Haberdashers' School

Occasional Papers Series in the Humanities

Occasional Paper Number Seventy-Four

Are passively managed funds better than actively managed funds for the long-term equity investor?

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September 2024

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Abstract

This paper uses both theoretical arguments and historical analysis to evaluate whether passively managed funds are better suited than actively managed funds for the long-term equity investor. It is important to note that this paper looks at the different styles of active management, how market conditions impact the success of each management style and employs data analysis techniques before drawing a conclusion.

I: Introduction

For many years, investors have debated between the two poles of management styles: 'active management' versus 'passive management'. Those who have had success with passive management, such as John C. Bogle and Burton G. Malkiel, favour investing in index funds and going with the market. However, there are those who have had success with active management, such as Peter Lynch and Bill Ackman, who dare to use various different strategies to try to outperform the market and yield excess returns. Whilst there are clear success stories on either management style's side, I intend to use both theoretical and empirical evidence in this paper to come to a conclusion as to which style yields more success for the long-term equity investor.

In order to compare the natures of passive management and active management, it is essential to have coherent definitions of key terms and outline the scope of this paper.

A passive fund tracks a market index, multiple market indices, or a specific area of the market "seeking to own all the stocks in a given market index, in the proportion they are held in that index" (Hunt 2022). This is in contrast to an active fund which aims to outperform a benchmark to generate 'alpha' (abnormal rate of return compared to a specific benchmark, when adjusted

for risk) through selective stock-picking (Pettit 2017, p4). Many active funds use indices as the basis for a replication strategy such as Standard & Poor's (S&P), Russell, and MSCI. Active funds rely on fund managers to adjust the fund's holdings in response to performance and the current market conditions and thus typically have higher fees than passive funds.

There are multiple definitions of a 'long-term investor', some attributing to 'time-horizon', affinity to 'fundamental analysis' as opposed to 'technical analysis', or even those with greater resilience or emotional control (Apogee 2020). A coherent definition of a long-term investor is that of Dr G Warren which establishes a long-term investor as "more to do with attitude or mindset, than holding period" with a tolerance for "near-term volatility or short-term underperformance" (Warren 2016). Therefore, daily and weekly fluctuations in fund performance will not be considered with too much weight, but instead there will be a focus on annual performance or longer timeframes.

Equity and bonds are arguably the two most commonly invested asset classes with little room for debate. An equity share gives the investor a share of a publicly listed company whereas bonds involve lending to a company or government for a set-rate of interest (Juma 2023). The focus on equity funds as opposed to bond funds in this paper is justified by how "the almost stochastic dominance (ASD) approach [in determining investor's preference] unambiguously supports the popular practice of advising a higher stock-to-bond ratio for longer investment horizons [disregarding pathologic preferences]" (Bali *et al.* 2009, p14).

II: Theoretical benefits favouring Passive Management

Passive management has distinguishing characteristics which can be advantageous for the long-term investor compared to active management. The five major characteristics that will be addressed are: (i) lower cost (ii) tax efficiency (iii) lower risk (iv) diversification (v) use in efficient markets.

A major characteristic of passive funds is their cheap cost compared to active funds leading to less erosion of an investor's profits. Passive funds tend to have management fees 0.07% of the total investment in the fund as opposed to active funds with fees on average ranging from around 0.65% to over 1% each year (Barclays 2024). There are multiple reasons for the higher cost of active funds, including increased portfolio turnover and thus increased brokerage fees which are passed onto the investor. Moreover, the need for continuous research and analysis to identify investment opportunities requires skilled professionals, many resources, and complex trading strategies such as sector rotation or market timing which also increase costs for the firm. The lower costs of passive funds can be a reason as to why passive funds may be more attractive to a long-term investor as lower costs will enhance the overall net returns over the long term. Forbes Council Member Jonathan Dash gives a good example of the impact of costs on an investor's portfolio over a long-time horizon. For a $200,000 portfolio with an investment return of 6.5% per annum over 30 years, a 3% annual fee would result in a $560,134 value after 30 years whereas a 1% annual fee would result in a $981,678 value which is 75% higher (Dash 2021).

