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### RESEARCH ARTICLE

## BETTING ON CLUBS OR CAREERS: A COMPREHENSIVE COMPARISON OF RISK-ADJUSTED RETURNS FOR ATHLETE ISAS VS. TEAM STOCKS

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### Abstract

This paper examines the comparative financial returns of athlete income-share agreements (ISAs) and publicly traded sports team stocks over a typical athletic career span. Using the England U18 national soccer team from 2015 as the ISA cohort, I simulate investment contracts that grant a 5% share of lifetime earnings at three price tiers (\$50k, \$100k, \$200k per 1%). These are compared against historical price-only returns for fifteen European football clubs from 2015 to 2025. Results reveal that ISA outcomes are extremely skewed: most contracts collapse to full losses (median = -100%), while a handful of breakout stars generate large windfalls (max +692.7%). In contrast, sports team equities display modest but consistent gains (mean  $\approx +0.67\%$ , median  $\approx +0.50\%$ ) with low dispersion. Across descriptive statistics, mean-difference tests, median/rank tests, and permutation analyses, team stocks significantly outperform ISAs at realistic pricing levels. However, tiered analyses show that selective investment in medium-potential athletes can yield returns comparable to teams, suggesting that ISA performance depends critically on screening and contract design. Extending the comparison to venture capital and angel investing benchmarks highlights the structural similarity of ISAs to high-risk, high-reward asset classes, where most bets fail but rare outliers dominate. Overall, while sports equities currently provide superior and more reliable returns, ISAs remain a promising but immature asset class whose competitiveness will depend on more selective, venture-style approaches to pricing and investment structure.

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### Introduction:-

In a world where fans wear their favorite player's jersey, obsess over stats, and agonize over every pass, tackle, and goal, there seems to be no limit to a fan's diehard support. But what if fans could go beyond cheering for their favorite teams or athletes and actually invest in them, sharing in the upside of a breakout star's career earnings or a championship ring? The idea of investing in future athletic potential through athlete income-share agreements (ISAs) has long intrigued economists and sports enthusiasts alike. Although platforms like Fantex once tried to bring this idea to market (notably signing NFL player Arian Foster to a tracking-stock IPO), regulatory hurdles and

liquidity issues held them back. Still, the concept raises an intriguing question: could investing in a young athlete's future income be more rewarding than buying stock in a traditional sports franchise?

This paper explores which investment yields better financial returns over an athlete's typical career span: athlete ISAs or publicly traded sports team stocks. To answer this question, we construct a modeled case study comparing hypothetical ISA investments in youth soccer players to historical returns from sports teams traded on public markets. Specifically, we use publicly available career earnings data for players who were part of an elite youth development program (England's U18 national team, 2015 cohort) and simulate ISA-based investments in their careers. We then compare those modeled 10-year returns to actual stock performance of 15 European football clubs (e.g. Manchester United, Juventus, Borussia Dortmund) over the same 2015–2025 period. The analysis examines both return potential and associated investment risk for each approach. In preview, our results indicate that publicly traded team equities delivered modest but steady gains on average (mean  $\approx +0.7\%$ , median  $\approx +0.5\%$  over ten years), whereas a broad ISA portfolio underperformed severely (mean  $\approx -66\%$ , median =  $-100\%$ ), largely because many players never reached lucrative careers. However, we also find that with selective targeting of mid-performing athletes, ISA outcomes can nearly match team stock returns: our Medium-tier portfolio produced mean and median returns around  $+3\%$ , statistically indistinguishable from clubs.

This suggests that skilled selection could dramatically narrow the gap. This research contributes to ongoing discussions in sports economics and finance by examining athlete-linked investments from a financial returns and portfolio perspective. While there is established literature on the pricing and performance of publicly traded sports teams, and growing interest in fractionalized athlete ownership (e.g. Fantex and similar ventures), few studies have quantitatively benchmarked athlete ISAs against team equities over the same horizon. By modeling ISAs based on real athlete career trajectories and comparing them to actual sports team stock performance, this paper fills a gap in the literature by providing the first direct, long-term empirical comparison of the two asset types. In particular, it demonstrates how ISAs, a new and immature financial product, stack up against the more established, institutionally supported market for team stocks, thus clarifying both their shortcomings and their potential as a future asset class. This comparison offers a forward-looking framework for how fans and investors might choose between betting on clubs versus betting on careers. The remainder of the paper is structured as follows: First, we review prior literature on sports team stocks and on athlete-based investment vehicles. Next, we describe our data and simulation design. We then present analysis and results from multiple statistical tests, including breakdowns by player performance tier. Finally, we conclude with a discussion of what the findings imply for the viability of athlete ISAs relative to traditional sports equity.

## Literature Review:-

The literature relevant to this study falls into two broad areas: research on publicly traded sports teams, which provides a well-documented benchmark of how traditional sports equities behave, and emerging work on athlete-linked investment vehicles, such as ISAs and tracking stocks, which are far less studied. Reviewing both areas establishes the foundation for our comparison: team stocks as relatively mature, low-growth financial assets, and athlete ISAs as a high-risk, high-reward concept that has not yet been rigorously evaluated against team equities.

### Publicly Traded Sports Team Stocks

A substantial body of research has examined the financial performance of publicly traded sports teams, particularly European football (soccer) clubs. A recurring theme is the linkage between sporting results and stock returns. Early studies found that victories tend to drive positive abnormal returns for a club's stock, while losses lead to declines. For example, Duque and Ferreira (2005) analyzed Portugal's two listed clubs (Sporting CP and FC Porto) and found that for Sporting, a win led to an average next-day share price increase of about  $+1.5\%$ , whereas draws and defeats had negative impacts (draws surprisingly causing around  $-1.3\%$  as they often represented an unexpected failure to win). Interestingly, in Porto's case the effects were less pronounced except that draws still led to a  $\sim -1.2\%$  drop.

