E*)) respectively; and characteristic-timing in expansions (*DGTW* (*E*)). Independent variables: a dummy identifying the months_placebo classification (*M_placebo*), dummy variables identifying the top *q*% of funds with the highest timing ability in recessions (*TopT_R*) or picking ability in expansions (*TopP_E*); and the interaction between the *M_placebo* dummy (in interactions abbreviated with: *M*) and the high-ability dummies (*TopP_ExQ*, *TopT_RxQ*). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Coefficients are estimated using high-ability cut-offs of $q = 10\%$ to $q = 25\%$. Bars indicate 10% confidence intervals. Control variables and all regression specifications are the same as described in Table G.1. Control variables are omitted for brevity.

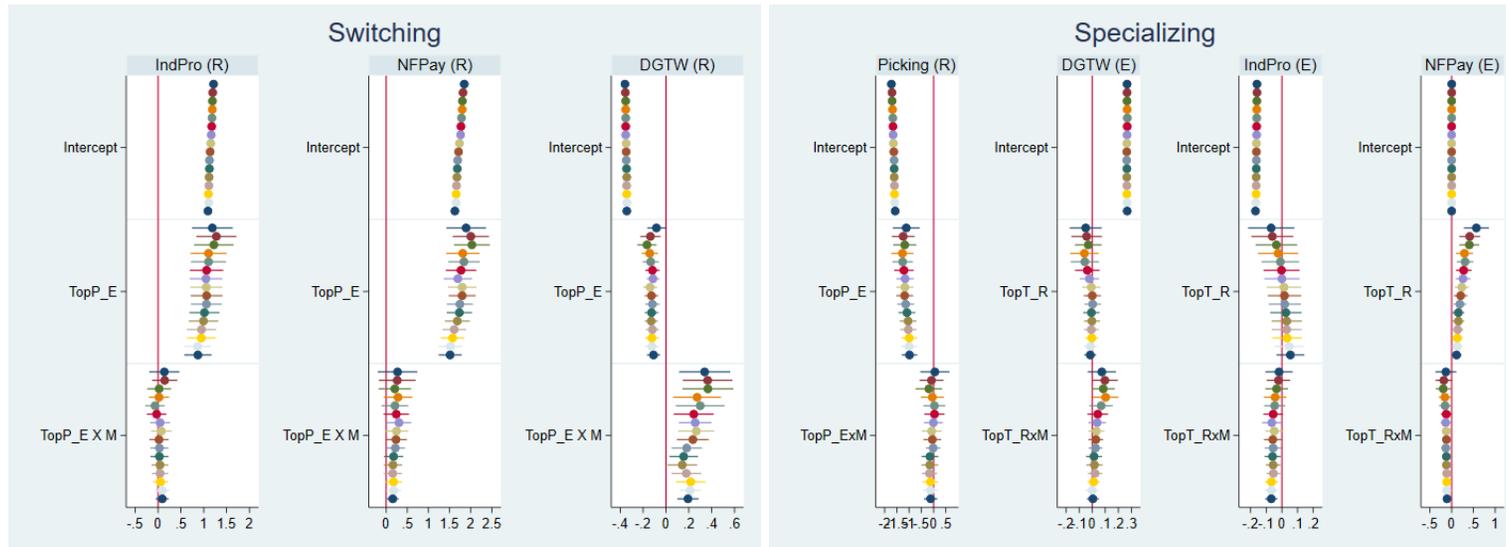


Table G.5: **Hp. ??: Average Picking and Timing Abilities:** All Models in Panel 1 (2) are run using only observations from NBER recession (expansion) months. Dependent variables: stock picking (SP_SUE), macro-timing (MT_IndPro , MT_NFPay) and characteristics-timing (CT_DGTW) abilities. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables and all regression specifications are the same as described in Table G.1. Control variables are omitted for brevity.

<i>Recessions</i>				
	SP_SUE	MT_IndPro	MT_NFPay	CT_DGTW
	(1)	(2)	(3)	(4)
Constant	-1.7805*** (-53.47)	1.2776*** (53.55)	1.9447*** (59.99)	-0.3612*** (-278.75)
F	-0.0066 (-0.07)	0.0742 (1.00)	0.1253 (1.17)	-0.0194 (-0.72)
R2	0.14	0.42	0.21	0.79
Obs	37,874	37,874	37,874	37,874
Constant	-1.7805*** (-53.47)	1.2776*** (53.54)	1.9447*** (59.94)	-0.3612*** (-278.10)
M	-0.0064 (-0.16)	0.0126 (0.52)	0.0327 (1.02)	0.0111 (0.37)
R2	0.14	0.42	0.21	0.79
Obs	37,874	37,874	37,874	37,874
<i>Expansions</i>				
	SP_SUE	MT_IndPro	MT_NFPay	CT_DGTW
	(1)	(2)	(3)	(4)
Constant	0.0635*** (7.88)	-0.1617*** (-29.94)	0.0143** (2.06)	0.2654*** (410.80)
F	0.0037 (0.11)	0.0173 (0.90)	0.0000 (0.00)	0.0172** (2.22)
R2	0.14	0.22	0.33	0.37
Obs	255,930	255,930	255,930	255,930
Constant	0.0635*** (7.88)	-0.1617*** (-29.93)	0.0143** (2.06)	0.2654*** (398.47)
M	-0.0327** (-2.48)	0.0046 (0.80)	-0.0026 (-0.33)	0.0050 (0.58)
R2	0.14	0.22	0.33	0.37
Obs	255,930	255,930	255,930	255,930

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.0$

Table G.6: **Hp ??: Portfolio Diversification:** Dependent variables: the natural log of the number of stocks held ($\ln(NStocks)$), and of the volatility of fund returns ($\ln(RetVol)$). Independent variables and all regression specifications are the same as described in Table G.1; control variables are omitted for brevity. Model (6) also controls for the percentage of cash held ($Cash$). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body.

	$\ln(NStocks)$		$\ln(RetVol)$	
	(1)	(2)	24m (3)	36m (4)
Constant	4.451*** (338.76)	4.457*** (325.34)	1.489*** (636.35)	1.527*** (627.79)
F	-0.069* (-1.73)	-0.057 (-1.34)	0.012* (1.74)	0.014** (1.98)
F X Recess	-0.006 (-0.23)	-0.001 (-0.05)	-0.001 (-0.14)	-0.004 (-0.65)
Cash %		-0.022*** (-9.87)		
R2	0.18	0.15	0.77	0.77
Obs	331,660	314,850	314,100	291,782
Constant	4.451*** (338.37)	4.457*** (325.12)	1.489*** (635.79)	1.527*** (627.06)
M	0.005 (1.32)	0.005 (1.34)	0.001 (1.35)	0.001 (1.01)
M X Recess	-0.008 (-1.08)	-0.010 (-1.30)	-0.003 (-0.78)	-0.001 (-0.41)
Cash %		-0.022*** (-9.86)		
R2	0.18	0.15	0.77	0.77
Obs	331,660	314,850	314,100	291,782

