Department of Business Administration

Master in Taxation and Financial Management of Strategic Decisions

A comparative assessment between active and passive investment funds

Apr 2021

Author: Vasmatzidis Panagiotis

Supervising professor: Tampakoudis Ioannis

Submitted to obtain the academic degree:
Master in Taxation and Financial Management of Strategic Decisions

Table of Contents

Table of Figures

Abbreviations

- AuM: Assets Under Management
- US: United States
- UIT: Unit Investment Trust
- TWRR: Time Weighted Return Rate
- MWRR: Money Weighted Return Rate
- SEC: Securities and Exchange Commission
- ETF: Exchange Traded Fund
- AP: Authorized Participants
- TIF: Traditional Indexed Funds
- RIC: Regulated Investment Company
- NAV: Net Asset Value
- WAM: Weighted Average Maturity
- IRS: Internal Revenue Service
- ADR: American Depositary Receipt
- MLP: Master Limited Partnership
- OTC: Over The Counter
- IPO: Initial Public Offering
- CAGR: Compounded Annual Growth Rate
- SPY: Standard & Poor's Depositary Receipt

- CDSL: Contingent Deferred Sales Load
- MSCI: Morgan Stanly Capital International
- RIA: Register Investment Advisor
- IRA: Individual Retirement Account
- Bps: Basis points (100 bps = 1%)
- Cap: Capitalization
- HIFO: Highest In First Out
- REIT: Real Estate Investment Trust
- SPIVA: Standard & Poor's Indices Versus Active
- CRSP: Center for Research in Security Prices
- ICI: Investment Company Institute

Abstract

In 1776 Adam Smith introduced the world to the concept of the invisible hand, a profound idea that described the benefits that were produced for society by the market economy if things were left unintended. Since then, free markets have dominated the global economy and presented the world with far more alternative uses for the scarce resource called capital. This in a highly intertwined world, led money become the measure of everything and a means to an end for most affairs. As long as money retains its current status the importance of it will be significant to the life quality of modern era people. The scope of this study is to offer the reader solid evidence on what has been empirically proven true in the financial markets regarding the act of investing. The investing approach adopted is characterized by the constant priority to preserve the capital pool by assuming minimum risk with the intention of achieving satisfactory results compared to the overall market returns. Finally, our viewpoint will be that of the common investor meaning a person that has little to no experience in the financial markets symbolizing the great sum of people.

1 Introduction

1.1 Preface

Since the introduction of the first index fund, available to retail investors by Vanguard in 1975, a fundamental templet has shifted towards what at first seems like a counterintuitive way of participating in the financial markets. In September 2019, Bloomberg, a financial, software, data, and media company announced on an article called "End of Era" that for the first time in financial history, passive equity fund assets surpassed their actively managed counterparts. The milestone was reached in August when capital cashflows in the mutual fund sector favored the US-based equity passive funds amass assets of 4,271 trillion $, compared with 4,246 trillion $ in

actively managed equity funds. For a concept to materialize into action of this

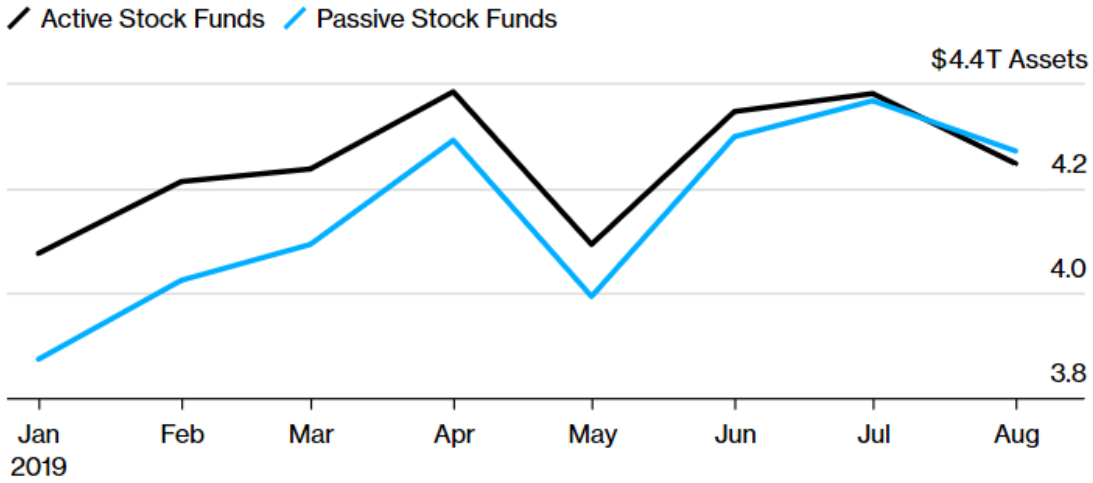
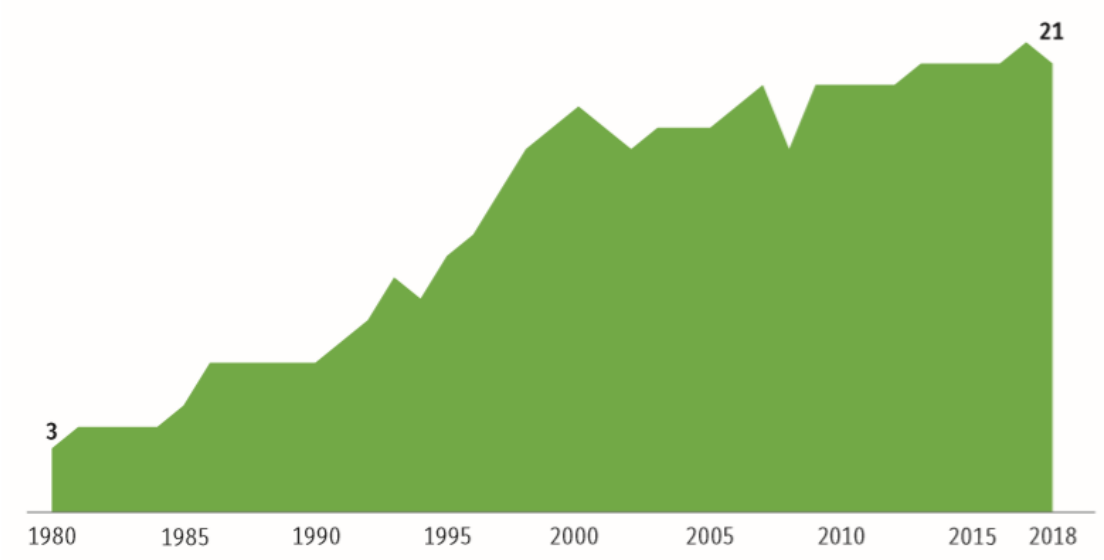


Figure: 1 Net assets of US-based equity mutual funds *Source: Bloomberg*

magnitude indicates that a revolution has occurred in the outlook of individual and institutional investors, regarding the fundamental premises of optimal investing in the financial markets. Nevertheless, black swans since 1975, such as the Black Monday of 1987, the dot-com bubble, the subprime mortgage crisis, and other ill events, may have proliferated the approval of the passive managed fund. Furthermore, extensive literature and scientific research had been carried out during the past and present century refining the theoretical background in finance, concurrently to the evaluation of emerging empirical evidence provided by the markets. As of year-end 2018, US-based passive managed assets (index mutual funds and indexed ETFs) amounted to 6,6 trillion $ or 36% of total long-term assets in mutual funds, compared to 18% a decade earlier. Initiating as a mental transition that was followed by the abolishment of the ever-going chase to “beat the market” or the trust in one’s ability to pick winners, indexing led to profoundly affecting financial markets and the overall economy. For that reason, this study will emphasize on the building blocks of the financial markets, no other than the common people, referred throughout this inquire as common investors. As a common investor, we define an individual who does not have the adequate skill, ability, knowledge, and psychology to invest in equities and fix income markets a proportionately large amount of capital relative to their income. This type of investor characterizes the majority of modern people whose job proficiency varies across different fields outside the financial sector. Even though they lack the much-needed expertise to invest efficiently the capital and future income themselves, they still are in dire need of investment returns to harness the compound effect and counter the corrosive aftereffect of inflation during the long term. Most of the time, the accumulated capital is directed into a successful retirement, college tuition for offsprings, or as a cushion of safety provisioned for unfavorable circumstances. Thus, it is paramount that the common investor does not participate by any means in speculative ventures, while the capital should be invested with minimum risk to assure safety of principal while maintaining maximum efficiency.

