Education and Investment Skill: Evidence from Mutual Fund Managers*

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Abstract

Does higher-quality education make better mutual fund managers? Using course syllabi from 702 managers' colleges, I measure two dimensions of education quality: Relevance, how closely coursework matches investment-management knowledge and skills, and Timeliness, how up to date the ideas and methods taught were. A one-standard-deviation increase in either predicts 80 basis points higher annual net returns. Prestige and selectivity do not explain the results. The two measures capture distinct investment skills: in rich information environments with high analyst coverage, Relevance helps managers use existing information more effectively. In thin information environments with low analyst coverage, Timeliness helps them develop their own analysis.

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1. Introduction

What makes some active mutual fund managers better than others? A large literature attributes differences in performance to information advantages, industry specialization, professional networks, and experience. This paper studies another potential source of skill: the content of a manager's formal education.

The question is difficult to study in most labor markets. Worker productivity is rarely observed directly, and education is usually measured using institutional characteristics such as school rankings, admissions selectivity, test scores, or degree type. These variables describe where a person studied or who was admitted, but not what the person was taught.

Active equity mutual funds provide a useful setting because managerial output is directly observable. I observe returns, risk-adjusted performance, portfolio holdings, and individual trades. I can therefore connect the content of a manager's education to subsequent professional performance.

I measure two complementary dimensions of education quality. The first, *Relevance*, captures how closely the curriculum aligns with the knowledge and skills used in investment management. It compares how closely a manager's coursework resembles the knowledge and skills used in investment-management jobs with how closely it resembles knowledge and skills used across finance jobs more broadly.

A curriculum scores highly when it places greater emphasis on security analysis, valuation, portfolio construction, asset allocation, trading, and investment risk than on general finance activities such as budgeting, accounting operations, spreadsheets, and process management. Relevance is therefore a relative measure of occupation-specific versus general

finance knowledge.

The second measure, *Timeliness*, captures how up to date the ideas and methods taught in the curriculum were at the time. Adapting the frontier-knowledge-proximity measure of Biasi and Ma (2025), I compare the content of each syllabus with recent and older academic research in the same field. A curriculum scores highly when its content is more closely related to recent research.

The two measures capture different but complementary features of education quality. Foundational investment concepts may remain highly relevant long after they cease to be new, while recent research may expand the methods available to analyze securities and construct portfolios. A curriculum can therefore score highly on both measures by teaching the core knowledge required for investment management while also incorporating recent advances.

I construct a new manager-level panel by combining mutual fund performance, manager education histories, course syllabi, academic publications, and job postings. Morningstar Direct and the CRSP Survivor-Bias-Free Mutual Fund Database provide manager identities, fund characteristics, returns, and holdings. Revelio Labs provides each manager's institutions, degree types, and fields of study. I map these education records to curricular content from the Open Syllabus Project. I characterize the research frontier using publications from Elsevier's Scopus database and the work of investment management using job postings from the Dewey corpus. The resulting data assign each manager a Relevance score and a Timeliness score based on the content of their education.

Managers with higher scores on either measure perform better. In my most robust OLS specification, a one-standard-deviation increase in Relevance is associated with 81 basis

points higher annualized net returns. The corresponding estimate for Timeliness is 80 basis points. The results are similar for gross returns: 82 basis points for Relevance and 74 basis points for Timeliness. They also hold after adjusting for factor exposure. Across rolling 12-, 24-, and 36-month windows, Relevance predicts 49 to 55 basis points higher annualized four-factor alpha, while Timeliness predicts 52 to 60 basis points. The estimates are robust to fund size, fund age, manager tenure, year-month fixed effects, and investment-objective fixed effects.

A natural concern is that the education measures proxy for school prestige rather than curriculum content. Managers who attend schools with higher Relevance or Timeliness may also attend more selective institutions, obtain stronger professional networks, or benefit from a more valuable institutional reputation.

I address this concern in two ways. First, I control directly for historical *U.S. News & World Report* rankings, Ivy League membership, the finance-research standing of the university, and undergraduate admissions selectivity. The education coefficients remain positive and statistically significant in every specification. Relevance estimates range from 67 to 76 basis points, while Timeliness estimates range from 64 to 78 basis points.

Second, I construct wrong-field placebo measures that hold the university fixed but replace the manager's actual curriculum with History or Engineering syllabi from the same institution. The measures constructed from the manager's actual field continue to predict fund performance. The placebo measures do not. Unrelated coursework from the same university carries the same institutional reputation, resources, and broad student body but has no relation to returns. The evidence therefore points to curriculum content rather than the general advantages of attending a particular school.

The central identification challenge is that students do not choose colleges randomly. Ability, ambition, family resources, or an early interest in finance may affect both college choice and later fund performance. I address this concern with an instrumental-variables strategy adapted from Card (1993). For each education measure, I use the corresponding measure at the four-year university geographically closest to the manager's high school as an instrument for the content of the education the manager actually received. The design exploits the tendency of students to attend nearby institutions: 42% of managers in my sample attended a university within 100 miles of their high school.

I recover managers' high-school locations from the U.S. School Yearbooks collection on Ancestry.com. I match each manager's name and approximate graduation year to yearbook records and verify the matches using photographs and professional biographies. To account for differences in childhood circumstances and residential sorting, I control for the 1990 median household income of the manager's high-school ZIP code.

The instruments strongly predict the education managers receive. The Kleibergen–Paap first-stage F-statistics are 40 for Relevance and 160 for Timeliness. The IV estimates are also economically large. A one-standard-deviation increase in Relevance raises annualized net returns by 211 basis points, while a one-standard-deviation increase in Timeliness raises annualized net returns by 113 basis points.

I next ask how the two dimensions of education relate to the returns managers earn on individual investment decisions. The two measures should not necessarily be valuable in the same settings. In stocks followed by many analysts, managers have access to a common set of forecasts, valuation models, and research reports. The advantage in these stocks should come from using widely available information more effectively, so Relevance should be especially

valuable. In stocks with little analyst coverage, managers cannot rely on the same research infrastructure and must develop more of the analysis themselves. Timeliness should be more valuable in these settings because exposure to recent ideas and methods may help managers approach problems for which established analysis is limited.

I test these predictions using the returns to funds' new positions. New positions isolate securities that managers actively choose to add, rather than stocks inherited from an earlier portfolio or held for reasons unrelated to a current investment decision. I define a position as new when a stock appears in a fund's holdings after being absent from the portfolio for the preceding twelve months.

Each month, I classify stocks by analyst coverage relative to firm size. Because larger firms naturally attract more analysts, the raw number of analysts does not by itself identify whether a stock is heavily or lightly researched. I therefore regress the log of one plus the number of analysts issuing earnings forecasts on log market capitalization and listing-exchange indicators. The residual measures whether a stock receives more or less analyst coverage than is typical for a firm of its size. Stocks in the bottom decile of this residual distribution form the thin-information group, while stocks in the top decile form the rich-information group.

For each new position, I measure the stock's cumulative return in excess of the risk-free rate beginning in the month after initiation and continuing for 12, 24, or 36 months, or until the fund exits the position. I then relate these returns jointly to Relevance and Timeliness, estimating the regressions separately for thin- and rich-information stocks.

The results differ sharply across the two groups. Timeliness predicts the returns to new positions in thin-information stocks: a one-standard-deviation increase is associated with

1.69 percentage points higher cumulative excess returns over 12 months and 3.14 percentage points over 36 months. Relevance has no detectable relation with returns in these stocks. The pattern reverses in rich-information stocks. Relevance predicts 1.38 percentage points higher cumulative excess returns over 12 months and 1.76 percentage points over 36 months, while Timeliness has no detectable relation with performance. The Timeliness relation strengthens with the return horizon, whereas the Relevance relation appears within the first year and changes little thereafter. The evidence therefore suggests that the two dimensions of education are associated with different forms of investment skill: frontier-oriented training is most valuable when managers must produce their own analysis, while task-relevant training is most valuable when the information is already available and the challenge is to use it well.

The rest of the paper is organized as follows. Section 2 reviews related literature. Section 3 describes the data. Section 4 explains how the two measures are constructed. Section 5 presents the baseline results. Section 6 describes the identification strategy. Section 7 examines whether the results reflect curriculum content rather than institutional prestige Section 8 investigates mechanisms. Section 9 concludes.

2. Related Literature

This paper contributes to three strands of literature. First, I add to the literature on the existence and measurement of active mutual fund manager skill. Early work finds little evidence of skill. Jensen (1968) shows that funds fail to outperform passive benchmarks net of fees, while Carhart (1997) attributes performance persistence to mechanical momentum rather than manager ability. Later studies, however, document skill using alternative

approaches. Grinblatt and Titman (1989) and Grinblatt and Titman (1993) use quarterly holdings to uncover stock-picking ability not visible in realized returns alone. Berk and van Binsbergen (2015) measure skill by the total dollar value managers extract from capital markets and show that the average manager generates millions of dollars annually. Kacperczyk, Nieuwerburgh, and Veldkamp (2014) further show that skill is time-varying, with managers emphasizing stock selection in expansions and market timing in recessions.

A related literature identifies the sources of this outperformance. Kacperczyk, Sialm, and Zheng (2005) show that managers earn higher returns when they concentrate in industries where they have greater information advantages. Coval and Moskowitz (1999) find that managers outperform in geographically proximate firms. Cohen, Frazzini, and Malloy (2008) show that shared educational networks with corporate board members generate informational advantages. Similarly, Cao, Chen, Cohen, and Zhao (2026) show that managers with executive-level spousal ties outperform through trades in the industries where their spouses work. I contribute to this literature by identifying education quality as a new source of investment skill. Using the Biasi and Ma (2025) education-quality measure, I show that managers educated at institutions closer to the academic frontier subsequently earn higher fund returns. These findings suggest that differences in education quality help explain cross-sectional variation in active managerial skill.

Second, I add to the literature linking managerial attributes to mutual fund performance. Chevalier and Ellison (1999) show that managers from more selective undergraduate institutions achieve higher risk-adjusted returns. Using average student SAT scores as a proxy for ability or education quality, they find that managers from elite institutions outperform by roughly 100 basis points per year. Performance differences remain significant even after

accounting for risk-taking and behavioral traits. Gottesman and Morey (2006) further show that holding an MBA only improves performance if the degree comes from a top-ranked program. Other characteristics, such as gender and age, also influence investor flows and risk-taking. For instance, Atkinson, Baird, and Frye (2003) find that female managers suffer lower inflows despite matching the performance of their male counterparts, and Greenwood and Nagel (2009) show that inexperienced managers disproportionately chased trends during the late-1990s technology bubble. Finally, recent work highlights the value of specific experience over simple tenure; Kempf, Manconi, and Spalt (2017) demonstrate a strong "learning-by-doing" effect where managers significantly outperform in industries where they have accumulated the most past experience.

I contribute to this literature by showing that education quality during college drives mutual fund manager outperformance. To measure this educational exposure, I adopt the frontier knowledge proximity metric developed by Biasi and Ma (2025), which uses text analysis of university syllabi to quantify how closely course content aligns with cutting-edge academic research. Previous studies use institutional prestige—such as high undergraduate SAT scores (Chevalier & Ellison, 1999) or top-tier MBA rankings (Gottesman & Morey, 2006)—as a proxy for education quality. These broad metrics bundle student selection, signaling, and instructional quality into a single black-box variable. By mapping the exact syllabi taught at a manager's alma mater to contemporaneous research, the education-quality score isolates the actual pedagogical content the manager consumes. This curriculum-based approach demonstrates that the specific curricular content of a manager's training meaningfully adds to their performance.

Finally, I contribute to the literature on human capital formation and the returns to edu-

cation. A central challenge in this literature is distinguishing whether the economic premium of a college degree reflects true skill accumulation (Becker, 1962), or innate ability and signaling (Spence, 1973). A vast empirical literature estimates the returns to schooling (Angrist & Krueger, 1991; Card, 1999) and the wage premium associated with attending highly selective colleges (Black & Smith, 2006; Dale & Krueger, 2002, 2014). However, because worker productivity is rarely observable, researchers typically rely on wages as a proxy, making it difficult to disentangle an institution's signaling value from actual value-added instruction (MacLeod, Riehl, Saavedra, & Urquiola, 2017). Recent work by Biasi and Ma (2025) offers new evidence on the content of university instruction. Using course syllabi, they show that exposure to frontier knowledge—curricula aligned with recent academic research—improves graduation rates and post-graduation earnings.