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.7: **Hp. ??: Information Gap—funds placebo:** Dependent variables: TNA-weighted average of the natural log of market capitalization ($\ln(MktCap)$), of the natural log of monthly media mentions ($\ln(News)$); of age in months (Age), and of the number of analysts following the stocks held ($Analysts$). Independent variables are the same as described in Table G.1. Control variables omitted for brevity. Models (3)-(5) also control for $\ln(MktCap)$ and illiquidity—measured using Amihud ratio—($Illiquidity$) of stocks held. Models (1) and (6) exclude from the control variables set the size style ($Size$). All regression specifications are the same as described in Table G.1; the key variable of interest is the funds_placebo F . Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	<i>Stock Characteristics</i>							
	$\ln(MktCap)$		Age		$\ln(News)$		$Analysts$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	9.713*** (277.91)	9.713*** (609.19)	316.063*** (253.38)	316.063*** (319.06)	4.371*** (408.35)	4.371*** (881.85)	8.055*** (307.04)	8.055*** (536.68)
F	-0.055 (-0.52)	-0.040 (-0.82)	-8.916** (-2.38)	-6.948** (-2.29)	-0.032 (-1.01)	-0.008 (-0.53)	-0.065 (-0.77)	-0.009 (-0.18)
F X Recess	0.000 (0.01)	0.024 (0.75)	2.796 (0.98)	1.645 (0.64)	-0.023 (-0.86)	-0.037* (-1.80)	-0.065 (-0.91)	-0.098 (-1.57)
Size		-4.001*** (-125.07)	-201.051*** (-52.22)	-6.960 (-1.36)	-2.301*** (-67.10)	0.101** (2.13)	-6.359*** (-26.12)	-0.838** (-2.38)
Illiquidity			6.976** (2.35)	22.478*** (5.29)	-0.050*** (-2.75)	0.141*** (3.45)	-0.428*** (-4.45)	0.013 (0.18)
Stock_Size				48.671*** (42.49)		0.602*** (61.16)		1.385*** (18.90)
R2	0.10	0.60	0.50	0.69	0.52	0.85	0.63	0.76
Obs	331,656	331,656	331,656	331,656	331,510	331,510	331,656	331,656

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.0$

Table G.8: **Hp. ??: Information Gap—months placebo**: Dependent variables: TNA-weighted average of the natural log of market capitalization ($\ln(MktCap)$), of the natural log of monthly media mentions ($\ln(News)$); of age in months (Age), and of the number of analysts following the stocks held ($Analysts$). Independent variables are the same as described in Table G.1. Control variables omitted for brevity. Models (3)-(5) also control for $\ln(MktCap)$ and illiquidity—measured using Amihud ratio—($Illiquidity$) of stocks held. Models (1) and (6) exclude from the control variables set the size style ($Size$). All regression specifications are the same as described in Table G.1; the key variable of interest is the months_placebo M . Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	<i>Stock Characteristics</i>							
	<i>ln(MktCap)</i>		<i>Age</i>		<i>ln(News)</i>		<i>Analysts</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	9.713*** (277.89)	9.713*** (609.09)	316.063*** (252.97)	316.063*** (318.53)	4.371*** (408.24)	4.371*** (881.73)	8.055*** (307.04)	8.055*** (536.75)
M	0.013 (1.34)	0.003 (0.43)	0.104 (0.19)	-0.027 (-0.07)	-0.001 (-0.31)	-0.003 (-1.11)	0.001 (0.06)	-0.003 (-0.20)
M X Recess	-0.006 (-0.21)	0.013 (0.72)	0.203 (0.14)	-0.491 (-0.40)	-0.004 (-0.24)	-0.012 (-1.46)	0.088** (2.44)	0.068*** (2.60)
Size		-4.001*** (-125.09)	-201.091*** (-52.19)	-6.908 (-1.35)	-2.301*** (-67.07)	0.101** (2.13)	-6.360*** (-26.13)	-0.838** (-2.38)
Illiquidity			7.040** (2.39)	22.537*** (5.30)	-0.050*** (-2.75)	0.142*** (3.46)	-0.427*** (-4.44)	0.013 (0.18)
Stock_Size				48.692*** (42.49)		0.602*** (61.15)		1.385*** (18.91)
R2	0.10	0.60	0.50	0.69	0.52	0.85	0.63	0.76
Obs	331,656	331,656	331,656	331,656	331,510	331,510	331,656	331,656

t statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.0

Table G.9: **Hp. ?? Commonality:** Dependent variables: holdings commonality ($Comm$), active commonality ($AComm$), and the natural log of dispersion ($Log(Disp)$). Independent variables and all regression specifications are the same as described in Table G.1. Control variables are omitted for brevity. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	<i>Comm</i> (1)	<i>AComm</i> (2)	$\ln(Disp)$ (3)
Constant	12.114*** (176.86)	6.556*** (127.98)	0.238*** (16.80)
F	-0.235 (-1.11)	-0.173 (-1.11)	0.046 (1.02)
F X Recess	-0.109 (-0.76)	-0.086 (-0.80)	-0.013 (-0.32)
R2	0.55	0.53	0.16
Obs	331,660	331,660	331,656
Constant	12.114*** (176.81)	6.556*** (127.93)	0.238*** (16.79)
M	0.001 (0.03)	0.001 (0.07)	0.001 (0.18)
M X Recess	0.084 (1.18)	0.072 (1.21)	0.013 (0.83)
R2	0.55	0.53	0.16
Obs	331,660	331,660	331,656

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.10: **Hp. ??: Performance—funds placebo:** Dependent variables: performance measured as the 24-months (Models (1) and (3)) and 36-months (Models (2) and (4)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *Alpha* is constructed monthly and then averaged across months in a quarter. *VA* is obtained by multiplying those *Alphas* by beginning of quarter $\ln(TNA)$. Regressions are run separately for recessions (Models (1)-(2)) and expansions (Models (3)-(4)). Independent variables are the same as in Table G.1, but they are lagged to relate end of quarter performance to beginning of quarter characteristics. The key variable of interest is the funds_placebo *F*. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

<i>Alpha – ff6</i>				
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i>	<i>36m</i>	<i>24m</i>	<i>36m</i>
	(1)	(2)	(3)	(4)
Constant	1.011*** (198.70)	0.995*** (440.04)	1.121*** (472.94)	1.098*** (486.91)
F	0.012 (0.44)	0.006 (0.23)	0.000 (0.02)	0.006 (0.65)
R2	0.19	0.18	0.30	0.28
Obs	13,527	12,499	86,974	80,996

<i>VA – ff6</i>				
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i>	<i>36m</i>	<i>24m</i>	<i>36m</i>
	(1)	(2)	(3)	(4)
Constant	5.525*** (164.44)	5.508*** (267.95)	6.164*** (336.50)	6.132*** (339.71)
F	0.063 (0.37)	-0.030 (-0.19)	-0.028 (-0.44)	0.006 (0.09)
R2	0.20	0.18	0.31	0.29
Obs	13,527	12,499	86,974	80,996

