The Source of Individual Alpha: Cognitive Ability vs. Elite Education in a Retail-Dominated Market*

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Abstract

We examine whether investment performance in a retail-dominated market—the Chinese A-share market—reflects educable financial skill or latent cognitive ability. By linking China's national college entrance examination (CEE/Gaokao) records for the 1999–2003 cohorts to ten years of granular brokerage transaction data (2014–2023), we trace how pre-college cognitive ability and institutional education shape long-run portfolio outcomes. Using regression discontinuity (RD) designs around elite-college and economics-major admission cutoffs, we find no significant effect of institutional prestige or specialized financial training on investor performance. Elite college graduates and economics majors earn nearly identical returns, Sharpe ratios, and risk-adjusted profiles as their near-miss counterparts. In contrast, CEE rank—a robust proxy for cognitive ability—strongly predicts portfolio alpha even after controlling for an extensive set of socioeconomic and demographic fixed effects. A ten-percentile increase in CEE rank is associated with a 0.05 percentage point rise in monthly returns, which compounds into a 61% performance gap between the top and bottom quartiles over a decade. This "cognitive alpha" is driven by distinct behavioral advantages: high-ability investors demonstrate superior stock selection (favoring high-ROA and low-beta firms), maintain significantly lower turnover rates, and interact with financial advisers more rationally and with less overconfidence. Our findings suggest that in speculative, retail-heavy environments, heterogeneity in wealth accumulation reflects innate cognitive traits rather than the signaling or human capital effects of educational credentials.

JEL Classification: G11, G51, I23, J24

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1 Introduction

Wealth inequality has risen sharply in recent decades, driven increasingly by significant heterogeneity in returns to wealth. Even among individuals with similar initial endowments, persistent differentials in investment performance allow wealth to compound at vastly different rates, exacerbating disparities over time (Piketty, 2014; Saez and Zucman, 2016; Fagereng et al., 2020a). While this phenomenon is well-documented in developed nations—where the top 1% of U.S. households realize annual returns nearly 5 percentage points higher than the middle class (Xavier, 2024)—it is an equally critical concern in developing economies where financial institutions are less mature and retail participation is more volatile.

In China's retail-dominated market, these return gaps can be catastrophic for social mobility: during the 2014–2015 bubble-crash episode, the largest 0.5% of households gained 31% in equity wealth, while the bottom 85% lost 28% (An et al., 2022). Yet, the source of this "individual alpha" remains fiercely debated. In this paper, we investigate a fundamental question: do educational credentials and specialized financial training causally improve investment performance, or are superior returns primarily driven by innate cognitive ability? By examining whether attending an elite university or majoring in economics makes one a better investor—or if high-ability individuals are simply more adept at navigating markets regardless of their degree—we aim to disentangle the roles of formal human capital and latent cognitive alpha in the quest for wealth.

Answering whether investment performance reflects educable skill or latent ability has long been difficult due to data limitations. We overcome this by assembling a uniquely rich longitudinal dataset from China that links individuals' Gaokao performance to their real-world investment outcomes. Our analysis focuses on the 1999–2003 cohorts of the Gaokao. We observe each student's overall Gaokao rank and subject-specific scores alongside their subsequent college admission results. We match these administrative records to a decade of detailed stock brokerage transactions (2014—2023) for a major firm, capturing the actual investment behavior of 142,440 individuals. This dataset includes every trade and portfolio

position, investor demographics, and even anonymized chat logs between investors and financial advisors. This combination of early-life ability measures and long-run wealth outcomes is unprecedented in scale, allowing us to disentangle the roles of innate cognitive alpha versus formal college education in a retail-dominated market.

To identify the causal impact of elite education, we exploit the sharp score cutoffs embedded in China's university admissions system. Admission to elite Tier-1 colleges depends on whether an applicant's Gaokao score exceeds a province-specific threshold. Similarly, competitive economics or finance majors typically impose higher major-specific cutoffs than other fields within the same university. These rules generate regression discontinuities (RD) that serve as quasi-experiments: students just above a cutoff gain access to a more prestigious credential, while those just below do not, creating near-randomized comparison groups. By implementing RD designs around these admission thresholds, we obtain clean causal estimates of the effects of institutional prestige and specialized financial training on subsequent investor performance.

Our analysis yields several striking findings. First, elite college education has no causal impact on stock investment returns; investors who narrowly attended a top-tier college achieve no higher average returns or risk-adjusted performance than those who just missed the cutoff. Second, majoring in Economics or Finance yields no discernible benefit. Despite the intense demand for these "hot" majors during the early 2000s, students who narrowly gained entry into these programs do not outperform their near-miss counterparts. These results suggest that formal finance education, as delivered in a traditional academic setting, does not confer a practical advantage in navigating real-world market volatility.

In contrast, innate cognitive ability emerges as a powerful predictor of investor success. A 10-percentile improvement in Gaokao rank is associated with a 0.05 percentage point increase in monthly portfolio returns. While seemingly modest, this effect compounds substantially: investors in the top quartile of ability realize roughly 61% higher total returns over a decade than those in the bottom quartile. Notably, the type of ability matters; quanti-

tative aptitude—proxied by Math scores—is especially salient, whereas high language scores have no such predictive power.

The outperformance of high-ability investors is driven by superior behavior and judgment rather than institutional signaling. These individuals achieve significantly higher Sharpe ratios, indicating they are not merely taking more risk but are making fundamentally better investments. Their portfolios tilt toward firms with higher profitability (ROA) and lower risk, and they trade less frequently, avoiding the excessive turnover that often erodes retail returns. Furthermore, textual analysis of advisor chat logs reveals that high-ability investors are more proactive in seeking information and ask more sophisticated questions, yet they exhibit lower levels of overconfidence and a more calibrated, humble tone. Ultimately, our results suggest that heterogeneity in wealth accumulation reflects persistent cognitive traits—specifically the ability to process information and mitigate behavioral biases—rather than the specific technical knowledge or credentials acquired during college.

Our findings contribute to two primary strands of research by providing a causal decomposition of the factors driving wealth accumulation in a retail-dominated market. First, we extend the literature on the drivers of heterogeneity in returns to wealth. Previous research has established that return differentials arise from a complex interplay of factors, including household risk-taking behaviors (Campbell et al., 2019; Bach et al., 2020), persistent genetic endowments (Barth et al., 2020; Black et al., 2020), and varying levels of formal education or specialized financial knowledge (Campbell, 2006; Calvet et al., 2007; Jappelli and Padula, 2013; Cole et al., 2014, 2016; Lusardi et al., 2017; Fagereng et al., 2020b; Talpsepp et al., 2020; Altmejd et al., 2024). While prior work has identified a strong correlation between cognitive ability (IQ) and investment performance (Agarwal and Mazumder, 2013; Grinblatt et al., 2012, 2016; Eber et al., 2024), our study is the first to provide clean causal evidence that these performance gaps are fundamentally rooted in latent cognitive ability rather than the human capital or signaling effects of elite schooling. In a market defined by high speculative noise and frequent behavioral traps, we show that "cognitive alpha"—the capacity

to maintain discipline and process complex information—is a more potent driver of wealth than institutional prestige or specialized financial training.

Second, we add to the extensive literature on the returns to education and college quality. The vast human capital literature has primarily quantified the value of education through labor-market productivity and wage premia (Card, 2001; Altonji et al., 2012, 2016; Kirkeboen et al., 2016; Heckman et al., 2006b, 2018; Delavande and Zafar, 2019; Eika et al., 2019; Acemoglu et al., 2022; Andrews et al., 2024; d'Astous and Shore, 2024). We extend this framework beyond income to the domain of capital markets, showing that while elite degrees may signal productivity to employers, they do not causally improve an individual's ability to manage personal wealth once innate ability is accounted for. Furthermore, our results speak to the ongoing debate regarding the effectiveness of financial literacy education in empowering households to make better financial decisions (Christiansen et al., 2008; Fernandes et al., 2014; Campbell, 2016; Kaiser et al., 2022; Hvidberg, 2023). By documenting the null effects of both Tier-1 institutional attendance and economics-specific training, we demonstrate that formal financial "schooling" fails to translate into a practical investment advantage in a retail-heavy environment. This suggests that the perceived success of elite or finance-trained graduates is largely driven by pre-market selection rather than the transformative effect of the curriculum itself.

Overall, our study highlights a critical and often overlooked dimension of human capital theory: ability does not only shape labor income; it also determines the rate at which that income compounds in capital markets. This has profound implications for global wealth inequality. If high-ability individuals consistently achieve superior returns while formal education provides little corrective benefit, then wealth gaps may represent a form of "ability inequality" that is systematically amplified by the structure of the equity market. Our findings suggest that policies aimed at narrowing wealth disparities must look beyond traditional educational access and instead focus on mitigating the behavioral disadvantages that "low-alpha" investors face in volatile, retail-heavy environments.

While China's A-share market possesses unique institutional characteristics, it serves as a global laboratory for disentangling whether individual alpha originates from educational credentials or innate ability. In this retail-dominated environment—where household investors, rather than institutional intermediaries, drive the vast majority of trading volume—we can isolate the "noise-filtering" and risk-assessment capacities of high-ability investors in their purest form. These behavioral mechanisms align with longitudinal evidence from the United States and Europe, which consistently links higher cognitive ability to reduced susceptibility to biases and superior risk-adjusted returns (Grinblatt et al., 2012; Hvidberg, 2023). By leveraging the Gaokao as a high-stakes, exogenous proxy for cognitive filtering, our research provides a scalable framework for understanding how information-processing traits govern wealth accumulation in any emerging economy where individual decision-making remains a central pillar of capital allocation.

The remainder of the paper is organized as follows. Section 2 introduces the institutional background, including the Gaokao system and the equity market in China. Section 3 describes the two administrative datasets we use—a universe of Gaokao test takers and stock transaction records from a leading financial institution. Section 4 examines whether elite university education and economics major training causally improve individual stock returns. This section begins by outlining the RD design and then presents the empirical findings. Although it is difficult to identify a causal effect of cognitive ability, Section 5 provides three sets of empirical evidence supporting the "cognitive ability hypothesis." Section 6 concludes.

2 Institutional Background

2.1 The National College Entrance Examination and Admissions

Institutional Overview The National College Entrance Examination, or Gaokao, is the high-stakes, near-exclusive determinant for university admission in China. The examination

assesses proficiency in core subjects—Chinese, Mathematics, and English—alongside track-specific electives. During our study period (1999–2003), students specialized in either a Science track (Physics, Chemistry, Biology) or a Social Science track (History, Politics, Geography). This specialization typically begins in the second year of high school, followed by formal registration in the winter prior to the June examination.

The early 2000s marked a transformative "massification" of Chinese higher education, with participation nearly doubling from 2.8 million in 1999 to over 6 million in 2003 (Li et al., 2014). Despite this expansion, the system remained steeply hierarchical, centered on the elite Project 985 and Project 211 institutions.[1] For most, the Gaokao served as the sole meritocratic vehicle for social stratification and rural-to-urban mobility (Jia et al., 2025).