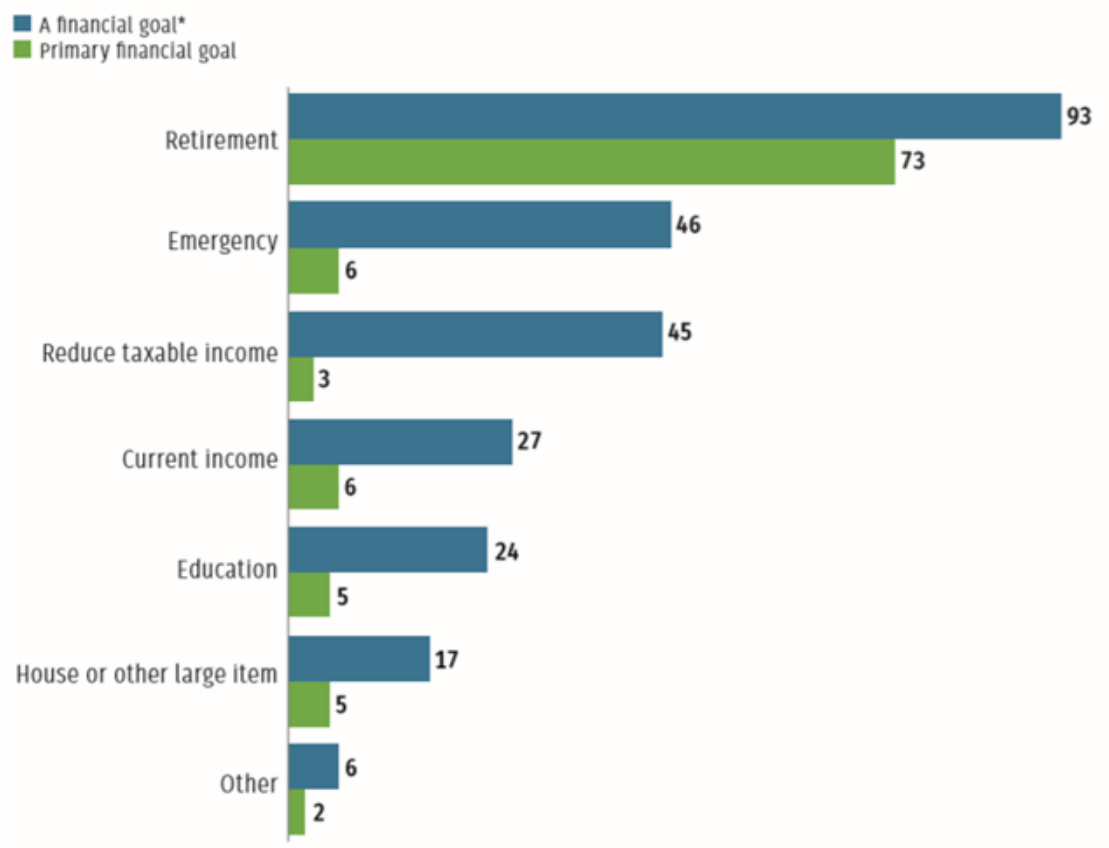
Figure: 2 Share of Household Financial Assets Held in Investment Companies (Percentage of household financial assets, year-end)



Source: Investment Company Institute and Federal Reserve Board

Throughout the period started in 1980 and ended in 2018, households in the US maintained an increasing reliance on investment companies as vehicles to participate in the financial markets. Mutual funds -the predominant investment company class- with assets of 17,7 trillion $ at year-end 2018, were held primarily (89%) by households in both long term (13,9 trillion $) and money market investments (1,9 trillion $). The percentage of households owning mutual funds multiplied since 1980, from 5,7% or 4,6 million to 43,9% or 56 million. Tax-advantaged plans, at the end of 2018, were substantially comprised of mutual funds, 56% of defined contribution, and 46% of individual retirement account plan assets were invested in them. Retail investors have accumulated immense amounts of assets in the financial markets with the help of mutual funds and other investment companies. Their goal is often associated with a foreseen need for capital or income yield in a future time. Among other esteemed motives, 93% of retail investors owning mutual funds indicated that retirement is one of their financial goals, while 73% defined retirement as their primary investment intent.

Figure: 3 Percentage of US households owning mutual funds (%, year-end 2018)



Source: Investment Company Institute

Hence, the way mutual funds fared during the past decades dictate whether financial goals set by the investors are partially or fully realized. The choice among alternative financial products is the one to be made with the utmost prudence. Both active and passive management concepts must be examined in their entirety and on an ongoing basis. This inquire will focus on determining the concept which better served the common investor during the long run started in 1975. Historical evidence by no means describes what the future may hold in the financial markets, but nevertheless, they can shed a ray of light into what that may be.

1.2 Objectives

Thesis statement

This thesis aims with the assistance of scientific literature and institutional reports to summarize and adequately explain the multidimensional notion of whether a common investor is better suited in either an active or passive managed mutual fund.

The purpose of this study is to inform and educate the reader on a highly practical matter in the field of finance. The subject will be approached from various perspectives as the intention is to holistically illustrate the topic and provide an integrated point of view. Presented data will be both conceptual as well as quantitative in the form of tables and diagrams, with emphasis given to

the latter as to facilitate, if possible, a vivid and comprehensible representation. The study is written in plain language as to be understood by the individuals referred to as “common investors,” that is the majority of people. Experts in the field of finance will find this thesis of little importance as its purpose is not to propose any juvenile scientific breakthrough but rather to remind and epitomize what has already been discovered. The inquiry is referred to the US market and the common investor who participates in assets available by financial institutions inside the boundaries of the US. Likewise, any reference to the domestic market or domestic financial instruments and legislation issues should be examined by the standpoint of a US citizen. Data deficiency renders impossible the task of providing an extensive analysis for every major market worldwide. Nevertheless, the inquiry’s intent is not to present mere data and vain facts but provide the reader with ubiquitous investment philosophy and reasoning applicable under any jurisdiction.

1.3 Research Methodology

The structure of this inquire will abide by the strict rules and guidelines of a systematic review. Dempster (2011, p.15) defines a systematic review as: “a comprehensive review of literature which differs from a traditional literature review in that it is conducted in a methodical (or systematic) manner, according to a pre-specified protocol to minimize bias, with the aim of synthesizing the retrieved information.” Originally derived by Archie Cochrane in the medical field, systematic reviews aim to appraise the soundness of all relevant research and combine it to illustrate an initial subject effectively. Thus, existing biases must be identified in advance prior to reaching conclusions. Systematic reviews are favored among the scientific community as they capitalize on the immense existing literature to provide novel insight. The main stages of a successful systematic review are as follow:

- Statement definition
- Systematic search and selection of relevant data
- Quality assessment
- Synthesis

During the statement definition stage, the practitioner must state a clear set of objectives as well as establish eligibility criteria that will take place during the literature selection process. Then, with regard to the aforementioned criteria, all available literature is systematically reviewed in order to identify the top-tier relevant scientific research. Results that fit the selection’s process guidelines are assessed for bias and reliability. Finally, data is combined, analyzed, and presented to answer the initial objective.

The utilization of existing literature implies that presented data will be analyzed on a secondary level. A secondary analysis is used to perform additional analysis of an original dataset or additional analysis of a sub-set of the original dataset (Hinds et al., 1997; Heaton 1998) or apply a new perspective or conceptual focus to the original research issues (Heaton, 1998). Data sources used for this inquire are universally acknowledged for the

highest level of integrity and originate exclusively from top-rated journals and research providers. Presented data will be of quantitative nature and will be organized and analyzed in a way to help the reader comprehend the examined subject. Conclusions will be drawn in a gradual, data-based narrative to holistically answer the main objective of whether a common investor should invest in either active or passive mutual funds during a long-term horizon.

1.4 Data selection standards

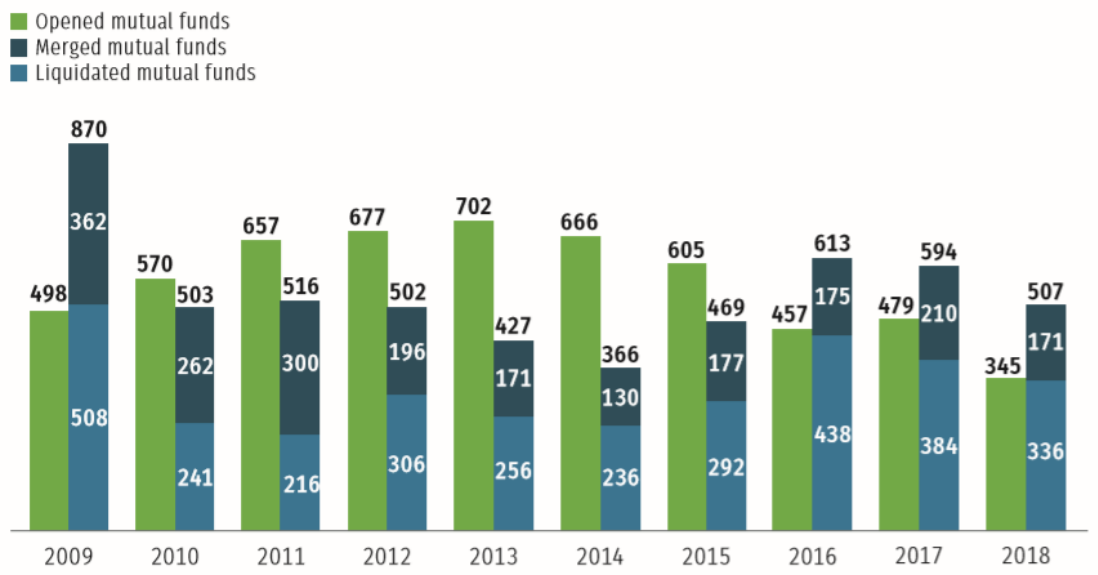
Considering the nature of the systematic review process, guidelines must be adopted beforehand to ensure quality thresholds for the presented information. Literature that does not comply with the quality standards is discarded for the purposes of this study. Procured conclusions will always be presented in light of Ockham's razor problem-solving method, usually paraphrased as "the simplest solution is most likely the right one." Objectivity must remain the cornerstone of this thesis for it to ensure the unprejudiced representation of facts and therefore succumb not to fallacies. For that reason, scientific research will be evaluated among other factors for the following pivotal biases:

- Confirmation Bias
- Survivorship Bias
- Apples-to-Apples
- Money-Weighted Returns
- Asset-Weighted Returns