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.11: **Hp. ??: Performance—months placebo:** Dependent variables: performance measured as the 24-months (Models (1) and (3)) and 36-months (Models (2) and (4)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *Alpha* is constructed monthly and then averaged across months in a quarter. *VA* is obtained by multiplying those *Alphas* by beginning of quarter $\ln(TNA)$. Regressions are run separately for recessions (Models (1)-(2)) and expansions (Models (3)-(4)). Independent variables are the same as in Table G.1, but they are lagged to relate end of quarter performance to beginning of quarter characteristics. The key variable of interest is the months_placebo *M*. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

<i>Alpha – ff6</i>				
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i>	<i>36m</i>	<i>24m</i>	<i>36m</i>
	(1)	(2)	(3)	(4)
Constant	1.011*** (198.77)	0.995*** (440.23)	1.121*** (472.99)	1.098*** (487.15)
M	-0.016 (-0.61)	-0.021 (-0.82)	0.008 (1.22)	0.009 (1.24)
R2	0.19	0.18	0.30	0.28
Obs	13,527	12,499	86,974	80,996

<i>VA – ff6</i>				
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i>	<i>36m</i>	<i>24m</i>	<i>36m</i>
	(1)	(2)	(3)	(4)
Constant	5.525*** (164.48)	5.508*** (267.66)	6.164*** (336.45)	6.132*** (339.75)
M	-0.110 (-0.80)	-0.154 (-1.06)	0.030 (0.76)	0.037 (0.85)
R2	0.20	0.18	0.31	0.29
Obs	13,527	12,499	86,974	80,996

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.12: **Hp. ??: Performance and Information Gap—funds placebo:** Dependent variable: performance measured as the 24-months (Models (1)–(3)), and 36-months (Models (4)–(6)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural log of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(News)$), the natural log of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the funds_placebo (*F*). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Independent variables are the same as described in Table G.1, but they are lagged to relate end of quarter performance to beginning of quarter characteristics. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.081*** (346.96)	6.082*** (339.60)	6.081*** (338.09)	6.051*** (343.51)	6.052*** (336.92)	6.052*** (336.07)
F	-0.010 (-0.06)	0.111 (0.63)	0.242 (0.87)	0.064 (0.38)	0.204 (1.10)	0.346 (1.19)
F X Recess	0.205 (1.45)	0.214 (1.51)	0.203 (1.44)	0.061 (0.46)	0.069 (0.51)	0.056 (0.42)
Age	-0.003** (-2.63)			-0.002** (-2.08)		
Age X F	-0.000 (-0.20)			-0.000 (-0.46)		
$\ln(News)$		-0.178* (-1.85)			-0.118 (-1.20)	
$\ln(News)$ X F		-0.036 (-0.96)			-0.049 (-1.24)	
$\ln(MktCap)$			-0.151** (-2.08)			-0.124* (-1.77)
$\ln(MktCap)$ X F			-0.029 (-1.06)			-0.035 (-1.25)
R2	0.29	0.29	0.29	0.27	0.27	0.27
Obs	99,758	99,718	99,757	92,799	92,768	92,798

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.13: **Hp. ??: Performance and Information Gap—months placebo:** Dependent variable: performance measured as the 24-months (Models (1)–(3)), and 36-months (Models (4)–(6)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural log of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(News)$), the natural log of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the months_placebo (*M*). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Independent variables are the same as described in Table G.1, but they are lagged to relate end of quarter performance to beginning of quarter characteristics. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.081*** (346.99)	6.082*** (339.62)	6.081*** (338.10)	6.051*** (343.70)	6.052*** (337.09)	6.052*** (336.21)
M	-0.036 (-0.30)	0.068 (0.39)	0.171 (0.63)	-0.009 (-0.06)	0.162 (0.91)	0.190 (0.68)
M X Recess	-0.129 (-0.87)	-0.137 (-0.94)	-0.142 (-0.97)	-0.222 (-1.39)	-0.224 (-1.43)	-0.233 (-1.48)
Age	-0.003** (-2.65)			-0.002** (-2.08)		
Age X M	0.000 (0.59)			0.000 (0.38)		
$\ln(News)$		-0.181* (-1.86)			-0.120 (-1.21)	
$\ln(News)$ X M		-0.010 (-0.24)			-0.030 (-0.72)	
$\ln(MktCap)$			-0.153** (-2.07)			-0.126* (-1.78)
$\ln(MktCap)$ X M			-0.015 (-0.54)			-0.016 (-0.56)
R2	0.29	0.29	0.29	0.27	0.27	0.27
Obs	99,758	99,718	99,757	92,799	92,768	92,798

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.14: **Hp. ??: Performance and Commonality or Overcrowding—funds placebo:** Dependent variable: performance measured as the 24-months (Models (1) and (3)), and 36-months (Models (2) and (4)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the funds_placebo *F*. Variables construction is detailed in Table ??; summary statistics are reported in Table ?. All other independent variables are the same as described in Table G.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

	<i>VA – ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
Constant	6.08*** (338.58)	6.05*** (336.13)	6.08*** (339.82)	6.05*** (337.18)	6.08*** (336.71)	6.05*** (335.13)	6.08*** (338.56)	6.05*** (336.61)
F	0.02 (0.16)	0.10 (0.87)	-0.01 (-0.08)	0.06 (0.64)	-0.03 (-0.32)	0.05 (0.54)	-0.03 (-0.39)	0.03 (0.39)
F X Recess	0.20 (1.43)	0.06 (0.44)	0.20 (1.41)	0.06 (0.42)	0.20 (1.42)	0.05 (0.39)	0.20 (1.42)	0.06 (0.43)
Comm	-0.03* (-1.91)	-0.03 (-1.43)						
Comm X F	-0.00 (-0.67)	-0.01 (-1.16)						
AComm			-0.05** (-2.38)	-0.04* (-1.90)				
AComm X F			-0.00 (-0.53)	-0.01 (-1.02)				
OC					-0.01* (-1.95)	-0.01* (-1.67)		
OC X F					-0.00 (-0.13)	-0.00 (-0.75)		
AOC							-0.02*** (-2.73)	-0.02** (-2.36)
AOC X F							-0.00 (-0.05)	-0.00 (-0.56)
R2	0.29	0.27	0.29	0.27	0.29	0.27	0.29	0.27
Obs	99,759	92,800	99,759	92,800	99,759	92,800	99,759	92,800

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table G.15: **Hp. ??: Performance and Commonality or Overcrowding—months placebo:** Dependent variable: performance measured as the 24-months (Models (1) and (3)), and 36-months (Models (2) and (4)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the months_placebo *M*. Variables construction is detailed in Table ??; summary statistics are reported in Table ?. All other independent variables are the same as described in Table G.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. Regressions specification: quarterly frequency; quarter fixed-effects; standard errors clustered at the quarter and fund level.