I contribute to this literature by examining a setting in which individual performance is more directly observable and by applying the frontier knowledge measure developed by Biasi and Ma (2025) to mutual fund managers. Rather than inferring skill from wages, I study whether managers who were educated at higher-quality institutions subsequently earn higher fund returns. This approach allows me to test whether a curriculum-based measure of education quality is associated with later career performance in asset management.

3. Data

I combine data on mutual fund performance, manager assignments, education histories, university curricula, academic research, and job requirements. The result is a manager–fund–month panel that links the content of a manager's education to the performance of the

funds they subsequently manage. The sample covers 2003 through 2025.

3.1. Mutual Fund Performance and Manager Assignments

I obtain mutual fund returns and characteristics from the CRSP Survivor-Bias-Free Mutual Fund Database. I restrict the sample to actively managed U.S. equity mutual funds and exclude index funds. CRSP provides monthly net-of-fee returns, total net assets, expense ratios, investment-objective codes, and fund inception dates. I measure fund size as the natural logarithm of total net assets and fund age as the number of years since inception.

I construct gross-of-fee returns by adding fund expenses back to net returns. I also estimate annualized Carhart four-factor alphas over rolling 12-, 24-, and 36-month windows. The remaining performance measure is benchmark-adjusted return. For each active fund, I define the benchmark as the largest index fund in the same objective-code category and subtract the benchmark return from the active fund's return.

I identify the managers responsible for each fund using Morningstar Direct. Morningstar records the start and end dates of each manager's tenure at a fund, as well as the manager's name and fund-family affiliation. I merge these tenure histories with CRSP so that each observation corresponds to a manager managing a particular fund in a particular month. A co-managed fund therefore contributes one observation for each manager assigned to it in that month. Manager tenure is the number of years since the manager began managing the fund.

3.2. Manager Education Histories

I obtain managers' education histories from Revelio Labs. Revelio combines information from professional-network profiles, public resumes, and company websites and standardizes the resulting records across individuals, institutions, employers, and occupations. Its education files report the institution attended, degree type, field of study, and attendance or graduation dates. Its position files report employers, job titles, and employment dates.

I link the Morningstar manager universe to Revelio in three steps. I first restrict potential matches to individuals with the same last name. I then compare first names using a conservative fuzzy-match threshold. Finally, I compare the fund family reported by Morningstar with the individual's employer history in Revelio. I manually review ambiguous matches and retain only links for which the manager's identity and employment history are consistent across the two sources.

Although the Revelio records may contain multiple degrees for a manager, I retain only the manager's undergraduate education record. The education measures are based on the manager's undergraduate institution and undergraduate field of study. They are therefore fixed for each manager across all manager–fund–month observations.

3.3. Course Syllabi

I measure curriculum content using course syllabi from the Open Syllabus Project. Open Syllabus collects publicly available syllabi from university websites and converts them into a common machine-readable format. Each record identifies the institution, academic field, course year, and course title and contains text describing the course, including its description

and learning objectives.

I restrict the syllabus data to English-language courses taught at four-year U.S. institutions and to the finance and economics fields. The scored syllabi cover 2008 through 2018. I standardize institution names and link them to the universities in the Revelio education records. I similarly map the fields reported by Revelio into the corresponding Open Syllabus field classifications.

The syllabus records describe the curricula available at the institution and in the field the manager studied. They do not identify the manager's exact course selections. I therefore aggregate the available syllabi within each manager's undergraduate institution and field of study. To reduce noise from sparsely represented curricula, I retain a manager only when the corresponding undergraduate institution–field cell is supported by at least 25 linked syllabi. I apply this coverage requirement consistently to both education measures and throughout the main empirical analysis.

3.4. Academic Publications

I characterize the academic research frontier using publications from Elsevier's Scopus database. Scopus provides article titles, abstracts, author keywords, index keywords, journal identities, publication years, and citation information. These fields summarize the topics and methods used in academic research and allow course content to be compared with research published at different points in time.

The research corpus contains articles from the top finance and economics journals by SCImago Journal Rank (SJR). I assign each syllabus to the research corpus corresponding

to its Open Syllabus field. Section 4 explains how I use these publications to construct Timeliness.

3.5. Job Postings

I measure the content of investment-management work using online job advertisements from Dewey's Job Records data. The postings contain employer descriptions of job responsibilities, required knowledge, qualifications, and skills. I classify occupations in the job-postings data using O*NET codes." The investment-management corpus combines postings for Investment Fund Managers (O*NET 11-3031.03) and Financial and Investment Analysts (O*NET 13-2051). I include analyst positions because security research, financial analysis, and valuation are direct inputs into portfolio-management decisions. The comparison corpus contains postings for Financial Specialists, All Other (O*NET 13-2099), which describe finance work that is not specific to managing an investment portfolio.

I process the investment-management and comparison postings identically and retain the portions of each advertisement that describe responsibilities, duties, qualifications, and required skills. Section 4 describes how I compare these postings with syllabi to construct Relevance.

3.6. Merged Sample

I link the fund panel, manager histories, education records, and syllabus data using manager, institution, field, degree date, and fund-tenure information. Each manager–fund–month is assigned the Relevance and Timeliness scores associated with the manager's undergraduate

degree. Both scores are formed by averaging the syllabus-level measures linked to that manager–degree record.

4. Measuring Manager Education Quality

I measure two features of a manager's education: whether the curriculum teaches the knowledge needed to analyze securities and manage portfolios, and whether it incorporates recent ideas and methods from academic research. I call these measures *Relevance* and *Timeliness*, respectively.

Relevance measures how closely the curriculum matches the work of investment management. It contrasts the similarity of each syllabus to investment-management jobs with its similarity to finance jobs more broadly. Investment-management jobs emphasize security analysis, valuation, portfolio construction, asset allocation, trading, and investment risk. General finance jobs place greater weight on corporate budgeting and planning, accounting and financial operations, spreadsheet use, process management, and general professional skills. A syllabus scores highly when its content is more closely aligned with investment-management knowledge and skills than with knowledge and skills used broadly across finance occupations. Relevance is therefore a relative measure of specific versus general finance knowledge.

Timeliness measures how up to date a curriculum's content was relative to contemporaneous academic research. Following Biasi and Ma (2025), I compare each syllabus with recent research in the same field and with older, established research. A course that incorporates newer developments, such as machine-learning methods for return prediction, will generally

score higher than a course focused primarily on long-established material. Higher Timeliness therefore indicates that the ideas and methods taught were closer to the contemporaneous research frontier.

The two measures capture complementary dimensions of curriculum quality. Foundational concepts such as the CAPM remain important for understanding asset prices and managing portfolios even though they are no longer new. Relevance captures whether the curriculum teaches such job-relevant knowledge, while Timeliness captures whether it also incorporates recent advances. A school can score highly on both measures by teaching the core principles required for investment management and updating the curriculum as new ideas and methods emerge.

4.1. Timeliness

Timeliness measures whether a curriculum teaches its field's current research or its older, foundational material. I construct it following Biasi and Ma (2025), who measure how closely college course content aligns with current scholarly research by comparing the text of each course syllabus to recent versus older research published in high-impact journals—those with the highest SCImago Journal Rank (SJR). I build this measure for the managers in my sample, applying it to their college coursework in finance and economics. For a syllabus taught in year t, the measure asks whether its language is closer to research published in the years just before t or to older research. The construction has four steps: I (1) build a knowledge dictionary from the research literature, (2) represent each syllabus and each article as a weighted vector over that dictionary, (3) form for each syllabus a recent and an

older research benchmark, and (4) score the syllabus by its proximity to recent relative to older research.

Step 1–Knowledge dictionary: The first step is to construct a knowledge dictionary: the common set of research terms over which I represent every syllabus and every article, so that course content and academic research can be compared directly. The dictionary is the set of all unique author-provided keywords from every article published—since each journal's inception—in the leading finance and economics journals, ranked by the SCImago Journal Rank (SJR). [1]

Step 2a—Term-frequency vector: The next step is to represent each document—a syllabus or an article—as a vector over the knowledge dictionary. Let c_{dw} be the number of times term $w \in W$ appears in document d. Rather than use this raw count, I let a term's first appearance count fully and each additional repetition add progressively less, so its weight levels off however many times it recurs:

$$TF_{dw} = \frac{c_{dw}\,(k_1 + 1)}{c_{dw} + k_1}, \qquad k_1 = 1.2.$$

The constant k_1 controls how quickly the weight levels off, and I set it to 1.2, the conventional value for this transformation in information retrieval.[2] This keeps a document from scoring

[1] Open Syllabus classifies syllabi only at the broad-field level, so finance courses fall under a single "Business" field that also spans accounting, marketing, and management. I therefore treat this field as one corpus, pooling its journals into a single dictionary, and likewise build one dictionary for Economics.

[2] The transformation is the term-frequency component of the BM25 ranking function Robertson and Zaragoza (2009). Its rationale is that repeated mentions carry diminishing information: the first occurrence of a term is strong evidence that a document treats that concept, while further occurrences add little. A term's weight climbs fastest on its first mention and can never exceed $k_1 + 1$, so repetition alone cannot let one term dominate the vector. The parameter k_1 sets the speed of this leveling-off—as $k_1 \to 0$ the transformation approaches a present-or-absent indicator, and as $k_1 \to \infty$ it approaches the raw count—and

as more timely simply because it repeats a trendy term many times—what matters is that a concept is present and emphasized, not how often a single word is repeated. The resulting vector $\{TF_{dw}\}_{w \in W}$ captures the document's mix of research concepts—which dictionary terms it uses and how heavily it draws on each.

Step 2b—Down-weighting common terms: Not all terms are equally informative. Generic terms such as "markets," "firms," or "returns" appear in nearly every finance and economics document and reveal little about its specific content, whereas terms such as "machine learning" or "difference-in-differences" characterize what a document is actually about. Following Biasi and Ma (2025), I therefore weight each term by its inverse document frequency, which is larger the fewer documents contain it (Kelly, Papanikolaou, Seru, & Taddy, 2021):

$$IDF_w = \ln\left(\frac{|D|+1}{\sum_{n \in D} \mathbf{1}(c_{nw} > 0) + 1}\right),$$

where D is the set of documents and the denominator counts how many contain term w; the $+1$ terms keep the weight well defined when a term is absent.

Step 2c—Making the weights backward-looking: Standard inverse document frequency is not enough here, because a term's informativeness changes over time: a term that is specific and frontier in one period can become common later. If weights were computed by pooling all years, such a term would be judged generic even when evaluating an earlier syllabus for which it was still novel. "Machine learning," for instance, appeared in few finance and economics documents in the early 2000s—a strong signal of frontier content at the

$k_1 = 1.2$ is its standard default across information-retrieval applications.

time—but is common by 2020; a pooled weight would understate how close to the frontier an early-2000s syllabus that taught it really was. Following Biasi and Ma (2025), I therefore make the weight backward-looking, so that the weight of term w for a document in year t depends only on the documents that predate it:

$$BIDF_{tw} = \ln\left(\frac{|D_t| + 1}{\sum_{n \in D_t} \mathbf{1}(c_{nw} > 0) + 1}\right),$$

where D_t is the set of articles and syllabi published before year t. Each term is thus weighted by how distinctive it was when the document was written: "machine learning" receives a high weight for an early-2000s syllabus, whereas a long-established term such as "asset pricing" receives a low one.

Step 3—Comparing the syllabus to recent and older research: Using the weighted vectors from Step 2, I measure how close a syllabus d is to a research article n by their cosine similarity, $\rho_{dn} = (V_d/\|V_d\|) \cdot (V_n/\|V_n\|)$, which is larger the more distinctive vocabulary they share. Following Biasi and Ma (2025), for a syllabus taught in year t, I compare each syllabus to two vintages of research—a recent window of articles published in $[t-3, t-1]$ and an older window in $[t-17, t-15]$. [3]

[3] Following Biasi and Ma (2025), these windows come from the field's citation-age distribution—the gap, in years, between an article and the works it cites. The recent lag τ is the 5th percentile of citation ages and the older lag τ' the 90th; both are close to 2 and 16 years for finance and for economics, so I fix the windows at $[t-3, t-1]$ and $[t-17, t-15]$ across fields.