The tax inefficiency of active funds (often unaccounted for) has also, through applying the First-In-First Out principle, led to "the proportion of short-term capital gains realized decreasing in a statistically significant manner" especially after the amendment of the Income Tax

Assessment Act in 1999 (Fong *et al.* 2009) and so fund managers charge greater fees to account for this. Even if it is possible to consistently outperform the market, with the "huge list of marketable securities that must include a fair number that can be identified as undervalued", the cost erosion of active funds mean that it is not worth the investor's effort unless they can add around 5% before taxes (Graham 1973, p34).

The risk associated with passive funds is also much lower than active funds. This risk can be inherent in the portfolio composition, shown by how active funds with higher tracking error have more exposure to systematic risk, or related to the management of the portfolio with key-man risk: the dependency on certain individuals – in this case active fund managers – for the success of the portfolio. Notable examples of this include the movement of Glen Bickerstaff to TCW after his 47.5% return on his Transamerica Premier Equity Fund in 1997 (Zweig 2003, p245) or, although more to do with the bond market than equities market, the departure of William H. 'Bond King' Gross from Pimco to the smaller firm Janus in 2014 (Goldstein 2014). Indeed, such sudden departures are not uncommon and investors in active funds should bear this in mind when selecting funds. The sudden change in style due to a change in manager is also likely to disadvantage an active fund.

Passive funds also provide broad market exposure offering increased diversification to mitigate against correlated price movements. This is because greater exposure decreases unsystematic risk, reducing the impact of specific companies or downturns on the fund's overall performance. An active fund will not be able to offer the same level of diversification as a passive fund as the fund manager would struggle to have sufficient resources to be able to research a large number of stocks as constituents for their portfolio construction process, so passive funds are the best option for an investor requiring wide diversification to a market.

The efficient market hypothesis is a hypothesis that states that securities prices reflect all available information and hence consistent alpha generation is impossible (Downey 2023). According to this theory, stocks always trade at their fair value on exchanges, which makes it impossible for investors to purchase undervalued stocks or sell stocks for inflated prices (Jones & Netter c1999). Proponents of this theory would invest in passive funds as they would believe that an active fund cannot gain any advantages in an efficient market. This is especially true in developed markets which are the most researched and thus supposedly the most efficient. However, the extent to which markets are efficient (especially strong and semi-strong efficiency) is limited and has been theoretically and empirically challenged by individuals' violation of Von Neumann-Morgenstern rationality, evidence of investor sentiment, and more (Schleifer 2000).

III: Approaches to Active Management

In their 2009 paper "How Active Is Your Fund Manager? A New Measure That Predicts Performance," Cremers & Petajisto classify the different styles of active management across two dimensions: Active Share and Tracking Error, where:

$$\text{Active Share} = \frac{1}{2}\sum_{i=1}^{N}\left|w_{fund,i} - w_{index,i}\right|$$

$$\text{Tracking Error} = \text{stdev}(\text{R}_{\text{fund}} - \text{R}_{\text{index}})$$

$w_{fund,i}$ is the weight of stock i in the active fund
$w_{index,i}$ is the weight of stock i in the index
R_{fund} is the return of the active fund
R_{index} is the return of the index
N is the number of positions in the portfolios
(Cremers & Petajisto 2009)

In layman's terms, Active Share is the proportion of the fund that takes active long or short positions whereas Tracking Error measures the time-series standard deviation of return on the active positions (Cremers & Petajisto 2009).