	<i>VA – ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
Constant	6.08*** (338.62)	6.05*** (336.31)	6.08*** (339.92)	6.05*** (337.40)	6.08*** (336.73)	6.05*** (335.24)	6.08*** (338.64)	6.05*** (336.78)
M	0.07 (0.77)	0.12 (1.26)	0.09 (1.50)	0.14** (2.12)	0.07 (0.86)	0.08 (1.01)	0.09 (1.43)	0.12* (1.75)
M X R	-0.14 (-0.94)	-0.23 (-1.46)	-0.14 (-0.94)	-0.22 (-1.45)	-0.15 (-1.05)	-0.24 (-1.56)	-0.15 (-1.06)	-0.24 (-1.58)
Comm	-0.03* (-1.90)	-0.03 (-1.42)						
Comm X M	-0.00 (-0.53)	-0.01 (-0.96)						
AComm			-0.05** (-2.35)	-0.04* (-1.87)				
AComm X M			-0.01 (-1.37)	-0.02** (-2.03)				
OC					-0.01* (-1.88)	-0.01 (-1.65)		
OC X M					-0.00 (-0.60)	-0.00 (-0.64)		
AOC							-0.02** (-2.62)	-0.02** (-2.28)
AOC X M							-0.01 (-1.29)	-0.01 (-1.56)
R2	0.29	0.27	0.29	0.27	0.29	0.27	0.29	0.27
Obs	99,759	92,800	99,759	92,800	99,759	92,800	99,759	92,800

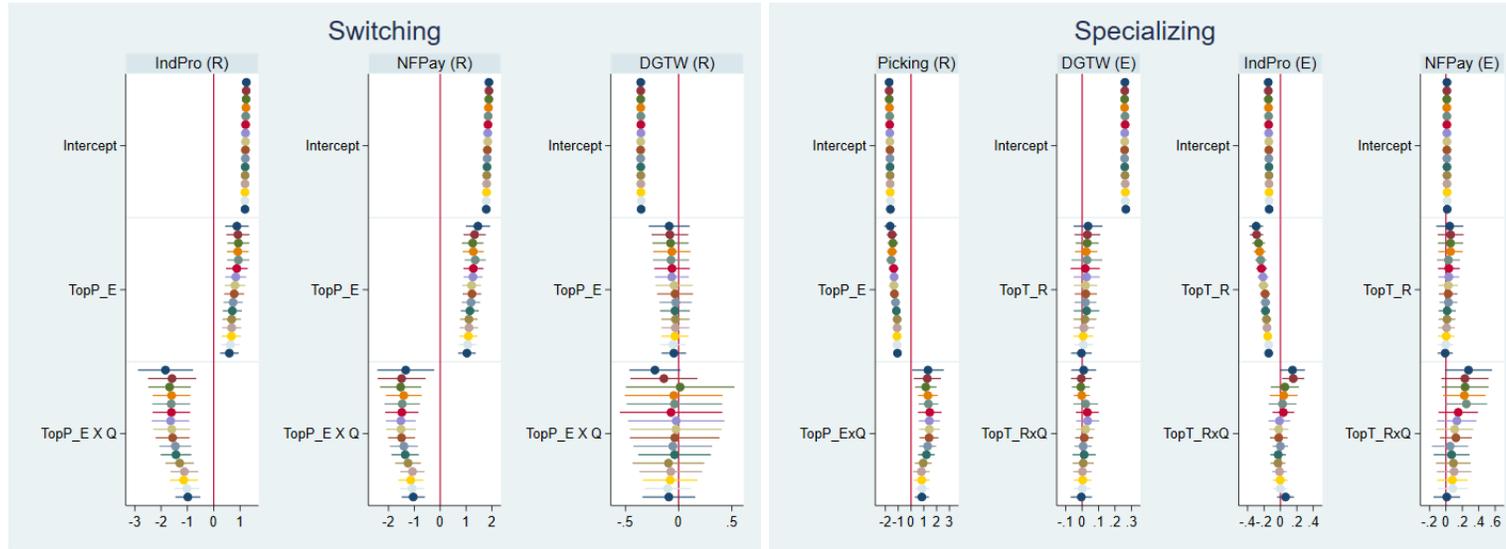
t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

H Dynamic high-ability measures

I replicate Table ?? utilizing a dynamic version of the high-ability measures described in Section ?. More specifically, for each recession (expansion) I identify the high-ability sample as those funds that most frequently belong to the top of the picking (timing) distribution in the *previous* expansion (recession).

Table H.1: **Hp. ??: High Ability Funds:** Graphical representation of regression coefficients. Panel 1 Dependent variables: macro-timing in recessions with respect to innovations in industrial production ($IndPro (R)$) or non-farm payrolls ($NFPay (R)$); and characteristic-timing in recessions ($DGTW (R)$). Panel 2 Dependent variables: stock picking in recessions and macro-timing in expansions with respect to earning surprises ($Picking (R)$) and innovations in industrial production ($IndPro (E)$) or non-farm payrolls ($NFPay (E)$) respectively; and characteristic-timing in expansions ($DGTW (E)$). Independent variables: a dummy identifying quantitative funds ($Quant$), dummy variables identifying the top $q\%$ of funds with the highest timing ability in recessions ($TopT_R$) or picking ability in expansions ($TopP_E$), constructed dynamically; and the interaction between the $Quant$ dummy and the high-ability dummies ($TopP_ExQ$, $TopT_RxQ$). Coefficients are estimated using high-ability cut-offs of $q = 10\%$ to $q = 25\%$. Bars indicate 10% confidence intervals. Control variables and all regression specifications are the same described in Table F.1. Control variables are omitted for brevity.

39



I Technological Changes

I.1 Analysis

I replicate the results that illustrate differences in characteristics and holdings of quantitative and discretionary funds for two sub-periods: 2000-2014 and 2015-2017. That is because the later part of the sample is characterized by sizable technological advancements, particularly in the usage of AI for investment management. In the main body of the paper I hypothesized that quantitative mutual funds should not be at the forefront of technological development. Hence, I do not expect to observe sizable differences in results before and after 2015.

I.2 Results

As can be seen Table I.1 the age, size and factor exposure differences between quantitative and discretionary funds are broadly consistent across the two sub-periods. A few notable exceptions are: (1) the difference in size is less pronounced in the second sub-period, as would be expected given the passing of time alone; (2) the turnover ratio of discretionary funds decreases in the second sub-period, hence the difference in turnover between quantitative and discretionary funds marginally increases; (3) There doesn't seem to be a difference in exposure to the Investment factor in the second sub-period.

From Table I.2 we see that differences in flows and fees are also consistent. In the second sub-period, though, quantitative funds experience a marginally lower decrease in fund-flows than discretionary funds. There also appears to be a decrease in fees for both groups, quantitative funds still charging lower fees than discretionary ones.

Table I.3 shows that differences in the number of stocks held and in return volatility between quantitative and discretionary funds are also consistent across the two sub-periods.

Tables I.4 and I.5 show differences in information availability of stocks held between quantitative and discretionary funds. Results are consistent between the two sub-periods. The only notable difference being that all funds increase the size of stocks held in the second sub-period, quantitative funds increasing it by a larger amount.