Step 4—Timeliness: Timeliness is the syllabus's average similarity to recent research relative to older research, times 100:

$$p_d = 100 \times \frac{S_d^{\text{recent}}}{S_d^{\text{old}}}, \qquad S_d^W = \frac{1}{|W|} \sum_{n \in W} \rho_{dn},$$

where S_d^W is d's average cosine similarity to the articles in window W. A value above 100 means the syllabus is closer to recent than to older research; content equally close to both cancels in the ratio. I then collapse these syllabus scores into a single, static measure for each institution–field pair, averaging p_d over all its syllabi across all years. Each manager is assigned the value for the manager's undergraduate field of study at the undergraduate institution attended.

4.2. Relevance

Relevance measures how closely a curriculum matches the specific work of investment management relative to finance in general. I compare each syllabus to two sets of job postings—one for investment-management occupations, one for finance occupations broadly—and ask whether its content looks more like the first than the second. The construction has four steps: I (1) build two job-posting benchmarks, one for investment-management work and one for general finance work; (2) represent each syllabus and each posting as a semantic vector; (3) measure each syllabus's similarity to the two benchmarks; and (4) score the syllabus by how much more it resembles investment-management work than general finance, then aggregate to the manager's institution-field.

Step 1—Job postings benchmark: I first construct the two benchmarks against which each syllabus is compared: one for investment-management work and one for generic finance work. I define these benchmarks using real online job postings from Dewey's Job Records dataset, drawing the first from investment-management occupations and the second from generic-finance occupations. [4] From each posting, I retain the sections describing job responsibilities, required knowledge and skills, job tasks, etc., and remove boilerplate such as company descriptions, benefits, and equal-opportunity statements.

Step 2—Representing the text with embeddings: Syllabi and job postings often describe the same knowledge or task using different language. To compare their content, I represent each syllabus and each job posting from step 1 with a *sentence embedding*. An embedding converts the passage into a vector—a list of numbers that summarizes its meaning. Passages that express similar ideas receive similar vectors, even when they share few or no words, while passages about different topics receive dissimilar vectors. This allows, for example, a syllabus passage on "equity valuation" to match a job posting that asks an employee to "analyze companies and recommend stocks."

Step 3—Similarity of each syllabus to the two benchmarks: After embedding the job postings and syllabus passages, I summarize each benchmark using a small set of representative reference points and measure how closely each syllabus passage matches those points.

Constructing the benchmarks requires two steps. First, I clean the job postings. Oc-

[4]The investment-management occupations are the O*NET categories Investment Fund Managers (11-3031.03) and Financial and Investment Analysts (13-2051); the generic-finance category is Financial Specialists, All Other (13-2099). Postings come from the Dewey job-postings corpus.

cupational classifications are noisy: portfolio-management positions often appear under the broader analyst code job postings, while the fund-manager code includes some positions unrelated to managing investments. I thus retain only postings whose content is sufficiently similar to a fixed set of statements describing core investment-management tasks. [5]

Second, I distill the postings in each benchmark into a small set of representative reference points. An individual posting reflects the wording of a particular employer, the responsibilities of a particular position, and the tasks that the employer chooses to emphasize. Comparing syllabi directly with individual postings would therefore capture this idiosyncratic variation rather than the underlying content of the occupation. The relevant benchmark is instead the set of themes that recur across many postings.

I identify these recurring themes by clustering the embedded postings separately within the investment-management and generic-finance benchmarks and representing each cluster by its centroid. Each centroid serves as a prototype for a distinct occupational theme. For example, the investment-management postings form clusters related to valuation and financial modeling, portfolio construction, and fixed-income analysis. Each benchmark therefore becomes a compact set of reference points that captures the recurring substance of the occupation rather than the wording of any individual posting. [6]

I then compare each syllabus passage with the two sets of reference points. For syllabus passage c with embedding e_c, let $\{F_i\}$ and $\{G_j\}$ denote the investment-management and generic-finance reference points, respectively. Let $\mathcal{N}_c^{\text{inv}}$ and $\mathcal{N}_c^{\text{gen}}$ denote the three reference

[5] The screening statements describe tasks such as security analysis, valuation, portfolio construction, risk management, and investment decision-making.

[6] I apply k-means separately to the embedded postings in the two benchmarks. I retain 11 clusters describing investment-management work and 14 clusters describing generic-finance work.

points in each benchmark with the highest cosine similarity to passage c. I define:

$$f_c = \frac{1}{3} \sum_{i \in \mathcal{N}_c^{\text{inv}}} \cos(e_c, F_i), \qquad g_c = \frac{1}{3} \sum_{j \in \mathcal{N}_c^{\text{gen}}} \cos(e_c, G_j).$$

Thus, f_c is the average similarity of passage c to its three nearest investment-management reference points, while g_c is the corresponding average for generic finance. Using the three nearest reference points allows each passage to match the occupational themes most relevant to its content without requiring it to resemble every theme represented in the benchmark.

Step 4—Relevance score and aggregation: Steps 1 through 3 give, for each passage of a syllabus, how much it resembles investment-management work (f_c) and generic finance (g_c). I combine these into a single score for the syllabus. A passage should raise the score when it looks like investment work, and it should count for more the more it looks like investment work *beyond* generic finance. I therefore weight each passage's investment similarity f_c by its excess over its generic similarity, $f_c - g_c$, sum across the syllabus's passages, and normalize by the syllabus's total generic-finance content:

$$\text{Relevance} \;=\; \frac{\sum_c (f_c - g_c)\, f_c}{\sum_c g_c}.$$

The numerator is large when a syllabus's passages resemble investment work and little else; the denominator normalizes by how much finance content the syllabus contains at all, so the score measures a curriculum's investment *tilt* rather than its length or overall quantity of finance. A curriculum built around valuation, portfolio construction, and security analysis scores high; one built around budgeting, financial reporting, or general professional skills

scores near zero, because that content resembles generic finance about as much as investment work and cancels.

This yields one score per syllabus. As with Timeliness, I aggregate it to a static institution–field measure: I average the syllabus scores within each institution and field, keeping institution–field cells with at least 25 syllabi, and I assign each manager the value for the corresponding undergraduate institution–field pair. they studied at the institution they attended. Finally, I standardize the measure across the estimation sample, so that each coefficient reports the effect of a one-standard-deviation increase in Relevance.

My sample period runs from 2003 to 2025 and consists of 890 mutual funds and 702 managers, who attended 144 distinct four-year U.S. universities. The education measures are constructed from 85,211 finance and economics course syllabi taught at these institutions.

Table 1 presents the summary statistics.

Insert Table 1 About Here

5. Empirical Analysis: Baseline Results

This section examines the relation between manager education quality and subsequent fund performance. I report results for the two measures developed in Section 4: Relevance, which captures how closely a curriculum matches the knowledge used in investment management, and Timeliness, which captures how closely its content reflects the contemporaneous research frontier. I examine four measures of performance: net-of-fee returns, gross-of-fee returns, risk-adjusted alphas, and benchmark-adjusted returns

5.1. Education Quality and Net Returns

I estimate the following specification separately for Relevance and Timeliness:

$$\begin{aligned}\text{Return}_{i,f,t} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} \\ + \lambda_t + \delta_s + \phi_m + \epsilon_{i,f,t},\end{aligned} \tag{1}$$

The dependent variable, $\text{Return}_{i,f,t}$, is the annualized net-of-fee return, in percentage points, of fund f managed by manager i in month t. $\text{Education Quality}_i$ denotes either the manager's Relevance score or Timeliness score. Both measures are standardized, so β reports the difference in annualized net returns associated with a one-standard-deviation increase in the relevant measure. The vector $X_{f,t}$ includes fund size and fund age, and $\text{Manager Tenure}_{i,f,t}$ measures the manager's tenure at the fund. λ_t denotes year-month fixed effects. δ_s and ϕ_m represent investment-objective fixed effects and fund-family fixed effects respectively. Standard errors are clustered at the manager level and reported in parentheses.

Insert Table 2 About Here

Table 2 reports the results. Panel A presents estimates for Relevance, and Panel B presents estimates for Timeliness.

Column (1) includes year-month fixed effects. A one-standard-deviation increase in Relevance is associated with 89 basis points higher annualized net returns. The corresponding estimate for Timeliness is 97 basis points. Both coefficients are statistically and economically significant.

Column (2) adds fund-family fixed effects, so the estimates come from comparisons among

managers working within the same fund family. This absorbs persistent differences across families in research resources, distribution networks, compensation systems, brand reputation, and hiring practices. The coefficients rise to 100 basis points for Relevance and 119 basis points for Timeliness, showing that the relation is not driven simply by higher-quality managers sorting into better-performing fund companies. Column (3) adds investment-objective fixed effects, comparing managers of funds that follow the same broad strategy. The coefficients remain large—82 basis points for Relevance and 84 basis points for Timeliness—showing that the relation is not explained by differences in average returns across investment styles.

Columns (4) through (6) introduce a set of fund and manager controls, including fund age, fund size, and manager tenure. The estimates remain large across these specifications, ranging from 81 to 98 basis points for Relevance and from 80 to 111 basis points for Timeliness. In the preferred specification in column (6), a one-standard-deviation increase in Relevance or Timeliness is associated with approximately 80 basis points higher annualized net returns, with both estimates significant at the 1% level.

The estimates vary little across specifications. The Relevance coefficient ranges from 81 to 100 basis points, and the Timeliness coefficient ranges from 80 to 119 basis points. Overall, managers whose education is more closely matched to investment-management tasks, and managers whose education is closer to the research frontier, earn higher subsequent net returns.

5.2. Education Quality and Alternative Measures of Fund Performance

The net-return relation in Table 2 does not depend on how fund performance is measured. I re-estimate the specification in column (6) of Table 2 for gross-of-fee returns, Carhart four-factor alphas estimated over 12-, 24-, and 36-month windows, and benchmark-adjusted returns. Table 3 reports the estimates. Panel A presents the results for Relevance, while Panel B presents the results for Timeliness. Column (1) reproduces the net-return estimates for comparison.

Insert Table 3 About Here

Column (2) uses gross-of-fee returns. Net returns measure what investors earn after fees, whereas gross returns more directly capture managerial value added. Berk and Green (2004) show that skilled managers attract capital until decreasing returns to scale eliminate abnormal net performance, so skill may appear in gross returns even when it is competed away in net returns. A one-standard-deviation increase in Relevance is associated with 82 basis points higher annualized gross returns, while the corresponding estimate for Timeliness is 74 basis points. These estimates are close to the net-return estimates of 81 and 80 basis points, respectively. The relation therefore appears in the performance managers produce, not only in the returns investors retain after fees.

The return results may reflect differences in factor exposure rather than differences in managerial ability. To address this possibility, I estimate rolling risk-adjusted performance

measures using the Carhart Four-Factor model (Carhart, 1997). For each manager i managing fund f at time t, I estimate the following regression over the prior 12, 24, and 36 months:

$$r_{i,t} = \alpha_i + \beta_{1,i} \times \text{MktRF}_t + \beta_{2,i} \times \text{SMB}_t + \beta_{3,i} \times \text{HML}_t + \beta_{4,i} \times \text{MOM}_t + \epsilon_{i,t}, \qquad (2)$$

where the intercept is the four-factor alpha, estimated separately over rolling 12-, 24-, and 36-month windows.

Columns (3) through (5) report the results. A one-standard-deviation increase in Relevance is associated with 49 basis points higher annualized alpha over the 12-month window, 53 basis points over the 24-month window, and 55 basis points over the 36-month window. The corresponding estimates for Timeliness are 52, 60, and 60 basis points. Five of the six coefficients are statistically significant at the 5% level; the 36-month Relevance estimate is significant at the 10% level. The estimates are smaller than those for raw returns but remain positive after adjusting for market, size, value, and momentum exposure.