Confirmation bias is the product of wishful thinking and direct influence of desire on beliefs and, therefore, to the interpretation of evidence. As a form of cognitive bias, it leads the individual to deviate from rational judgment. After a certain misconception is established, the only evidence which embraces the construct are selected while the ones who contradict it are neglected. The end result is a one-side argument which is fatal for objectivity and dangerous if real-world actions are taken based on a proven false hypothesis. Survivorship bias is especially common during research, which involves mutual fund performance. As a sample bias, it greatly distorts conclusions as it fails to account for the sample difference observed between two periods. To clarify, it has been proven that mutual funds and especially active managed mutual funds are more prone to merge or liquidate during a specified amount of time. In order to account for performance, the objective researcher must take into account the mutual funds which ceased operations as they were part of the initial opportunity cost of any investor seeking to invest in a mutual fund during the beginning of the referring period. Failing to do so will exaggerate performance results in favor of the actively managed mutual fund sample group. Apple to apple comparison standard indicates that analogies should be made between identical in nature, size, and structure samples. To illustrate, the researcher cannot claim that the performance of a bond mutual fund is inadequate when benchmarked against an index such as the S&P 500, which is comprised of stocks. When performance is calculated in a time-weighted

return rate (TWRR) instead of a money-weighted return rate (MWRR) base, it constitutes a notorious fallacy when the intended goal is to emphasize the returns earned by the investor group and not the manager's competence. Behavioral reality is that investors place their capital in a mutual fund after the exceptional performance is achieved and announced by the investment company. Hence, returns adjusted for cashflows in contrast to those adjusted for time are significantly diminished in case of overperformance ceases to persist. Average returns of a mutual fund group are often calculated by applying equal weight among funds. Thereby, mutual funds with less AuM are able to impact the overall average identically to larger funds. To eliminate this false notion, mutual fund returns are weighted with their net asset values. Therefore, a mutual fund with 1 billion $ in AuM is more significant to the group's average than a mutual fund with 100 million $ of assets.

Figure: 4 Number of Mutual Funds Entering and Exiting the Industry



Source: Investment Company Institute

2 Basic concepts

2.1 Investment company

An investment company is a financial institution with a primary role of engaging in the business of investing. The company invests the participant's capital and issues shares or units representing ownership in the collective investment. Hence, participants receive professional asset management services in return for a fee that may vary according to performance. Investment companies are regulated by the Securities and Exchange Commission and must register under the Investment Company Act of 1940. They must also abide by the Securities Act of 1933 and the Securities Exchange Act of 1934. Currently, under the US securities law exist five categories of investment companies:

- Open-end Management Investment Company

- Closed-end Management Investment Company
- Unit Investment Trust
- Management Company
- Face amount certificate Company

Unregulated investment companies do exist e.g., hedge funds; however, they are irrelevant to this study mainly due to capital thresholds, which render them unavailable to most investors. Furthermore, rigid data disclosure policies regarding function and performance present a significant impediment to their fair evaluation.

2.2 Investment funds

An investment fund is a scheme created by consolidating capital provided by a group of participants into a money pool. The pool is managed under a professional organization -in this case, the investment company- which invests the capital according to a predetermined strategy proportionate to the dictated risk aversion level. Therefore, investors in exchange for a fee enjoy superior portfolio management based on their desired rewards. Funds differ greatly in investment principle, structure, cost, portfolio allocation, and consistency. Modern portfolio management revolves around two fundamental principles, commonly known as active or passive investing. The active approach requires top-tier capacity to be exercised by the fund in order to exceed the returns of a relative benchmark. On the other hand, passive management's sole aim is to minimize costs parallel to replicating the composition and hence delivering similar returns to those of the relative benchmark. Exposure to every domestic or international asset and sub-asset class is available through active and passive portfolios.

2.3 Active management

Traditional asset management rests on the notion that markets are inefficient, indicating that asset price valuations tend to be occasionally wrong. Thereby through the utilization of superior knowledge, experience, and sophisticated algorithms, managers are, in theory, able to exploit those misconceptions. The goal is to achieve above-average returns for fund investors by exceeding the performance of relative benchmarks or broad barometers such as the SP& 500. To outperform the market's averages or more widely known as beating the market, managers must evaluate asset and sub-asset prospects in relation to complicated sets of parameters and historical data extensively. Overall, the pursuit of abnormal returns or "alpha" comes at a great monetary cost as great effort and expenses are required by the management to suffice for a promising portfolio composition and strategy. However, research has shown that for most investment funds, the practice of proving the market consensus wrong consistently underpinned below-average performance.

2.4 Passive management

On the other hand, passive management, based on the theoretical foundation of the efficient market hypothesis, requires no exceptional skill or ability to implement. A passive fund's single objective is to closely emulate the

composition and returns of a relative index[1] while minimizing expenses. Hence, portfolio assets are weighted as well as fluctuate in tandem to the benchmark's composition and volatility. Indexing is applied for both broad and niche market segments, with the majority of AuM tracking broad market indices like the S&P 500. Successful indexing is defined as a fund's ability to imitate the exact returns provided by its relative benchmark consistently. However, illiquid market segments may not be liable for the investment fund to emulate perfectly. In such cases, the manager may resolve to sampling, replacing cost-inefficient assets with other highly correlated financial products in pursuit of providing equivalent returns to the index.

2.5 Investment Company Schemes

2.5.1 Open-end investment fund

Open-end investment funds (widely known as mutual funds) are pools that expand or contract according to cash flows. Specifically, the pool expands in correspond to share issuance (inflows) and shrink during share redemptions (outflows). Shares are issued and redeemed directly by the fund in the NAV[2] value, while their distribution is usually outsourced to third parties who act as brokers. Management is passive or active, with either existing portfolios covering the entire market. Share or unit value is directly linked to the underlying NAV asset values and is calculated once a day, subsequently to trading hours. Mutual funds are the cornerstone of collective investments, with the majority of AuM represented under the open-end investment structure.

2.5.2 Closed-end investment fund

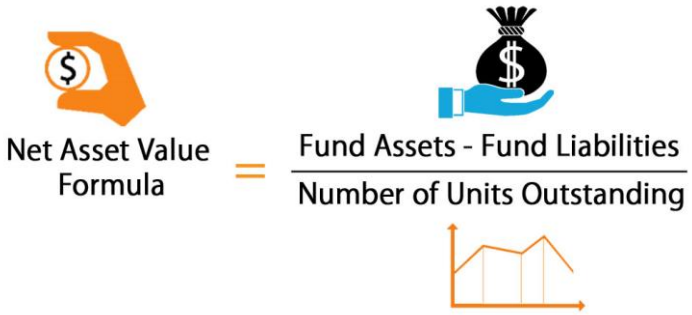
Closed-end investment funds are pools that raise capital during a single round (IPO). Initially, they issue a fixed number of shares, although subsequent share offerings and dividend reinvestments are possible, which are then listed on the stock exchange or trade OTC. Hence, the capital pool is retained fairly stable, with share or unit transactions fulfilled through the stock exchange. Therefore, the share price is designated in the stock market according to supply and demand and not exclusively by the NAV value, which may result in shares trading at a premium or discount.

---

[1] An index or benchmark is a collection of assets e.g., stocks, bonds with identical or close related properties, which are grouped together to represent a specific market segment.

[2] Net asset value or NAV represents the per share value of the investment's funds' assets minus its accrued liabilities at a specific point of time. SEC regulations oblige mutual funds and ETFs to calculate the NAV value at least once a day.

Figure: 5 The Net Asset Value (NAV) formula



2.5.3 Unit Investment Trust (UIT)

UITs are registered investment companies that resemble both open-end as well as closed-end funds. Their distinctive characteristics reside on the fact that they incorporate a termination date based on predetermined goals, in addition to being neutral managed. Initially, they issue a fixed number of units which represent ownership to the underlying portfolio. Federal law obliges UITs to maintain a fixed portfolio with composition alternations solely possible under limited occasions. Thus, in contrast to active and passive managed funds, UITs are, in essence, unmanaged. Outstanding units are redeemable by law on request of the holder in their underlying NAV value. Besides, trust sponsors may maintain a secondary market in which units can be sold back to the sponsor and letter resold to prominent investors. The trust during the termination phase pays the proceeds accordingly to the unit holders, or in case of a holder's election, they are reinvested in another trust. UITs are identified as either equity or bond trusts. Based on historical data measuring the percentage of allocated assets since the introduction of the unit investment trust structure in 1961, bonds were the predominant asset class with equities growing in popularity for the last two decades, accounting for 86% of assets at year-end 2018.

2.5.4 Exchange Traded Fund (ETF)

Introduced in 1993, exchange-traded fund features are comparable to both closed-end as well as open-end funds. The resemblance to the closed-end structure being that ETF shares trade in the stock market like any other publicly listed share, contrarily to mutual funds whose price settle after the market close. Whereas their outstanding share number changes daily as it happens with an open-end fund structure as shares are created and redeemed. It should be noted, however, that individual shares are not created or redeemed based on their NAV value by the provider, but with the assistance of pre-determined institutions known as authorized participants. APs engage in in-kind transactions with the ETF provider by exchanging in both ways' blocks of shares (creation units) with security baskets. This creates an arbitraged mechanism intended to minimize price deviations between the ETF price and the underlying NAV value. Most ETFs are considered passive investments as they track the performance of specific market benchmarks or indices, which minimizes their incurred expenses.