An illustration of the fund management styles across the two dimensions is shown below:

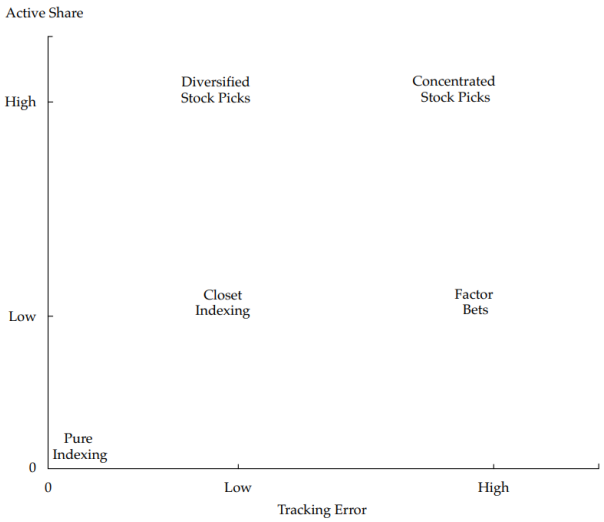

Fig 1. Active Management Matrix (Cremers & Petajisto 2009)

A majority of active funds do not fit clearly into each of the four categories, but instead are moderately active with a moderate amount of tracking error. In general, however, Active Share and Tracking Error show a positive correlation, as illustrated below:

Active Share (%)	Tracking Error (% per year)								
	0–2	2–4	4–6	6–8	8–10	10–12	12–14	>14	Total
90–100	0	0	6	36	66	47	44	87	285
80–90	0	0	35	83	67	55	35	50	326
70–80	0	7	56	62	63	33	17	19	257
60–70	0	22	85	60	25	13	5	6	216
50–60	0	24	49	25	14	4	2	0	120
40–50	2	28	20	6	3	0	0	0	61
30–40	4	14	9	2	0	0	0	0	30
20–30	0	3	0	0	0	0	0	0	5
10–20	5	3	0	0	0	0	0	0	8
0–10	70	0	0	0	0	0	0	0	73
Total	82	104	262	275	238	152	103	164	1,380

Fig 2. Distribution of Mutual Funds across Active Share and Tracking-Error Ranges in 2009
N.B. U.S. all-equity mutual funds, Tracking-Error calculated by last 6 months (Petajisto 2013)

Closet Indexing involves managers mimicking most of the index, charging high fees without providing much additional value. This is evidenced by an R-Squared value that tends to

increase over time. Given the high cost of this active management style and its similarity to a low-cost passively-managed fund, this form of active management will not be discussed further as it is clearly a suboptimal investment.

Factor Bets targets securities with "specific characteristics such as value, quality, momentum, size, and minimum volatility" to seek outperformance (Smart 2023). Advocates of Factor Bets argue that there is economic rationale behind the traits they look out for, and the importance of variables with "no special standing in asset-pricing theory" such as book-to-market equity (value) and size, explain the cross-section of average returns e.g. on the NYSE (Fama *et al.* 1992).

Diversified Stock Picking involves taking large but diversified positions away from the index as opposed to Concentrated Stock Picking which also seeks for different factors for outperformance. Thus by having a high Active Share, they take overweight or underweight positions in certain securities. The two reasons active fund managers undergo stock picking are if they believe a sector is permanently undervalued or they believe their staff is able to select undervalued stocks in that sector better than any other (Elton *et al.* 2014).

IV: Theoretical Benefits favouring Active Management

Active management has distinguishing characteristics which can be advantageous for the long-term investor compared to passive management. The three major characteristics that will be addressed are: (i) potential for outperformance (ii) flexibility and downside protection (iii) exploitation of market inefficiencies.

Actively managed funds have demonstrated a potential for significant outperformance if the managers are significantly skilled. Two prominent examples are that of Peter Lynch and also the late James 'Jim' H. Simons, both of whom ran actively managed funds. Peter Lynch was appointed to manage the Magellan Fund at Fidelity Investments where he annualised a 29.2% return during his 13 years running the fund (Chen 2024). Peter Lynch's view was that investors should research and invest in areas they know well rather than investing broadly, aligning with the Concentrated Stock Picking view. Jim Simons, on the other hand, founded Renaissance Technologies and ran its Medallion Fund. As a renowned mathematician, Simons used quantitative strategies and a black-box model that "finds individual patterns in data and exploits each pattern" to aggregate many small profits into a sizeable sum (Nickolas 2022). His firm's fund achieved a 62% annualised return, before fees, and generated its highest return of 98.5% in the year 2000 (Maggiulli 2023). Nick Maggiulli, COO of Ritholtz Wealth Management, explains how $1 invested in the Medallion Fund from 1988-2021 would have grown to almost $42,000 (net of fees) while $1 invested in the S&P 500 would have only grown to $40 over the same time period (Maggiulli 2023). Whilst many active funds do not generate significant alpha returns, these two examples demonstrate that a handful of well-managed active funds with well thought out strategies can generate outrageous returns, showing active management's potential for outperformance.