Column (6) uses benchmark-adjusted returns. For each active fund, I define the benchmark as the largest index fund in the same investment-objective category and subtract its return from the active fund's return. This measure compares each active fund with a passive alternative following the same broad investment strategy. A one-standard-deviation increase in Relevance is associated with 28 basis points higher annualized benchmark-adjusted returns, while the corresponding estimate for Timeliness is 38 basis points. Both coefficients are statistically significant at the 5% level.

Across gross returns, four-factor alphas, and benchmark-adjusted returns, both measures

of education quality predict higher subsequent performance. Managers whose education is more closely matched to investment-management tasks, and managers whose education is closer to the research frontier, outperform across multiple return measures.

Appendix Tables A.2, A.3, and A.4 report the full OLS specification battery for gross returns, four-factor alphas, and benchmark-adjusted returns, respectively. The results remain positive across the alternative fixed-effect structures and control specifications.

6. Identification Strategy

The main empirical challenge is that a manager's education quality is endogenous. Managers do not randomly attend universities or select curricula. Those who are more able, more motivated, or better prepared for careers in finance may be more likely to choose institutions with high Relevance or Timeliness scores, and those same characteristics may later improve their performance as fund managers. OLS estimates may therefore confound the effect of education quality with selection into the institutions that provide it.

To address this concern, I implement an instrumental-variable strategy based on geographic proximity. The design adapts the instrument introduced by Card (1993), who uses proximity to a four-year college as an instrument for educational attainment. The economic intuition is that students who live closer to a college face lower costs of attendance and are therefore more likely to pursue additional schooling. I apply this logic to the quality, rather than the quantity, of education.

Specifically, I instrument the education-quality score of the university a manager attended with the corresponding score of the four-year university closest to the manager's high school

for which I can construct a measure in the manager's field of study.[7] I implement the design separately for the two measures of education quality.

For Relevance, I instrument the Relevance score of the attended university with the Relevance score of the nearest university. For Timeliness, I instrument the Timeliness score of the attended university with the Timeliness score of the nearest university. Each 2SLS specification therefore contains one endogenous education measure and its corresponding nearest-university instrument.

6.1. Instrument Construction

Locating managers' high schools: I first identify the high school each manager attended, which allows me to locate the manager before the college decision. I collect these data manually from two primary sources. For a small subset of managers, I obtain high-school information from LinkedIn profiles available through Revelio Labs. For most managers, I use Ancestry.com's *U.S. School Yearbooks, 1900–2016* collection, a repository of digitized high-school and college yearbooks.[8] The records typically contain student photographs and information identifying the school and its location.

I search for each manager using the manager's full name and an approximate year of high-school attendance, inferred as four years before completion of the bachelor's degree. This search generally produces several possible matches. I review each candidate manually and compare the yearbook photograph with a contemporary professional headshot obtained from LinkedIn, a mutual fund prospectus, or a firm website. I retain only unambiguous

[7] I construct nearest-university scores using the same procedure as the manager-level measures, including the requirement of at least 25 underlying syllabi per school–field cell.

[8] https://www.ancestry.com/search/collections/1265/

matches. For each verified manager, I record the high-school name, city, and state and then collect the school's street address and ZIP code.

Identifying the nearest university: I next identify the geographically closest four-year university for which an OSP education-quality score is available in the manager's field of study. I geocode the addresses of the high schools and OSP-covered universities and calculate the geodesic distance between each high school and university. I manually verify each match to ensure that the selected university is reasonably accessible from the manager's high school.[9]

The nearest university generates two distinct instruments. Its Relevance score serves as the instrument for the Relevance score of the university the manager attended. Its Timeliness score separately serves as the instrument for the attended university's Timeliness score. Although both instruments are based on the same nearest institution, each uses the institution's score for the corresponding education-quality measure.

6.2. Identifying Assumptions

Instrument relevance: The relevance condition requires each nearest-university score to predict the corresponding score of the university the manager actually attended. In other words, the nearest university's Relevance score must predict the attended university's Relevance score, while the nearest university's Timeliness score must predict the attended university's Timeliness score.

Students display a strong geographic bias in their college choices. Figure 1 plots the dis-

[9]Straight-line distance can occasionally produce implausible matches, such as universities separated from the high school by a body of water or another substantial geographic barrier. I correct these cases manually.

tance between each manager's high school and undergraduate institution. Forty-two percent of managers attend college within 100 miles of where they grew up. Students may remain close to home to reduce tuition and travel costs, stay near family, or take advantage of feeder relationships between local high schools and universities.

Insert Figure 1 About Here

Because students disproportionately attend nearby colleges, the local set of universities shapes the education they ultimately receive. A manager who grows up near a university with a curriculum closely matched to investment-management tasks is more likely to receive high-Relevance training. Similarly, a manager who grows up near a university whose curriculum is close to the research frontier is more likely to receive high-Timeliness training. Accessing a university farther from home requires the student to incur additional financial and geographic costs.

The first-stage estimates confirm this mechanism. I estimate the first stage separately for each measure. In the Relevance specification, a one-standard-deviation increase in the nearest university's Relevance score is associated with a 0.51-standard-deviation increase in the Relevance score of the university the manager attends. In the Timeliness specification, a one-standard-deviation increase in the nearest university's Timeliness score is associated with a 0.75-standard-deviation increase in the attended university's Timeliness score. Both estimates are statistically significant at the 1% level. The corresponding Kleibergen–Paap F-statistics are 40 for Relevance and 160 for Timeliness.

Exclusion restriction: The exclusion restriction requires the nearest university's education-quality score to affect subsequent fund performance only through the curriculum of the university the manager attends.

The main threat to this condition is that universities with high Relevance or Timeliness scores may be located in economically advantaged areas. Growing up in such an area may provide better schools, greater financial resources, higher financial literacy, or access to professional networks before college. These childhood advantages could independently affect later fund performance.

I address this concern by controlling for the median household income of the manager's high-school ZIP code, measured in the 1990 Census.[10] This control absorbs differences in the socioeconomic status of managers' childhood neighborhoods.

Conditional on the fixed effects, childhood-neighborhood income does not predict either education-quality measure. Its first-stage coefficient is small and statistically indistinguishable from zero in both the Relevance and Timeliness specifications. The remaining identifying variation compares managers who grew up in similarly affluent neighborhoods but differed in their proximity to a university with a high score on the relevant education-quality measure.

6.3. Two-Stage Least Squares Estimates

I estimate the effect of education quality on fund performance using two-stage least squares. I estimate separate 2SLS systems for Relevance and Timeliness: each education measure is instrumented with the corresponding score of the four-year university nearest the manager's

[10]The median manager in the sample completes college around 1999–2000, placing the college decision in the mid-1990s. The 1990 Census provides the last pre-college measure of neighborhood income for most managers in the sample.

high school.

For each education-quality measure, the first stage is:

$$\begin{aligned}\text{Education Quality}_i = \pi\,\text{Nearest University Quality}_i + \rho\,\text{Median Income}_i + \gamma_1' X_{f,t} \\ + \eta_1\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \epsilon_{i,f,t},\end{aligned} \tag{3}$$

where $\text{Education Quality}_i$ is manager i's standardized Relevance or Timeliness score. Nearest University Qu is the corresponding standardized score of the four-year university closest to the manager's high school. Thus, the Relevance specification instruments attended-university Relevance with nearest-university Relevance, while the Timeliness specification uses nearest-university Timeliness as the instrument. Median Income_i is the 1990 median household income of the manager's high-school ZIP code.

The second stage is:

$$\begin{aligned}\text{Return}_{i,f,t} = \beta_{\text{IV}}\,\widehat{\text{Education Quality}}_i + \theta\,\text{Median Income}_i + \gamma_2' X_{f,t} \\ + \eta_2\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \epsilon_{i,f,t},\end{aligned} \tag{4}$$

where $\widehat{\text{Education Quality}}_i$ is the fitted value from Equation (3). The dependent variable is the fund's annualized net-of-fee return. The remaining controls and fixed effects follow Equation (1). Standard errors are clustered at the manager level. The IV sample is limited to managers for whom I can verify the high school attended and construct the corresponding nearest-university instrument. This yields 292 managers and 25,296 manager–fund–month observations for Relevance, and 291 managers and 25,262 observations for Timeliness.

Insert Table 4 About Here

Table 4 reports the 2SLS estimates. Columns (1) and (2) present the first- and second-stage results for Relevance, while columns (3) and (4) present the corresponding results for Timeliness. The instruments are strong: the Kleibergen–Paap F-statistics are 40 for Relevance and 160 for Timeliness, both well above conventional weak-instrument thresholds. The second-stage estimates are statistically significant and economically meaningful. A one-standard-deviation increase in instrumented Relevance is associated with 211 basis points higher annualized net returns. The corresponding estimate for instrumented Timeliness is 113 basis points.

As added robustness, Appendix Table A.6 reports the 2SLS estimates for gross returns, four-factor alphas, and benchmark-adjusted returns. The strongest results appear for the 24- and 36-month alphas: instrumented Relevance predicts 221 and 232 basis points higher annualized alpha, while the corresponding estimates for Timeliness are 115 and 118 basis points. The remaining estimates are positive and qualitatively similar.

Finally, since education quality and the instrument are measured at the manager level, their values are repeated across a manager's fund-month observations. These repeated observations do not provide independent first-stage variation. I therefore cluster standard errors by manager, so that inference reflects variation across managers rather than treating each fund-month as independent.

Appendix Table A.5 verifies that the first-stage relation is not an artifact of the panel structure. The table re-estimates the first stage in a cross-section with one observation per manager. A one-standard-deviation increase in nearest-college Relevance predicts a 0.57-standard-deviation increase in attended-college Relevance, while the corresponding estimate for Timeliness is 0.75 standard deviations. Both coefficients are significant at the 1% level.

The first-stage F-statistics are 205 and 500, respectively. Thus, the instrument's strength comes from cross-sectional differences in managers' local college environments and subsequent college choices, not from repeatedly observing the same manager over time.

7. Education Content or School Prestige?

A central concern is that Relevance and Timeliness may proxy for institutional prestige rather than curriculum content. Managers from highly ranked schools may outperform because those institutions offer better resources and confer prestige and reputational advantages in the fund industry. If so, the baseline coefficients would reflect where managers studied rather than what they learned.

I address this concern in two ways. First, I control directly for school rankings/selectivity and reputation. Second, I construct wrong-field placebo measures that hold the university fixed but replace the finance curriculum with History or Engineering syllabi. These tests separate curriculum content from the broader advantages of attending a prestigious institution.

7.1. Controlling for University Prestige

I first control directly for the prestige and selectivity of the manager's undergraduate institution. For each education measure and each prestige proxy, I estimate

$$\begin{aligned}\text{Return}_{i,f,t} = \beta\,\text{Education Quality}_i + \theta_k'\text{Prestige}_i^{(k)} + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} \\ + \lambda_t + \delta_s + \epsilon_{i,f,t},\end{aligned} \tag{5}$$

where Education Quality$_i$ is either Relevance or Timeliness, and Prestige$_i^{(k)}$ denotes the school-level prestige or selectivity control used in specification k. I add one prestige measure at a time to the specification in column (6) of Table 2.

I use four measures of institutional prestige and selectivity. First, I measure general university reputation using the *U.S. News & World Report* National Universities rankings collected by Andrew Reiter.[11] I average each school's rank across all available years from 1990 through 2026, producing a measure of its long-run reputation rather than its position in a particular year. I enter this measure in three forms. The rank-tier specification includes indicators for average ranks 1–20, 21–50, and 51–150, with unranked institutions as the omitted category. The Top-20 specification includes a single indicator for whether the school's average rank falls within the top 20. The continuous specification enters reverse-coded average rank, so that higher values indicate greater prestige. [12]

Second, I include an Ivy League indicator. This measure captures the reputational value associated with the eight Ivy League institutions that may not be fully summarized by a numerical university rank.

Third, I measure finance-specific standing using the ASU Finance Research Rankings.

[11] The historical ranking data are available from Andrew Reiter's website at https://www.andyreiter.com/datasets/.