Since they are mostly index-based, they are registered under the Investment Company Act of 1940. Nonregistered with the 1940 act and active managed ETF's comprised only 4% of ETF net assets at year-end 2018. Moreover, they are offered virtually on every asset or sub-asset class, ranging from traditional to alternative investments. Overall, they do not require investment thresholds that determine the least amount of capital needed to participate, but on the other hand they are accompanied by transaction costs as any other marketable security. Tax-efficiency is related to the operational structure of the individual fund (multi/dual-share, stand-alone, or master-feeder structure). ETFs are designed to provide cheap and quick exposure to a wide spectrum of assets and strategies. This indicates that products may vary considerably in terms of risk (e.g., leveraged, inverse leveraged, esoteric), style (e.g., stock, bond, commodity, currency, alternative, exotic) and management (e.g., active, passive). Thereby, the investor must always perform due diligence prior to the allocation of capital in ETFs to ensure that he is getting the appropriate form of exposure to his portfolio.

2.5.5 Index Fund (TIF)

Index funds operate as open-end mutual funds that specialize in closely tracking major stock and bond indices like the S&P 500, Nikkei 225, FTSE 100, and the Bloomberg Barclays US Aggregate Bond Index. That type of investment bets on a steady world economic growth in the long term that will ultimately push asset prices upwards over the years. Every index fund is considered to own a segment of the economy since passive managers do not pick assets manually but instead emulate precisely the composition of a major index. This passive procedure eliminates a plethora of investment risks such as manager risk, individual asset risk, and sector risk leaving only market risk to be assumed by the passive investor. However, the embedded competitive advantage for every passive investment is the minimization of incurred costs that translate in enhanced bottom-line returns for the investor. TIFs do not charge sales load fees and require minimum management and operational expenses. Besides, their portfolio turnover is the lowest among mutual funds, which further reduces transaction costs and amplifies tax efficiency on capital gains. The above factors drive the cost of index fund ownership at rock-bottom levels, constituting index investing vehicles extremely efficient when compared to actively managed alternatives.

2.6 Investment company returns

There are three basic ways for a mutual fund or ETF to provide returns on investment for shareholders. It must be noted that, corporate level taxation is avoided by the investment companies as determined by their RIC[3] status.

[3] Any investment entity structure can identify as a regulated investment company if deemed eligible by the Internal Revenue Service (IRS). RIC status ensures that investment companies operate under the conduit theory in which tax obligations arising from capital gain and income distributions are passed to fund shareholders. Alternatively, distributions are taxed both on corporate as well as shareholder level. Among other requirements, RICs are required to pay shareholders a minimum of 90% of investment company taxable income so they will not be

That ensures that any income distributed to investors will not be double-taxed on both corporate and personal levels.

2.6.1 Capital gain distribution

Mutual fund or ETF portfolio holdings may increase in value over time. The excess value is called capital gain, and according to fund policy, it may be distributed to the shareholders. Investors should always bear in mind that capital gain realization may entail a future tax obligation.

2.6.2 Dividend/Interest payment

Assets comprising the investment fund portfolio may provide income as compensation to shareholders or debtholders. The accumulated income US regulation requires US-domiciled mutual funds and ETFs to distribute at least 90% of their income to investors. Equity and real estate mutual funds and ETFs distribute dividends based on their underlying holdings while bond mutual funds and ETFs distribute interest based on their fixed income securities. Income payments are accumulated by the fund and distributed periodically, usually every quarter. Investors are usually given a choice to reinvest income deriving from capital gain distributions or dividends (DRIPs) in exchange for additional shares. Income reinvestment benefits integrate the adoption of the dollar-cost averaging strategy parallel to compounding investment growth with more shares, which in turn generate further income. Finally, investors ought to evaluate the tax consequences of any fund payment, in this case being the distinction between qualified[4] and ordinary dividends[5].

2.6.3 Increased NAV/Increased Market Price

Mutual fund and ETF portfolios, when increased in value after the accounting of liabilities and expenses, result in higher NAV price per share. However, for ETFs, the market may designate a price premium or discount. Shareholders, according to share NAV price or market price, have the ability to redeem their

---

taxed on the corporate level. Nonetheless, most RICs distribute 100% of net investment income to avoid any fund-level taxation.

[4] Qualified dividends are eligible for special tax treatment, which entails their favorable taxation under the capital gain tax rate (0%, 15%, 20% depending on tax bracket). Qualified dividends must meet specific requirements outlined below by the IRS:
Holding period: The distributing fund must hold the income paying security for at least 61 days (more than 60 days requirement) out of the 121-day period beginning at least 60 days prior to the ex-dividend date of the security. Moreover, the investment fund shareholder must own the fund's shares for also for more than 60 days.
Qualified companies: Only dividends originating from US corporations and qualified foreign companies, usually referring to those listed on the US market or trade through an ADR (American Depositary Receipt), are eligible for favorable tax treatment.
IRS exemptions: Dividends or interest paid from REITs, MLPs (Master Limited Partnerships), employee stock options, tax-exempt companies, special one-time dividends, deposits and the income deriving from hedging purposes such as short selling and call/put options do not qualify for taxation under the capital gain tax rate.

[5] On the other hand, non-qualified dividends are the most common dividend type paid by every security unless otherwise stated. Ordinary dividends are taxed as ordinary income according to the shareholder's tax bracket, which may entail a hefty tax liability.

shares at NAV value or sell them through the stock exchange. Share value is related to future dividend payments in addition to unrealized capital gain size; thus, it is unwise to buy shares prior to an incoming distribution, which will result in the investment be reduced by precisely the distribution's tax obligation.

3 Mutual fund/ETF compositions

3.1 Equity funds

Stock funds invest their available capital pool mainly on equities. Despite equities being volatile assets, their long-term return has rewarded common and preferred shareholders alike more than any other asset class. To illustrate, for the period 1900-2018, the annualized return (or CAGR - Compound Annual Growth Rate) on US equities was 9,69%. In the hypothetical scenario of someone investing 1$ back in 1900, his investment would have grown to 59.925,42$ by 2018. However, in reality, we have to adjust for inflation taking place during the 118-year period; by doing that, we conclude that the real return on investment is 6,54% per annum or 1.884,6$ in dollar terms.

3.1.1 Size

Large-Mid-Small Cap

Equity funds, according to investment strategy, may choose to allocate part of their capital or focus exclusively on stocks that match specific criteria. A popular factor is capitalization due to the fact that cap groups are perceived to incorporate certain general characteristics. For example, large-cap stocks are usually stable entranced corporations with limited growth, steady dividends, and little chance for bankruptcy during the sort-term future. On the other hand, small-cap stocks are perceived as growth-oriented companies that have the potential if they survive to evolve into large or mid-cap stocks. Thereby, an equity fund described e.g., as large-cap focuses only on the highest capitalization stocks found in an index, country, or continent.

3.1.2 Sector

Another widespread factor used for niche market exposure is sectors. The economy is split into segments called sectors in which corporations undergo comparable external and internal environments while offering closely related products and services. An investor, for example, may decide to overweight corporations that operate in the energy sector by choosing an equity index fund or ETF, which tracks the MSCI USA Energy Index. To conclude, currently exist 11 recognized sectors which are represented by their relative benchmarks:

- Materials
- Industrial
- Financial
- Energy

- Consumer discretionary
- Information technology
- Communication services
- Real estate
- Health care
- Consumer staples
- Utilities

3.1.3 Investing Approaches

Value-Growth-Core-Blend

A fund categorized as “value” implement a value-based investing strategy. Value investing boils down to picking assets whose fundamentals do not reflect their current price. In other words, they are considered undervalued at their current price. A potential portfolio fund candidate is deemed undervalued if certain value criteria are met, usually funds identify undervalued issues based on earnings and book value. Companies that constitute the value group typically offer limited upside potential but instead provide safety in addition to a regular and steady dividend income. Value mutual funds and ETFs are best suited for investors who aim to obtain higher expected returns than bonds but also require a standard level of safety.

On the other hand, growth refers to companies who trade above their intrinsic value (overvalued). However, their revenues, cash flows, and ultimately profits are expected to grow at an above-average pace leading to capital appreciation. In general, growth companies do not distribute dividends as every available resource is reinvested back into the company so to achieve maximum possible expansion. Growth stocks are not guaranteed to accomplish their business plan viably and, therefore, experience increased volatility. Thus, risk intolerant investors who do not plan on long term investing are advised to reconsider the acquisition of such mutual funds or ETFs.

Core mutual fund or ETF positions are referred to as a portfolio’s building blocks, which may be constituted by either equity or bond holdings. The lamp sum of the investor’s capital (60% - 80%) must be allocated on core positions that embody both value and growth attributes with weights varying according to investment company strategy. Core equities are typically large-cap companies that incorporate both value and growth characteristics. Similarly, core bond funds invest in highly rated issues that are considered risk free (T-bond) or close to risk-free status (high investment-grade corporate bonds).

Blend mutual funds or ETFs are a distinct form of hybrid funds that combine value and growth elements. This approach emphasizes on gaining capital appreciation through the growth component while maintaining a robust income yield by the value constituent. Blend funds cannot be defined as core parts of the portfolio since they can be comprised of issues of any capitalization size.