These results underscore that on-field performance, especially relative to expectations, can significantly sway investor sentiment. Subsequent studies across leagues reinforced this asymmetric reaction pattern. Scholtens & Peenstra (2009) and Bernile & Lyandres (2011) observed that markets react more strongly to negative surprises (upset losses) than to positive surprises (wins), meaning a defeat hurts a club's stock more than an equivalent upset victory helps it.

Bebyn (2023) likewise finds in an event-study of major clubs (Manchester United, Juventus, Borussia Dortmund) that unexpected wins, especially in high-stakes UEFA tournament matches, yield significant positive abnormal returns, whereas expected results are largely priced in. This suggests team stock prices incorporate fan and investor expectations; only when teams outperform or underperform expectations do shares move substantially. There is also evidence of behavioral biases in these markets. Supino (2024) shows that investors react more strongly to high-profile losses (e.g. elimination from UEFA Champions League) than to equivalent domestic losses, implying an overreaction driven by emotional disappointment. Such findings point to a degree of irrationality and sentiment in sports equities, in contrast to the efficient market ideal, where fan psychology and media hype can create excess volatility. Beyond match results, strategic decisions like player transfers also influence club stock performance. Garcia and Raimundo (2024) examine over 200 European football transfer events and find that signing an elite player tends to boost the club's share price, whereas selling a star or losing a key player causes a decline. This indicates investors value the future revenue or performance impact of top players, capitalizing that into the stock. Notably, these kinds of personnel shocks (player trades, managerial changes, etc.) are unique to team stocks – an important distinction when later comparing to athlete ISAs, which are not directly exposed to team management decisions.

Team stocks also exhibit structural quirks: Ferreira and Peenstra (2017) identified autocorrelation and herding behavior in club stock returns, particularly around periods of speculative attention (e.g. playoffs or takeover rumors). This herding can lead to price bubbles or crashes disconnected from fundamentals, further highlighting that sports equities may deviate from standard financial models. In terms of long-run performance, the track record of sports team stocks has been mixed. Many clubs' shares underperform broad market indices over time. For instance, an index fund of European soccer stocks (the "Football Fund") launched in 1998 actually lost 13% in its first year, reflecting the poor returns of many newly listed clubs. Recent evidence is somewhat more optimistic; a Nasdaq analysis noted sports team stocks have delivered modest positive returns in recent years, though with the caveat that past success is no guarantee of future results. Overall, the literature paints team stocks as relatively conservative investments, prone to short-term swings on game days or news, but over the long run yielding small returns (and occasional dividends) that roughly track a low-risk profile. They offer investors a stake in a sports franchise's steady revenue streams (broadcast rights, ticket sales, merchandise), but not necessarily the explosive growth one might hope for from a star athlete's breakout career.

### **Background and Literature on Athlete Investment Vehicles (ISAs and Related)**

Compared to team stocks, the literature on directly investing in athletes is just emerging. The concept of an Athlete Income-Share Agreement (ISA) – where an investor funds an athlete upfront in exchange for a fixed percentage of that athlete's future earnings – draws from the broader idea of income-contingent financing (previously explored in education and entrepreneurship finance). In sports, this idea gained real-world traction in the 2010s through ventures like Fantex and contractual arrangements in professional baseball. Fantex, a San Francisco startup, attempted to create a marketplace for "athlete brands" by launching IPO-like offerings linked to players' future income. In 2013 it famously signed NFL running back Arian Foster, paying him \$10 million for a 20% share of his future earnings and offering shares of this tracking stock to the public. While innovative, Fantex's approach faced skepticism; as one analyst noted, "this is an extraordinarily idiosyncratic, volatile investment" (Knowledge@Wharton, 2013) for outside investors, essentially transferring the high risk of an athlete's career onto the shareholders. Indeed, injuries or performance slumps can instantly derail an athlete's earning trajectory – a risk that is diversified in a team stock (one player's injury has limited impact on a large club's revenues) but catastrophic in a single-athlete investment. Fantex ultimately struggled with regulatory approvals and market liquidity, and the experiment was short-lived. However, private athlete investment deals have continued.

In Major League Baseball, for example, specialized investment funds like Big League Advance (BLA) have provided minor league players with upfront cash in exchange for a slice of their future MLB earnings. A notable case is Fernando Tatis Jr., who at 17 accepted \$2 million from BLA for 10% of his eventual earnings. After Tatis blossomed into a superstar (signing a \$340 million contract), that stake would entitle BLA to an estimated \$34 million, a massive return, leading Tatis to file a lawsuit in 2025 seeking to void what he called a predatory agreement. This exemplifies both the lottery-like upside for investors and the potential for athletes to later regret the cost of capital. Similar structures are now appearing for college athletes in the Name-Image-Likeness (NIL) era, where companies offer recruits money upfront (or cover college costs) in exchange for a portion of future pro earnings. Academic commentary on these arrangements (e.g. Medeiros 2015, Schwartz 2014 in law reviews) often debates their legality and ethics but generally acknowledges that if properly structured as equity-like ISAs rather

than loans, they can align incentives: investors bear the risk and reward of a player's career, while the athlete secures funding and risk-sharing. Despite these real-world developments, scholarly literature on athlete ISAs is limited. Most analyses draw analogies to venture capital or "celebrity bonds." The high risk–high reward profile of investing in a young athlete's future is frequently likened to venture investing: most startups (or athletes) fail to yield returns, but the rare successes can more than pay for the losses. In fact, the distribution of outcomes in athlete portfolios is expected to follow a power-law (Pareto) distribution, just as in VC funds. From a financial theory standpoint, an investor in an ISA is essentially taking an equity stake in human capital.