Finally Table I.6 shows that the commonality (dispersion) in holdings remains higher (lower) for quantitative funds. Consistently with Figure ??, in the paper's main body, we observe an overall decrease in commonality in the second sub-period.

Table I.1: **Age, size and style:** Dependent variables: funds' age ($\ln(\text{Age})$), size ($\ln(\text{TNA})$), turnover ratio (Turnover), the amount of cash held in percentage of TNA (Cash), and style (Market , Size , Value , Mom , Invest. and Profit.). Independent variables: Quant dummy and its interaction with a dummy identifying NBER recessions periods (Recess); expense ratio (Expenses); turnover ratio (Turnover); growth in net fund flows (FlowsGrowth); the volatility in net fund flows growth (FlowsVol); total fund loads (Loads); fund style, size and age as listed above. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. All explanatory variables are de-meanned such that the Constant can be interpreted as the unconditional mean of the dependent variable for Discretionary funds. Control variables have been omitted for brevity. Each regression excludes the control variable corresponding to the dependent variable. All regressions include month fixed-effects (FE); standard errors are clustered at the month and fund level (Cl).

	$\ln(\text{Age})$ (1)	$\ln(\text{TNA})$ (2)	Turnover (3)	Cash (4)	Market (5)	Size (6)	Value (7)	Mom (8)	Invest. (9)	Profit. (10)
Sub-period 2000 to 2014										
Constant	4.83*** (379.30)	5.56*** (190.88)	83.86*** (80.13)	3.20*** (70.12)	0.74*** (736.25)	0.16*** (30.30)	0.04*** (20.19)	-0.02*** (-13.03)	-0.07*** (-36.11)	-0.05*** (-29.90)
Quant	-0.11*** (-3.63)	-0.31*** (-4.59)	26.18*** (8.95)	-0.79*** (-7.78)	0.00 (1.61)	-0.02* (-1.95)	0.02*** (3.54)	0.02*** (4.54)	0.02*** (3.24)	0.03*** (5.75)
Quant X Recess	-0.03 (-0.87)	0.01 (0.10)	-4.37 (-1.47)	-0.35** (-2.42)	0.00 (0.42)	0.00 (0.27)	0.01 (0.77)	0.01 (1.18)	0.02 (1.54)	-0.01 (-0.92)
R2	0.27	0.30	0.13	0.08	0.94	0.15	0.37	0.17	0.16	0.30
Obs	275,003	275,003	275,003	258,193	275,003	275,003	275,003	275,003	275,003	275,003
Sub-period 2015 to 2017										
Constant	5.12*** (325.16)	5.86*** (168.74)	62.79*** (59.59)	2.15*** (37.81)	0.70*** (619.95)	0.16*** (29.42)	0.01*** (5.22)	-0.02*** (-14.62)	-0.02*** (-7.56)	-0.01*** (-6.66)
Quant	-0.11** (-2.50)	-0.14* (-1.75)	31.68*** (9.78)	-0.76*** (-4.79)	-0.00 (-0.30)	-0.05*** (-3.13)	0.02** (2.48)	0.01** (2.07)	0.00 (0.42)	0.03*** (4.71)
R2	0.25	0.39	0.15	0.07	0.97	0.22	0.36	0.31	0.16	0.33
Obs	56,657	56,657	56,657	56,657	56,657	56,657	56,657	56,657	56,657	56,657

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table I.2: **Flows and Fees:** Dependent variables: growth in net fund flows (*FlowGrowth*), the volatility of net fund flows growth (*FlowVol*), funds' expense ratio (*Expenses*), management fees (*Mgmt*), Actual 12b1 fees (*12b1*) and fund loads (*Loads*). Variables construction is detailed in Table ??; summary statistics are reported in Table ?. Independent variables and all regression specifications are the same as described in Table I.1. Control variables are omitted for brevity.

	<i>Flow</i>		<i>Fees</i>			
	<i>Growth</i> (1)	<i>Vol</i> (2)	<i>Expenses</i> (3)	<i>Mgmt</i> (4)	<i>12b1</i> (5)	<i>Loads</i> (6)
Sub-period 2000 to 2014						
Constant	0.010 (0.53)	0.040*** (78.45)	1.240*** (207.99)	0.722*** (144.41)	0.246*** (45.95)	0.009*** (41.79)
Quant	-0.104 (-1.37)	0.002 (1.29)	-0.091*** (-6.25)	-0.044*** (-3.34)	0.018 (1.22)	-0.000 (-0.19)
Quant X Recess	-0.515*** (-3.87)	0.005 (1.30)	0.001 (0.06)	-0.005 (-0.32)	-0.002 (-0.19)	-0.000 (-0.04)
R2	0.06	0.08	0.34	0.07	0.32	0.20
Obs	275,003	275,003	275,003	274,663	196,124	275,003
Sub-period 2015 to 2017						
Constant	-0.493*** (-13.57)	0.037*** (41.67)	1.073*** (172.94)	0.699*** (106.91)	0.232*** (37.46)	0.007*** (29.04)
Quant	0.190* (1.73)	0.002 (0.81)	-0.043** (-2.69)	-0.031* (-1.83)	0.013 (0.71)	-0.000 (-0.03)
R2	0.05	0.09	0.35	0.08	0.26	0.13
Obs	56,657	56,657	56,657	56,657	31,529	56,657

t statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.01

Table I.3: **Hp ??: Portfolio Diversification:** Dependent variables: the natural log of the number of stocks held ($\ln(NStocks)$), and of the volatility of fund returns ($\ln(RetVol)$). Independent variables and all regression specifications are the same as described in Table I.1; control variables are omitted for brevity. Model (6) also controls for the percentage of cash held ($Cash$). Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body.

	$\ln(NStocks)$		$\ln(RetVol)$	
	(1)	(2)	24m (3)	36m (4)
Sub-period 2000 to 2014				
Constant	4.455*** (343.65)	4.462*** (330.87)	1.536*** (375.84)	1.589*** (379.26)
Quant	0.312*** (9.35)	0.322*** (9.63)	-0.034*** (-3.58)	-0.039*** (-4.08)
Quant X Recess	0.065** (2.10)	0.056* (1.67)	0.019** (2.02)	0.031*** (3.33)
Cash		-0.020*** (-8.98)		
R2	0.19	0.17	0.67	0.62
Obs	275,003	258,193	259,549	240,086
Sub-period 2015 to 2017				
Constant	4.434*** (253.95)	4.434*** (245.50)	1.266*** (303.33)	1.240*** (304.89)
Quant	0.314*** (6.84)	0.326*** (6.92)	-0.056*** (-5.17)	-0.051*** (-4.77)
Cash		-0.022*** (-4.72)		
R2	0.23	0.18	0.19	0.14
Obs	56,657	56,657	54,551	51,696

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table I.4: **Hp. ??: Information Gap—before:** Dependent variables: TNA-weighted average of the natural log of market capitalization ($\ln(MktCap)$), of the natural log of monthly media mentions ($\ln(News)$); of age in months (Age), and of the number of analysts following the stocks held ($Analysts$). Independent variables are the same as described in Table I.1. Control variables omitted for brevity. Models (3)-(5) also control for $\ln(MktCap)$ and illiquidity—measured using Amihud ratio—($Illiquidity$) of stocks held. Models (1) and (6) exclude from the control variables set the size style ($Size$). All regression specifications are the same as described in Table I.1. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. This table reports only results for the sub-period 2000-2015.