The Centralized Admission Process Admissions are governed by a centralized, province-level system where colleges allocate fixed enrollment quotas for each major to specific provinces. Consequently, competition occurs exclusively within province-year-track cells, and raw scores are meaningful only as relative rankings among peers in the same cell.

During our sample period, the sequential mechanism (a variant of "immediate acceptance") was the dominant matching logic. Universities prioritized applicants who listed them as their first choice, only considering lower-ranked preferences if quotas remained unfilled. Since elite institutions typically filled their seats in the first round, the system forced students to gamble on a single top-tier target, making the first-choice selection the most critical strategic decision in the process.

University Hierarchy and Tiered Cutoffs The system stratifies institutions into "tiers" based on prestige and admission thresholds. Tier-1 mainly comprises elite Project 985 and 211 universities, admitting roughly the top 14% of examinees (with the most elite 985 subset admitting only 3.1%) during our sample period. Subsequent tiers encompass provincial

[1] Launched in 1995 and 1998, Projects 211 and 985 were strategic initiatives to develop world-class research universities. Though integrated into the "Double First-Class" initiative in 2017, these designations remain the primary benchmarks for institutional prestige and graduate employability.

bachelor-granting colleges (Tier-2 and Tier-3) and vocational institutions.

A student's eligibility for elite institutions is governed by the Tier-1 cutoff score (*yi ben xian*), or the Minimum Admission Control Line. Provincial authorities set this line annually to exceed the total Tier-1 quota slightly—typically by 110% to 120%—ensuring universities have a sufficient applicant pool under the sequential mechanism.

However, the Tier-1 cutoff functions as a "fuzzy" threshold rather than a sharp boundary for three reasons. First, the provincial line establishes baseline eligibility, but individual universities set higher effective admission lines based on their specific first-choice applicant pool. Second, bonus points for specialized achievements can shift a student's rank.[2] Third, the risks of the sequential mechanism mean that scoring above the line does not guarantee placement if the student miscalculates their preferences.

Within-University Selectivity Even after clearing a university's general admission line, students must surpass a secondary major-specific cutoff. In the early 2000s, high demand for "hot" majors—particularly Economics and Management—resulted in thresholds significantly higher than the university's baseline. Students failing these internal cutoffs were often subjected to major reallocation (*tiaoji*), an administrative process that placed them in under-enrolled disciplines to avoid total rejection. Thus, access to high-demand fields remained a separate, high-stakes competition even within the elite tier.

2.2 Equity Market in China

The Chinese equity market—commonly referred to as the "A-share" market—has become a cornerstone of the global financial system, ranking as the world's second-largest by market capitalization with a valuation of approximately $16.3 trillion as of early 2026. Primarily

[2]In addition to raw exam performance, a small proportion of students qualify for bonus points, which are added to their subject scores and incorporated into their total CEE score for ranking purposes. These points—typically ranging from 5 to 20—are awarded for specialized achievements, such as winning subject Olympiads, or as a form of affirmative action for specific groups, including ethnic minorities. Because only a small share of test takers receive bonus points, including or excluding them does not alter our main findings.

comprised of the Shanghai (SSE), Shenzhen (SZSE), and Beijing (BSE) Stock Exchanges, the market's global significance is reflected in its integration into major international benchmarks like the MSCI China and FTSE Russell indices. This integration has catalyzed significant foreign institutional inflows, exceeding $83 billion in exchange-traded funds since 2025.[3]

Unlike developed markets such as the United States, the Chinese market is defined by a massive retail investor base. Comprising over 200 million individual accounts, these investors drive approximately 80% of total trading volume (An et al., 2022). Consequently, while U.S. markets are characterized by institutional dominance and high informational efficiency, the A-share market exhibits significantly higher annualized volatility—recorded at 30.6% compared to 17.0% for the United States (World Bank, 2022). The prevalence of "trend-following" retail traders, who often treat the market as a speculative arena, further exacerbates price swings and hinders efficient capital allocation.

These structural idiosyncratic features suggest that cognitive ability is a critical determinant of excess returns, a concept we define as "cognitive alpha." This alpha likely functions through two primary channels. First, the lack of institutional intermediaries places the burden of data synthesis directly on the household; thus, the ability to process information and evaluate uncertainty becomes a primary driver of performance. Second, higher cognitive ability correlates with a reduction in psychological pitfalls—such as the gambler's fallacy, overconfidence, and herd behavior—that frequently lead to suboptimal allocation and wealth destruction for the average retail trader (Xue et al., 2012; Talpsepp et al., 2020).

3 Data and Variables

3.1 College Entrance Examination Data

Our Gaokao data come from comprehensive administrative records covering the universe of test takers between 1999 and 2003, encompassing more than 23 million individuals. The

[3]Source: https://english.news.cn/20260107

dataset is organized into three main components: individual demographics (gender, ethnicity, birth year, hukou status, and academic track), subject-specific raw scores, and realized admission outcomes, which identify the specific college–major placement for approximately 14.2 million admitted students.[4] We supplement these data with hand-collected province–year–track cutoff scores for Tier-1 universities. In addition, we compute major-specific cutoffs for economics programs within each university using the administrative records.

3.2 Stock Transaction Data

Our stock transaction data come from a leading financial institution, one of the earliest and most influential full-service brokerage firms in China's capital market. The firm consistently ranks among the top domestic securities providers and offers a comprehensive range of services, including investment banking, wealth management, trading and institutional services, and investment management. It operates more than 300 branches nationwide and frequently ranks first in the industry by the number of registered advisors.

We obtain *transaction-level* data spanning 2014 to 2023. Each transaction record includes detailed information on trade timing, security identifiers, transaction type (buy or sell), quantity, price, and associated fees. We also observe customer demographic information collected at account registration, including gender, age, income, and industry of employment. Most importantly, regulatory requirements mandate that customers provide their national ID numbers when opening a brokerage account, which enables us to link these customers to our Gaokao dataset.

Two novel variables, rarely available in similar datasets, warrant further discussion. The first measures financial literacy. This variable is derived from a standardized assessment administered by the brokerage firm at account registration to evaluate clients' knowledge

[4]Note that admission outcomes are observed only for students admitted to at least one program. This selection does not affect our empirical design. We focus on two key variables: an indicator for admission to a Tier-1 university and the raw CEE score. For students not admitted to any university, the Tier-1 admission indicator is mechanically zero, while the raw CEE score is available for all test takers.

of basic financial concepts, risk tolerance, and familiarity with equity market operations. The assessment is mandatory under regulatory guidelines and is used to classify investors by risk profile and product suitability. This measure is particularly valuable for assessing the impact of economics education, as a core objective of such training is to equip students with fundamental knowledge of financial markets. The second consists of anonymized chat records between investors and advisors conducted via WeCom.[5] These records provide insight into the information investors rely on when making decisions—whether they emphasize long-term fundamentals or short-term price movements—and reveal their ability to process and extract useful information from professional advice.

Our transaction-level data offer several important advantages over registry data, which are commonly used in prior studies. First, the high-frequency nature of our data allows us to compute stock returns over horizons shorter than one year. This feature is particularly important in China, given the high volatility of the A-share market. For example, in 2024, the Shanghai Securities Composite Index—a leading benchmark of the A-share market—rose by 12.67%, from 2962.28 to 3351.76. However, this annual figure masks substantial intra-year fluctuations.[6] To capture such dynamics, we use monthly returns as our benchmark. Second, our data enable the construction of detailed measures of investor behavior. For example, we can compute turnover rates—a key indicator of trading intensity—which are not available in annual registry data.

These advantages come with costs. Most importantly, we observe data from only one brokerage firm, albeit one of the largest in China. Among the 23 million test takers in our Gaokao dataset, we successfully match 142,440 individuals to the brokerage records. Given an estimated stock market participation rate of 20% among college graduates, this matched sample represents roughly 10% of that population—a share comparable to the firm's market share among retail investors. Appendix Table A.1 addresses potential sample

[5]WeCom, an enterprise-grade communication platform developed by Tencent, serves as the corporate version of WeChat.

[6]The index fell to 2635.09 in February, rebounded to 3174.27 in May, declined again to 2689.70 in mid-September, and then surged sharply at the end of September following strong policy stimulus.

selection concerns using a Heckman two-step procedure. In the first stage, we use the number of the firm's branches at each city as an instrumental variable for account registration. The resulting Heckman estimates are visually indistinguishable from our baseline results, which we present in the following section.

3.3 Summary Statistics

Table 1 presents the summary statistics. Because we are particularly interested in differential educational and investment outcomes across CEE scores, we divide the sample into four quartiles based on the score. Panel A reports individual characteristics, including gender, age at the time of the exam, hukou status, and ethnicity. The key takeaway is that these characteristics vary little across CEE quartiles. Although they are undoubtedly important indicators of socioeconomic status (SES), their limited association with CEE scores suggests that the scores capture more than SES, including cognitive ability.[7] Panel B presents admission outcomes. Unsurprisingly, students with higher CEE scores are much more likely to be admitted. Two facts merit emphasis. First, the probability of admission to Tier-1 universities is virtually zero for students outside the top CEE quartile, but rises to 61% for those in the top quartile. Second, the share of students enrolling in economics majors increases monotonically across CEE quartiles, indicating that economics was a "hot" major during our sample period.

Panel C presents the association between CEE scores and investment performance. We observe a clear positive correlation between the score and monthly returns. Investors with higher CEE scores exhibit lower turnover rates and select stocks with higher returns on assets (ROA). Panel D reports the textual analysis of investors' communications with their investment advisers. Investors in the top CEE quartile communicate far more frequently than those in the bottom quartile (5.15 times per month versus 2.03). Interestingly, despite their generally superior stock market performance, high-CEE-score investors appear more

[7] We provide further evidence that the CEE score is a good proxy for cognitive ability in Section 5.

humble in their communications. Textual analysis suggests that they are less positive and less confident when discussing investments. This humility does not reflect a lack of knowledge. In fact, the bottom row of Table 1 shows that they exhibit greater vocabulary diversity.

4 Education and Stock Returns

Figure 1 shows a highly robust positive association between CEE scores and stock returns. What drives this correlation? The first hypothesis is that students with higher CEE scores enroll in higher-quality universities and are more likely to major in economics. Better education *causally* improves stock market performance. We refer to this as the "better education hypothesis." The second hypothesis is that CEE scores primarily reflect test takers' cognitive ability, which contributes directly to higher stock returns. We refer to this as the "cognitive ability hypothesis." Distinguishing between these two hypotheses is crucial because it sheds light on the source of "personal alpha"—that is, why some investors consistently outperform others in the same stock market.