Gary Becker's classic theories of human capital would suggest such stakes could be efficient if markets allow them, enabling talent to be funded by those who can bear risk. But in practice, informational asymmetry and adverse selection pose challenges: athletes and their agents know more about their prospects and health than investors do, and only certain athletes will be willing to sell shares of themselves (often those in need of cash or those overestimating their future, leading to a non-random pool). Our study contributes to this emerging literature by providing empirical data on what a portfolio of athlete ISAs might yield and directly comparing it to team stocks. To our knowledge, prior work has not quantitatively benchmarked athlete ISA returns against a traditional investment. By doing so, we offer insight into whether the risk-adjusted returns of backing athletes can justify the gamble. We also tie our discussion to the venture capital analogy: as we will show, the performance of our simulated ISA portfolio indeed mirrors the skewness of a VC/angel portfolio (many losses, few big wins). This raises a crucial point for the literature: if athlete ISAs can be priced and structured optimally, they may become an asset class similar to sports venture capital, but without such optimization, our findings suggest they underperform stable alternatives like owning shares of a team.

## Data and Methodology:-

### Sample and Time Frame

To compare athlete ISAs versus team stocks on equal footing, we analyze a 10-year investment horizon (2015–2025), roughly corresponding to the early-to-mid career span of a youth athlete. Ten years balances practical data availability with a meaningful period for compounding returns and reflects that a typical professional athlete's peak earning window often falls within a decade from turning professional. For the athlete ISA side, our sample consists of the entire England national U18 soccer squad from 2015 (49 players). We chose this cohort because it represents a group of high potential youth prospects all entering adulthood around the same time, essentially a "portfolio" of bets a fan-investor might have made in 2015 on future stars.

We tracked each player's actual career gross earnings from 2015 through 2025, in nominal USD (converted from salaries, prize money, etc., using historical exchange rates as needed). Earnings data were gathered from Transfermarkt and other public sources such as player contracts, salary databases, and news reports. If a player never signed a professional contract or earned negligible amounts, their career earnings are recorded as zero. On the team stock side, we assembled data on 15 publicly traded European football clubs over the same period 2015–2025 using Yahoo Finance. These include well-known clubs like Manchester United (MANU), Juventus (JUVE), Borussia Dortmund (BVB), Ajax, Benfica, and others across various exchanges. For each club, we obtained daily stock prices and computed the price-only return from January 2015 to mid-2025 (using August 9, 2025 as the endpoint in our dataset). Price-only return (i.e. percentage change in stock price over the period) excludes dividends and currency effects; this choice makes for a conservative comparison in favor of ISAs (since including dividends would slightly boost total returns for team stocks). Table 1 summarizes the sample and basic data characteristics.

**Table 1: Summary of data samples (2015–2025).**

| Asset Type                                   | Sample Size | Investment Horizon      | Mean   | 25th Percentile | Median | 75th Percentile |
|----------------------------------------------|-------------|-------------------------|--------|-----------------|--------|-----------------|
| Athlete ISAs (Career Earnings, USD millions) | 49 Players  | 2015–2025 (Career Span) | \$4.2m | \$0.0m          | \$0.4m | \$3.5m          |
| Team Stocks (Total Price Return, %)          | 15 Clubs    | 2015–2025 (10 years)    | +0.67% | –0.2%           | +0.5%  | +1.2%           |

The rationale for the 10-year window is to capture the majority of an athlete's early career in which an investor from 2015 would be "locked in." By 2025, most of the U18 players are around 28–29 years old, an age by which their career trajectories (superstar vs. journeyman vs. wash-out) are largely realized. Similarly, a 2015 investment in a sports team's stock held for a decade would reflect a long-term investor's outcome, smoothing out short-term volatility. Unlike much of the literature that focuses on short-term changes in stock prices driven by wins, losses, or transfer news, this paper emphasizes the long-term horizon because it aligns with the nature of ISAs. An ISA is not a

bet on a single game or season but on the arc of a player's entire career, meaning that the relevant comparison is not day-to-day swings but decade-long performance. By focusing on this longer horizon, we create a consistent framework where both the team stocks and athlete ISAs are evaluated in terms of their sustained investment potential rather than their immediate, event-driven fluctuations.

### ISA Contract Simulation:

With actual career earnings in hand for each player, we simulate the returns to a hypothetical ISA investment in those players. We assume that in 2015 an investor could purchase a fixed percentage of each player's future income for an upfront payment – essentially, an income-share contract. A key parameter here is pricing: how much should one pay for 5% of a young player's lifetime earnings? Rather than try to “predict” each player's career in advance (which would introduce forecasting error), we take the perspective of a fan-investor considering a standard deal offered to any elite prospect. We simulate 5% lifetime income ISAs at three price points to reflect varying levels of optimism or market efficiency:

**Low-price (underpriced):** \$50,000 per 1% of future income (i.e. \$250,000 for a 5% stake)

**Mid-price (baseline):** \$100,000 per 1% (i.e. \$500,000 for 5%)

**High-price (overpriced):** \$200,000 per 1% (i.e. \$1,000,000 for 5%)

These price tiers are informed by real-world analogs. For instance, Fantex's deals, and some NIL agreements valued athlete equity in the low six-figures per percentage point range, depending on hype. \$500k for 5%) represents a bargain (perhaps a savvy investor finding an undervalued talent or negotiating a cheap deal), whereas the high tier (\$1M for 5%) represents an overly optimistic price (overpaying upfront). By examining all three, we can see how sensitive ISA returns are to initial pricing – a crucial factor given that these contracts are new and pricing models are still evolving.