	<i>Stock Characteristics</i>							
	$\ln(MktCap)$		Age		$\ln(News)$		$Analysts$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sub-period 2000 to 2014							
Constant	9.644*** (269.78)	9.644*** (587.50)	309.496*** (246.94)	309.496*** (313.69)	4.407*** (393.73)	4.407*** (860.66)	7.945*** (309.78)	7.945*** (518.84)
Quant	0.148* (1.71)	0.052 (1.23)	14.032*** (4.38)	11.498*** (4.74)	0.059** (1.98)	0.026* (1.65)	-0.075 (-1.07)	-0.141*** (-3.15)
Quant X Recess	-0.073 (-1.11)	-0.062 (-1.60)	0.120 (0.03)	3.214 (0.92)	-0.038 (-1.31)	0.002 (0.11)	-0.053 (-0.68)	0.029 (0.42)
Size		-3.951*** (-119.48)	-197.803*** (-46.78)	-4.846 (-0.84)	-2.338*** (-63.60)	0.079* (1.65)	-6.234*** (-25.07)	-1.154*** (-3.42)
Illiquidity			6.945** (2.02)	24.689*** (5.75)	-0.081*** (-2.94)	0.142*** (5.17)	-0.586*** (-4.99)	-0.119 (-1.16)
Stock_Size				49.005*** (38.49)		0.614*** (59.53)		1.290*** (18.60)
R2	0.10	0.60	0.50	0.69	0.53	0.86	0.64	0.76
Obs	275,003	275,003	275,003	275,003	274,925	274,925	275,003	275,003

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table I.5: **Hp. ??: Information Gap—after:** Dependent variables: TNA-weighted average of the natural log of market capitalization ($\ln(MktCap)$), of the natural log of monthly media mentions ($\ln(News)$); of age in months (Age), and of the number of analysts following the stocks held ($Analysts$). Independent variables are the same as described in Table I.1. Control variables omitted for brevity. Models (3)-(5) also control for $\ln(MktCap)$ and illiquidity—measured using Amihud ratio—($Illiquidity$) of stocks held. Models (1) and (6) exclude from the control variables set the size style ($Size$). All regression specifications are the same as described in Table I.1; the key variable of interest is the months_placebo M . Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. This table reports only results for the sub-period 2015-2017.

	<i>Stock Characteristics</i>							
	<i>ln(MktCap)</i>		<i>Age</i>		<i>ln(News)</i>		<i>Analysts</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sub-period 2015 to 2017							
Constant	10.048*** (258.16)	10.048*** (569.92)	347.945*** (210.26)	347.945*** (252.14)	4.200*** (345.32)	4.199*** (590.97)	8.588*** (230.84)	8.588*** (402.64)
Quant	0.344*** (3.40)	0.140*** (2.75)	22.251*** (4.68)	15.510*** (4.43)	0.085** (2.65)	0.010 (0.64)	0.142 (1.28)	-0.123** (-2.07)
Size		-4.245*** (-72.96)	-221.979*** (-41.64)	-15.833** (-2.67)	-2.022*** (-31.09)	0.242** (2.55)	-7.169*** (-9.25)	0.930 (0.74)
Illiquidity			7.951** (2.10)	18.408** (2.66)	0.000 (0.02)	0.115** (2.16)	-0.008 (-0.07)	0.403** (2.69)
Stock_Size				48.716*** (34.90)		0.535*** (30.16)		1.914*** (7.94)
R2	0.13	0.62	0.50	0.68	0.50	0.83	0.62	0.79
Obs	56,653	56,653	56,653	56,653	56,585	56,585	56,653	56,653

t statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.01

Table I.6: **Hp. ?? Commonality:** Dependent variables: holdings commonality ($Comm$), active commonality ($AComm$), and the natural log of dispersion ($Log(Disp)$). Independent variables and all regression specifications are the same as described in Table I.1. Control variables are omitted for brevity. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body.

	$Comm$ (1)	$AComm$ (2)	$ln(Disp)$ (3)
Sub-period 2000 to 2014			
Constant	12.335*** (179.93)	7.042*** (127.19)	0.335*** (22.71)
Quant	4.234*** (20.24)	2.496*** (14.11)	-0.075** (-2.08)
Quant X Recess	0.584** (2.58)	0.345 (1.58)	-0.112*** (-2.73)
R2	0.59	0.54	0.14
Obs	275,003	275,003	275,003
Sub-period 2015 to 2017			
Constant	11.043*** (175.35)	4.195*** (135.62)	-0.234*** (-13.19)
Quant	5.272*** (20.85)	1.992*** (16.72)	-0.250*** (-5.52)
R2	0.63	0.58	0.14
Obs	56,657	56,657	56,653

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

J Alternative performance measurement

J.1 Monthly frequency

Table J.1: **Hp. ??: Performance:** Dependent variables: performance measured as the 24-months (Models (1), (3)) and 36-months (Models (2), (4)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *VA* is obtained by multiplying *Alphas* by beginning of month $\ln(TNA)$. Regressions are run separately for recession (Models (1) – (2)) and expansion (Models (3) – (4)) months, identified using NBER business cycle dates. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of month performance to beginning of month fund characteristics. Control variables are omitted for brevity. All regressions are run at the monthly frequency and include month fixed-effects; standard errors are clustered at the month and fund level.

	<i>Alpha – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
<i>Constant</i>	1.027*** (181.31)	1.014*** (348.53)	1.130*** (468.29)	1.105*** (482.38)
<i>Quant</i>	-0.136** (-2.77)	-0.112** (-2.33)	-0.027* (-1.86)	-0.023 (-1.55)
Adjusted R^2	0.15	0.13	0.18	0.17
Obs	38,851	35,815	273,772	254,795

	<i>VA – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	5.535*** (154.98)	5.557*** (244.17)	6.203*** (339.47)	6.159*** (343.15)
Quant	-0.595** (-2.39)	-0.499* (-2.04)	-0.096 (-1.19)	-0.062 (-0.74)
R2	0.15	0.14	0.19	0.17
Obs	38,851	35,815	273,772	254,795

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.2: **Hp. ??: Performance and Information Gap:** Dependent variable: performance measured as the 24-months (Models (1)-(3)), and 36-months (Models (4)-(6)) rolling Fama-French 6 *Alpha* multiplied by beginning of month $\ln(TNA)$ (*VA*). Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural logarithm of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(Newsp)$), the natural logarithm of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of month performance to beginning of month fund characteristics. Control variables are omitted for brevity. All regressions are run at the monthly frequency and include month fixed-effects; standard errors are clustered at the month and fund level.