In addition to a potential for significant outperformance, active funds have increased flexibility as opposed to passive funds. Whilst passive funds are required to hold certain equities in certain weights to make sure tracking error is negligible, active funds can respond to changing market conditions and seek investment opportunities. This allows them to – in real-time – tilt

towards undervalued securities and away from overvalued securities. Moreover, active managers can tailor their investments to their client's risk tolerance and personal utility function. For example, a more conservative investor can use a manager who favours dividend-paying stocks as opposed to a more enterprising investor's appeal for high-growth stocks. This flexibility is extended further in active management's ability to offer downside protection. Whilst in bull markets passive funds will give an investor the upside, in bear markets they don't use instruments to hedge against losses. On the other hand, strategies active managers use to minimise losses during bear markets are: dollar-cost-averaging, liquidating equity, or tilting towards defensive industries. These strategies cannot be achieved with passive funds hence leaving an investor vulnerable during market crashes or corrections.

The existence of market inefficiencies is demonstrated by the existence of anomalies, a situation whereby a performance of a stock or group of stocks deviate from the assumptions of the efficient market hypothesis (EMH) (Latif *et al.* 2011). There are three types of anomalies: calendar anomalies, fundamental anomalies and technical anomalies (Latif *et al.* 2011). Calendar anomalies are caused as a function of time period, appearing as a seasonality component in a time-series. Some common examples are the 'Weekend Effect' where stock prices are likely to fall on Monday with a closing price less than the previous Friday, or the 'January Effect' where small-cap stocks generate larger returns in the first two weeks of January. A fundamental anomaly is one which includes a deviation in a security's price from its underlying fundamentals. Some examples include the 'Neglected Firm Effect' where lesser-known companies tend to outperform similar better-known companies (suggesting they are undervalued contradicting EMH) and the 'Earnings Announcement Effect' where stock prices may continue to adjust to earnings announcements weeks after the announcement (contradicting the instantaneous information incorporation posited by EMH). The success of technical analysis – the study of historical market data in generating returns – refutes weak form EMH's theory (and hence the stronger forms') that past prices and information are incorporated in a securities' current price. Hence, active managers can use technical indicators such as 'Moving Averages' and strategies such as 'Trading Range Break' to generate returns (Latif *et al.* 2011). Passive funds do not have managers and analysts which research such anomalies to utilize, and therefore will never be able to profit from them. Equity active managers, on the other hand, use quantitative models to identify entry and exit points to leverage anomalies for their own gain, either via equities or their derivatives. Concentrated Stock Pickers would exploit anomalies in individual stocks to leverage mispricing, whereas Factor Bets would be able to systematically exploit anomalies across a range of securities in the aforementioned market-specific factors.

V: Impact of Market Factors on Management Style

The theoretical arguments for Passive Management and Active Management have just been discussed but it is important to briefly take the different market conditions and types of investors into consideration. The factors that will be discussed here are: (i) development of markets (ii) establishment of companies (iii) market sentiment (iv) investor's scale.

Markets can be classified into developed markets and emerging markets. Developed markets are likely to favour a passive management approach due to the greater market efficiency making it harder to find mispriced securities. Emerging markets are more likely to have

information asymmetry, structural inefficiencies, and market distortions, favouring active management which can profit from these inefficiencies.

Companies are always listing themselves on the stock exchange to raise capital for corporate financing. This has led to the gradual transition between older, more established companies, e.g. General Electric (GE), Coca-Cola (KO), and The Walt Disney Company (DIS), and newly established companies, e.g. Coinbase (COIN), Snapchat (SNAP), and Spotify Technologies (SPOT). The lack of historical data behind the new firms have led to them being invested in more actively and the converse is true for more established firms.