4.1 Empirical Strategy

Elite University RD In this section, we examine the "better education hypothesis" using a standard regression discontinuity (RD) design based on the Tier-1 cutoff score. We estimate the following econometric specification:

$$\begin{aligned} Y_{ipck} = \beta \cdot \mathbb{1}\{\text{Rank}_{ipck} - \text{Cut}_{pck} \geq 0\} + \gamma^{-} \cdot (\text{Rank}_{ipck} - \text{Cut}_{pck}) \cdot \mathbb{1}\{\text{Rank}_{ipck} - \text{Cut}_{pck} < 0\} \\ + \gamma^{+} \cdot (\text{Rank}_{ipck} - \text{Cut}_{pck}) \cdot \mathbb{1}\{\text{Rank}_{ipck} - \text{Cut}_{pck} \geq 0\} + \delta X'_{ipck} + \epsilon_{ipck}. \end{aligned} \tag{1}$$

Rank$ipck$ is the CEE percentile rank of individual i in province p, exam cohort c,[8] and track k. Cutpck converts the Tier-1 cutoff score into the corresponding percentile rank within each province–cohort–track cell. The indicator variable $\mathbb{1}\{\text{Rank}ipck - \text{Cut}pck \geq 0\}$ therefore denotes whether a student scores above the Tier-1 cutoff. This specification follows a standard local linear RD framework (Cattaneo and Titiunik, 2022). X'_{ipck} is a vector of control variables, including gender, age, hukou status, a retake indicator, province–cohort–track fixed effects (FEs), and county fixed effects. ϵ_{ipck} is the error term. Standard errors are clustered at the province–cohort–track level.

Y_{ipck} is the outcome variable of interest for individual i in province p, cohort c, and track k. When this variable indicates admission to any Tier-1 university, equation (1) represents the first-stage regression, capturing the extent to which passing the cutoff increases the probability of enrolling in an elite university. When the outcome is equity market performance, equation (1) provides the reduced-form estimate of whether enrolling in an elite university improves financial performance.

Economics Major RD The empirical strategy for estimating the returns to an economics major closely mirrors that used to estimate the returns to attending an elite university. The econometric specification resembles equation (1), with one key difference. Our identification strategy relies on the fact that economics is a "hot" major, with major-specific cutoffs typically exceeding those of other fields. We therefore exploit the RD design around major-specific cutoffs *within* each university. Specifically, we replace the Tier-1 cutoff at the province–cohort–track level in equation (1) with the major-specific cutoff within each elite university. Correspondingly, we modify the fixed effects in the covariates from province–cohort–track fixed effects to college–province–cohort–track fixed effects.

[8]Throughout this paper, "cohort" refers to the exam cohort, or the year in which students take the Gaokao. In China, students are traditionally identified by their year of entry. For example, those who entered university in 2000 are referred to as the 2000 *ji*.

Identification Requirement The validity of an RD design hinges on the continuity of the conditional expectation of potential outcomes at the threshold, implying that individuals cannot precisely manipulate the assignment variable to self-select into treatment (Lee and Lemieux, 2010). In the context of the Gaokao, this requires that students near the Tier-1 cutoff cannot perfectly control their final scores to fall just above the threshold. Ex ante, this condition is highly likely to hold given the inherent uncertainty in the testing and scoring process. The CEE comprises multiple subjects graded by different examiners—often including subjective components such as essays—and is subject to a centralized, province-level scaling process that is revealed only after the exam. As a result, precise score targeting is virtually impossible. Moreover, because the Tier-1 cutoff is itself a moving threshold determined by the contemporaneous distribution of scores and fixed provincial quotas, students cannot know the exact cutoff in advance.

We present three pieces of empirical evidence supporting the validity of our RD design. First, we employ the McCrary density test to examine whether there is a discontinuous jump in the density of the assignment variable at the threshold (McCrary, 2008). Appendix Figures A.1 and A.3 report the results for the Tier-1 RD and the economics major RD, respectively, and show no evidence of systematic sorting just above the cutoff. Second, we conduct balance tests by replacing the outcome variable in equation (1) with predetermined characteristics that should vary smoothly around the cutoff, including gender, age, hukou status, and ethnicity. Appendix Tables A.2 and A.3 present the results for the two RD settings.[9] We find no evidence of discontinuities in these predetermined variables at the thresholds. Finally, to reinforce the unpredictability of the Tier-1 cutoff, we perform a placebo test in Appendix Figure A.2, examining whether the cutoff scores from the previous or subsequent year predict enrollment in an elite university in the current year. The probability of elite

[9]One potential concern is that our data cover only a single brokerage firm in China. It is possible that better-educated individuals or those majoring in economics have a stronger preference for this broker. The first columns of Appendix Tables A.2 and A.3 examine this possibility by using an indicator for whether a Gaokao test taker appears in our brokerage data as the outcome variable. We find no evidence of discontinuous jumps in the probability of being included in our sample around the cutoff scores.

university enrollment varies smoothly around these placebo cutoffs.

4.2 Main Results

The Effect of Elite Education Figure 2 presents the first-stage results exploiting the Tier-1 cutoff scores. Barely surpassing the cutoff generates a clear and sizable discontinuous jump (around 40%) in the probability of enrolling in an elite university. However, when we change the outcome variable to stock return rates, the discontinuity disappears, as shown in Figure 3. This pattern suggests that, in the Chinese context, there is no evidence that elite education causally improves stock returns.

Table 2 partially investigates why elite education does not improve stock market performance. We focus on four indicators of investors' portfolio choices: the Sharpe ratio, turnover rate, risk level (beta), and ROA. The Sharpe ratio measures risk-adjusted returns by dividing excess returns (over the risk-free rate) by the standard deviation of returns. It captures how much return an investor earns per unit of total risk and is widely used in the asset pricing and portfolio choice literature as a benchmark for investment efficiency (Sharpe, 1966). It also allows us to assess whether better-educated investors prefer safer assets with lower expected returns. Turnover rate measures how frequently an investor buys and sells securities within a given period. It reflects trading intensity and is closely related to transaction costs and behavioral biases. Prior research shows that excessive trading is often associated with overconfidence and lower net returns (Barber and Odean, 2000). Risk level (beta) captures a portfolio's systematic risk exposure relative to the overall market in the Capital Asset Pricing Model (CAPM) framework (Sharpe, 1964). A higher beta implies greater exposure to aggregate market fluctuations. ROA, defined as net income divided by total assets, serves as an indicator of firm quality and investment sophistication (Novy-Marx, 2013). Together, these four measures provide a comprehensive assessment of portfolio performance, trading behavior, risk exposure, and stock selection quality.

Panel B of Table 2 reports the RD estimates for the four portfolio indicators. The only

variable that exhibits a statistically significant effect is the turnover rate: investors with an elite university education have higher turnover. However, this increased trading activity does not translate into higher returns, as shown in Panel A. One possible explanation is that the "985" or "211" label may lead these investors to perceive themselves as superior to their peers when trading stocks. Such overconfidence may be further amplified by the dominance of retail traders in the A-share market, where individual investors are more likely to trade against other individuals rather than professional institutions.

The Effect of Economics Major Education Although we find no evidence that enrolling in an elite university in China improves individual stock returns, we next examine whether major-specific education—particularly in economics—plays a positive role. Figure 4 illustrates our identification strategy, which exploits the fact that, within each university, the cutoff for the economics major is generally higher than those for other majors. Because we define the major cutoff as the lowest admission score within each university–major cell, failing to surpass this threshold mechanically implies zero probability of admission to the economics major. Barely exceeding the cutoff increases the probability of enrolling in the economics major by 23%.

Figure 5 explores whether economics major, which should theoretically equip students with expertise to the equity market,[10] increases stock returns. However, we find no such empirical evidence. Table 3 reports the reduced-form RD estimation on the causal effect of economics major education on stock returns. The education of economics major neither increase the stock returns, as shown in Panel A, nor change the chosen investment portfolio, as shown in Panel B.

Discussion Why does education—including elite university education and economics major training—fail to improve individual stock returns in China? We argue that a mismatch between theory and practice is a key explanation.

[10] Applying the same RD design, we find that majoring in economics causally improves financial literacy.

Although elite universities and economics programs excel at teaching canonical models (e.g., CAPM), these frameworks were largely developed in the context of financial markets in developed economies—particularly the United States—and typically assume a high degree of market efficiency. Such conditions are often absent in the Chinese A-share market. Moreover, the dominance of retail investors in the A-share market contributes to noise trading and herd behavior, further widening the gap between standard financial theory and actual market practice.

It is important to note that market inefficiency is not unique to China but is also common in other emerging markets, such as India, Brazil, and Vietnam.[11] Consequently, our findings suggest that in the absence of strong market efficiency and practical financial literacy, the mere acquisition of canonical financial knowledge may be insufficient to improve household wealth accumulation through capital markets.

5 Cognitive Ability and Stock Returns

In the previous section, we found no supportive evidence for the "better education hypothesis." What, then, explains the positive association between CEE scores and stock returns documented in Figure 1? In this section, we explore the "cognitive ability hypothesis." We provide evidence that CEE scores—particularly math scores—serve as a strong proxy for cognitive ability, which in turn contributes to higher stock returns.

5.1 Empirical Strategy

We argue ex ante CEE scores serve as a good and intuitive proxy for cognitive ability. Test scores have been widely used as a proxy of cognitive ability, particularly the AFQT (Armed Forces Qualification Test) scores in the NLSY (National Longitudinal Surveys of Youth)

[11] A recent report published by MSCI, known for its influential stock market indices, reviews market infrastructure across major equity markets (2025 Global Market Accessibility Review). The China A-share market is rated as insufficient in areas such as clearing and settlement, transferability, stock lending, and short selling. However, these features are also common among other emerging markets.

data.[12] Gaokao serves a functionally equivalent, if not more rigorous, role in the Chinese context. Much like the AFQT, the Gaokao is a high-stakes, comprehensive assessment that measures a broad spectrum of cognitive domains, including linguistic proficiency, mathematical reasoning, and analytical problem-solving. Given that the Gaokao is the culmination of twelve years of standardized primary and secondary schooling and remains the near-exclusive determinant of university placement, it captures the persistent cognitive differences and academic preparation of students.

Establishing a causal relationship between cognitive ability and stock returns is challenging because intrinsic cognitive ability is difficult to define and measure; test scores serve only as a proxy. Moreover, unlike the RD design around cutoff scores, it is difficult to identify a clear source of exogenous variation in cognitive ability.

Nevertheless, we provide three sets of empirical evidence suggesting that cognitive ability is an important contributor to the positive *correlation* between CEE scores and stock returns. First, the correlation remains highly stable even after adding an extensive set of socioeconomic status (SES) controls. Second, among the three core test subjects—Chinese, mathematics, and English—math scores are the strongest predictor of stock returns. Third, using investors' chat logs with financial advisers, we apply natural language processing techniques to construct several measures that proxy for cognitive ability and show that CEE scores are strongly correlated with these measures.

5.2 Main Results

Stability of the Coefficient with the Addition of Control Variables The first piece of evidence supporting the "cognitive ability hypothesis" comes from the stability of coefficients with the addition of control variables. It is fair to expect that students from richer regions within the same provinces obtain higher scores in Gaokao. If the score–return association simply reflects that people from higher-SES families perform better in the stock

[12]Several well-cited studies include Neal and Johnson (1996); Heckman et al. (2006a); Agarwal and Mazumder (2013); Deming (2017).

market, adding SES controls should drastically reduce the size of the coefficients in an OLS regression.

Table 4 suggests that this is not the case. The first column—the baseline specification without additional controls—shows a statistically significant positive coefficient of 0.0071. The second column adds high school fixed effects, hometown fixed effects, and demographic controls (including hukou), all of which are strongly correlated with socioeconomic status. Including these controls slightly increases the coefficient to 0.0079.