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.121*** (344.45)	6.122*** (338.67)	6.121*** (337.56)	6.087*** (344.29)	6.087*** (338.58)	6.087*** (337.88)
Quant	-0.845*** (-4.03)	-0.708*** (-2.70)	-1.025*** (-2.71)	-0.774*** (-3.54)	-0.640** (-2.37)	-0.892** (-2.35)
Quant X Recess	-0.477* (-1.90)	-0.516** (-2.08)	-0.473* (-1.91)	-0.452* (-1.76)	-0.488* (-1.91)	-0.451* (-1.76)
Age	-0.002** (-2.48)			-0.002** (-2.04)		
Age X Quant	0.002*** (4.28)			0.002*** (3.87)		
$\ln(Newsp)$		-0.130 (-1.48)			-0.089 (-1.03)	
$\ln(Newsp)$ X Quant		0.140*** (2.64)			0.132** (2.44)	
$\ln(MktCap)$			-0.099 (-1.61)			-0.091 (-1.52)
$\ln(MktCap)$ X Quant			0.094*** (2.62)			0.085** (2.35)
R2	0.18	0.18	0.18	0.16	0.16	0.16
Obs	311,373	311,238	311,371	289,448	289,340	289,446

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.3: **Hp. ??: Performance and Commonality or Overcrowding:** Dependent variable: performance measured as the 24-months, and 36-months rolling Fama-French 6 *Alpha*, multiplied by beginning of month $\ln(TNA)$ (*VA*). Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. All other independent variables are the same as described in Table ??, but they are lagged in order to relate end of month performance to beginning of month fund characteristics. Control variables are omitted for brevity. All regressions are run at the monthly frequency and include month fixed-effects; standard errors are clustered at the month and fund level.

	<i>VA - ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
Constant	6.12*** (338.13)	6.09*** (338.16)	6.12*** (339.19)	6.09*** (338.94)	6.12*** (338.45)	6.09*** (338.46)	6.12*** (339.89)	6.09*** (339.67)
Quant	-0.34** (-2.36)	-0.30** (-2.01)	-0.15 (-1.32)	-0.11 (-0.96)	-0.51*** (-2.84)	-0.42** (-2.36)	-0.33** (-2.42)	-0.27* (-1.92)
Quant X Recess	-0.51** (-2.03)	-0.48* (-1.88)	-0.50** (-2.00)	-0.48* (-1.86)	-0.42* (-1.68)	-0.41 (-1.59)	-0.49** (-1.99)	-0.47* (-1.84)
Comm	-0.03 (-1.65)	-0.02 (-1.43)						
Comm X Quant	0.02*** (2.65)	0.02** (2.37)						
AComm			-0.05** (-2.14)	-0.04* (-1.86)				
AComm X Quant			0.02** (2.08)	0.02* (1.78)				
OC					-0.02* (-1.96)	-0.01* (-1.90)		
OC X Quant					0.03 (0.45)	0.02 (0.27)		
AOC							-0.03** (-2.52)	-0.02** (-2.37)
AOC X Quant							-0.04 (-0.33)	-0.05 (-0.40)
R2	0.18	0.16	0.18	0.16	0.18	0.16	0.18	0.16
Obs	311,377	289,452	311,377	289,452	311,377	289,452	311,377	289,452

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

J.2 Alpha constructed from after fee returns

Table J.4: **Hp. ??: Performance:** Dependent variables: performance measured as the 24-months (Models (1), (3)) and 36-months (Models (4), (6)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *Alpha* is constructed monthly and then averaged across all months in a quarter, based on after fee returns. *VA* is obtained by multiplying those quarterly *Alphas* by beginning of quarter $\ln(TNA)$. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Regressions are run separately for recession (Models (1) – (2)) and expansion (Models (3) – (4)) quarters, identified using NBER business cycle dates. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects; standard errors are clustered at the quarter and fund level.

	<i>Alpha – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	-0.223*** (-44.58)	-0.236*** (-109.82)	-0.089*** (-42.47)	-0.106*** (-54.62)
Quant	-0.134** (-2.97)	-0.109** (-2.99)	-0.024 (-1.60)	-0.022 (-1.43)
R2	0.07	0.07	0.09	0.09
Obs	13,527	12,499	86,974	80,996

	<i>VA – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	-1.253*** (-41.48)	-1.380*** (-93.95)	-0.476*** (-37.27)	-0.578*** (-47.99)
Quant	-0.691** (-2.86)	-0.579** (-2.73)	-0.148* (-1.92)	-0.137 (-1.66)
R2	0.07	0.08	0.09	0.09
Obs	13,527	12,499	86,974	80,996

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.5: **Hp. ??: Performance and Information Gap:** Dependent variable: performance measured as the 24-months (Models (1)-(3)), and 36-months (Models (4)-(6)) rolling Fama-French 6 *Alpha* (based on after fee returns) averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural logarithm of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(News)$), the natural logarithm of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects; standard errors are clustered at the quarter and fund level.

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.580*** (-49.20)	-0.580*** (-47.23)	-0.580*** (-47.10)	-0.685*** (-59.18)	-0.685*** (-57.06)	-0.685*** (-57.04)
Quant	-0.797*** (-4.22)	-0.648*** (-2.88)	-1.035*** (-3.07)	-0.742*** (-3.59)	-0.570** (-2.48)	-0.937*** (-2.68)
Quant X Recess	-0.570** (-2.44)	-0.605*** (-2.73)	-0.563** (-2.50)	-0.595** (-2.57)	-0.628*** (-2.83)	-0.592** (-2.63)
Age	-0.002** (-2.37)			-0.002* (-1.81)		
Age X Quant	0.002*** (4.62)			0.002*** (3.94)		
$\ln(News)$		-0.162* (-1.69)			-0.103 (-1.07)	
$\ln(News)$ X Quant		0.123*** (2.67)			0.111** (2.38)	
$\ln(MktCap)$			-0.140* (-1.94)			-0.114 (-1.66)
$\ln(MktCap)$ X Quant			0.092*** (2.97)			0.085*** (2.68)
R2	0.09	0.09	0.09	0.09	0.09	0.09
Obs	99,758	99,718	99,757	92,799	92,768	92,798

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.6: **Hp. ??: Performance and Commonality or Overcrowding:** Dependent variable: performance measured as the 24-months and 36-months rolling Fama-French 6 *Alpha* (based on after fee returns), averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. All other independent variables are the same as described in Table F.1, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects; standard errors are clustered at the quarter and fund level.