In Bull Markets, the overall market is growing and the positive momentum leads to minimal need to outperform the benchmark which itself is generating high returns. However, in Bear Markets, active management allows investors to hedge against falling stock prices and tilt towards more resilient industries.

An institutional investor is a company or organization with employees who invest on behalf of others, allocating capital to reach investment goals it represents, whereas retail investors are individuals who invest their own money, typically on their own behalf (Palmer 2023). Institutional investors may favour either style, depending on their objectives. Retail investors – in theory – should favour passive management due to its cost-effectiveness and lack of barrier-to-entry but the rise of online brokers such as Robinhood have disrupted this trend. However, it is safe to say that most retail investors do prefer passive management styles as many invest without making investment management a full-time occupation (Graham 1973).

VI: Historical Analysis of Management Styles

Given financial economics is a very practical discipline, I have decided to use my own personal data analysis techniques to draw my own conclusions from raw Yahoo Finance financial data. The principles of Econometrics, as the “unification of all three [statistics, economic theory, and mathematics],” has been used to come to a conclusion as demonstrated below (Hansen 2020):

(i) Construction of Proxy Portfolios

In order to compare the relative performance between passive and active funds, I have decided to create a proxy for each. As a proxy for passive funds, I have decided to use the S&P 500 given it is the most invested index fund with its broad market exposure of 500 US stocks (Folger 2024). As a proxy for active funds, I have created a portfolio of 9 stocks that have the greatest active share in the most common active portfolios, sourced from Interactive Investor and Hargreaves Lansdown.