**For each player  $i$ , and each price tier, we calculate the realized return on investment (ROI) as:**

$$ROI_i = \frac{0.05 \times \text{Total earnings}_{2015-2025, i} - \text{Upfront cost}}{\text{Upfront cost}}.$$

This yields a percentage return (in decimal form) over the 10-year period. A negative ROI indicates the investor lost money (the player's 5% earnings share fell short of the price paid), while a positive ROI means the contract was profitable for the investor. By construction, the worst possible outcome is –100% (the player earned nothing, so the entire upfront is lost), and there is no upper cap on the upside (if a player became a superstar, the 5% share could return many times the cost). This asymmetric payoff – limited downside (–100%) but unbounded upside – mirrors a venture capital style bet. After computing ROIs for all 49 players under each price scenario, we form aggregate results for the ISA “portfolio”. Note that in reality an investor might not buy every player's ISA; they might pick and choose. We consider the full set (“All players”) as a baseline and later analyze subsets (e.g. excluding the lowest performers) to explore the value of selection.

### Team Stock Returns:

For the team stocks, the calculation is more straightforward: for each club, we take the percentage price return from the start of 2015 to mid-2025. For example, if a club's stock was \$10.00 per share in Jan 2015 and \$10.50 in Aug 2025, the price-only return is +5% (0.05 in decimal). We deliberately use price-only to isolate the equity appreciation component; many clubs pay no dividends, and those that do (or share price changes due to currency shifts for foreign investors) would add small additional returns – thus our comparison slightly favors the ISA side by understating total shareholder returns. Using local currency prices for each stock, we avoid FX issues for local investors. We compile the 15 returns into a distribution representing the sports team asset class performance over the decade. Before proceeding to analysis, it's worth noting a few design limitations. First, our team sample is limited to those clubs that were continuously publicly traded and had reliable pricing over 2015–2025; many famous clubs (Real Madrid, Barcelona, etc.) are not publicly listed, so they are absent. Second, the England U18 (2015) cohort is just one set of players; outcomes might differ with other cohorts or sports. Third, we assume a buy-and-hold strategy for both assets (no rebalancing, no selling mid-way). Despite these limitations, the setup mirrors a realistic decision

for a sports-savvy investor circa 2015: “Should I back the future income of promising youth players or invest in the listed equity of clubs I know?”. The expectation might be that the ISA side behaves like a VC portfolio – many failures, a few huge successes – while the team side behaves like a stable stock portfolio. Our tests will evaluate which actually performed better in this scenario.

### Analysis and Results:-

This section presents the results of our comparison between athlete ISAs and team stocks, progressing from broad descriptive statistics to more targeted statistical tests and scenario analyses. We begin by outlining the overall return distributions and highlighting the contrasting patterns of risk and reward. Next, we formally test differences in means, medians, and distributions to establish the statistical significance of these patterns. We then explore how selective investment strategies, such as focusing only on medium-tier athletes, change the outcomes and narrow the performance gap relative to team equities. Finally, we consider broader risk and diversification issues and situate our findings within the context of venture capital and angel investing benchmarks. This progression allows us to move from simple descriptive insights to more nuanced, risk-adjusted comparisons, ultimately providing a comprehensive view of how ISAs and team stocks stack up across different dimensions of investment performance.

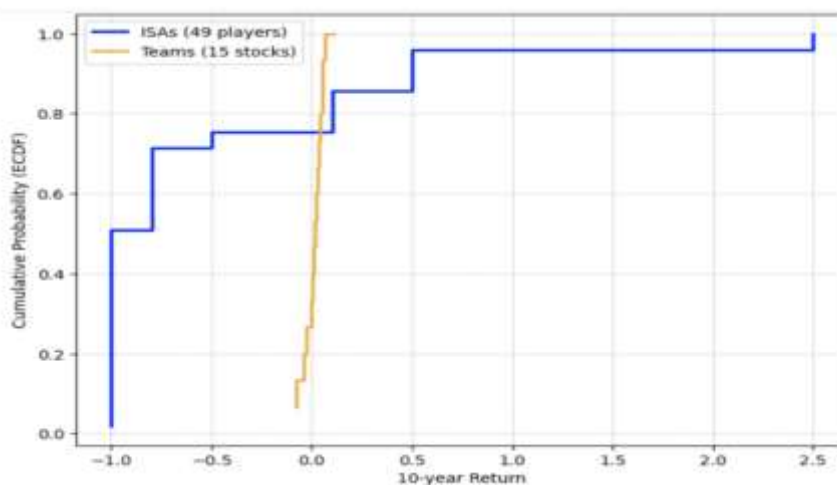
#### Descriptive Statistics

We begin with a high-level comparison of the return distributions for ISAs vs. team stocks. Table 2 presents summary statistics for the simulated ISA returns at each price tier alongside the team stocks (10-year total returns).

**Table 2: Return summary, 2015–2025 (per investment). ISA figures assume a 5% income share; Team figures are stock price returns. (All values in decimal form, where 1.0 = +100% total return.)**

| Investment                      | Mean ROI         | Median ROI       | Std. Dev.      | Min             | Max             |
|---------------------------------|------------------|------------------|----------------|-----------------|-----------------|
| ISA – Low Price (\$250k for 5%) | -0.3222 (-32.2%) | -1.000 (-100%)   | 1.4596 (146%)  | -1.000 (-100%)  | 6.9270 (+693%)  |
| ISA – Mid Price (\$500k for 5%) | -0.6611 (-66.1%) | -1.000 (-100%)   | 0.7298 (73%)   | -1.000 (-100%)  | 2.9635 (+296%)  |
| ISA – High Price (\$1M for 5%)  | -0.8305 (-83.1%) | -1.000 (-100%)   | 0.3649 (36%)   | -1.000 (-100%)  | 0.9818 (+98%)   |
| Team Stocks                     | +0.0067 (+0.67%) | +0.0050 (+0.50%) | 0.0115 (1.15%) | -0.008 (-0.81%) | 0.0287 (+2.87%) |

Table 2 immediately highlights the stark contrast. At mid-tier (baseline) pricing, the average ISA investment lost about -66% of its value over ten years, and the median outcome was a complete -100% loss. In fact, more than half of the players yielded a full loss (their 5% earnings never reached the upfront cost). Meanwhile, team stocks had a small positive mean and median (~+0.5%), with very low variability (std ~1%). The best team stock did about +2.9%, and the worst about -0.8%. In other words, nearly every club stock eked out a tiny gain, whereas the typical ISA was a wipeout.