	<i>VA – ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
Constant	-0.58*** (-47.44)	-0.69*** (-57.29)	-0.58*** (-47.53)	-0.69*** (-57.37)	-0.58*** (-47.57)	-0.69*** (-57.45)	-0.58*** (-47.80)	-0.69*** (-57.70)
Quant	-0.39*** (-2.95)	-0.37** (-2.57)	-0.21** (-2.06)	-0.18 (-1.65)	-0.52*** (-2.81)	-0.44** (-2.38)	-0.34** (-2.46)	-0.29** (-2.04)
Quant X Recess	-0.59*** (-2.65)	-0.62*** (-2.77)	-0.58** (-2.63)	-0.61*** (-2.79)	-0.52** (-2.28)	-0.55** (-2.40)	-0.58** (-2.65)	-0.60*** (-2.71)
Comm	-0.04* (-1.90)	-0.03 (-1.47)						
Comm X Quant	0.03*** (3.60)	0.02*** (3.03)						
AComm			-0.05** (-2.41)	-0.04* (-1.95)				
AComm X Quant			0.02*** (2.78)	0.02** (2.22)				
OC					-0.02** (-2.03)	-0.01* (-1.67)		
OC X Quant					-0.00 (-0.01)	0.01 (0.15)		
AOC							-0.03*** (-2.73)	-0.02** (-2.34)
AOC X Quant							-0.07 (-0.61)	-0.05 (-0.41)
R2	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Obs	99,759	92,800	99,759	92,800	99,759	92,800	99,759	92,800

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

J.3 Alpha Measured as the intercept of the rolling regressions

Table J.7: **Hp. ??: Performance:** Dependent variables: performance measured as the 24-months (Models (1), (3)) and 36-months (Models (4), (6)) rolling Fama-French 6 *Alpha*—Panel 1—and Value Added (*VA*)—Panel 2. *Alpha* are obtained as the intercept of the monthly rolling regressions, it is then averaged across all months in a quarter. *VA* is obtained by multiplying those quarterly *Alphas* by beginning of quarter $\ln(TNA)$. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. Regressions are run separately for recession (Models (1) – (2)) and expansion (Models (3) – (4)) quarters, identified using NBER business cycle dates. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects; standard errors are clustered at the quarter and fund level.

	<i>Alpha – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	1.222*** (194.23)	1.223*** (221.44)	1.135*** (389.23)	1.144*** (387.08)
Quant	-0.157*** (-6.83)	-0.126*** (-5.41)	-0.021** (-2.05)	-0.029*** (-2.85)
R2	0.50	0.55	0.56	0.61
Obs	13,527	12,499	86,974	80,996

	<i>VA – ff6</i>			
	<i>Recessions</i>		<i>Expansions</i>	
	<i>24m</i> (1)	<i>36m</i> (2)	<i>24m</i> (3)	<i>36m</i> (4)
Constant	6.783*** (171.20)	6.937*** (189.43)	6.284*** (292.00)	6.444*** (284.06)
Quant	-0.727*** (-5.24)	-0.589*** (-4.32)	-0.060 (-1.00)	-0.078 (-1.30)
R2	0.54	0.61	0.57	0.63
Obs	13,527	12,499	86,974	80,996

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.8: **Hp. ??: Performance and Information Gap:** Dependent variable: performance measured as the 24-months (Models (1)-(3)), and 36-months (Models (4)-(6)) rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). *Alphas* are obtained as the intercept of the monthly rolling regressions. Independent variables: information gap, measured as: the age of stocks held (*Age*), the natural logarithm of the number of times stocks held are mentioned monthly in Dow Jones news ($\ln(News)$), the natural logarithm of the market capitalization of stocks held ($\ln(MktCap)$). Are also included interactions between information gap proxies and the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper's body. Independent variables are the same as described in Table ??, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed-effects; standard errors are clustered at the quarter and fund level.

	<i>VA_24m</i>			<i>VA_36m</i>		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	6.354*** (305.57)	6.355*** (298.25)	6.354*** (296.52)	6.513*** (293.73)	6.514*** (287.05)	6.513*** (285.40)
Quant	-0.849*** (-4.85)	-0.566*** (-2.81)	-0.965*** (-3.19)	-0.913*** (-5.06)	-0.612*** (-2.98)	-1.024*** (-3.21)
Quant X Recess	-0.521*** (-4.12)	-0.558*** (-4.09)	-0.513*** (-3.73)	-0.482*** (-3.97)	-0.525*** (-3.84)	-0.476*** (-3.50)
Age	-0.004*** (-8.13)			-0.003*** (-8.93)		
Age X Quant	0.002*** (5.36)			0.003*** (5.46)		
$\ln(News)$		-0.238*** (-6.07)			-0.214*** (-5.49)	
$\ln(News)$ X Quant		0.119*** (2.75)			0.129*** (2.90)	
$\ln(MktCap)$			-0.162*** (-5.12)			-0.150*** (-4.77)
$\ln(MktCap)$ X Quant			0.091*** (3.12)			0.096*** (3.14)
R2	0.58	0.57	0.57	0.63	0.63	0.63
Obs	99,758	99,718	99,757	92,799	92,768	92,798

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table J.9: **Hp. ??: Performance and Commonality or Overcrowding:** Dependent variable: performance measured as the 24–months, and 36–months rolling Fama-French 6 *Alpha*, averaged within a quarter and multiplied by beginning of quarter $\ln(TNA)$ (*VA*). *Alphas* are obtained as the intercept of the monthly rolling regressions. Independent variables: commonality, active commonality, overcrowding and active overcrowding (*Comm*, *AComm*, *OC*, *AOC*), and their interaction with the *Quant* dummy. Variables construction is detailed in Table ??; summary statistics are reported in Table ?? in the paper’s body. All other independent variables are the same as described in Table ??, but they are lagged in order to relate end of quarter performance to beginning of quarter fund characteristics. Control variables are omitted for brevity. All regressions are run at the quarterly frequency and include quarter fixed–effects; standard errors are clustered at the quarter and fund level.

	<i>VA – ff6</i>							
	24m (1)	36m (2)	24m (3)	36m (4)	24m (5)	36m (6)	24m (7)	36m (8)
Constant	6.35*** (296.77)	6.51*** (286.44)	6.35*** (297.47)	6.51*** (287.27)	6.35*** (297.34)	6.51*** (286.80)	6.35*** (298.42)	6.51*** (287.96)
Quant	-0.25** (-2.04)	-0.27** (-2.15)	-0.09 (-1.00)	-0.08 (-0.89)	-0.52*** (-4.34)	-0.58*** (-4.55)	-0.25** (-2.38)	-0.30*** (-2.71)
Quant X Recess	-0.53*** (-3.81)	-0.50*** (-3.50)	-0.53*** (-3.79)	-0.49*** (-3.56)	-0.46*** (-3.06)	-0.41*** (-2.81)	-0.53*** (-3.40)	-0.48*** (-3.13)
Comm	-0.04*** (-5.08)	-0.04*** (-5.25)						
Comm X Quant	0.02*** (3.21)	0.02*** (3.31)						
AComm			-0.05*** (-5.51)	-0.05*** (-6.09)				
AComm X Quant			0.02* (1.97)	0.01* (1.83)				
OC					-0.02*** (-6.21)	-0.02*** (-6.03)		
OC X Quant					-0.01 (-0.32)	0.01 (0.38)		
AOC							-0.03*** (-6.97)	-0.03*** (-6.67)
AOC X Quant							-0.11 (-1.35)	-0.06 (-0.81)
R2	0.57	0.63	0.57	0.63	0.57	0.63	0.57	0.63
Obs	99,759	92,800	99,759	92,800	99,759	92,800	99,759	92,800

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$