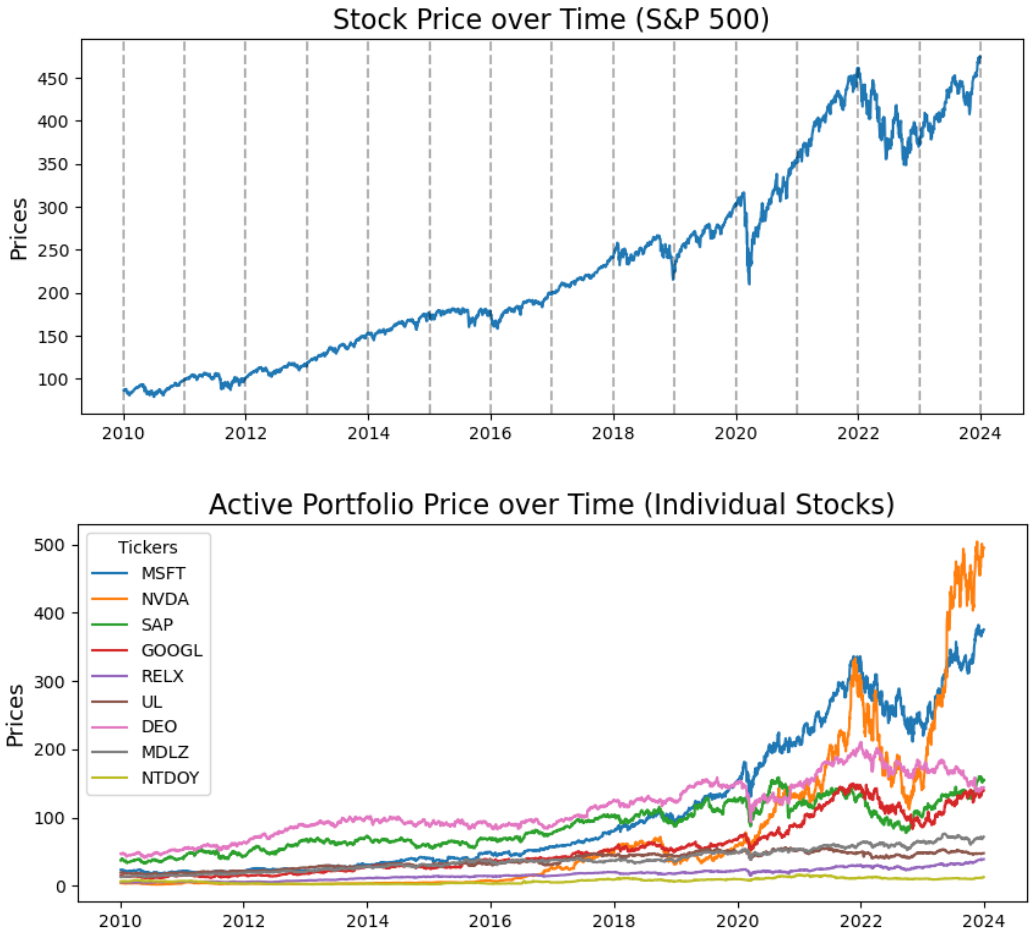

Fig 3 & 4. Visuals of the raw data analysed, from 01-01-2010 to 01-01-2024, for the S&P 500 (SPDR S&P 500 Trust ETF) and 9 of the most actively held stock positions

The returns for each of the stocks in the active portfolio has been cumulated and averaged in order to compare it to the proxy passive fund. Stock weight optimisation and rebalancing has not taken place on the active portfolio and so the weights of the stocks in the portfolio are equal to avoid an unfair edge for the active portfolio. There are also numerous ways to optimise and rebalance portfolios, including Mean-Variance optimisation, Black-Litterman Model, and Risk Parity. Choosing an appropriate model would require additional research and analysis outside the scope of this report.

(ii) Correlation Tests & Conclusions

The decision has been made to perform PPMCC* tests of various market properties against the proxy portfolios to determine the correlation and relative performance.

	Proxy Passive Portfolio, r_P=	**Proxy Active Portfolio, r_A=**
Market† Volatility	+0.136054	+0.143014
Market Price to Book Ratio	-0.451329	-0.286758
Market Price to Earnings Ratio	-0.218588	-0.237226
US Federal Reserve Rate	+0.569951	+0.621967
Market Dividend Yield	+0.442765	+0.416794
Market Earnings Yield	+0.393997	+0.313390

*PPMCC stands for Pearson's Product Motion Correlation Coefficient and is a statistical test for linear correlation

†The market representation is the S&P 500 due to its broad market exposure

	Difference, $\|r_A - r_P\|$=
Market Volatility	0.006960
Market Price to Book Ratio	0.164571
Market Price to Earnings Ratio	0.018640
US Federal Reserve Rate	0.052016
Market Dividend Yield	0.025970
Market Earnings Yield	0.080610

The results have shown the following conclusions:

1. None of the metrics have a very strong positive or negative) correlation with the passive or active fund returns, where a strong PPMCC correlation is defined as $|r| > 0.7$ (Thomas 2023).
2. When the Market Price to Book Ratio is low, the passive portfolio has greater returns than the active portfolio. This can be explained as when valuations are low, there is no need to differentiate from the market and use resources to find the best stocks as the whole market can be bought for a good value. In the opposing case when valuations are high, it makes sense to be a stock picker.
3. Similarly, when the Market Earnings Yield is high, the passive portfolio has greater returns than the active portfolio. This can be explained as a high Market Earnings Yield implies companies in the market are profitable and so there is less of a need to use resources to identify the best stocks.
4. The final trend is that in times of a high Federal Reserve Rate, the cost of funding is higher creating difficult conditions for companies to operate in. This perhaps explains the higher returns in the active portfolio as a manager is rewarded for being pickier in what they buy.

Overall, these conclusions validate the idea that in Bull Markets, passive funds are preferable, and in Bear Markets active funds outperform as the effort taken to pick better stocks within a tough market can be compensated with higher returns.

(iii) Financial Metrics & Conclusions

I have decided to analyse the financial metrics of Beta, R-Squared, and Sharpe Ratio to measure the sensitivity to market movements, proportion of movements tied to markets, and

risk-adjusted return, respectively. These metrics can be used to justify the suitability of the proxy portfolios constructed, and the reliability of the conclusions drawn.