3.2 Bond Funds

Bond mutual funds or ETFs are schemes that collectively invest in fix-income securities. Such funds diverge significantly in terms of maturity, quality, and future tax implications. Their purpose is to adequately diversify the investor's portfolio and provide income yield at regular time intervals. Bond funds are essential in conservative portfolios such as the ones that aim in income yield during the individual's life distribution phase. Underlying assets in some bond funds can also include other debt instruments such as collateralized debt obligations and mortgage back securities in order to improve the income yield. Funds are generally placed under any of the following categories:

- Government
- Municipal
- Investment grade
- High yield
- International

Government bond funds invest entirely on treasury and government agency securities. Treasuries are considered to be the risk-free market benchmark since the U.S. government can always issue excess fiat currency to pay its outstanding debt. At year-end 2018, investment companies held approximately 13% of the total government outstanding securities. Municipal funds invest their capital in fix-income securities that are issued by state and local governments. As of the same time period, investment companies held 25% of all outstanding municipal securities. After their evaluation by rating agencies, bonds that have a credit rating above BBB or Baa, are regarded as investment-grade issues. This indicates that they have a low chance for default, while bonds that fail to meet this criterion are addressed as "junk" or high yield issues since they must pay more interest to compensate for the excess risk. International bond funds, as their name implies, focus on debt-instruments that are issued by governments and corporations that reside outside of the U.S. boundaries. At year-end 2018, investment companies owned 20% of outstanding corporate bonds and foreign bonds that were held by U.S. residents. Income derived from bonds issued by the federal government and its agencies is free from local and state taxes. Likewise, income from municipal bonds is exempt from federals taxes and may also be free from state taxes in the state where the bond was issued. In any event, the common investor is always advised to consult a professional tax advisor to obtain information about the local tax regulation.

3.3 Balanced Funds

Balanced or asset allocation funds are characterized by their diversification among stocks and bonds, which may occasionally include money market instruments to reduce portfolio risk. Assets are allocated on a relatively fixed basis (e.g., 60/40 stock-bond portfolio), which is rebalanced on regular time intervals. Balanced funds are often confused with blend funds as they are closely related. The main difference is that balanced funds include both equity and fixed-income instruments, while the typical blend fund is comprised of

equities. According to the efficient frontier[6] balanced funds are able to achieve superior risk-adjusted returns due to their innate design to combine at least two asset classes.

3.4 Target Date Funds

Comparable to balanced funds, target date or retirement funds resort to the utilization of more than one asset class, with that often be other funds. They aim to act as long-term holdings that accumulate capital toward a pre-defined future need (retirement, college tuition). The name of the fund is often a reference to the pre-determined goal, such as “Retirement Fund 2055”. For that reason, the allocation of capital is not fixed among asset classes but alters gradually to more conservative allocations in due course. It must be stated, however, that target-date funds are not guaranteed to achieve the desired goals as market conditions may deviate substantially from historical norms.

3.5 Money market Funds

Money market funds are used globally by both institutions and retail investors as a proxy to cash positions by investing in top-grade short-term securities. These low-risk, highly liquid investments must have maturities equal to or less than 397 days (approximately 13-months) and, on average, have a WAM of 60 days or less. These securities are usually repurchase agreements (repos), treasury bills, top-grade commercial paper, bankers’ acceptance, certificates of deposit, and other money market mutual funds. Money funds in the U.S. aim to have a stable 1$ NAV[7], or in other words, never depreciate the initial capital of the investment. Despite being a rare occurrence, when the NAV value of a fund falls below the 1$ mark, it said that the fund “broke the buck.” Money market funds produce much lower returns than equities and bonds but, on average, offer an amplified yield than bank deposits. According to the ICI, the following structures are universally recognized to be the most widely used money market vehicles.

- Government Money Market funds
- Prime Money Market funds
- Tax-exempt Money Market Funds

Government money market funds invest 99.5 % of their capital in government securities, cash, and repos that are collateralized by the two former classes. Prime funds invest mostly in corporate debt securities in addition to allocating a smaller proportion of their capital in short term government securities.

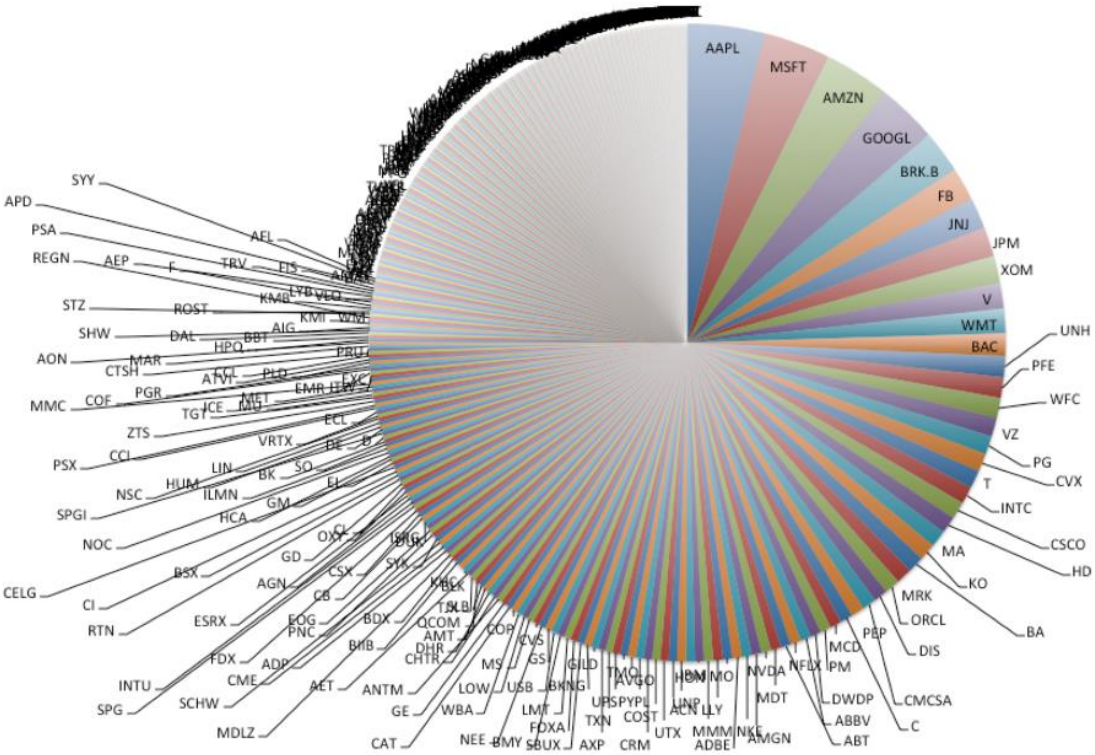
---

[6] The efficient frontier or portfolio frontier proposed by Markowitz H. in 1952, is a curve that represents sets of optimal portfolio combinations. Points in the curve, depict the highest possible expected return for any given level of standard deviation (risk) or the lowest possible standard deviation for any given expected return value. Therefore, sub-optimal portfolios (e.g., 100% bonds), if optimized, have the capacity to achieve higher expected returns by assuming the same amount of standard deviation.

[7] Institutional prime and municipal money market funds maintain a floating NAV value.

Lastly, tax-exempt funds invest primarily in state and local debt securities that entail the benefit of exemption from the federal income tax liability.

Figure: 6 Illustration of a typical index fund portfolio that tracks the S&P 500 index



4 Theoretical Background

In the course of this chapter, a concise review of the most prominent academic literature will be made. The aim is to introduce the reader to fundamental concepts and academic research which defined the field of finance for years to come. Extensive literature exists covering all aspects of finance, addressing both narrow and broad scope topics. However, referring to even a modest subset may overwhelm the determined reader, with unnecessary for the objectives of this study, scientific jargon. Aforesaid, only a handful of scientific literature will be presented to provide for a stable foundation.

4.1 Efficient market hypothesis - Behavioral Finance

In 1970 Eugene F. Fama outlined the efficient market as “A market in which prices always fully reflect available information.” The EMH indicates that a unique price exists for every security which incorporates all available information during any time frame. The model makes use of three underlying assumptions that Fama deemed sufficient but not necessary regarding the required conditions for an efficient market to take place. The first one considers that security transactions are free of charge while the second assumes that all available information is freely accessible by every market participant, and the third adopts the notion that all participants agree on the

price implications of information. Fama noted for the last two criteria that they are “not descriptive of markets met in practice.” At the same time, during an interview at the Chicago Booth Review, he stated the following for the EMH: “It’s a model, so it’s not completely true. No models are completely true. They are approximations to the world.”. According to Fama, market efficiency is divided into the following three levels according to information availability:

- Weak
- Semi-strong
- Strong

Weak form refers to the price formulation, which is derived from historical information and events. Semi-strong indicates that prices adjust based on publicly available information such as earnings reports, M&A, and other events. Finally, a strong market efficiency implies that prices further reflect non-publicly announced data or monopolistic access to information. In 1973, the release of the first edition of Burton G. Malkiel’s acclaimed book *A Random Walk Down Wall Street* introduced the random walk concept to a broad audience. Random walks indicate that the sequence of past returns does not provide any useful insight in assessing future return distributions since the unimpeded flow of information which influences price alterations is randomly generated. However, the model does not assume past information to be of no value, especially since returns are considered to be stationary throughout time. Malkiel claimed that due to market efficiency, even a chimpanzee is capable of selecting a portfolio that performs as well as those managed by professionals. In a 2003 paper attempting to uphold the EMH, Malkiel stated that neither fundamental analysis -the analysis of financial information such as annual reports- nor technical analysis -the analysis of past trends and price movements- can assist the investor in achieving greater than average returns. Thus, both Fama and Malkiel signify that since prices reflect every bit of available information -in a semi-strong efficiency level- and given that information flow randomly the sole rational option is to own a diversified (passive managed) portfolio which will obtain a rate of return similar to the one achieved by the market.