[12] In the continuous-rank specifications, schools that never appear in the top 150 are assigned the bottom of the reverse-rank scale and flagged with a separate unranked indicator. The rank gradient is therefore estimated among ranked schools, while unranked schools receive a separate intercept.

The ASU ranking orders universities by cumulative finance-faculty publications in leading finance journals from 1990 through 2025. I enter the ranking in the same three forms: indicators for ranks 1–20, 21–50, and 51–150; a Top-20 indicator; and a reverse-coded continuous rank with a separate indicator for unranked institutions.

Fourth, I measure undergraduate selectivity using the institution's admission rate from IPEDS. Lower admission rates indicate greater selectivity. This specification includes a separate indicator for institutions with missing admission-rate data.

Insert Table 5 About Here

Table 5 reports the coefficient on the education-quality measure from each regression. Column (1) reports the Relevance estimates, and column (2) reports the Timeliness estimates. The first row reproduces the baseline estimates without an additional prestige control.

The coefficients change little after controlling for school prestige and selectivity. The Relevance estimate ranges from 67 to 76 basis points, compared with 81 basis points in the baseline specification. The Timeliness estimate ranges from 64 to 78 basis points, compared with a baseline estimate of 80 basis points. Every coefficient remains statistically significant at the 5% level or better. Observable differences in school prestige and selectivity therefore explain little of the relation between education quality and fund performance.

7.2. Wrong-Field Placebo

The prestige controls above rely on observed measures of school rank and selectivity. I complement them with a wrong-field placebo that holds the university fixed and changes only the curriculum used to construct the education measure. The comparison is between the manager's actual major and an unrelated field taught at the same university.

I use History as the primary placebo and Engineering as an additional test. History has little overlap with finance or investment management, while Engineering provides a technically oriented but still distinct comparison. Of the 701 managers in the baseline OLS sample, the History placebo is available for 378 and the Engineering placebo for 367. Within each placebo sample, I estimate the real and placebo measures for the same managers.

For Relevance, I replace the syllabi from the manager's major with History syllabi from the same university and score them against the same fund-manager and generic-finance job postings used in the original measure. I then repeat the procedure with Engineering syllabi. For Timeliness, I replace the manager's major-field syllabi with History and, separately, Engineering syllabi, while preserving the original research benchmark: Business majors remain matched to the business-journal corpus, and Economics majors to the economics-journal corpus. In both exercises, the university, reference sets, publication windows, and scoring procedures remain fixed; only the syllabus field changes.

The placebo measures ask whether unrelated curricula from the same university also predict fund performance when passed through the same finance-based measurement procedure. A null placebo alongside a significant real measure points to the curriculum in the manager's actual field of study rather than broader school attributes such as ranking, reputation, or

resources.

Insert Table 6 About Here

Table 6 reports the results. Columns (1) and (2) use the History sample, while columns (3) and (4) use the Engineering sample. Within each sample, the "Real" column re-estimates the education measure constructed from syllabi in the manager's actual major, and the "Placebo" column replaces those syllabi with syllabi from the placebo field. The real and placebo regressions therefore use the same managers and observations.

Panel A reports the Relevance results. In the History sample, Relevance constructed from the manager's actual major predicts 85 basis points higher annualized net returns, whereas Relevance constructed from History syllabi predicts only 5 basis points. In the Engineering sample, the corresponding estimates are 102 basis points for the real Relevance measure and 8 basis points for the Engineering placebo.

Panel B reports the Timeliness results. In the History sample, Timeliness constructed from the manager's actual major predicts 102 basis points higher annualized net returns, whereas the History-based placebo predicts -22 basis points. In the Engineering sample, the corresponding estimates are 78 basis points for the real Timeliness measure and -2 basis points for the Engineering placebo. All four real-measure coefficients are statistically significant, whereas the placebo coefficients are null for both fields.

The return relation therefore appears only when the measure is constructed from the manager's actual field of study. Unrelated coursework from the same university does not predict performance, even though it carries the same institutional ranking, reputation, and

resources.

8. Mechanism: How Does Education Quality Improve Manager Performance?

Having established that both Relevance and Timeliness predict higher fund performance, I next examine how these two dimensions of education translate into investment skill. Relevance captures how closely a curriculum matches the work of investment management, while Timeliness captures how closely it reflects recent research. The central idea is that these forms of training should be valuable in different information environments.

Stocks differ sharply in the information available about them. Some stocks receive extensive analyst coverage relative to their size. Forecasts, valuation models, and research reports are widely available, and new disclosures are processed quickly. In these stocks, the relevant information is largely shared. Any advantage must therefore come from analyzing the same information better than other investors. Other stocks receive little or no analyst coverage. For these firms, there is no comparable research infrastructure. An investor must produce the analysis: build the model, collect the relevant information, and form an independent estimate of value.

These differences generate distinct predictions for the two education measures. Timeliness captures exposure to recent ideas and methods, where the relevant questions are often not yet settled or summarized. It should therefore predict the performance of positions in thin-information stocks, where managers must develop their own analysis. Relevance captures

training in valuation, security analysis, and related investment-management tools. It should therefore predict the performance of positions in rich-information stocks, where the relevant inputs are widely available and the advantage comes from analyzing them more effectively. To test these predictions, I proceed in five steps.

First, each month I classify all U.S. common stocks in my sample according to analyst coverage relative to firm size. Analyst coverage is the number of analysts issuing annual earnings forecasts for the firm in IBES; firms with no forecasts are assigned a coverage count of zero. I measure coverage relative to size because larger firms typically attract more analysts than smaller firms. Each month, I regress $\log(1 + \text{Analyst Coverage})$ on log market capitalization and listing-exchange indicators. The residual from this regression indicates whether a stock has more or fewer analysts than would normally be expected for a firm of its size.

Stocks in the bottom decile of the residual distribution are classified as having thin information environments: they receive relatively little analyst coverage for their size and therefore have relatively little publicly available research. Stocks in the top decile are classified as having rich information environments: they receive relatively high analyst coverage for their size and are surrounded by abundant forecasts, models, and research reports. Thus, the classification does not depend on a fixed number of analysts. For example, a small firm followed by eight analysts may belong to the rich group if similarly sized firms are typically followed by only three, whereas a large firm followed by twelve analysts may belong to the thin group if firms of its size are typically followed by twenty-five. The middle 80% of stocks are excluded.

Second, I identify the stocks that a fund newly adds to its portfolio. For each stock in a

holdings report, I check whether it was absent from the fund's portfolio during the preceding twelve months. If the stock was absent throughout that period and appears in the current report, I classify it as a new position—a fresh initiation rather than an addition to an existing holding. I date the position's initiation to the month of that holdings report and assign it the stock's thin- or rich-information classification in the same month.

Third, I measure the subsequent performance of each new position. For each stock, I begin in the month after the position first appears in the fund's holdings and calculate its cumulative return in excess of the risk-free rate. I construct separate outcomes over 12-, 24-, and 36-month horizons. For each outcome, returns accumulate until the fund sells the stock or the relevant horizon is reached, whichever occurs first. Thus, if a fund sells a new position after eight months, the outcome is the stock's cumulative excess return over those eight months. If the fund continues to hold the stock, the outcome is measured through month 12, 24, or 36.

Fourth, I aggregate the new positions to the fund-month and information-environment level. If a fund initiates several positions in thin-information stocks during the same month, I take the equal-weighted average of their subsequent returns and treat that average as one observation. I do the same for positions initiated in rich-information stocks. Each observation therefore measures the average performance of a fund's new positions in one information environment during a given month. A fund contributes a thin-information observation only in months in which it initiates at least one thin-information position. Because such initiations are less frequent, the thin-information sample is smaller than the rich-information sample.

Fifth, I estimate the following regression separately for thin- and rich-information posi-

tions at the 12-, 24-, and 36-month horizons:

$$\text{Cohort Return}_{f,t,e}^{(h)} = \beta_1 \,\text{Timeliness}_{m(f,t)} + \beta_2 \,\text{Relevance}_{m(f,t)} + \gamma' X_{f,t} + \lambda_t + \mu_{o(f)} + \epsilon_{f,t,e}^{(h)},$$

The dependent variable is the fund-month average return constructed in the previous step for information environment e and horizon h. $m(f,t)$ denotes the manager of fund f in month t, and $o(f)$ denotes the fund's investment objective. The vector $X_{f,t}$ includes fund size, fund age, and manager tenure. The terms λ_t and $\mu_{o(f)}$ denote year-month and investment-objective fixed effects, respectively.

Relevance and Timeliness enter each regression together. The coefficient on each measure therefore captures its association with the subsequent performance of new positions while holding the other dimension of education fixed. All continuous independent variables are standardized, and standard errors are clustered by fund. The education coefficients measure the percentage-point difference in cumulative excess returns associated with a one-standard-deviation increase in the corresponding measure.

Insert Table 7 About Here

Table 7 reports the results. Columns (1)–(3) examine positions initiated in thin-information stocks over 12-, 24-, and 36-month horizons. Columns (4)–(6) examine positions initiated in rich-information stocks over the same horizons.

In thin information environments, Timeliness predicts higher returns at every horizon. A one-standard-deviation increase in Timeliness is associated with 1.69 percentage points

higher cumulative excess returns over 12 months, 2.18 percentage points over 24 months, and 3.14 percentage points over 36 months. The 12- and 36-month estimates are significant at the 5% level, while the 24-month estimate is significant at the 10% level. Relevance has no detectable association with the performance of positions initiated in thin-information stocks.

The pattern reverses in rich information environments. A one-standard-deviation increase in Relevance is associated with 1.38 percentage points higher cumulative excess returns over 12 months, 1.88 percentage points over 24 months, and 1.76 percentage points over 36 months. The 12- and 24-month estimates are significant at the 5% level, while the 36-month estimate is significant at the 10% level. Timeliness has no detectable association with the performance of positions initiated in rich-information stocks.

The horizon patterns are also consistent with the proposed mechanism. The Timeliness coefficient grows from 1.69 percentage points at 12 months to 3.14 percentage points at 36 months, consistent with slower price discovery in stocks with limited analyst coverage. The Relevance coefficient appears within the first year and changes little thereafter, consistent with faster incorporation of information in heavily covered stocks.

Taken together, the results indicate that the two dimensions of education are associated with different forms of investment skill. Frontier-oriented training is most valuable when managers must develop analysis in the absence of an established research infrastructure. Task-relevant training is most valuable when information is abundant and the advantage comes from analyzing shared inputs more effectively. This separation is difficult to reconcile with Relevance and Timeliness being merely interchangeable measures of a single education-quality factor. At the same time, the estimates identify where the component specific to each measure operates; they do not decompose the aggregate return relation documented

earlier in the paper.