The robustness of the coefficient stays not only for controlling variable *prior to* Gaokao, but also for after going to college. Columns (3)–(6) progressively add a set of admission outcomes. The largest dip in coefficient happens when we add college FEs in column (4) (down to 0.0054), which is not surprising because students with higher cognitive ability achieve higher scores and go to better universities. However, furthering adding major controls have no impact on the coefficient, echoing our findings of the null effect of economics major education in the previous section. Adding work industry after graduation also barely influence the coefficient. The surprising stability of the coefficients imply that the correlation is likely driven by something innate in a person, such as cognitive ability.

Math Scores as the Strongest Predictor The second piece of evidence comes from comparing the correlations between stock returns and subject-specific scores—Chinese, mathematics, and English. We argue that math scores provide a cleaner proxy for cognitive ability than Chinese scores. According to the Cattell–Horn–Carroll (CHC) theory—a foundational framework in psychology—mathematics primarily assesses quantitative reasoning, logical deduction, and abstract problem-solving.[13] In contrast, the Chinese (language arts) component reflects a greater degree of crystallized intelligence, as it relies heavily on accumulated knowledge of literature and historical context, as well as subjective essay-writing skills that are more susceptible to environmental influences and rote memorization.

Figure 6 reports the coefficients from regressions of monthly stock returns on subject-

[13]See Schneider and McGrew (2018) for a recent comprehensive review of CHC theory.

specific scores. With baseline controls, the coefficient on math scores is the largest (0.0041), approximately 2.5 times that of Chinese scores. The strong association with math performance and the comparatively weak association with Chinese scores provide compelling evidence that the positive correlation between CEE scores and individual stock returns is largely driven by cognitive ability.

"Smart Choices" in the Equity Market Although investment behavior is inherently individualized, the financial literature identifies a set of "smart choices" that distinguish more sophisticated equity market participants. Foremost among these is the avoidance of overtrading, as high turnover—often driven by overconfidence bias—tends to erode net returns through excessive transaction costs and poor market timing (Barber and Odean, 2000). In addition, disciplined investors emphasize "quality" factors, particularly firms with strong profitability measures such as ROA (Fama and French, 2015). In the volatile environment of the Chinese A-share market, adherence to these rational strategies is especially important. These "smart choices" therefore reflect the practical manifestation of cognitive alpha.

Figure 7 presents the relationship between CEE rankings and stock selection. Investors with higher scores tend to choose stocks with lower beta—indicating lower exposure to market fluctuations—and higher ROA. Figure 8 shows that high-score investors also trade less frequently. Together, these patterns suggest that investors with higher CEE scores make "smart choices" in the equity market.

Table 5 reports the association between CEE rankings and investor characteristics derived from chat log data. We highlight two main findings. First, high-score investors contact investment advisers more frequently (column 1). They seek advice actively, not because they lack knowledge. On the contrary, they exhibit greater vocabulary diversity in their communications, as shown in the last column, suggesting a deeper understanding of financial markets. Second, their tone is more humble. They are generally less optimistic about future market performance (column 2) and display lower levels of expressed confidence (column 3).

Overall, actively seeking information and avoiding overconfidence appear to contribute to higher individual stock returns.

Summary Together, these three strands of evidence—the structural stability of the score coefficient, the disproportionate predictive power of mathematics, and the distinct behavioral patterns of high-scoring investors—converge to strongly support the cognitive ability hypothesis. The fact that the association between CEE scores and stock returns remains robust despite the inclusion of rigorous socioeconomic and post-admission controls suggests that the effect is not merely a byproduct of familial background or institutional "labeling," but is instead driven by a persistent individual trait. This trait aligns closely with fluid intelligence, as evidenced by the dominance of math scores—a classic proxy for abstract reasoning—over the more environmental Chinese language scores. Crucially, the chat log data reveals that this cognitive advantage manifests as "cognitive alpha" in the marketplace; high-ability investors do not necessarily rely on exclusive information, but rather on superior behavioral discipline, characterized by the avoidance of overconfidence, reduced turnover, and a preference for fundamental quality. Ultimately, these findings suggest that the Gaokao functions as an effective filter for the latent cognitive traits that facilitate rational decision-making in complex financial environments.

6 Conclusion

This study addresses a foundational question in financial economics: does investment alpha originate from educable skills or latent cognitive ability? As return heterogeneity becomes a primary driver of global wealth inequality, determining whether these returns are a product of institutional prestige or individual traits is essential. If elite degrees and specialized financial training fail to bridge the performance gap, then wealth accumulation may be more dependent on "cognitive alpha" than on the egalitarian promise of expanded higher education. In a retail-heavy markets (the Chinese A-share market), disentangling these forces is critical

for understanding the limits of formal human capital in democratizing financial success.

Our empirical analysis provides a definitive "horse race" between these two drivers. Using regression discontinuity designs around the high-stakes thresholds of the Chinese Gaokao, we find that elite college attendance and majoring in economics or finance yield null causal effects on long-run investment performance. Graduates from Tier-1 institutions and finance programs earn returns and Sharpe ratios nearly identical to their near-miss counterparts. In sharp contrast, we document a robust "cognitive alpha": a ten-percentile increase in pre-college Gaokao rank—specifically in mathematics—predicts a 61% higher total return over a decade. This outperformance is underpinned by superior behavioral discipline, as high-ability investors select fundamentally stronger stocks, trade less frequently, and maintain a calibrated, less overconfident engagement with financial advice.

Despite these clear findings, our study is subject to specific institutional and temporal boundaries. Our data navigate a market characterized by high speculative noise and a lack of institutional depth. The "cognitive alpha" we identify may be particularly potent in such an environment, where the ability to filter noise and resist "herd behavior" is the primary determinant of success. If the Chinese A-share market moves toward greater informational efficiency in the future—driven by increased institutionalization and tighter regulatory oversight—the relative importance of innate cognitive alpha may diminish as fundamental values become more transparent and easier to track via passive instruments.

Nevertheless, the implications of this study extend beyond the specific geography of the Chinese A-share market. Spatially, our findings offer a scalable framework for other emerging economies—such as those in Southeast Asia, Latin America, and South Asia—where retail participation is surging and formal financial education is often disconnected from market realities. Temporally, the mechanisms of "smart choices" and behavioral discipline we have identified are universal traits of successful investing that align with longitudinal evidence from the United States and Europe. By highlighting that the source of individual alpha lies in the "cognitive filter" rather than the "educational label," this research provides a persistent

insight into the nature of human capital: while schools may grant credentials, the market primarily rewards the latent ability to process complexity with humility and discipline.

References

Acemoglu, Daron, Alex He, and Daniel le Maire, "Eclipse of Rent-Sharing: The Effects of Managers' Business Education on Wages and the Labor Share in the US and Denmark," Technical Report, National Bureau of Economic Research 2022.

Agarwal, Sumit and Bhashkar Mazumder, "Cognitive abilities and household financial decision making," *American Economic Journal: Applied Economics*, 2013, *5* (1), 193–207.

Altmejd, Adam, Thomas Jansson, and Yigitcan Karabulut, *Business education and portfolio returns*, IZA-Institute of Labor Economics, 2024.

Altonji, Joseph G, Erica Blom, and Costas Meghir, "Heterogeneity in human capital investments: High school curriculum, college major, and careers," *Annual Review Economics*, 2012, *4* (1), 185–223.

_ , Peter Arcidiacono, and Arnaud Maurel, "The analysis of field choice in college and graduate school: Determinants and wage effects," in "Handbook of the Economics of Education," Vol. 5, Elsevier, 2016, pp. 305–396.

An, Li, Dong Lou, and Donghui Shi, "Wealth redistribution in bubbles and crashes," *Journal of Monetary Economics*, 2022, *126*, 134–153.

Andrews, Rodney J, Scott A Imberman, Michael F Lovenheim, and Kevin Stange, "The returns to college major choice: Average and distributional effects, career trajectories, and earnings variability," *Review of Economics and Statistics*, 2024, pp. 1–45.

Bach, Laurent, Laurent E Calvet, and Paolo Sodini, "Rich pickings? Risk, return, and skill in household wealth," *American Economic Review*, 2020, *110* (9), 2703–2747.

Barber, Brad M and Terrance Odean, "Trading is hazardous to your wealth: The common stock investment performance of individual investors," *Journal of Finance*, 2000, *55* (2), 773–806.

Barth, Daniel, Nicholas W Papageorge, and Kevin Thom, "Genetic endowments and wealth inequality," *Journal of Political Economy*, 2020, *128* (4), 1474–1522.

Black, Sandra E, Paul J Devereux, Petter Lundborg, and Kaveh Majlesi, "Poor little rich kids? The role of nature versus nurture in wealth and other economic outcomes and behaviours," *The Review of Economic Studies*, 2020, *87* (4), 1683–1725.

Calvet, Laurent E, John Y Campbell, and Paolo Sodini, "Down or out: Assessing the welfare costs of household investment mistakes," *Journal of Political Economy*, 2007, *115* (5), 707–747.

Campbell, John Y, "Household finance," *The Journal of Finance*, 2006, *61* (4), 1553–1604.

_ , "Restoring rational choice: The challenge of consumer financial regulation," *American Economic Review*, 2016, *106* (5), 1–30.

_ , **Tarun Ramadorai, and Benjamin Ranish**, "Do the rich get richer in the stock market? Evidence from India," *American Economic Review: Insights*, 2019, *1* (2), 225–240.

Card, David, "Estimating the return to schooling: Progress on some persistent econometric problems," *Econometrica*, 2001, *69* (5), 1127–1160.

Cattaneo, Matias D and Rocio Titiunik, "Regression discontinuity designs," *Annual Review of Economics*, 2022, *14* (1), 821–851.

Christiansen, Charlotte, Juanna Schröter Joensen, and Jesper Rangvid, "Are economists more likely to hold stocks?," *Review of Finance*, 2008, *12* (3), 465–496.

Cole, Shawn, Anna Paulson, and Gauri Kartini Shastry, "Smart money? The effect of education on financial outcomes," *The Review of Financial Studies*, 2014, *27* (7), 2022–2051.

_ , _ , **and** _ , "High school curriculum and financial outcomes: The impact of mandated personal finance and mathematics courses," *Journal of Human Resources*, 2016, *51* (3), 656–698.

d'Astous, Philippe and Stephen H Shore, "Human capital risk and portfolio choices: Evidence from university admission discontinuities," *Journal of Financial Economics*, 2024, *154*, 103793.

Delavande, Adeline and Basit Zafar, "University choice: The role of expected earnings, nonpecuniary outcomes, and financial constraints," *Journal of Political Economy*, 2019, *127* (5), 2343–2393.

Deming, David J, "The growing importance of social skills in the labor market," *The quarterly journal of economics*, 2017, *132* (4), 1593–1640.

Eber, Nicolas, Patrick Roger, and Tristan Roger, "Finance and intelligence: An overview of the literature," *Journal of Economic Surveys*, 2024, *38* (2), 503–554.