Despite Fama’s rational arguments that bind theory and action in the financial markets into a unified and elegant theory, deviations from the EMH cannot be overlooked. Black swan events indicate explicitly that financial markets are not entirely logically driven. Even more, the notion that every market practitioner is a “rational optimizer” or interpret a given fact equal to everybody else is fundamentally flawed when human behavior is taken into account. The field of examining finance from the standpoint of human phycology and sociology is called behavioral finance. Hence, deviations or anomalies observed from the EMH are regarded to be of behavioral nature. Active management proponents argue that anomalies constitute opportunities that can be exploited for higher than average results. Robert J. Schiller’s (2003) overview of how behavioral finance evolved through the decades cite that the biggest problem faced by the EMH during the 1980s was the existence of

excess volatility or volatility, which cannot be explained by the EMH model. Schiller defined volatility as the deviation between real stock prices and present values of subsequent real dividends for the SP500 index. He demonstrated that even though real value behaved in a stable trend, the price fluctuated wildly. This display of irrational behavior Schiller thought to be much more troublesome for the EMH than any other financial anomaly, such as the January effect [8] or the day of the week effect[9]. He concludes that despite efforts to provide a viable explanation, the presence of undefined factors or "noise" as it is scientifically called, ultimately determined market movements. Malkiel (2003) defended the EMH by stating: "Given enough time and massaging of data series, it is possible to tease almost any pattern out of most datasets." In essence, he implied that a plethora of behavioral patterns or anomalies are the product of sample selection bias or data mining. However, Malkiel, during the length of his phenomenal book "*A Random Walk Down Wall Street*" proposes investing guidelines, which diverge from the passive management approach -a somewhat controversial topic for a proponent of the EMH and random walk-. In the 1990s, the accumulated amount of evidence contradicting the EMH established eventually behavioral finance as a respected academic field. What had started as the "prospect theory[10]" (1979), developed by two phycologists Daniel Kahneman and Amos Tversky and later optimized by financial theorist Richard Thaler for utilization in the financial markets, evolved nowadays to what may be the only viable option of reconciling reason with human behavior.

4.2 Performance

William F. Sharpe (1991), stated that: "if active and passive management styles are defined in sensible ways, it must be the case that:

a) Before costs, the return on the average actively managed dollar will equal the return on the average passively managed dollar
b) After costs, the return on the average actively dollar will be less than the return on the average passively managed dollar".

The above self-proving assertations, as Sharpe mentions, are the product of simple arithmetic. It is impossible to argue that over any specified time frame,

---

[8] This effect suggests that every December, stock prices dip, while prices receive a substantial boost during the month of January. This occurs, due to investors dumping securities that have experienced a loss in December and repurchasing them in January, to mitigate the upcoming effective capital gains tax (loss harvesting).
[9] This theory states that returns can be predicted based on the day a trade is realized. For example, studies imply that Friday returns are superior to the ones achieved on Mondays.
[10] Prospect or loss-aversion theory introduces a revolutionary concept in classical economics as it questions the original utility-based measurement as a standard of choosing between two or more viable options. Specifically, it assumes that the individual's loss and gain are perceived differently, establishing a behavior criterion. Therefore, the theory states that when an individual is faced with two equal term options, the first emphasizing on possible gains while the second emphasizes on possible losses, the individual is more likely to choose the first option. Hence, the decision-maker does not weigh both options equally, as losses are overestimated while gains are underestimated.

the market return is the weighted average[11] of every individual security return trading in the market. Thereby, every passive dollar tracking the market return, must of necessity equal the market return in a pre-cost basis. Hence, the average actively managed dollar must equal the market return as well. Since the overall return equals the passive return, the average weighted return of every actively managed dollar must be identical as well to the market return before costs. On that account, it is readily understood that both returns are equal prior to the deduction of costs. Hence, the sole differentiator between the two return groups is the deduction of cost. Active management, on average, requires far more resources to endure the expensive practice of trying to exploit opportunities to beat the average return. Thus, after the deduction of cost, passive returns must outperform active ones. Sharpe indicated that empirical evidence that diverges from the above principle is "guilty of improper measurement." Nonetheless, the above does not imply that overperformance is unattainable for the active group. Instead, it denotes that since active returns are a zero-sum game before the deduction of cost, overperformance on the part of one investor translates to underperformance on the part of another. Even more so, after the deduction of expenses, active investment represents a negative-sum game in terms of net returns to investors.

Morningstar, an investment research company, has repeatedly studied the impact of costs on mutual fund performance. Russel Kinnel director of fund research in Morningstar during a 2010 report, noted the following: "If there's anything in the whole world of mutual funds that you can take to the bank, it's that expense ratios help you make a better decision. In every single time and data point tested, low-cost funds beat high-cost funds. Expense ratios are strong predictors of performance. In every asset class over every period, the cheapest quintile produced higher total returns than the most expensive quintile. In a 2016 update on the topic, Kinnel reiterated: "The expense ratio is the most proven predictor of future fund returns. I find that it is a dependable predictor when we run the data" and later added: "Cheapest-quintile funds were 3 times as likely to succeed as the priciest quintile". Eugene F. Fama and Kenneth R. French (2010) conducted extensive research on the ability of active management to recoup expenses. More notably, they observed the following: "The aggregate portfolio of actively managed U.S. equity mutual funds is close to the market portfolio, but the high costs of active management show up intact as lower returns to investors." Furthermore, they emphasized whether above-average returns are the result of innate ability or the product of pure chance. Simulation results were characterized as "disheartening" for fund investors, quoting: "Few active funds produce benchmark-adjusted expected returns that cover their costs. Thus, if many managers have sufficient skill to cover costs, they are hidden by the mass of managers with insufficient skill". Hence, despite the failure of most mutual funds to recoup expenses and the effect of chance in either a positive or negative way, Fama

[11] Returns are weighted according to initial market values.

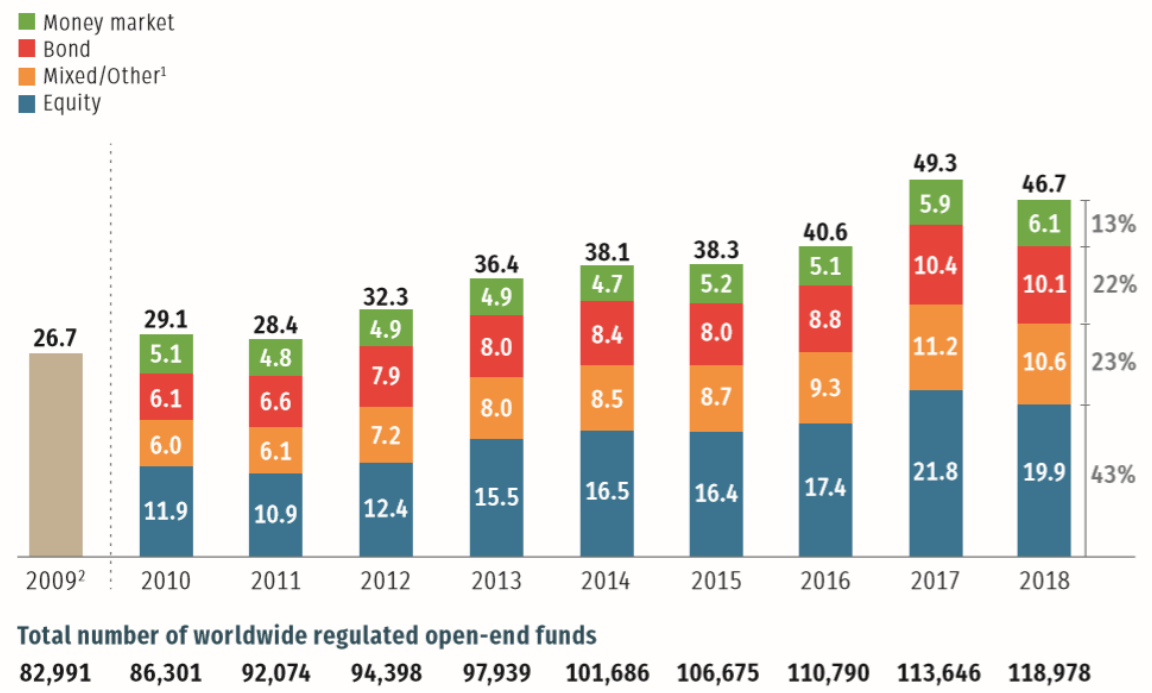
and French conclude that a group of fund managers do have sufficient skill to cover costs even though they consist a minority. Mark M. Carhart (1997), during an earlier research, demonstrated that persistence on mutual fund performance is a factor of momentum and cost. In more detail, he stated: “Results do not support the existence of skilled or informed mutual fund portfolio managers,” disregarding the idea of stock picking as a means to add value. He estimated that expense ratios account for a little more than a one-for-one drag on performance. At the same time, turnover reduced performance by 95 bps for every transaction, and the average no-load fund outperformed the average load fund by approximately 80 bps. It is important to mention that in both studies, research focused on the ability of managers to add value to fund returns in excess of the returns that a passive index investor could have gotten by passively maintaining exposure to the identical portfolio composition. To clarify, in case an actively managed fund outperformed the relative benchmark consistently e.g., due to higher exposure in international stocks as opposed to the S&P 500, the manager was neither skilled nor lucky; he just assumed excess risk. Hence, the investor could have enjoyed greater returns by substituting the active for the passive approach since passive management entails less expenses.

5 Perspective

Vanguard first introduced the world’s first index investment trust to individual investors on December 31, 1975. Theoretical inquiries that postulated index fund schemes and empirical data showcasing the inefficiency of active funds relatively to benchmarks acted as precursors even decades before. Wells Fargo and American National Bank had both established in 1973 the first two Standard and Poor’s Composite index funds, but they were reserved from the public as they were exclusively available to institutional clients. Later renamed to Vanguard 500 index fund after the Standard and Poor’s 500 index which it tracks, the robust initial criticism for the first index fund pivoted around the logical question on why someone would be content with average returns. The answer come gradually when the original 11 million $ asset base grew to 100 billion $ under management in November 1999 and eventually exceeded the Fidelity’s colossal Magellan fund in 2000.