9. Conclusion

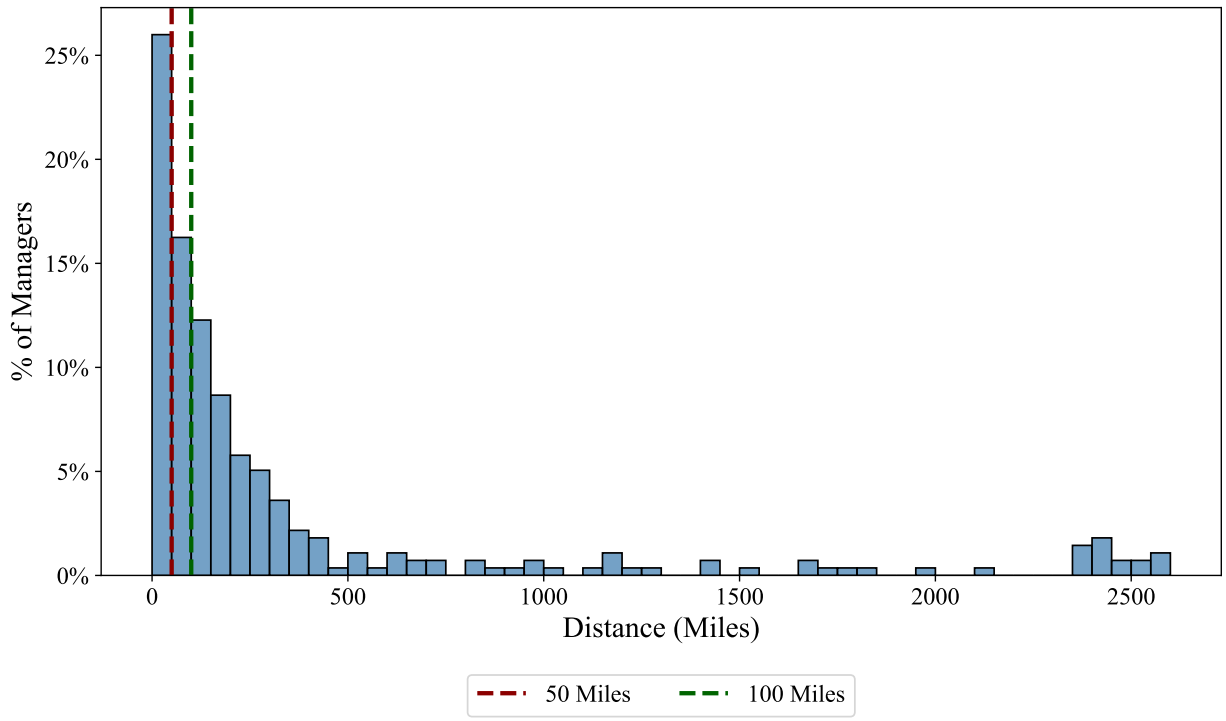
This paper examines whether the content of an active mutual fund manager's education affects subsequent fund performance. I measure education quality along two dimensions. Relevance captures how closely the curriculum matches the knowledge and skills required in investment management relative to finance work more broadly. Timeliness, which I adapt from the frontier knowledge proximity measure of Biasi and Ma (2025), captures how up to date the curriculum was by comparing its content with recent and older academic research.

Both dimensions predict performance. In the preferred OLS specification, a one-standard-deviation increase in Relevance or Timeliness is associated with approximately 80 basis points higher annualized net returns. The results extend to gross returns, four-factor alphas, and benchmark-adjusted returns, and are not explained by the prestige or selectivity of the manager's university. To address selection into colleges, I instrument each measure with the corresponding education quality of the four-year university closest to the manager's high school. The IV estimates imply increases in annualized net returns of 211 basis points for Relevance and 113 basis points for Timeliness.

Finally, I find that the two education measures matter in different information environments. Timeliness predicts the returns to new positions in thin-information stocks, where managers must produce much of the analysis themselves, and its predictive power increases with the return horizon. Relevance predicts the returns to new positions in rich-information stocks, where information is widely available and performance depends on how effectively

managers use it. This relation appears within the first year and does not strengthen thereafter. Neither measure predicts returns in the information environment associated with the other, suggesting that Relevance and Timeliness capture distinct dimensions of investment skill.

Figure 1. Geographic Distance to Undergraduate University



This figure plots the distribution of the geographic distance (in miles) between a manager's high school and their undergraduate institution. The sample consists of U.S. high school attendees. Distances are calculated using geocoded addresses from hand-collected yearbook and professional profile data. The dashed lines denote 50 miles (red) and 100 miles (green). The distribution highlights a strong geographic pattern in college choice, with the vast majority of managers attending universities close to their hometowns.

Table 1
Summary Statistics

This table reports summary statistics for the primary manager- and fund-level variables. Panel A reports manager characteristics. Relevance is a contrastive score comparing how closely a manager's course syllabi resemble investment-management job postings relative to finance job postings more broadly; higher values indicate greater alignment with investment-management work. Timeliness equals 100 times the average similarity of the curriculum to recent academic research divided by its average similarity to older research; higher values indicate a curriculum closer to the contemporary research frontier. Both Relevance and Timeliness have been standardized to have a mean of 0 and a standard deviation of 1. Median Income is the median household income of the manager's childhood ZIP code from the 1990 Census, reported in thousands of 1990 dollars. Manager Tenure is the number of years the manager has managed the fund. Panel B reports fund characteristics and performance. Net Return and Gross Return are annualized fund returns after and before fees, respectively. FFC4 Alpha is the annualized Carhart four-factor alpha estimated over rolling 12-, 24-, and 36-month windows. Returns and alphas are reported in percentage points. Fund Size is the natural logarithm of total net assets in millions of dollars, and Fund Age is measured in years since inception. The table reports the education measures in both raw and standardized (mean 0, SD 1) form; the standardized versions are the ones used in the regression analysis. N denotes the number of managers in Panel A and the number of funds in Panel B.

	Mean	SD	P10	P50	P90	N
Panel A: Manager Characteristics						
Relevance (standardized)	0.00	1.00	−1.41	−0.01	1.22	702
Timeliness (standardized)	0.00	1.00	−1.03	−0.11	1.60	702
Median Income	44.49	18.61	22.73	41.36	69.70	291
Manager Tenure	3.42	3.53	0.50	2.50	8.00	702
Panel B: Fund Characteristics and Performance						
Net Return	7.86	19.01	−2.40	9.29	18.70	918
Gross Return	8.97	19.53	−1.70	10.37	19.94	846
FFC4 Alpha (12m)	−1.48	7.05	−7.19	−0.94	3.56	785
FFC4 Alpha (24m)	−1.57	7.13	−7.63	−0.86	3.68	785
FFC4 Alpha (36m)	−1.44	7.20	−7.63	−0.76	4.04	785
Fund Size	3.78	2.37	0.55	3.77	6.89	890
Fund Age	10.54	9.29	1.67	8.00	23.54	890

Table 2
Manager Education and Net Fund Returns

This table reports estimates from the following regression:

$$\text{Return}_{i,f,t} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \phi_m + \epsilon_{i,f,t}.$$

$\text{Return}_{i,f,t}$ is the annualized net-of-fee return, in percentage points, of fund f managed by manager i in month t. Education quality is measured using Relevance in Panel A and Timeliness in Panel B. The vector $X_{f,t}$ includes fund size and fund age. The terms λ_t, δ_s, and ϕ_m denote year-month, objective code, and fund-family fixed effects, respectively, included as indicated. All continuous independent variables are standardized, so each coefficient reports the percentage-point change in annualized return associated with a one-standard-deviation increase in the corresponding variable. Standard errors are clustered by manager and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Annualized net return (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Relevance						
Relevance	0.89**	1.00**	0.82***	0.89**	0.98**	0.81***
	(0.39)	(0.44)	(0.28)	(0.38)	(0.44)	(0.28)
Fund Size				0.73**	1.18***	0.68***
				(0.33)	(0.36)	(0.26)
Fund Age				0.58	0.10	0.15
				(0.38)	(0.34)	(0.28)
Manager Tenure				−0.17	−0.54	−0.09
				(0.42)	(0.34)	(0.29)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.666	0.672	0.673	0.666	0.672	0.673
Observations	58,665	58,308	58,459	58,611	58,254	58,405
Panel B: Timeliness						
Timeliness	0.97**	1.19***	0.84***	0.93**	1.11***	0.80***
	(0.39)	(0.41)	(0.30)	(0.39)	(0.41)	(0.30)
Fund Size				0.68**	1.10***	0.65**
				(0.33)	(0.35)	(0.26)
Fund Age				0.60	0.14	0.16
				(0.37)	(0.34)	(0.28)
Manager Tenure				−0.15	−0.52	−0.07
				(0.42)	(0.33)	(0.29)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.666	0.672	0.673	0.666	0.672	0.673
Observations	58,665	58,308	58,459	58,611	58,254	58,405

Table 3
Manager Education and Alternative Measures of Fund Performance

This table reports estimates from the following regression:

$$\text{Performance}_{i,f,t}^{(k)} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \epsilon_{i,f,t}^{(k)}.$$

$\text{Performance}_{i,f,t}^{(k)}$ denotes the performance of fund f managed by manager i in month t, measured using annualized net returns, gross returns, FFC4 alphas estimated over rolling 12-, 24-, and 36-month windows, or benchmark-adjusted returns. Benchmark-adjusted return is the active fund's return minus the return of the largest index fund in the same objective-code category. Education quality is measured using Relevance in Panel A and Timeliness in Panel B. The vector $X_{f,t}$ includes fund size and fund age, while $\text{Manager Tenure}_{i,f,t}$ is the manager's tenure at the fund. The terms λ_t and δ_s denote year-month and objective code fixed effects, respectively. All continuous independent variables are standardized; each coefficient reports the percentage-point change in annualized performance associated with a one-standard-deviation increase in the corresponding variable. Standard errors are clustered by manager and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

			FFC4 Alpha			
	Net Return (1)	Gross Return (2)	12-Month (3)	24-Month (4)	36-Month (5)	Bmk.-adj. (6)
Panel A: Relevance						
Relevance	0.81***	0.82***	0.49**	0.53**	0.55*	0.28**
	(0.28)	(0.31)	(0.23)	(0.26)	(0.28)	(0.14)
Fund Size	0.68***	0.47*	0.52**	0.56**	0.63**	0.58***
	(0.26)	(0.28)	(0.22)	(0.23)	(0.25)	(0.15)
Fund Age	0.15	0.16	−0.52**	−0.36	−0.27	0.00
	(0.28)	(0.31)	(0.24)	(0.26)	(0.28)	(0.14)
Manager Tenure	−0.09	0.03	0.11	0.24	0.37	0.01
	(0.29)	(0.35)	(0.26)	(0.28)	(0.28)	(0.13)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.673	0.684	0.330	0.373	0.401	0.092
Observations	58,405	50,846	49,541	51,774	52,045	47,668
Panel B: Timeliness						
Timeliness	0.80***	0.74**	0.52**	0.60**	0.60**	0.38**
	(0.30)	(0.32)	(0.25)	(0.28)	(0.29)	(0.15)
Fund Size	0.65**	0.45	0.50**	0.53**	0.61**	0.55***
	(0.26)	(0.29)	(0.22)	(0.24)	(0.25)	(0.15)
Fund Age	0.15	0.16	−0.52**	−0.36	−0.26	0.00
	(0.28)	(0.30)	(0.24)	(0.26)	(0.28)	(0.13)
Manager Tenure	−0.07	0.04	0.11	0.25	0.38	0.02
	(0.29)	(0.35)	(0.26)	(0.28)	(0.29)	(0.13)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.673	0.684	0.330	0.373	0.402	0.092
Observations	58,405	50,846	49,541	51,774	52,045	47,668

Table 4
Manager Education Quality and Net Fund Returns: Instrumental-Variables Estimates

This table reports first-stage and two-stage least-squares estimates of the relation between manager education quality and annualized net-of-fee fund returns. Columns (1) and (2) examine Relevance, while columns (3) and (4) examine Timeliness. The instrument is the corresponding education measure at the four-year university nearest to the manager's high-school ZIP code. The dependent variable in the first-stage columns is the manager's education measure. The dependent variable in the second-stage columns is the annualized net-of-fee return, in percentage points. Both stages are estimated on the same manager–fund–month panel and include the 1990 median household income of the manager's high-school ZIP code, fund size, fund age, manager tenure, year-month fixed effects, and objective code fixed effects. All continuous independent variables are standardized. First-stage coefficients are reported in standard-deviation units. Second-stage coefficients report the percentage-point change in annualized returns associated with a one-standard-deviation increase in the predicted education measure. Standard errors are clustered by manager and reported in parentheses. The Kleibergen–Paap statistic is the cluster-robust first-stage F-statistic for the excluded instrument. Second-stage adjusted R^2 values are omitted because they do not have the usual interpretation in a 2SLS regression. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Relevance		Timeliness	
	First Stage	Second Stage	First Stage	Second Stage
	(1)	(2)	(3)	(4)
Nearest-College Measure	0.51***		0.75***	
	(0.08)		(0.06)	
$\widehat{\text{Education Measure}}$		2.11**		1.13**
		(1.05)		(0.57)
Median Income of HS ZIP	0.00	−0.06	−0.06	−0.01
	(0.07)	(0.47)	(0.05)	(0.45)
Fund Size	−0.02	0.77**	−0.05	0.73**
	(0.06)	(0.38)	(0.04)	(0.36)
Fund Age	0.01	−0.50	−0.01	−0.42
	(0.06)	(0.46)	(0.05)	(0.45)
Manager Tenure	0.00	0.12	−0.07**	0.15
	(0.06)	(0.57)	(0.03)	(0.57)
Year-month FE	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes
Kleibergen–Paap F-statistic	40		160	
Managers	292	292	291	291
Adjusted R^2	0.299	—	0.554	—
Observations	25,296	25,296	25,262	25,262