**Figure 1: Distribution of 10-Year Returns for ISA Investments vs. Team Stocks (2015–2025).**

Figure 1 illustrates these distributions: the ISA curve (blue) has a huge jump at  $-100\%$  (about 60% of all ISAs are at that floor), then a long flat stretch and a few points reaching into large positives; the team stocks curve (orange) is clustered tightly around 0 to  $+3\%$ .

These descriptive results already signal the core finding: unless one happens to pick a rare superstar, a typical athlete ISA stake loses most or all of its value, whereas a typical sports team stock position delivers a small gain with minimal volatility. For instance, out of 49 players, only a handful generated any positive return for the ISA investor – the top earner yielded nearly  $+296\%$  ROI (almost a fourfold payoff at mid-price), and a couple of others gave modest profits, but the vast majority (80% of players) resulted in losses. In fact, at mid pricing about 76% of ISAs were complete  $-100\%$  losses (the player's career earnings never even hit the break-even threshold).

By contrast, only  $\sim 33\%$  of the team stocks had a negative return over the decade, and even those losses were minor (none worse than  $-0.8\%$ ). This risk-return tradeoff is clearly unfavorable for ISAs under the given pricing; an investor faces very high probability of losing everything, in exchange for a small chance at enormous returns. It is worth noting the effect of pricing: at the low-price scenario (had the investor paid only \$250k for 5%), the ISA outcomes improve: mean loss of  $-32\%$  and a few more big wins (max  $\sim +693\%$ ). In fact, at the low-price tier our simulation shows the ISA mean ( $\sim -32\%$ ) might not be statistically worse than teams (we test this below). Conversely, at the high-price scenario (overpaying \$1M for 5%), the ISA investor gets almost uniformly crushed: median  $-100\%$  loss and even the best-case ROI was under  $+100\%$ . This confirms that initial pricing is critical for ISA viability – an unsurprising but important point: if investors overpay for an athlete's future income, the odds of profit are slim. The mid-tier pricing (\$500k for 5%) was meant to be “realistic,” and indeed it produced outcomes where only a generational talent would break even or better. In summary, the descriptive stats paint ISAs as a high-risk, skewed-return gamble and team stocks as a low-risk, low-return holding. Next, we examine whether these differences are statistically significant and how they change when considering only successful subsets of players.

#### Difference in Means (Expected Returns) :

From an investor's perspective, one key question is: which option offers the higher expected return? We formalize this by testing the difference in mean ROI between the ISA and team stock samples. Given the unequal variances observed (ISA returns are far more spread out), we use Welch's t-test for unequal variances to compare means. We conduct this test for each ISA pricing tier versus the teams.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Table 3 summarizes the Welch's t-tests comparing mean returns from ISAs and team stocks. The results make the contrast clear: at realistic mid-price levels (\$500k for 5%), ISAs underperformed significantly, with an average loss of  $-66\%$  compared to a slight gain of  $+0.7\%$  for team stocks ( $t = -6.403$ ,  $p < 0.001$ ). At the low-price tier (\$250k for 5%), the difference was not statistically significant ( $p = 0.121$ ), suggesting that investors who managed to secure ISAs at a bargain might have broken even relative to team stocks, though the mean outcome remained negative. At the high-price tier (\$1M for 5%), ISA performance collapsed, averaging  $-83\%$  versus  $+0.7\%$  for teams, and the difference was overwhelmingly significant ( $t = -16.0$ ,  $p < 0.001$ ). Together, these findings show that ISAs, when priced realistically or aggressively, yield dramatically worse mean outcomes than sports team equities, while only in an unrealistically cheap scenario do they approach parity.

**Table 3: Mean Difference Tests: ISA vs. Team Stocks (2015–2025)**

| Comparison (All Players)  | Mean ISA ROI | Mean Team ROI | Welch's $t$ | $p$ -value            |
|---------------------------|--------------|---------------|-------------|-----------------------|
| Low-price (\$250k for 5%) | $-32\%$      | $+0.7\%$      | $-1.577$    | 0.121                 |
| Mid-price (\$500k for 5%) | $-66\%$      | $+0.7\%$      | $-6.403$    | $6 \times 10^{-8}$    |
| High-price (\$1M for 5%)  | $-83\%$      | $+0.7\%$      | $-16.0$     | $5.6 \times 10^{-21}$ |

**In sum, using mean returns as the metric, team stocks outperform the broad ISA**

portfolio except in the unrealistically cheap scenario. At the baseline realistic pricing, teams “clearly dominate on average returns”. This answers our primary question in the affirmative for team stocks: an investor targeting expected value would have been better off buying the sports team stocks. However, mean may not tell the whole story given the non-normal, skewed nature of ISA returns. The ISA distribution violates normality assumptions (a mass at the floor and heavy skew), so it is prudent to also compare medians and distributional characteristics.