Eika, Lasse, Magne Mogstad, and Basit Zafar, "Educational assortative mating and household income inequality," *Journal of Political Economy*, 2019, *127* (6), 2795–2835.

Fagereng, Andreas, Luigi Guiso, Davide Malacrino, and Luigi Pistaferri, "Heterogeneity and persistence in returns to wealth," *Econometrica*, 2020, *88* (1), 115–170.

_ , _ , **Martin Blomhoff Holm, and Luigi Pistaferri**, "K-returns to education," 2020.

Fama, Eugene F and Kenneth R French, "A five-factor asset pricing model," *Journal of Financial Economics*, 2015, *116* (1), 1–22.

Fernandes, Daniel, John G Lynch Jr, and Richard G Netemeyer, "Financial literacy, financial education, and downstream financial behaviors," *Management science*, 2014, *60* (8), 1861–1883.

Grinblatt, Mark, Matti Keloharju, and Juhani T Linnainmaa, "IQ, trading behavior, and performance," *Journal of Financial Economics*, 2012, *104* (2), 339–362.

_ **, Seppo Ikäheimo, Matti Keloharju, and Samuli Knüpfer**, "IQ and mutual fund choice," *Management Science*, 2016, *62* (4), 924–944.

Heckman, James J, John Eric Humphries, and Gregory Veramendi, "Returns to education: The causal effects of education on earnings, health, and smoking," *Journal of Political Economy*, 2018, *126* (S1), S197–S246.

_ **, Jora Stixrud, and Sergio Urzua**, "The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior," *Journal of Labor economics*, 2006, *24* (3), 411–482.

_ **, Lance J Lochner, and Petra E Todd**, "Earnings functions, rates of return and treatment effects: The Mincer equation and beyond," *Handbook of the Economics of Education*, 2006, *1*, 307–458.

Hvidberg, Kristoffer Balle, "Field of study and financial problems: How economics reduces the risk of default," *The Review of Financial Studies*, 2023, *36* (11), 4677–4711.

Jappelli, Tullio and Mario Padula, "Investment in financial literacy and saving decisions," *Journal of Banking & Finance*, 2013, *37* (8), 2779–2792.

Jia, Ruixue, Hongbin Li, and Lingsheng Meng, "Elite College Education and Social Mobility in China," *Economic Development and Cultural Change*, 2025, *73* (3), 1145–1186.

Kaiser, Tim, Annamaria Lusardi, Lukas Menkhoff, and Carly Urban, "Financial education affects financial knowledge and downstream behaviors," *Journal of Financial Economics*, 2022, *145* (2), 255–272.

Kirkeboen, Lars J, Edwin Leuven, and Magne Mogstad, "Field of study, earnings, and self-selection," *The Quarterly Journal of Economics*, 2016, *131* (3), 1057–1111.

Lee, David S and Thomas Lemieux, "Regression discontinuity designs in economics," *Journal of economic literature*, 2010, *48* (2), 281–355.

Li, Shi, John Whalley, and Chunbing Xing, "China's higher education expansion and unemployment of college graduates," *China Economic Review*, 2014, *30*, 567–582.

Lusardi, Annamaria, Pierre-Carl Michaud, and Olivia S Mitchell, "Optimal financial knowledge and wealth inequality," *Journal of Political Economy*, 2017, *125* (2), 431–477.

McCrary, Justin, "Manipulation of the running variable in the regression discontinuity design: A density test," *Journal of econometrics*, 2008, *142* (2), 698–714.

Neal, Derek A and William R Johnson, "The role of premarket factors in black-white wage differences," *Journal of Political Economy*, 1996, *104* (5), 869–895.

Novy-Marx, Robert, "The other side of value: The gross profitability premium," *Journal of Financial Economics*, 2013, *108* (1), 1–28.

Piketty, Thomas, *Capital in the twenty-first century*, Harvard University Press, 2014.

Saez, Emmanuel and Gabriel Zucman, "Wealth inequality in the United States since 1913: Evidence from capitalized income tax data," *The Quarterly Journal of Economics*, 2016, *131* (2), 519–578.

Schneider, W. J. and K. S. McGrew, "The Cattell–Horn–Carroll theory of cognitive abilities," in "Contemporary intellectual assessment: Theories, tests, and issues (4th Edition)," The Guilford Press., 2018, pp. 73–163.

Sharpe, William F, "Capital asset prices: A theory of market equilibrium under conditions of risk," *Journal of Finance*, 1964, *19* (3), 425–442.

_ , "Mutual fund performance," *Journal of Business*, 1966, *39* (1), 119–138.

Talpsepp, Tõnn, Kristjan Liivamägi, and Tarvo Vaarmets, "Academic abilities, education and performance in the stock market," *Journal of Banking & Finance*, 2020, *117*, 105848.

World Bank, "Global Financial Development Database," 2022.

Xavier, Inês, "Wealth inequality in the US: the role of heterogeneous returns," *Available at SSRN 3915439*, 2024.

Xue, Gui, Qinghua He, Xuemei Lei, Chunhui Chen, Yuyun Liu, Chuansheng Chen, Zhong-Lin Lu, Qi Dong, and Antoine Bechara, "The Gambler's Fallacy Is Associated with Weak Affective Decision Making but Strong Cognitive Ability," *PLOS ONE*, 10 2012, *7* (10), 1–5.

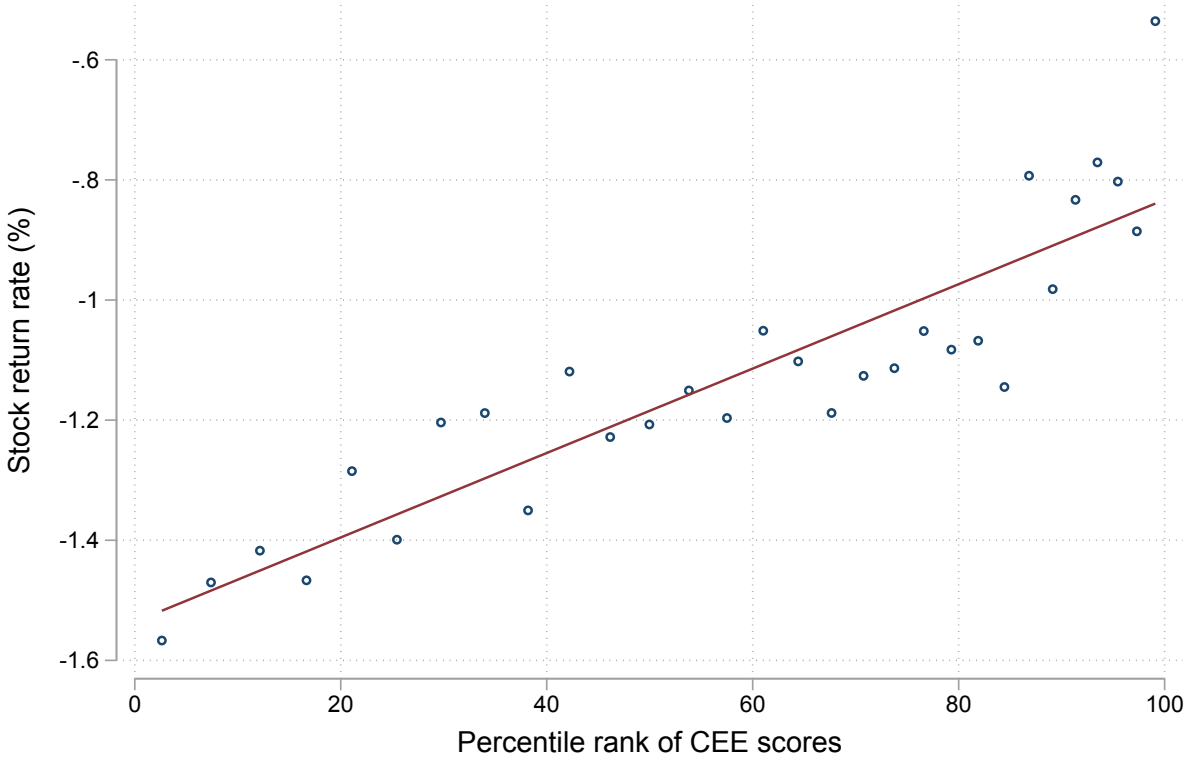
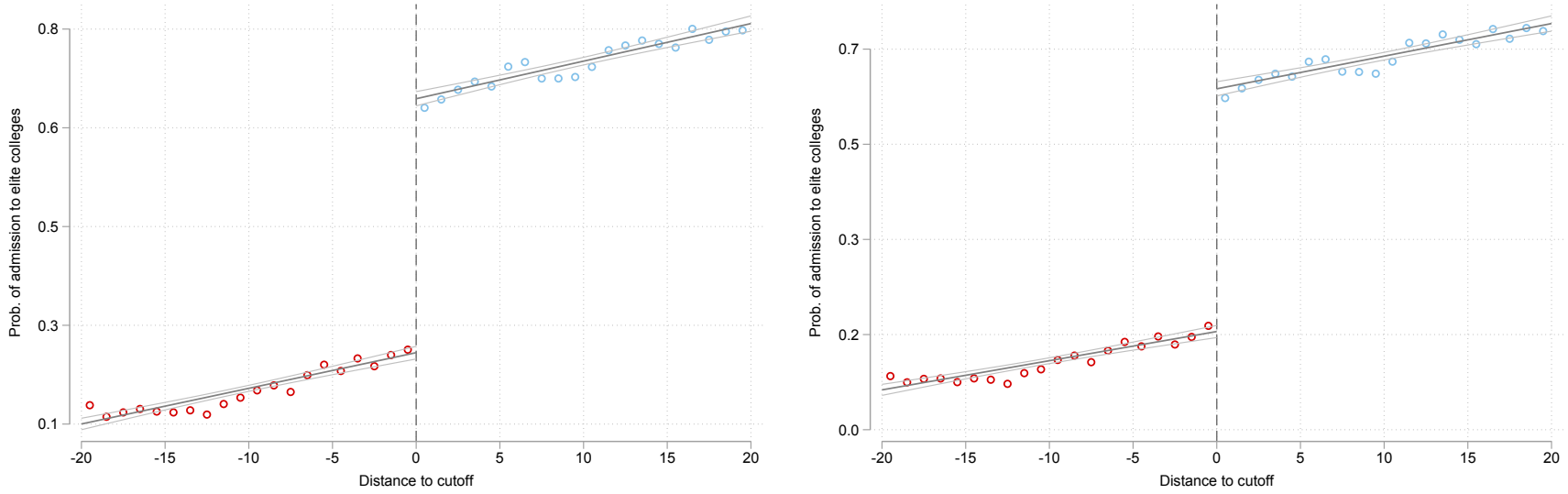