Figure: 7[12] Total Net Assets of Worldwide Regulated Open-End Funds

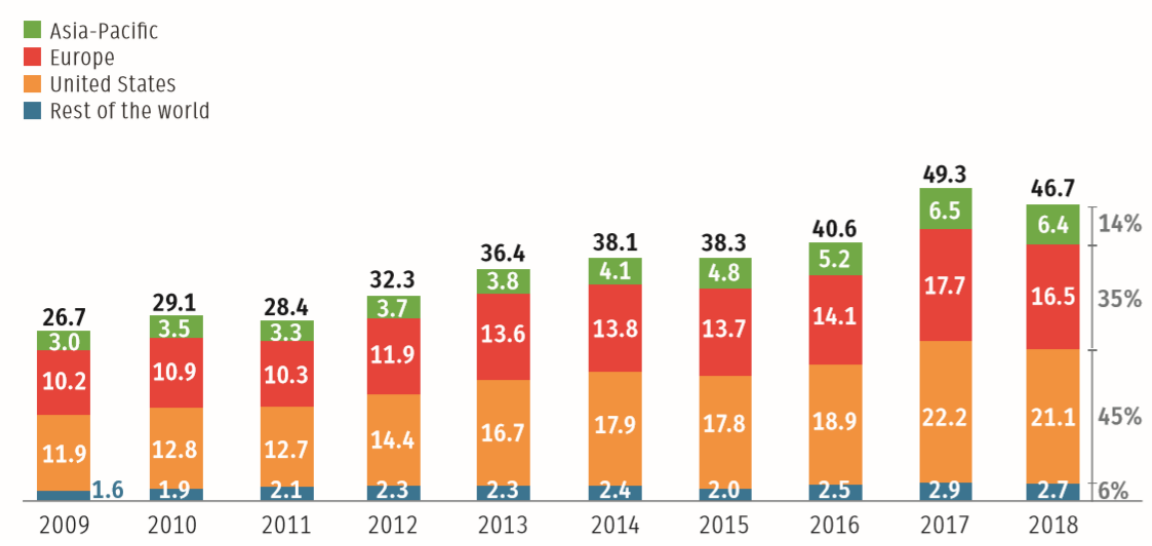
(Trillions $ by type of fund, year-end)



Source: International Investment Funds Association and ICI 2018

Figure: 8 Total Net Assets of Worldwide Regulated Open-End Funds

(Trillions $ by region, year-end)



Source: International Investment Funds Association and ICI 2018

Global demand for regulated open-end funds soared during the last decade. Assets since 2009 have increased by 74,9%, indicating the amassing need for

[12] Figure: 7 Not taking in consideration the mixed/other fund category as it is comprised of distinct asset classes e.g., 60/40 balanced funds and REITs.

professionally managed, regulated financial products that integrate excellent diversification properties. The lion's share of assets is in the United States (45%), with continental Europe being the next most prominent choice. Together they comprise 80% of the total regulated open-end mutual fund asset base accounting for 37,36 trillion $ in AuM. Equities constitute the preferred asset class with 43% of assets or 19,9 trillion $, with bonds being in the second most favored class with 22% of total assets. Assets held in worldwide regulated open-end funds since 2011, experienced a potent average growth rate of 7,36% per annum, reflecting the perception of a robust global economy. Global economic prospects deteriorated in 2018, as the decaying Sino-American trade relations and the unexpected growth deceleration of China triggered fears of a potential global economic slowdown. Eventually, in the fourth quarter of 2018, the S&P 500 plunged by 9% during December, this downfall ensued a 2,6 trillion $ asset value loss by open-end mutual funds. Correspondingly, stock returns for 2018 on US, European and Asian markets suffered stiff declines accounting for 5,3%, 14,3%, and 13,3%, respectively.

Figure: 9 Investment Company Total Net Assets by Type

(Billion $, year-end)

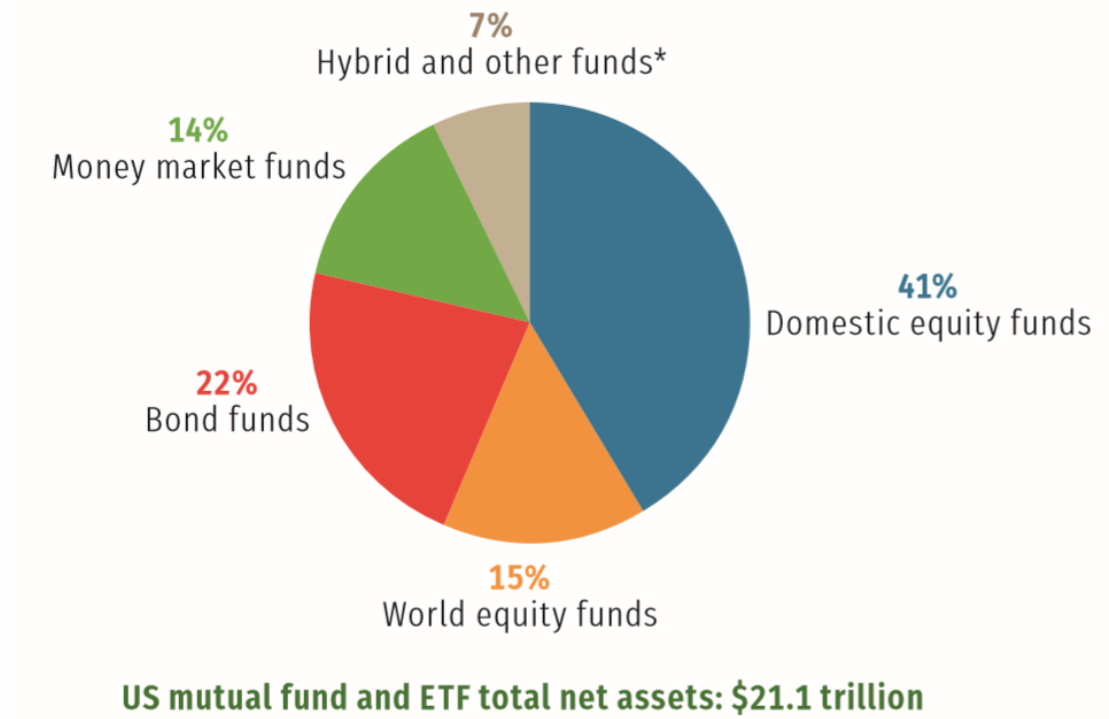
	Mutual funds	Closed-end funds[1]	ETFs[2]	UITs	Total[3]
1999	6,834	157	34	92	7,116
2000	6,956	150	66	74	7,245
2001	6,969	145	83	49	7,246
2002	6,380	161	102	36	6,680
2003	7,399	216	151	36	7,801
2004	8,093	255	228	37	8,614
2005	8,889	276	301	41	9,507
2006	10,395	299	423	50	11,167
2007	11,995	316	608	53	12,973
2008	9,619	185	531	29	10,364
2009	11,109	224	777	38	12,149
2010	11,831	239	992	51	13,113
2011	11,630	244	1,048	60	12,982
2012	13,054	265	1,337	72	14,728
2013	15,049	282	1,675	87	17,092
2014	15,877	292	1,975	101	18,244
2015	15,658	263	2,101	94	18,116
2016	16,353	265	2,524	85	19,227
2017	18,764	277	3,401	85	22,527
2018	17,707	250	3,371	70	21,398

Source: Investment Company Institute and Strategic Insight Simfund

US market asset allocation data since 1999 concerning the predominant fund schemes recognized under the investment company act of 1940 provide an insight into how investment in the mutual fund industry evolved. Albeit the introduction of ETFs in 1993, the first of them being the Standard & Poor's Depositary Receipt (SPY), promptly became widely favorable due to their unique properties. Originally, accounting for 34 billion $ or 0,48% of the total assets at year-end 1999 that figure ballooned to 3,371 billion $ or 15,75% of the total by year-end 2018. To underpin the strong demand, the ETF asset base growth tally to 29,09% per annum contrarily to 5,43% for the combined rest. Closed end-funds and UITs remained unfavorable with the investor group falling to attract substantial capital.

Figure: 10[13] Asset Allocation of US Mutual Funds and ETFs

(% of total net assets, year-end 2018)



Source: Investment Company Institute

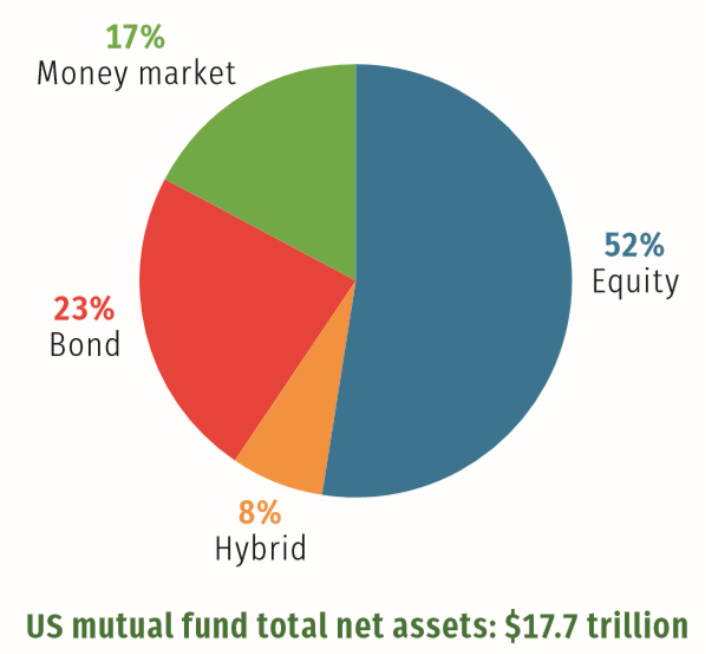
Mutual funds and ETFs conjointly constitute the vast majority of AuM, estimated at 21,078 trillion $ that are chiefly invested in long term positions. Equity funds, whether overweight domestic or international equities represent 56% of assets, significantly higher than the world's average of 43%. The same does not apply for hybrid and other funds[14], which deviate by negative

[13] Figure 10: Hybrid and other funds: Include both registered and not registered ETFs under the investment company act of 1940.
[14] Hybrid and other funds may invest in alternative asset classes, e.g., real estate, commodities, derivatives, cryptocurrencies, and carbon credits.