**Median and Distribution Tests** Because the median captures the “typical” outcome (especially relevant when distributions are skewed), we compare medians of ISA and team returns and perform non-parametric tests that are sensitive to the entire distribution. We use the Mann–Whitney U test (which assesses if one distribution tends to have higher values than the other, essentially a rank-sum test for median differences) and the Kolmogorov–Smirnov (KS) test (which compares the full empirical distributions). These tests do not assume normality and are robust to outliers, making them ideal for our case.

$$U = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1 \quad D = \sup_x |F_1(x) - F_2(x)|$$

The results align with the mean comparison and indeed strengthen the conclusions. Table 4 summarizes the results of median and distribution-based tests comparing ISA outcomes with team stocks. At the mid-price tier (\$500k for 5%), the median ISA return was a complete loss (−100%), while team stocks showed a modest +0.5% gain. Both the Mann–Whitney U ( $U = 101$ ,  $p < 0.001$ ) and KS tests ( $D = 0.714$ ,  $p < 0.001$ ) confirm that team returns stochastically dominate ISA outcomes, meaning that in most random pairings a team stock would outperform an ISA. Even at the low-price tier (\$250k for 5%), where ISAs looked relatively more favorable, the tests still showed a significant disadvantage: the typical ISA remained a complete loss, while teams retained a positive outcome. At the high-price tier (\$1M for 5%), nearly all ISA outcomes collapsed to −100%, rendering further testing unnecessary — the difference was overwhelming. These results highlight that from a median and distributional perspective, ISAs perform dramatically worse than team stocks, confirming that the “typical” investor would be far better off buying team equities than backing athletes indiscriminately.

**Table 4: Median and Distribution Tests: ISA vs. Team Stocks (2015–2025)**

| Price Tier (All Players)  | Median ISA ROI | Median Team ROI | Mann–Whitney U | p-value              | KS D-statistic / p-value     |
|---------------------------|----------------|-----------------|----------------|----------------------|------------------------------|
| Low-price (\$250k for 5%) | −100%          | +0.5%           | 61             | $2.9 \times 10^{-7}$ | 0.814 / $6.6 \times 10^{-8}$ |
| Mid-price (\$500k for 5%) | −100%          | +0.5%           | 101            | $5.7 \times 10^{-6}$ | 0.714 / $2.9 \times 10^{-6}$ |
| High-price (\$1M for 5%)  | −100%          | +0.5%           | −0             | $\ll 0.001$          | −1.0 / $\ll 0.001$           |

In summary, on a median or “typical outcome” basis, teams vastly outperform an all-player ISA portfolio. The median ISA outcome is essentially losing the entire investment, whereas the median team stock outcome is a slight gain. This is an intuitive but crucial point: someone investing broadly in unproven athletes should expect, in most cases, to lose money, whereas someone investing in clubs can at least expect to roughly break even or see a minor increase.

**The Role of Player Selection (Tiered Analysis)**

Thus far, we’ve treated the 49-player ISA portfolio as an indiscriminate bundle. In practice, an investor might attempt to select only certain athletes, for example, avoiding those deemed least likely to succeed. Our data allow us to explore a retrospective “what if” scenario: what if the investor only backed the more successful players? This is essentially asking whether skillful selection could make ISAs competitive with team stocks.

To test this, we split the players into performance tiers based on their market value in 2015 and tested with the corresponding price tiers.

**High-tier:** the highest-valued player in the cohort (> €2m)

**Medium-tier:** the next 5 moderately valued players (€0.5m - €2m)

**Low-tier:** the remaining 43 players who had minimal or no value at the time (< €500k)

This categorization yielded 1 High, 5 Medium, and 43 Low in our sample (we also consider a combined Medium+High group of the top 6 for some tests). The findings are striking; when focusing on the Medium-tier players, ISA performance improves dramatically and converges with team stocks. In fact, the Medium group as a whole achieved a slightly positive mean ROI (~+3.1%) and median ~+3.8% (at mid-price), which is on par with the team stocks' +0.7% mean, +0.5% median. Statistical tests confirm no significant difference in returns between the Medium-only ISA portfolio and the teams as highlighted in table 5:

**Table 5: Medium-Tier and Medium+High ISA vs. Team Stocks (2015–2025): Statistical Tests**

| Comparison Group          | Test Type      | Statistic / Value | p-value |
|---------------------------|----------------|-------------------|---------|
| Medium ISA vs. Teams      | Welch's t-test | $t = +0.27$       | 0.79    |
| Medium ISA vs. Teams      | Mann-Whitney U | $U \approx 38$    | 1.0     |
| Medium ISA vs. Teams      | KS Test        | $D \approx 0.05$  | 0.93    |
| Medium+High ISA vs. Teams | Welch's t-test | $t \approx +0.33$ | 0.74    |

When analyzing Medium-tier ISAs relative to team stocks, the results show near- identical performance. The Welch's t-test yielded  $t = +0.27$  ( $p = 0.79$ ), demonstrating no significant difference in means. Similarly, the Mann-Whitney U statistic ( $U \approx 38$ ,  $p = 1.0$ ) indicated equivalent medians, and the KS test ( $D \approx 0.05$ ,  $p = 0.93$ ) confirmed substantial overlap in the distributions. Even when expanding the group to include the single High-tier player, the results remained consistent, with Welch's  $t \approx +0.33$  ( $p = 0.74$ ). Taken together, these tests suggest that a portfolio limited to medium-tier athletes (and possibly a small number of higher-value players) could produce outcomes statistically indistinguishable from team stocks, underscoring the importance of selective investment. Figure 1 already hinted at this: the upper portion of the ISA distribution (excluding the mass at -100%) overlaps heavily with the team curve. Those points correspond to the medium performers. In practical terms, if an investor in 2015 could somehow identify and invest only in the middle-tier successful players (and avoid the complete flops), their portfolio would have achieved roughly the same returns as the team stocks on average, and with a similar distribution of outcomes. In our random pairing thought experiment, when considering only Medium players, it becomes a coin flip whether an ISA or a team does better – sometimes the player yields more, sometimes the club does.