Figure 1: Raw Correlation between CEE Rank and Monthly Stock Returns



(a) Raw data

(b) With province-cohort-track FE

Figure 2: Regression Discontinuity Design for Elite College Admission

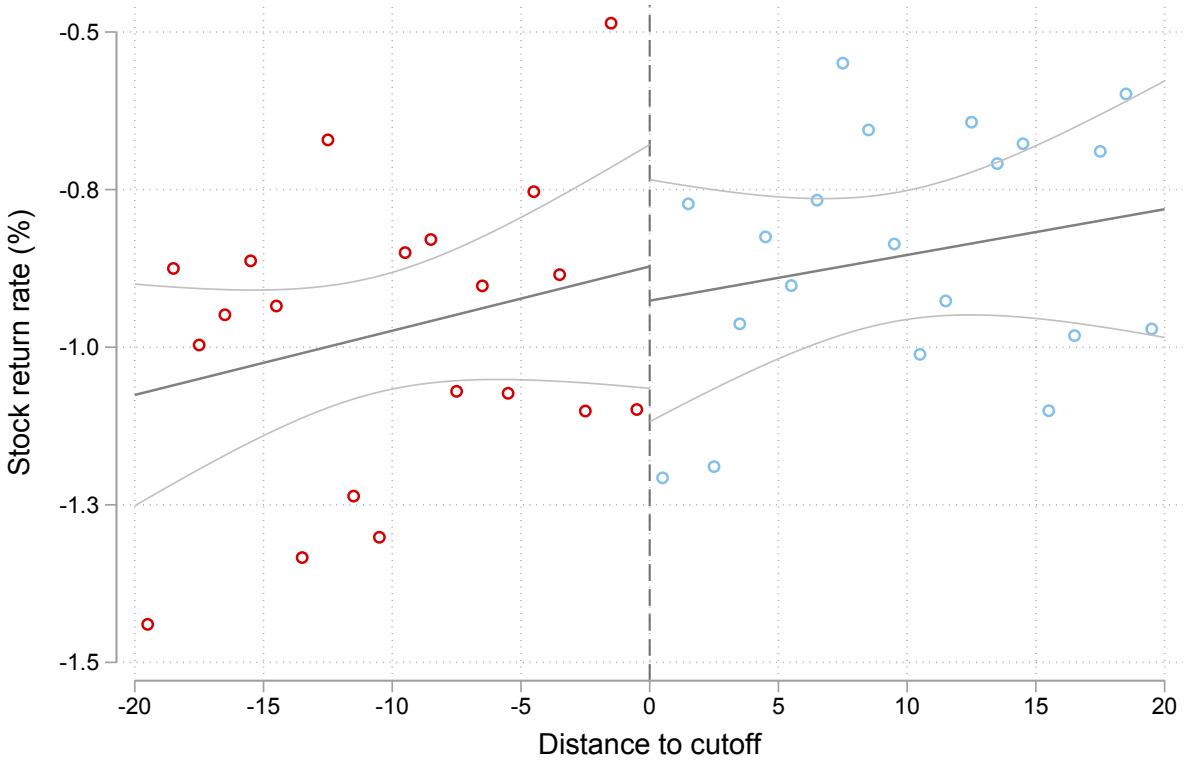


Figure 3: Does Enrollment in Elite Universities Improve Stock Returns?

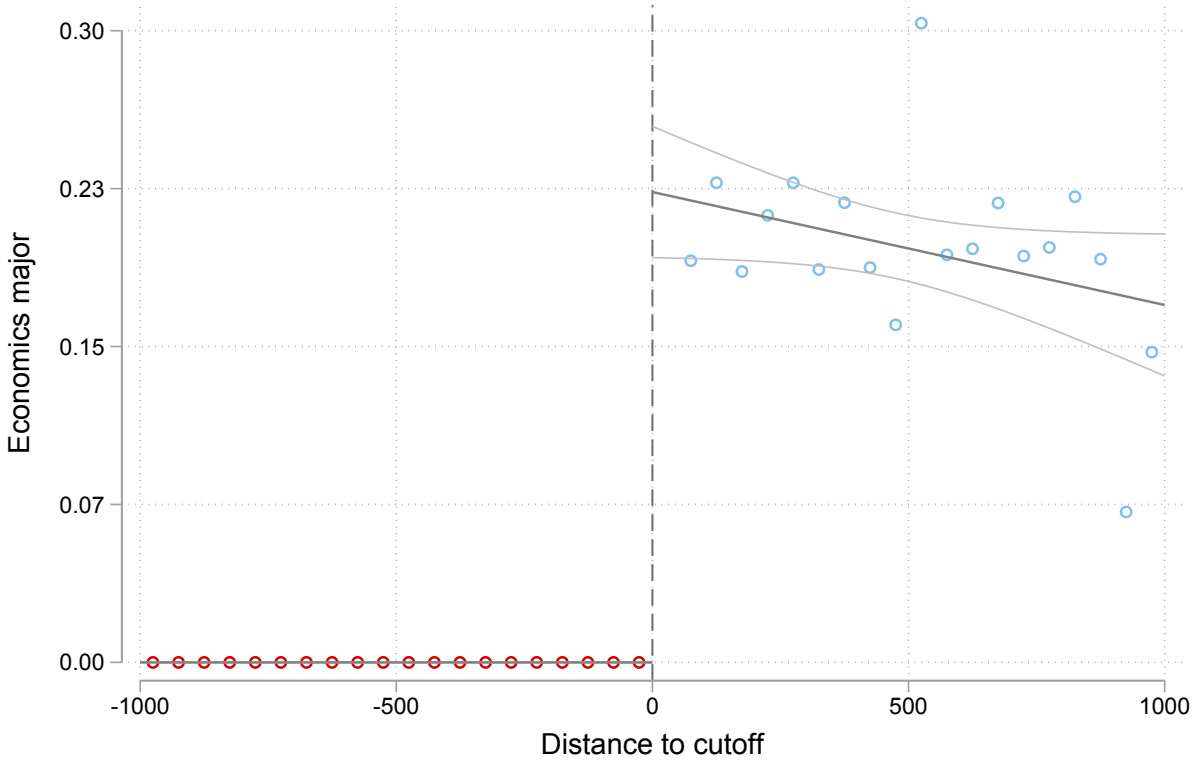


Figure 4: Regression Discontinuity Design for Econ Major Enrollment

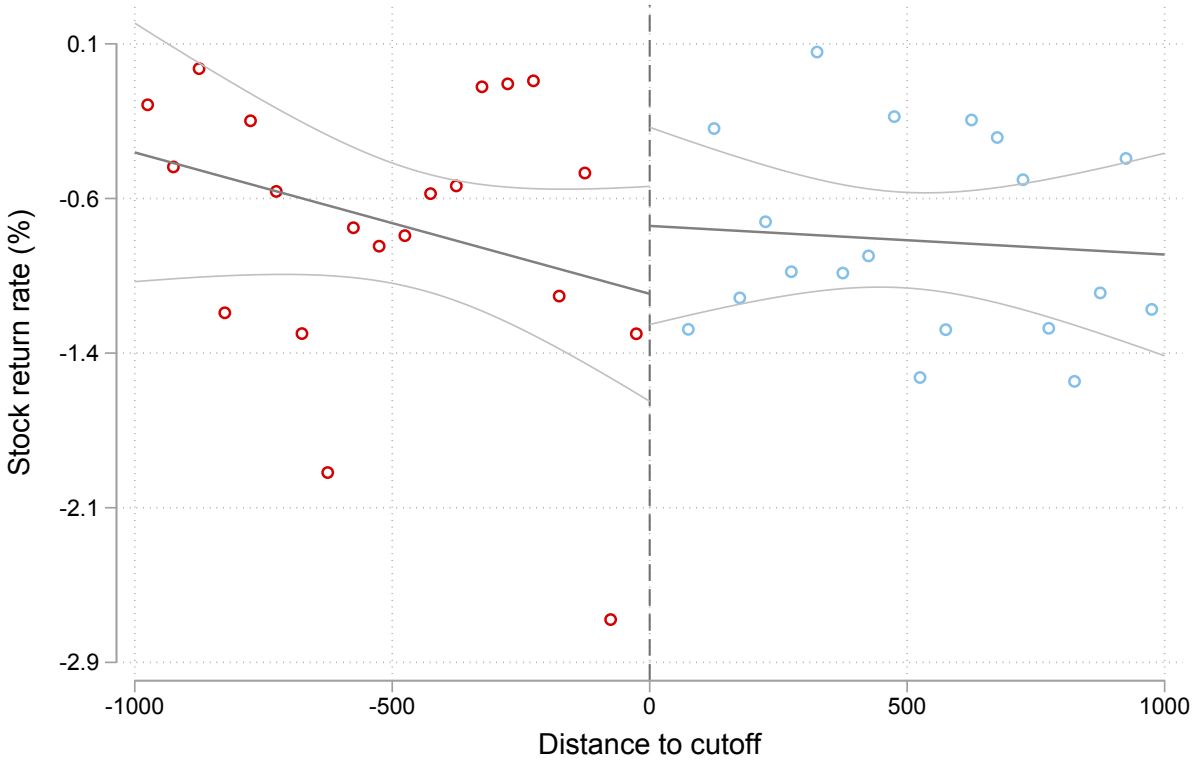


Figure 5: Does Enrollment in Economic Majors Improve Stock Returns?