Table 5
Manager Education and Fund Returns: Controlling for School Prestige and Selectivity

This table reports coefficients on Relevance in column (1) and Timeliness in column (2) from separate regressions of annualized net-of-fee fund returns. The first row reproduces column (6) of Table 2; each remaining row adds the control listed in the first column. U.S. News prestige is measured using average National Universities rank over 1990–2026. Rank tiers are indicators for ranks 1–20, 21–50, and 51–150; Top-20 indicates a rank from 1 through 20; and continuous rank is reverse-coded so that higher values indicate greater prestige. Ivy League indicates attendance at one of the eight Ivy League institutions. ASU rankings are based on cumulative finance-faculty publications in leading finance journals over 1990–2025 and are entered using the same three specifications. Admission rate is the average IPEDS undergraduate admission rate over 2014–2023, with lower values indicating greater selectivity. Unranked institutions are the omitted category in the rank-tier specifications and receive a separate indicator in the continuous-rank specifications; the admission-rate regression includes a missing-value indicator. All regressions include fund size, fund age, manager tenure, year-month fixed effects, and objective code fixed effects. Continuous independent variables are standardized. Coefficients are reported in percentage points, and manager-clustered standard errors are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Relevance (1)	Timeliness (2)
No prestige control	0.81***	0.80***
	(0.28)	(0.30)
U.S. News rank tiers	0.71**	0.72**
	(0.30)	(0.32)
U.S. News Top-20 indicator	0.67**	0.64**
	(0.29)	(0.31)
Continuous U.S. News rank	0.75**	0.78**
	(0.30)	(0.32)
Ivy League indicator	0.71**	0.70**
	(0.28)	(0.30)
ASU Finance Ph.D. rank tiers	0.76***	0.78***
	(0.28)	(0.30)
ASU Finance Ph.D. Top-20 indicator	0.76***	0.75**
	(0.28)	(0.30)
Continuous ASU Finance Ph.D. rank	0.75***	0.78***
	(0.28)	(0.30)
Admission rate	0.76**	0.78**
	(0.30)	(0.32)
Observations	58,405	58,405

Table 6
Wrong-Field Placebo: Curriculum Content or School Prestige?

This table tests whether the relation between manager education quality and fund performance reflects curriculum content or school prestige. The dependent variable is the annualized net-of-fee fund return, in percentage points. Panel A examines Relevance, and Panel B examines Timeliness. Within each sample, Real is the education measure constructed from the curriculum in the manager's actual field of study, whereas Placebo replaces that curriculum with the same institution's History or Engineering curriculum. The Real and Placebo regressions use identical managers and observations, holding school identity fixed while changing the curriculum used to construct the measure. Each column reports a separate regression including fund size, fund age, manager tenure, year-month fixed effects, and objective code fixed effects. All continuous independent variables are standardized. Coefficients report the percentage-point change in annualized returns associated with a one-standard-deviation increase in the corresponding measure. Standard errors are clustered by manager and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	History Sample		Engineering Sample	
	Real	Placebo	Real	Placebo
	(1)	(2)	(3)	(4)
Panel A: Relevance				
Education Measure	0.85**	0.05	1.02***	0.08
	(0.40)	(0.41)	(0.34)	(0.34)
Fund Size	0.88***	0.83**	0.58*	0.60*
	(0.33)	(0.34)	(0.35)	(0.36)
Fund Age	−0.11	−0.10	0.39	0.37
	(0.35)	(0.35)	(0.36)	(0.38)
Manager Tenure	0.15	0.13	0.16	0.19
	(0.42)	(0.43)	(0.37)	(0.36)
Year-month FE	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes
Managers	379	379	368	368
Adjusted R^2	0.697	0.697	0.683	0.682
Observations	32,687	32,687	32,106	32,106
Panel B: Timeliness				
Education Measure	1.02**	−0.22	0.78**	−0.02
	(0.42)	(0.38)	(0.36)	(0.32)
Fund Size	0.82**	0.85***	0.57	0.62*
	(0.32)	(0.32)	(0.36)	(0.36)
Fund Age	−0.07	−0.13	0.37	0.35
	(0.35)	(0.35)	(0.36)	(0.38)
Manager Tenure	0.14	0.10	0.18	0.18
	(0.42)	(0.42)	(0.37)	(0.37)
Year-month FE	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes
Managers	379	379	368	368
Adjusted R^2	0.698	0.697	0.683	0.682
Observations	32,687	32,687	32,106	32,106

Table 7
Mechanism: Where Each Kind of Education Pays

This table reports estimates from the following regression:

$$\text{Cohort Return}^{(h)}_{f,t,e} = \beta_1 \,\text{Timeliness}_{m(f,t)} + \beta_2 \,\text{Relevance}_{m(f,t)} + \gamma' X_{f,t} + \lambda_t + \mu_{o(f)} + \epsilon^{(h)}_{f,t,e}.$$

The dependent variable is the equal-weighted average cumulative excess return of the new positions initiated by fund f in month t within information environment e, measured over horizon h. A position is new if it appears in a holdings report after being absent from the fund for at least twelve months. Each fund's first twelve sample months are excluded. Returns begin in the following month and accumulate until the position exits or the 12-, 24-, or 36-month horizon is reached, whichever occurs first. Delisting returns are included. Stocks are classified monthly using the residual from a regression of log(1 + Analyst Coverage) on log market capitalization and exchange indicators. Coverage is the number of analysts issuing IBES annual earnings forecasts, with uncovered firms assigned zero. The bottom and top residual deciles define thin and rich information environments, respectively; the middle 80% are excluded. Columns (1)–(3) report thin-environment results, and columns (4)–(6) report rich-environment results. $m(f,t)$ denotes the manager of fund f in month t, and $o(f)$ denotes its investment objective. The vector $X_{f,t}$ includes fund size, fund age, and manager tenure; λ_t and $\mu_{o(f)}$ denote year-month and objective code fixed effects. Continuous independent variables are standardized. Education coefficients report the percentage-point difference in cumulative excess return associated with a one-standard-deviation increase in the corresponding measure, holding the other measure fixed. Returns are winsorized at the 1st and 99th percentiles within initiation month. Standard errors are clustered by fund and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Thin Information Environment			Rich Information Environment		
	12 Months	24 Months	36 Months	12 Months	24 Months	36 Months
	(1)	(2)	(3)	(4)	(5)	(6)
Timeliness	1.69**	2.18*	3.14**	0.61	0.46	0.60
	(0.76)	(1.12)	(1.32)	(0.68)	(0.83)	(0.88)
Relevance	−0.83	−0.36	−0.60	1.38**	1.88**	1.76*
	(0.64)	(0.91)	(1.06)	(0.69)	(0.82)	(0.92)
Fund Size	−0.69	0.02	0.27	−0.73	−0.37	−0.45
	(0.52)	(0.81)	(0.89)	(0.63)	(0.78)	(0.95)
Fund Age	−0.09	−0.63	−1.18	0.29	−1.07	−0.62
	(0.70)	(1.21)	(1.32)	(0.76)	(0.73)	(0.89)
Manager Tenure	0.60	0.19	−0.25	0.41	0.19	0.19
	(0.49)	(0.79)	(0.89)	(0.64)	(0.73)	(0.85)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.218	0.177	0.166	0.297	0.243	0.210
Observations	3,529	3,529	3,529	4,980	4,980	4,980

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Appendix A. Variable Definitions

Appendix Table A.1 defines the variables used throughout the analysis. It describes the construction and units of the two education-quality measures, the instrumental variables, the fund-performance measures, the fund and manager controls, and the measures of institutional prestige and selectivity.

Table A.1
Variable Definitions

Variable	Definition	Units
Relevance	Similarity of a manager's curriculum to investment-management job content relative to finance job content more broadly. Higher values indicate greater alignment with investment-management work.	Dimensionless score
Timeliness	One hundred times curriculum similarity to recent academic research divided by similarity to older research. Higher values indicate a curriculum closer to the contemporaneous research frontier.	Index points
Nearest-College Measure	The corresponding Relevance or Timeliness measure at the four-year university nearest to the manager's high school. Used as the excluded instrument.	Same units as the corresponding education measure
Predicted Education Measure	First-stage fitted value of Relevance or Timeliness obtained using the Nearest-College Measure as the excluded instrument.	Standard-deviation units
Net Return	Fund return after fees and expenses.	Percentage points per year
Gross Return	Fund return before fees and expenses, constructed by adding expenses back to net return.	Percentage points per year
FFC4 Alpha	Annualized Carhart four-factor alpha estimated over trailing 12-, 24-, or 36-month windows.	Percentage points per year
Benchmark-Adjusted Return	Fund return minus the return of the largest index fund in the same objective code.	Percentage points per year
Median Income of HS ZIP	Median household income of the manager's high-school ZIP code from the 1990 Census.	Thousands of 1990 dollars
Manager Tenure	Number of years the manager has managed the fund as of the observation month.	Years
Fund Size	Natural logarithm of the fund's total net assets, measured in millions of dollars.	Log points
Fund Age	Number of years since the fund's inception.	Years
Objective Code	CRSP investment-objective classification used to construct objective code fixed effects and select index-fund benchmarks.	Categorical
Fund Family	Fund-family affiliation used to construct fund-family fixed effects.	Categorical
U.S. News Rank Tiers	Indicators for average National Universities ranks 1–20, 21–50, and 51–150. Unranked institutions form the omitted category.	Indicator variables

Continued on next page

Table A.1 continued

Variable	Definition	Units
U.S. News Top-20 Indicator	Indicator equal to one when the institution's average National Universities rank is between 1 and 20.	Indicator
Continuous U.S. News Rank	Reverse-coded average National Universities rank, so higher values indicate greater prestige. The specification also includes an indicator for unranked institutions.	Rank index
Ivy League Indicator	Indicator equal to one when the manager attended an Ivy League institution.	Indicator
ASU Finance Ph.D. Rank Tiers	Indicators for ASU Finance Research Rankings of 1–20, 21–50, and 51–150. Unranked institutions form the omitted category.	Indicator variables
ASU Finance Ph.D. Top-20 Indicator	Indicator equal to one when the institution ranks among the top 20 in the ASU Finance Research Rankings.	Indicator
Continuous ASU Finance Ph.D. Rank	Reverse-coded ASU Finance Research Ranking, so higher values indicate greater research standing. The specification also includes an indicator for unranked institutions.	Rank index
Admission Rate	Average undergraduate admission rate reported in IPEDS. Lower values indicate greater selectivity.	Percent
Real Education Measure	Relevance or Timeliness constructed from the curriculum in the manager's actual field of study.	Same units as the corresponding education measure
History Placebo	Education measure reconstructed using the History curriculum of the same institution.	Same units as the corresponding education measure
Engineering Placebo	Education measure reconstructed using the Engineering curriculum of the same institution.	Same units as the corresponding education measure
New-Position Cohort Return	Equal-weighted average cumulative excess return of a fund's new positions initiated in the same month and information environment. Returns begin in the month after initiation and end at divestment or the 12-, 24-, or 36-month horizon, whichever occurs first.	Cumulative percentage points over the horizon
Thin Information Environment	Indicator for stocks in the bottom decile of analyst coverage relative to firm size. Relative coverage is the residual from a monthly regression of $\log(1 + \text{Analyst Coverage})$ on log market capitalization and exchange indicators.	Indicator

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Table A.1 continued

Variable	**Definition**	**Units**
Rich Information Environment	Indicator for stocks in the top decile of analyst coverage relative to firm size. Relative coverage is the residual from a monthly regression of $\log(1 + \text{Analyst Coverage})$ on log market capitalization and exchange indicators.	Indicator

Note: The Units column reports raw units. Continuous independent variables are standardized within the relevant estimation sample. Returns and alphas are not standardized and are reported in annualized percentage points, except the New-Position Cohort Return, which is cumulative over the indicated horizon.