**We also conducted permutation tests and simulated portfolio draws to reinforce this point.**

$$p = \frac{\#\{T^* \geq T_{\text{obs}}\}}{N}$$

A permutation test (randomly shuffling labels between ISA and team data to see if differences could occur by chance) confirmed that the observed gaps for All players are real ( $p \sim 0.0$ ), while for Medium players the differences were within random noise ( $p > 0.8$ ). Moreover, we ran random portfolio combination simulations: we repeatedly (10,000+ times) drew a random set of 15 ISA investments (to mirror picking 15 players) and compared the aggregate return to the 15 team stocks, counting how often the ISA portfolio “wins.” The results are shown in table 6:

**Table 6: Simulation Results: ISA Portfolio Win Rates vs. Team Stocks (2015–2025).**

| Portfolio Type       | Win Rate vs. Teams | Notes                                                                       |
|----------------------|--------------------|-----------------------------------------------------------------------------|
| All Players (49)     | ~0%                | Almost never outperforms;<br>dominated by majority of –100% ISA<br>outcomes |
| Medium-Tier Only (5) | ~78%               | Frequently outperforms;<br>strong performance driven by solid mid-tier      |
| Medium + High (6)    | ~20%               | Worse than Medium alone;<br>high-tier underperformance adds variance        |

These simulations underscore a critical insight: selectivity is the key to making athlete investments viable. If one could avoid the “dead weight” (the many players who never earn enough), the remaining investments can hold up against conventional assets. Our Medium-tier subset essentially removed the bottom 80–90% of outcomes, leaving only the top 10% or so of the distribution, which then looked quite attractive. This finding indicates that some scouting skill or predictive model would be required to improve the odds of picking winners. We discuss this further in the conclusion, but the evidence suggests that an ISA strategy targeted at known promising talents (and structured to limit exposure to busts) could dramatically narrow the performance gap relative to team stocks.

#### **Risk and Diversification Considerations :**

The comparisons above already imply the risk profiles: ISAs are far riskier. To quantify this, consider the loss rates and dispersion. At mid-price, 80% of individual player investments lost money (i.e. ROI < 0). For teams, that figure was 33%. If one held a broad portfolio of all 49 ISAs, about 80% of the positions would be in the red – one would be relying on the few big wins to bail out the rest. Indeed, the entire portfolio’s return (if equally weighting all players) was still deeply negative in our case. Diversification helps only so much when the distribution is so skewed; you would need dozens of players in hopes that a couple of them become superstars to offset the zeros. In contrast, a portfolio of multiple team stocks (say all 15) would actually reduce risk and almost guarantee a small positive outcome (in our sample, the worst 5-year subset of clubs still averaged slightly above 0). We computed the Sharpe ratio (using a zero risk-free rate for simplicity) for various groupings as an informal risk-adjusted metric.

$$\text{Sharpe Ratio} = \frac{R_p - R_f}{\sigma_p}$$

The Sharpe for the All-ISA portfolio was deeply negative (around –1.5), while for the Medium- only ISA portfolio it was slightly positive (+0.3), and for teams also positive but low (+0.2 to +0.3 range). Thus, on a risk-adjusted basis, unfiltered ISAs were clearly inferior to team stocks – but filtered ISAs approached similar risk-adjusted performance. Another perspective is stochastic dominance: The team stocks’ cumulative return distribution lies to the right of the ISA’s for almost all probability levels (see Figure ??), indicating that team stocks stochastically dominate a random ISA pick. An investor with no ability to pick and choose should prefer the team stock in a pairwise sense. Only when restricting to better players do the CDFs overlap and neither dominates.

#### **Comparison to Venture Capital and Angel Investing Benchmarks**

As a final analytical lens, we compare our results to venture capital (VC) and angel investment benchmarks. This serves two purposes: (1) to contextualize whether the high- risk/high-upside structure of ISAs could yield competitive returns if done right, and (2) to validate the analogy that athlete investing behaves like venture investing. We compiled industry data on VC fund performance (10-year internal rates of return for a broad sample of venture funds) and on angel investments (early-stage startup portfolios). The University of California’s endowment (UCOP) VC dataset indicates that a typical VC fund might achieve an annual IRR around 10% (which over 10 years roughly triples an investment, +~200% total), with high volatility. Indeed, our VC sample mean IRR was ~0.103 (+10.3%/yr) with std ~0.13, significantly outperforming the team stocks’ +2.4% CAGR over the same

horizon. This is not surprising: VC as an asset class demands a premium for illiquidity and risk. Angel investors (individuals investing in startups) reportedly target even higher returns to compensate for extreme risks: studies (e.g. Kauffman Foundation) suggest typical angel portfolios return ~2.5x cash-on-cash over ~5–7 years, equating to ~22–27% IRRs. These angel returns far exceed what our unfiltered athlete ISA portfolio delivered (which was negative), but it's important to note how angels achieve those returns: through extreme selectivity and active management, culling losses and doubling down on winners.

The pattern we observed in ISAs – many failures, few successes driving outcomes – mirrors the power-law returns of VC/angel investments. The difference is that in our baseline scenario the ISA “fund” pricing was too high and selection too broad, resulting in negative performance. If instead an ISA fund could emulate venture strategies – pay lower prices (get in early at a bargain), invest in a larger diversified pool of prospects, and crucially, stage investments (only commit big money once a player shows promise, similar to series financing rounds) – then the returns could move closer to those venture benchmarks. Our data hint at this: the Medium-tier subset essentially reflects a scenario of successful due diligence (i.e. picking only those who pan out to some degree), and that scenario matched the low returns of teams and even showed promise of upside.

To truly rival VC, an ISA portfolio would need to capture a couple of superstars (equivalent to startup “unicorns”) at low cost – something that might be achievable with better scouting or a larger group of athletes. In short, current real-world ISA deals (like Fantex or BLA) have yet to demonstrate they can deliver VC-like returns to investors. In our simulated case, the structure and pricing caused underperformance. But the structure of returns (skewness) was very much like VC. This suggests that ISAs are not fundamentally a poor concept, they are an early-stage, inefficiently priced version of a venture-style asset. The implication is that with improved contract design (e.g. performance triggers, variable pricing) and investor sophistication, ISAs could evolve to a point where they do yield competitive high-risk returns. We elaborate on these points in the conclusion.