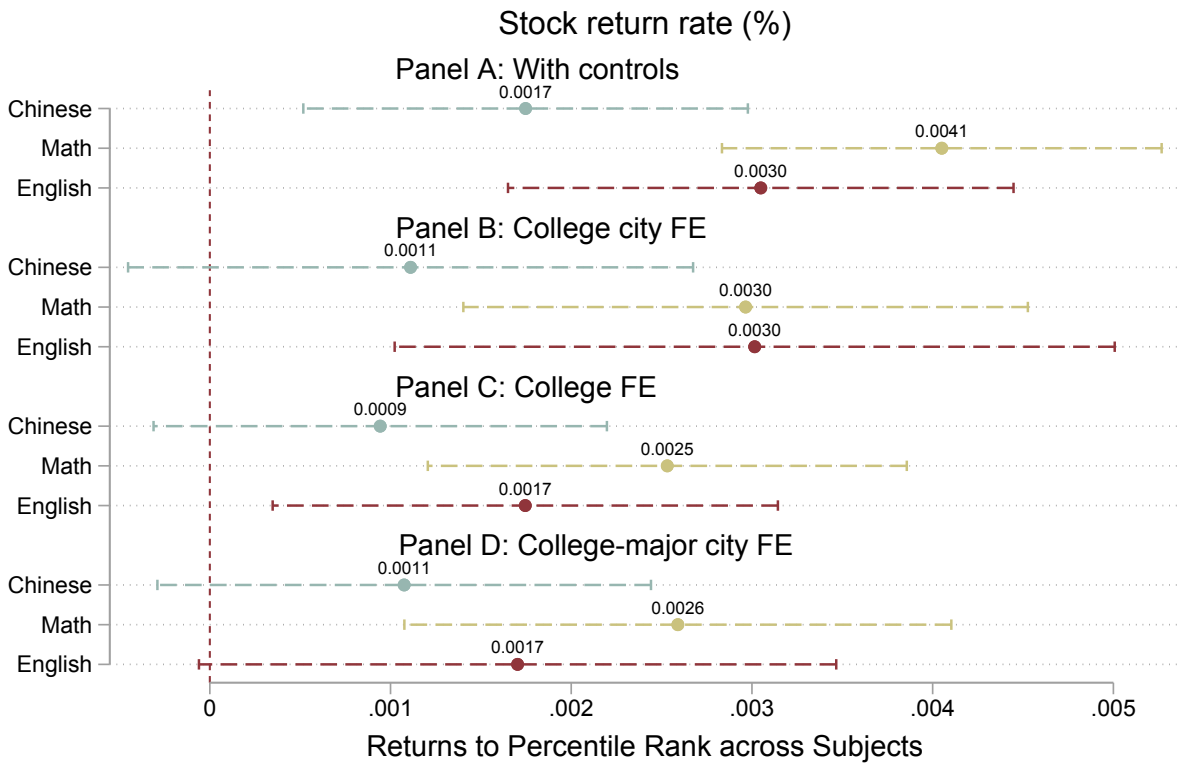
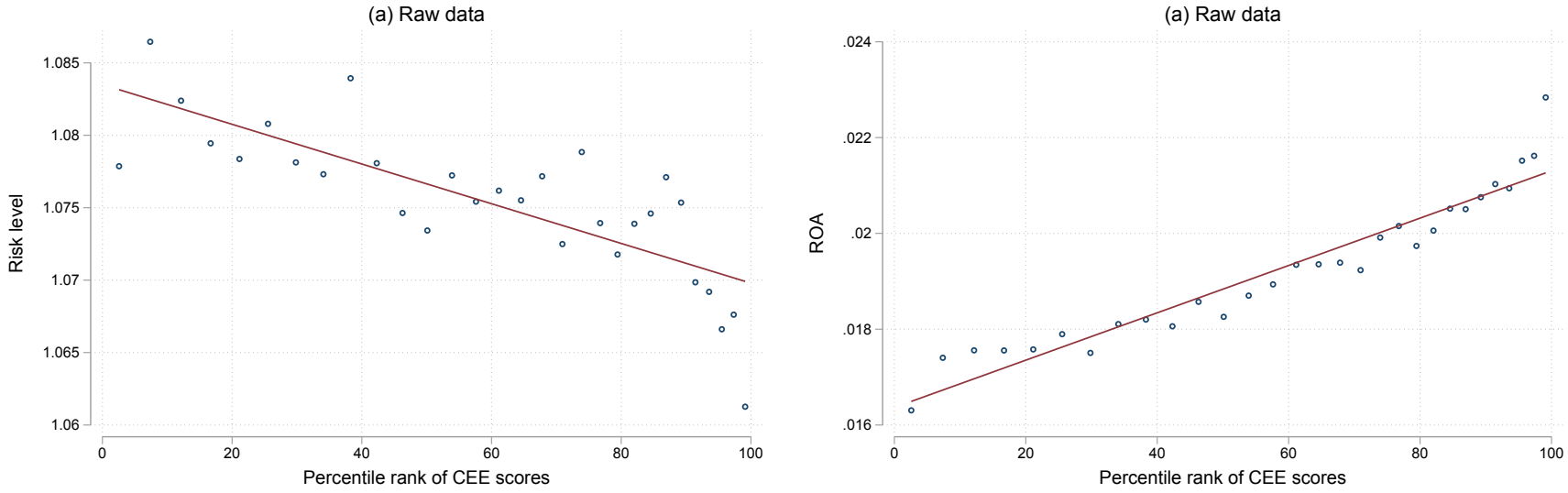


Figure 6: Correlation between the Rank across Different Subjects and Monthly Stock Returns



(a) Raw data (b) With province-cohort-track FE

Figure 7: Source of "Smart Alpha"—Stock Picking

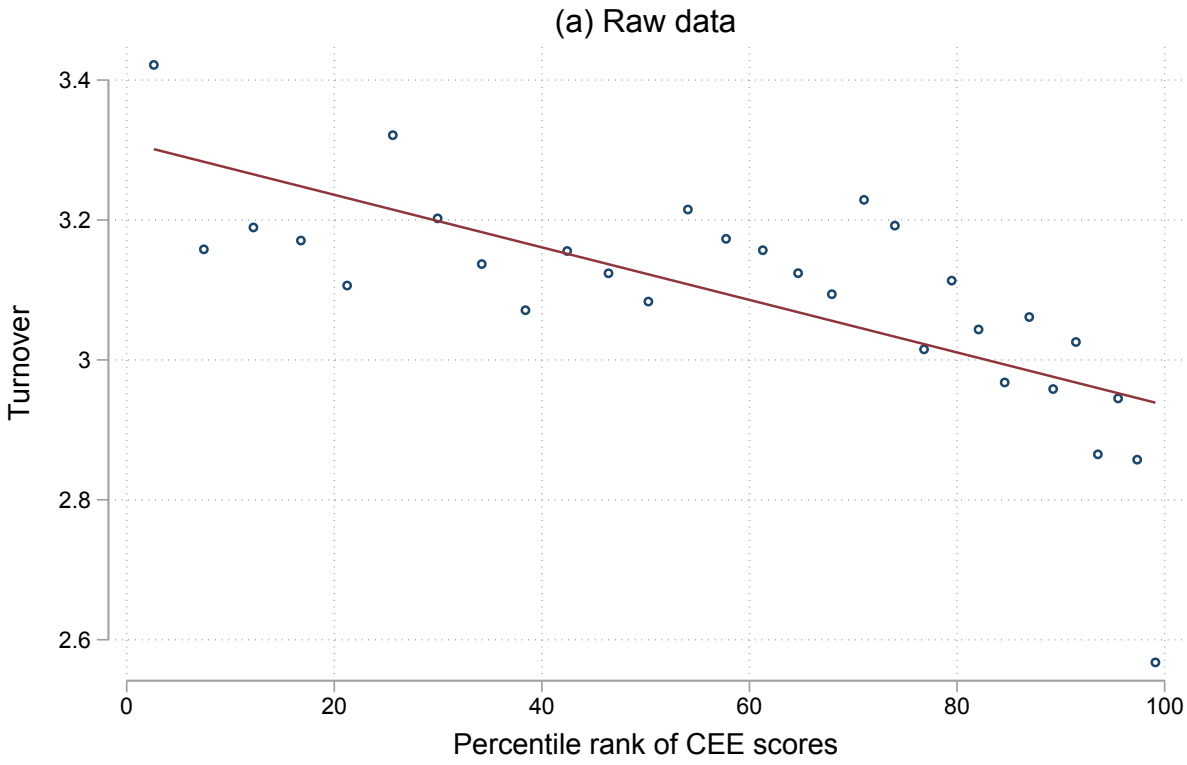


Figure 8: Source of "Smart Alpha"—Turnover Rate

Table 1: Summary Statistics

	CEE Rank			
Variable	1^{st} Quartile	2^{nd} Quartile	3^{rd} Quartile	4^{th} Quartile
Panel A: Investor Characteristics				
Female	0.38	0.41	0.37	0.34
	(0.49)	(0.49)	(0.48)	(0.47)
College entry age	19.02	19.01	18.95	18.72
	(1.03)	(1.02)	(1.02)	(0.97)
Urban residency	0.59	0.53	0.51	0.55
	(0.49)	(0.50)	(0.50)	(0.50)
Han race	0.95	0.95	0.95	0.96
	(0.21)	(0.22)	(0.21)	(0.21)
Panel B: CEE Outcomes				
CEE scores	318.8	417.5	481.4	554.5
	(60.8)	(46.6)	(48.2)	(58.9)
College admission	0.47	0.70	0.84	0.96
	(0.50)	(0.46)	(0.37)	(0.21)
First-tier college	0.01	0.02	0.08	0.61
	(0.12)	(0.14)	(0.27)	(0.49)
Economics major	0.03	0.06	0.07	0.10
	(0.18)	(0.23)	(0.26)	(0.30)
Panel C: Investor Performance				
Portfolio return (%)	-1.42	-1.22	-1.10	-0.85
	(4.87)	(4.68)	(4.63)	(4.60)
Sharpe ratio	-0.0125	-0.0120	-0.0118	-0.0115
	(0.018)	(0.016)	(0.017)	(0.015)
Turnover	3.23	3.13	3.14	2.91
	(5.78)	(5.54)	(5.58)	(5.27)
Beta	1.081	1.077	1.075	1.070
	(0.25)	(0.24)	(0.24)	(0.24)
ROA	0.017	0.018	0.020	0.021
	(0.023)	(0.022)	(0.022)	(0.022)
Panel D: On-Time Performance				
Monthly session frequency	2.03	3.25	4.67	5.15
	(1.97)	(1.92)	(2.29)	(2.37)
Overall positivity	0.25	0.20	0.18	0.15
	(0.46)	(0.47)	(0.39)	(0.41)
Overall confidence	0.36	0.37	0.29	0.16
	(0.57)	(0.59)	(0.47)	(0.46)
Vocabulary diversity	0.16	0.21	0.29	0.36
	(0.24)	(0.33)	(0.32)	(0.35)

Notes: TBD

Table 2: Effect of Elite University Education on Stock Returns

	(1)	(2)	(3)	(4)
Panel A	Stock Return Rate (%)			
Above cutoff	-0.046			
	(0.126)			
Panel B	Sharpe Ratio	Turnover	Risk Level	ROA
Above cutoff	-0.000	0.466***	0.008	0.001
	(0.000)	(0.166)	(0.008)	(0.001)

Notes: Province-cohort-track fixed effects (FE) and hometown FE included. Standard errors clustered by province-cohort-track.

Table 3: Effect of Economics Major Enrollment on Stock Returns

	(1)	(2)	(3)	(4)
Panel A	Stock Return Rate (%)			
Above cutoff	-0.066			
	(0.163)			
Panel B	Sharpe Ratio	Turnover	Risk Level	ROA
Above cutoff	0.000	0.103	-0.011	-0.000
	(0.001)	(0.164)	(0.007)	(0.001)

Notes: College-province-cohort-track fixed effects (FE) and hometown FE included. Standard errors clustered by province-cohort-track.