Appendix B. Additional OLS Robustness

The following tables examine whether the relation between manager education quality and fund performance is robust to alternative performance measures. Table A.2 uses gross returns, which add expenses back to net returns. Table A.3 uses Carhart four-factor alphas estimated over rolling 12-, 24-, and 36-month windows. Table A.4 uses returns relative to the largest index fund in the same objective code. Together, these tests show that the results are not specific to net returns, fund expenses, factor exposure, or the choice of performance benchmark.

Table A.2
Manager Education and Gross Fund Returns

This table reports estimates from the following regression:

$$\text{Return}_{i,f,t} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \phi_m + \epsilon_{i,f,t}.$$

$\text{Return}_{i,f,t}$ is the annualized gross-of-fee return, in percentage points, of fund f managed by manager i in month t. Education quality is measured using Relevance in Panel A and Timeliness in Panel B. The vector $X_{f,t}$ includes fund size and fund age, while $\text{Manager Tenure}_{i,f,t}$ is the manager's tenure at the fund. The terms λ_t, δ_s, and ϕ_m denote year-month, objective code, and fund-family fixed effects, respectively, included as indicated. All continuous independent variables are standardized, so each coefficient reports the percentage-point change in annualized gross return associated with a one-standard-deviation increase in the corresponding variable. Standard errors are clustered by manager and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Annualized gross return (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Relevance						
Relevance	0.98**	0.99**	0.82***	0.99**	0.96**	0.82***
	(0.43)	(0.47)	(0.31)	(0.42)	(0.46)	(0.31)
Fund Size				0.49	0.85**	0.47*
				(0.37)	(0.37)	(0.28)
Fund Age				0.75*	0.39	0.16
				(0.42)	(0.37)	(0.31)
Manager Tenure				−0.01	−0.38	0.03
				(0.48)	(0.37)	(0.35)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.678	0.685	0.685	0.678	0.685	0.684
Observations	51,036	51,035	50,886	50,996	50,995	50,846
Panel B: Timeliness						
Timeliness	1.00**	1.13**	0.76**	0.97**	1.07**	0.74**
	(0.41)	(0.44)	(0.32)	(0.41)	(0.44)	(0.32)
Fund Size				0.44	0.78**	0.44
				(0.37)	(0.37)	(0.29)
Fund Age				0.75*	0.44	0.16
				(0.41)	(0.37)	(0.30)
Manager Tenure				0.00	−0.37	0.04
				(0.48)	(0.37)	(0.35)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.678	0.685	0.684	0.678	0.685	0.684
Observations	51,036	51,035	50,886	50,996	50,995	50,846

Table A.3
Manager Education Quality and FFC4 Alphas

This table reports estimates from the following regression:

$$\text{FFC4 Alpha}_{i,f,t}^{(h)} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \phi_m + \epsilon_{i,f,t},$$

where $h \in \{12, 24, 36\}$ denotes the rolling window used to estimate the Carhart four-factor alpha. The dependent variables are annualized FFC4 alphas, in percentage points, for fund f managed by manager i in month t. Education quality is measured using Relevance in Panel A and Timeliness in Panel B. The vector $X_{f,t}$ includes fund size and fund age, while $\text{Manager Tenure}_{i,f,t}$ is the manager's tenure at the fund. The terms λ_t, δ_s, and ϕ_m denote year-month, objective code, and fund-family fixed effects, respectively. Columns (1)–(3) include year-month fixed effects and alternatively add fund-family or objective code fixed effects. Columns (4)–(6) repeat these specifications with fund size, fund age, and manager tenure. Coefficients on these controls are omitted for brevity. All continuous independent variables are standardized within the corresponding estimation sample, so each coefficient reports the percentage-point change in annualized alpha associated with a one-standard-deviation increase in the corresponding education measure. Standard errors are clustered by manager and reported in parentheses. The sample is restricted to managers with bachelor's degrees and education measures constructed from at least 25 syllabi. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Annualized FFC4 alpha (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Relevance						
12-Month Window						
Relevance	0.56**	0.65**	0.51**	0.55**	0.66**	0.49**
	(0.28)	(0.32)	(0.23)	(0.28)	(0.32)	(0.23)
Adjusted R^2	0.273	0.368	0.329	0.273	0.369	0.330
Observations	49,645	49,645	49,571	49,615	49,615	49,541
24-Month Window						
Relevance	0.56*	0.78**	0.55**	0.56*	0.76**	0.53**
	(0.32)	(0.35)	(0.26)	(0.32)	(0.35)	(0.26)
Adjusted R^2	0.268	0.446	0.371	0.269	0.448	0.373
Observations	51,886	51,886	51,804	51,856	51,856	51,774
36-Month Window						
Relevance	0.61*	0.83**	0.57**	0.61*	0.80**	0.55*
	(0.34)	(0.37)	(0.28)	(0.33)	(0.37)	(0.28)
Adjusted R^2	0.290	0.490	0.399	0.293	0.492	0.401
Observations	52,163	52,163	52,079	52,129	52,129	52,045
Fund Controls	No	No	No	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes

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Table A.3 continued

	Annualized FFC4 alpha (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel B: Timeliness						
12-Month Window						
Timeliness	0.65**	0.79**	0.54**	0.64**	0.77**	0.52**
	(0.29)	(0.33)	(0.25)	(0.29)	(0.33)	(0.25)
Adjusted R^2	0.274	0.369	0.329	0.274	0.369	0.330
Observations	49,645	49,645	49,571	49,615	49,615	49,541
24-Month Window						
Timeliness	0.69**	0.84**	0.63**	0.68**	0.79**	0.60**
	(0.31)	(0.35)	(0.27)	(0.31)	(0.35)	(0.28)
Adjusted R^2	0.269	0.446	0.372	0.270	0.448	0.373
Observations	51,886	51,886	51,804	51,856	51,856	51,774
36-Month Window						
Timeliness	0.71**	0.84**	0.62**	0.69**	0.79**	0.60**
	(0.32)	(0.35)	(0.28)	(0.32)	(0.36)	(0.29)
Adjusted R^2	0.291	0.490	0.399	0.294	0.492	0.402
Observations	52,163	52,163	52,079	52,129	52,129	52,045
Fund Controls	No	No	No	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes

Table A.4
Manager Education and Benchmark-Adjusted Fund Returns

This table reports estimates from the following regression:

$$\text{Return}_{i,f,t} = \beta\,\text{Education Quality}_i + \gamma' X_{f,t} + \eta\,\text{Manager Tenure}_{i,f,t} + \lambda_t + \delta_s + \phi_m + \epsilon_{i,f,t}.$$

$\text{Return}_{i,f,t}$ is the annualized benchmark-adjusted return, in percentage points, of fund f managed by manager i in month t. Benchmark-adjusted return equals the fund's net return minus the return of the largest index fund in the same objective-code category. Education quality is measured using Relevance in Panel A and Timeliness in Panel B. The vector $X_{f,t}$ includes fund size and fund age, while $\text{Manager Tenure}_{i,f,t}$ is the manager's tenure at the fund. The terms λ_t, δ_s, and ϕ_m denote year-month, objective code, and fund-family fixed effects, respectively, included as indicated. All continuous independent variables are standardized, so each coefficient reports the percentage-point change in annualized benchmark-adjusted return associated with a one-standard-deviation increase in the corresponding variable. Standard errors are clustered by manager and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Annualized benchmark-adjusted return (percentage points)					
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Relevance						
Relevance	0.35**	0.57***	0.27*	0.36**	0.61***	0.28**
	(0.16)	(0.22)	(0.14)	(0.16)	(0.22)	(0.14)
Fund Size				0.75***	0.63***	0.58***
				(0.19)	(0.23)	(0.15)
Fund Age				−0.21	−0.36**	0.00
				(0.16)	(0.16)	(0.14)
Manager Tenure				−0.02	−0.15	0.01
				(0.16)	(0.18)	(0.13)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.087	0.096	0.092	0.088	0.096	0.092
Observations	47,791	47,478	47,703	47,756	47,443	47,668
Panel B: Timeliness						
Timeliness	0.51***	0.62***	0.39***	0.47***	0.60***	0.38**
	(0.18)	(0.20)	(0.15)	(0.18)	(0.20)	(0.15)
Fund Size				0.71***	0.56**	0.55***
				(0.19)	(0.23)	(0.15)
Fund Age				−0.20	−0.33**	0.00
				(0.16)	(0.16)	(0.13)
Manager Tenure				−0.01	−0.14	0.02
				(0.16)	(0.18)	(0.13)
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund-family FE	No	Yes	No	No	Yes	No
Objective code FE	No	No	Yes	No	No	Yes
Adjusted R^2	0.088	0.096	0.092	0.088	0.096	0.092
Observations	47,791	47,478	47,703	47,756	47,443	47,668

Appendix C. Additional IV Robustness

The main-text IV estimates (Table 4) are panel 2SLS: both stages are estimated in the fund–month panel with identical fixed effects and controls. Table A.5 Table A.5 re-estimates the first stage at the manager level—one observation per manager—showing that the instrument's strength is purely cross-sectional and not an artifact of repeating manager-level information across fund–months. Table A.6 repeats the 2SLS for all return measures.

Table A.5
First Stage at the Manager Level

This table reports estimates from the following cross-sectional first-stage regression:

$$\text{Education Quality}_i = \pi\,\text{Nearest-College Measure}_i + \rho\,\text{Median Income of HS ZIP}_i + \epsilon_i$$

The unit of observation is a manager. The dependent variable is Relevance in column (1) and Timeliness in column (2). The Nearest-College Measure is the corresponding education-quality measure at the four-year university nearest to the manager's high school. Median Income of HS ZIP is the median household income of the manager's high-school ZIP code from the 1990 Census. The education measures and the corresponding nearest-college measures are standardized, so the coefficient on the instrument is reported in standard-deviation units. Conventional standard errors are reported in parentheses. The first-stage F-statistic tests the excluded instrument. These regressions do not include fixed effects or fund-level controls. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Relevance (1)	Timeliness (2)
Nearest-College Measure	0.57***	0.75***
	(0.04)	(0.03)
Median Income of HS ZIP	0.04	0.00
	(0.04)	(0.03)
First-stage F	205	500
Adjusted R^2	0.329	0.556
Observations	423	400

Table A.6
Instrumental-Variables Estimates Across Performance Measures

This table reports second-stage 2SLS estimates across alternative measures of fund performance. Panel A instruments Relevance, and Panel B instruments Timeliness, using the corresponding education measure at the four-year university nearest to the manager's high school. Coefficients and standard errors are reported in annualized percentage points for a one-standard-deviation increase in the predicted education measure. All specifications include Median Income of HS ZIP, fund size, fund age, manager tenure, year-month fixed effects, and objective code fixed effects. Standard errors clustered by manager are reported in parentheses. The Kleibergen–Paap F-statistic is reported for each specification. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

			FFC4 Alpha			
	Net Return (1)	Gross Return (2)	12-Month (3)	24-Month (4)	36-Month (5)	Bmk.-adj. (6)
Panel A: Relevance						
$\widehat{\text{Relevance}}$	2.11**	1.72	1.73*	2.21**	2.32**	0.04
	(1.05)	(1.17)	(0.92)	(0.97)	(0.97)	(0.51)
Median Income of HS ZIP	Yes	Yes	Yes	Yes	Yes	Yes
Fund Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen–Paap F	40	37	37	39	39	45
Observations	25,296	21,916	21,390	22,405	22,536	19,884
Panel B: Timeliness						
$\widehat{\text{Timeliness}}$	1.13**	1.03*	0.88*	1.15**	1.18**	0.32
	(0.57)	(0.59)	(0.45)	(0.49)	(0.51)	(0.31)
Median Income of HS ZIP	Yes	Yes	Yes	Yes	Yes	Yes
Fund Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes	Yes	Yes
Objective code FE	Yes	Yes	Yes	Yes	Yes	Yes
Kleibergen–Paap F	160	130	130	136	138	156
Observations	25,262	21,894	21,366	22,377	22,508	19,851