## **Conclusion:-**

In this study, we set out to compare two distinct forms of sports investment: athlete income-share agreements (ISAs) and sports team equity. By examining the career outcomes of England's 2015 U18 soccer cohort and benchmarking against the decade-long performance of publicly traded team stocks, the analysis revealed a striking contrast in both returns and risk profiles. Sports team stocks produced steady gains with relatively low variability across clubs. In our sample, an investor in a basket of team equities would have seen a slight positive return (~0.5% median over 10 years) with minimal drawdowns, essentially a stable, low-risk asset. ISAs, in contrast, displayed a far more volatile and polarized distribution of results. Most ISA contracts returned little or nothing (a majority were complete losses), while a handful of players generated substantial payoffs.

This dynamic left the average ISA portfolio underperforming the more balanced returns of sports stocks by a wide margin. In short, sports team equity offered reliability and modest growth, whereas ISAs resembled lottery tickets – a few big winners amongst plenty of busts. However, the fact that ISAs underperformed in our broad analysis does not imply that the concept is intrinsically flawed. The findings instead highlight that ISAs are a nascent and immature financial product, still in need of better structuring and pricing. Unlike publicly traded team equity, which benefits from decades of institutional development, liquidity, and mature pricing models, ISAs are only beginning to emerge as a structured asset class. The weaknesses revealed in our tests (poor average returns, high loss rates, and sensitivity to contract price) likely reflect mispricing and lack of selectivity rather than a fundamental impossibility. Importantly, the skewed distribution of ISA outcomes mirrors that of venture capital and angel investing, where most investments fail but a small set of winners drive portfolio performance. Our comparison to VC/angel benchmarks confirmed that, as currently implemented, ISAs did not match the average returns of those high-risk asset classes. Yet, the underlying power-law logic is the same: a small fraction of hits can theoretically deliver outsized upside. That structural similarity suggests that ISAs can, with refinement, move closer to the potential of established high-risk, high-reward investment models.

Notably, when we restricted the ISA portfolio to only medium-tier players, the performance gap largely disappeared. These selective ISA portfolios produced returns statistically indistinguishable from team stocks, and in fact beat the team stock portfolio in roughly 78% of random simulations. This reinforces the view that ISAs are not a fundamentally misaligned idea, rather their pricing and structure must evolve before they can deliver competitive returns on a risk-adjusted basis. What might that evolution look like? The path forward lies in smarter contract design and investment strategy for ISAs. A flat, one-size-fits-all pricing (e.g. paying \$500k for 5% of any youth

player) will almost invariably lead to overpayment on lower-tier prospects, which drags down portfolio performance. A more promising model is to be selective and invest only in those athletes whose early indicators (elite academy status, extraordinary youth statistics, etc.) justify the valuation. In practical terms, an ISA fund could employ scouting or machine learning models to screen players, much as VCs screen startups, and only fund the top percentile of prospects. Our data showed that if one had backed just ~10–20% of the best players, the results would have been dramatically better. Additionally, dynamic or milestone-based funding structures could protect investors. For instance, instead of giving a large lump sum at age 18, an ISA could be structured in tranches: the investor commits a smaller amount upfront and agrees to invest more only if the player reaches certain milestones (e.g. signing a top-division contract, making a certain number of senior appearances, etc.).

This is analogous to VCs staging investments across seed, Series A, B, etc., once startup milestones are met. Such stage gating would prevent sunk capital into players who never progress, thereby mitigating the many -100% outcomes. Had our hypothetical ISA investor only put significant money once a player “made it” to a pro roster, the loss frequency would drop, and returns would improve significantly (albeit at the cost of paying a higher price for a proven player – a trade-off to model in future research). Furthermore, portfolio diversification across sports or leagues could help. Our study focused on one cohort in one sport; an actual investor could pool ISAs from various sports (e.g. some soccer, some baseball, some basketball prospects) to spread risk. This might reduce the correlation of failures (since the return of athletes in different sports are independent) and increase the chance of at least a few breakout stars. Ultimately, the comparison to sports stocks in this paper illustrates both the challenge and the opportunity of athlete ISAs. On one hand, sports team equities provide a solid benchmark: they are relatively safe investments with known moderate returns (and even some non-monetary perks, like owning a piece of a beloved club). ISAs, in their current form, appear unfavorable by comparison – our analysis showed that a naive ISA portfolio would underperform a team stock index on both return and risk metrics.

On the other hand, ISAs offer something unique: the chance to directly invest in individual talent, aligning investor interests with an athlete’s success. This direct exposure to human potential is inherently volatile, but it also holds the allure of potentially transformative upside (e.g. backing the next Ronaldo or LeBron at youth stage could yield venture-like multiples). As a financial product, ISAs are not yet competitive with sports team equity, but they arguably shouldn’t be dismissed as simply a bad idea. Rather, they should be seen as an early prototype, one that requires refinement in pricing, structure, and selection strategy. With proper engineering, ISAs could evolve into a niche asset class that complements traditional sports investments, offering fans and investors a new avenue into the high-stakes world of professional athletics. In conclusion, if the question is “Which investment yields better returns: team stocks or athlete ISAs?”, the answer today is clear: sports team stocks have the edge in risk-adjusted performance over a typical career span.

But the more nuanced takeaway is that athlete ISAs, if implemented with the discipline of venture investing, have the potential to narrow that gap significantly. In a future where fans can seamlessly invest in athletes, the “portfolio vs. club” decision may hinge on one’s appetite for risk and belief in their scouting acumen. The conservative investor will favor the steady returns of owning a piece of a team, while the bold investor might embrace the thrill of backing raw talent. Ideally, with eyes open to the lessons from this study: diversify broadly, price wisely, and pick your players like a seasoned scout. The intersection of sports fandom and finance is still evolving, and this direct comparison contributes a step toward understanding how these very different investments stack up against each other.

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