Table 4: Association between CEE Rank and Stock Returns with Covariates

	Stock Return Rate (%)					
CEE Rank Percentile	0.0071***	0.0079***	0.0075***	0.0054***	0.0055***	0.0053***
	(0.0004)	(0.0005)	(0.0008)	(0.0007)	(0.0008)	(0.0008)
Province-cohort-track FE	YES	YES	YES	YES	YES	YES
High School FE	NO	YES	YES	YES	YES	YES
Hometown FE	NO	YES	YES	YES	YES	YES
Demographic Controls	NO	YES	YES	YES	YES	YES
College City FE	NO	NO	YES	YES	YES	YES
College FE	NO	NO	NO	YES	YES	YES
College-Major FE	NO	NO	NO	NO	YES	YES
Work Industry FE	NO	NO	NO	NO	NO	YES
Obs	142,440	142,440	142,440	142,440	142,440	142,440
R^2	0.00	0.15	0.18	0.16	0.24	0.25

Notes: TBD

Table 5: Association between CEE Rank and Words Used in Communication with Investment Advisers

	(1) Freq. of Reaching Out to advisor	(2) Positive	(3) Confident	(4) Vocabulary Diversity
CEE Rank Percentile	0.128***	-0.003***	-0.003***	0.005***
	(0.015)	(0.001)	(0.001)	(0.001)
Province-cohort-track FE	YES	YES	YES	YES
High School FE	YES	YES	YES	YES
Hometown FE	YES	YES	YES	YES
Demographic Controls	YES	YES	YES	YES
College City FE	YES	YES	YES	YES
College FE	YES	YES	YES	YES
College-Major FE	YES	YES	YES	YES
Work-Industry FE	YES	YES	YES	YES
Obs	142,440	142,440	142,440	142,440
R^2	0.27	0.33	0.35	0.52

Notes: TBD

Appendices. For Online Publication Only

Appendix A: Figures and Tables

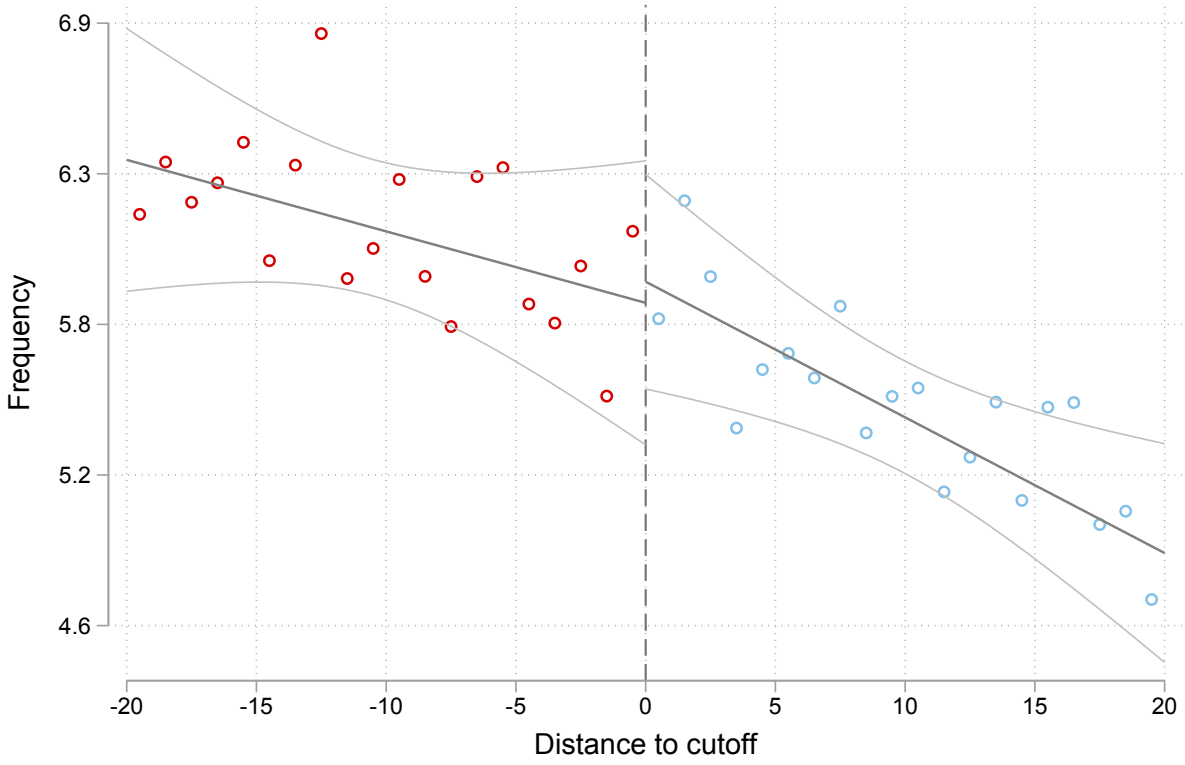
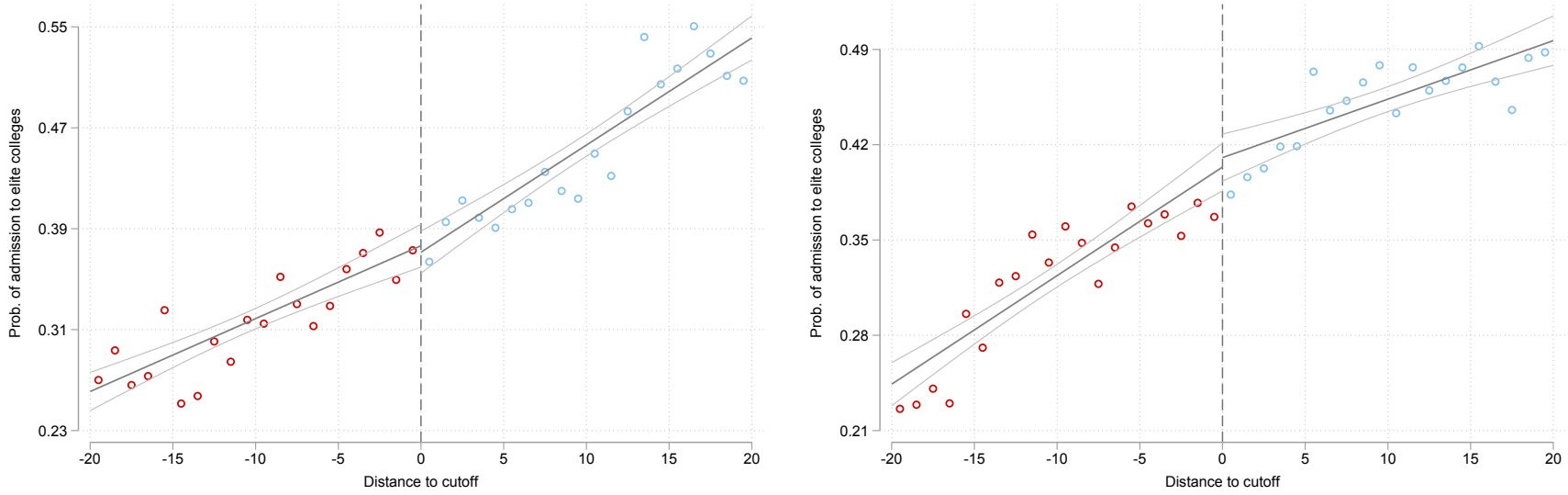


Figure A.1: Validity the RD Design—McCrary Test for Tier-1 Cutoff



(a) Using previous-cohort cutoffs

(b) Using next-cohort cutoffs

Figure A.2: Placebo Tests of Tier-1 Cutoff

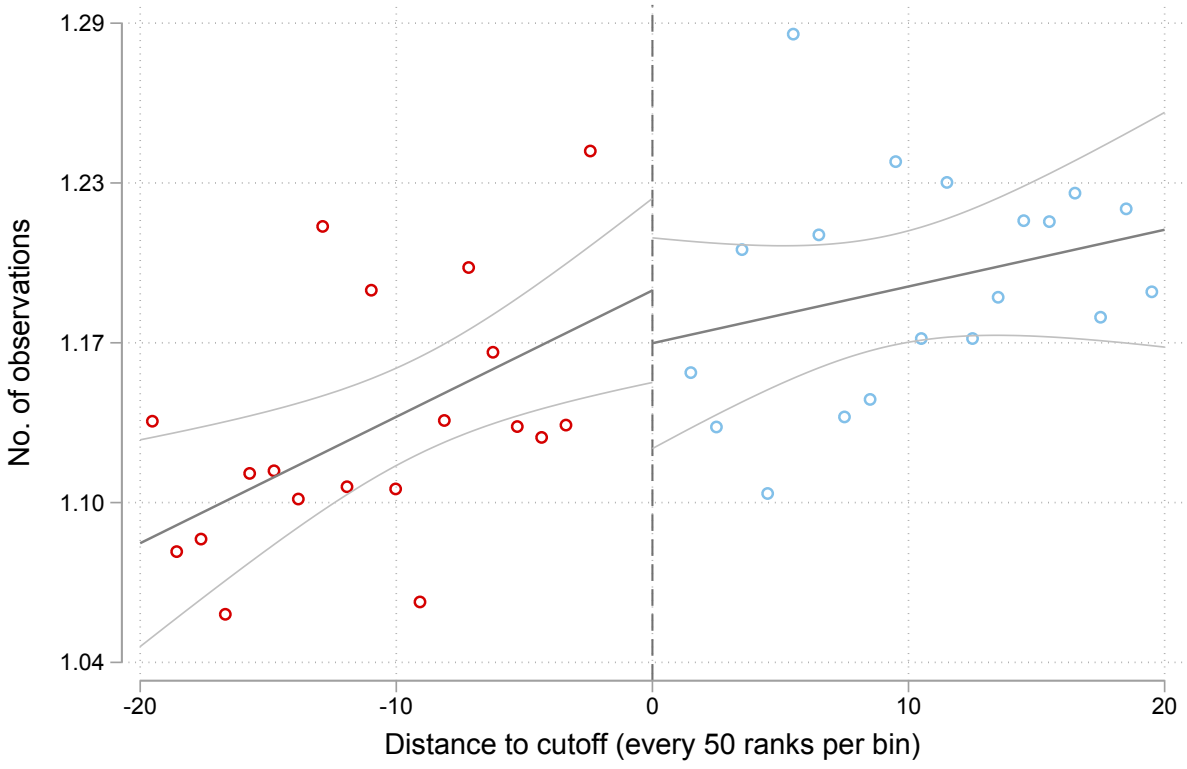


Figure A.3: Validity the RD Design—McCrary Test for Econ Major Cutoff

Table A.1: Addressing Sample Selection Issue

	Stock Return Rate (%)	
CEE Rank Percentile	0.0053***	0.0049***
	(0.0008)	(0.0008)
Model	OLS	Heckman
Province-cohort-track FE	YES	YES
High School FE	YES	YES
Hometown FE	YES	YES
Demographic Controls	YES	YES
College City FE	YES	YES
College FE	YES	YES
College-Major FE	YES	YES
Work Industry FE	YES	YES

Notes: TBD

Table A.2: Validity the RD Design—Balance Checks for Tier-1 Cutoff

	(1) Matched	(2) Female	(3) Age	(4) Urban	(5) Han race
Above cutoff	0.007	0.005	-0.009	-0.003	0.002
	(0.025)	(0.010)	(0.019)	(0.008)	(0.004)
Province-cohort-track FE	YES	YES	YES	YES	YES
Hometown FE	YES	YES	YES	YES	YES
Obs	1,356,127	33,719	33,719	33,719	33,719
R^2	0.18	0.16	0.22	0.49	0.39

Notes: TBD

Table A.3: Validity the RD Design—Balance Checks for Econ Major Cutoff

	(1) Matched	(2) CEE Rank	(3) Female	(4) Age	(5) Urban	(6) Han Race
Above cutoff	0.003	23.106	-0.001	-0.008	-0.024	0.005
	(0.018)	(35.791)	(0.011)	(0.020)	(0.024)	(0.009)
College-province-cohort-track FE	YES	YES	YES	YES	YES	YES
Hometown FE	YES	YES	YES	YES	YES	YES
Obs	1,059,230	27,923	27,923	27,923	27,923	27,923
R^2	0.19	0.27	0.17	0.18	0.24	0.25

Notes: TBD