	Proxy Passive Portfolio	**Proxy Active Portfolio**
Beta (6 d.p.)	1.000000	0.910240
R-Squared (6 d.p.)	1.000000	0.320361
Sharpe Ratio (6 d.p.)	0.730157	0.605336

Beta: The lower Beta of the active portfolio compared to the market indicates the active portfolio has less volatility than the market. In practice, this would be exemplified further with portfolio managers making adjustments to tactically mitigate volatility.

R-Squared: The low R-Squared of the active portfolio shows that a high active share has been taken such that only 32% of price movements are correlated with the stock market.

Sharpe Ratio: The passive portfolio has a higher Sharpe Ratio compared to the active portfolio over a long time horizon. This suggests that the passive portfolio yields a greater return per unit risk, on average. However in absolute terms, both values of Sharpe Ratios are below 1 and are hence deemed poor with a low level of return per unit risk. According to CMC Markets, a Sharpe Ratio less than 1 is considered poorly, between 1 and 1.99 as adequate, and over 2 as a very good investment.

Given the above values are sensible, the proxy portfolios are good models for passive and active funds.

(iv) Limitations of my Analysis

Although I have tried my best to mitigate against limitations, as with any model, there are some limitations to my analysis. The limitations are outlined as follows:

1. The model is more representative of US markets as opposed to other markets due to the proxy passive portfolio mirroring the S&P 500 and due to how many stocks in the proxy active portfolio are US based.
2. Large-cap technology stocks take up the most market share in the S&P 500, with the Magnificent 7 alone accounting for 30.47% of the portfolio. This suggests a large co-movement and that the S&P 500 itself is not as representative of the whole market as it should be.
3. Active managers in practice would optimise their portfolio and rebalance with changing market conditions. The model for the proxy active portfolio does not take this into consideration.
4. The cost of managing the active fund is not taken into account when calculating returns.
5. PPMCC has its own inherent limitations which would in turn limit my analysis:
    a. Assumes linear relationships
    b. Sensitive to outliers
6. The risk-free rate during Sharpe Ratio calculations is assumed to be 1%. In reality, the risk-free rate can vary over time depending usually on the 3-month US T-Bill (Hayes 2024).
7. Only compares a single proxy for passive and a single proxy for active

With more time and computational resources, these limitations could be addressed leading to a more accurate analysis of the data.

VII: Recent Trends in Investor Behaviour

Investors are seeing the benefits of passive management as EPFR (a subsidiary of Montagu Private Equity) has observed that “index funds have attracted almost $600 billion” whereas “traditional active funds have seen net outflows of $245 billion” in 2023. Indeed, Morningstar have found that over the longer time-horizon of 10 years, “passive equity funds enjoyed inflows of $4.498 trillion” as opposed to “active equity funds having suffered cumulative outflows of $3.69 trillion.” By assuming the masses have collective rationality, this trend is explained by the superiority of passive funds.

VIII: Concluding Thoughts

From evaluating the theoretical arguments and historical analysis of passive and active funds, this paper concludes that passive funds are superior to active funds for the long-term equity investor, if only a single investment style is permitted. In reality, a combination of the two with a core investment in passive index trackers and some satellite investments in emerging markets being the best choice for a long-term equity investor.

Whilst active management offers downside protection and a potential for outperformance, the widespread efficiency in many markets and the lower cost of passive funds contribute to its superiority. Moreover, as the data analysis has shown, whilst passive funds have greater volatility, they have a greater risk-adjusted return and perform far stronger in bull markets than active funds. Recent trends with the growing demand for passive funds amongst investors also reflects their perceived superiority.

The conditions needed for active funds to beat passive funds are a bearish landscape for which the prevalence is low considering the long-term trend of growth in stock markets. Many companies have met and exceeded their quarterly expectations, and with prospects for rate cuts later this year, the economic landscape will be favourable for companies in the wider market so there will be less of a need to actively seek out investment opportunities.

Markets are subject to change with new developments in global economies, geopolitical instability, and technological advancement. However, as of right now, the preference for a long term investor is to be invested in passive funds.

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