16 % points to the world portfolio. Bond, as well as money market funds, closely resemble the holistic asset allocation pattern.

Figure: 11 Asset Allocation of Mutual Funds

(% of total net assets, year-end 2018)

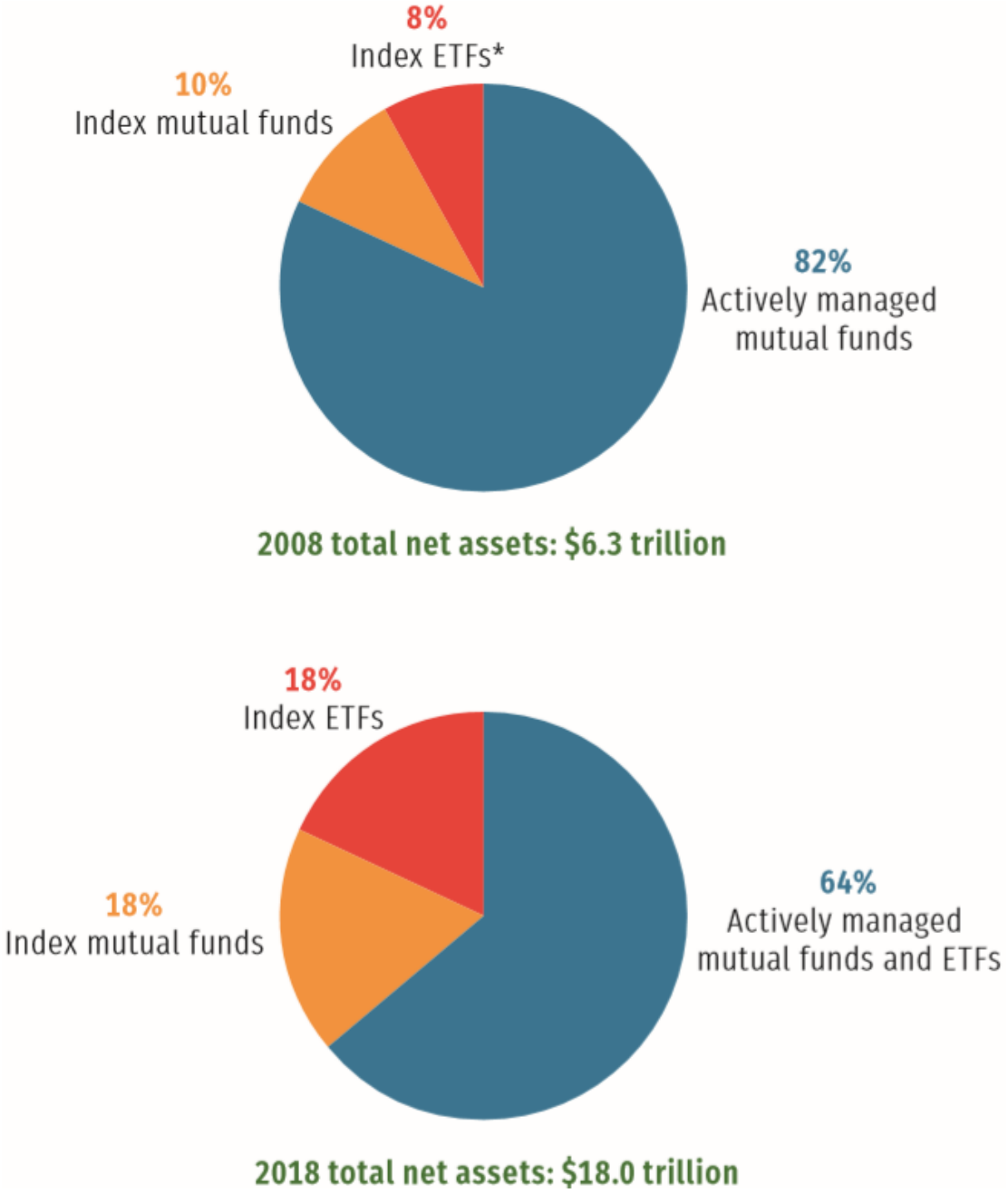


Source: Investment Company Institute

Subtraction of ETF assets provides a more detailed representation of the asset distribution pattern of mutual fund schemes, despite divergences being relatively small. In general, demand for mutual funds is influenced by financial objectives e.g., equity, bond, and hybrid funds are used by investors in order to secure long term financial goals in contrast to money market funds that are used as short-term cash storage. In 2018 long term asset classes experienced 350 billion $ in net outflows[15], chiefly on the grounds of deteriorating financial markets, increasing demand for index-based products, and ongoing demographic trends. Money market net inflows[16] during 2018 reached 159 billion $ as a probable reaction to the fourfold increase of Federal Reserve's fund interest rate, which renders money market returns more appealing. Notably, when ETF assets are excluded, money market assets are increased by 21,43% or 3 % points in the overall mutual fund portfolio. Hybrid funds increase by at least 14,29% or 1 % point as alternative investments (other funds) being exclusively ETF objectives.

[15] 2017: 72 billion $ net inflows, 2016: 193 billion $ net outflows.
[16] 2017: 107 billion $ net inflows, 2016: 30 billion $ net outflows (Federal Reserve increased interest rates three times during 2017).

Figure: 12 Asset Allocation of US Long Term Mutual Funds and ETFs



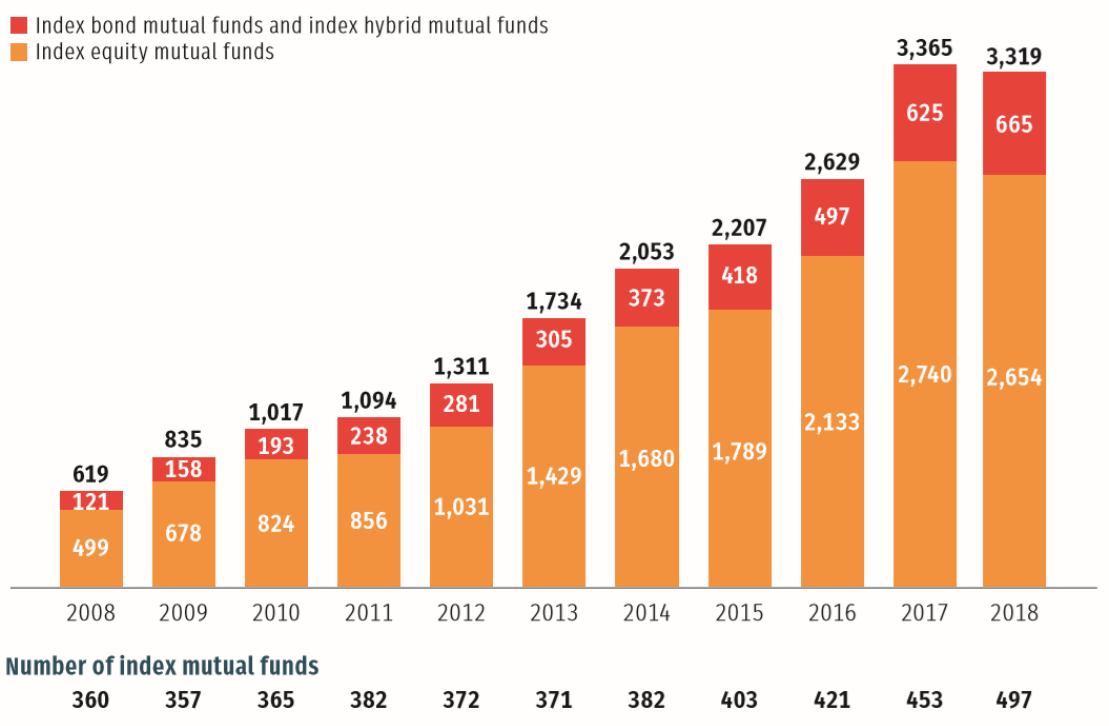
Source: Investment Company Institute

Index-based investments attained strong momentum during the ten year-period started in 2008. Passive assets ballooned from 18% of total assets to 36% by 2018, denoting the robust demand for index products. It is crucial to heed that the passive fund's excess growth occurred during a decade in which overall assets in long term funds grew by 186%. The bulk of index fund assets -accounting for 62%- as of year-end 2018, are concentrated in domestic equities, which make up 42% of present inflows. Despite indexing's amassed prominence since its inception, with estimated assets of 6,6 trillion $

in the US market alone, actively managed funds are still the preferred mutual fund scheme.

Figure: 13 Total Net Assets and Number of Index Mutual Funds

(Billion $, year-end)

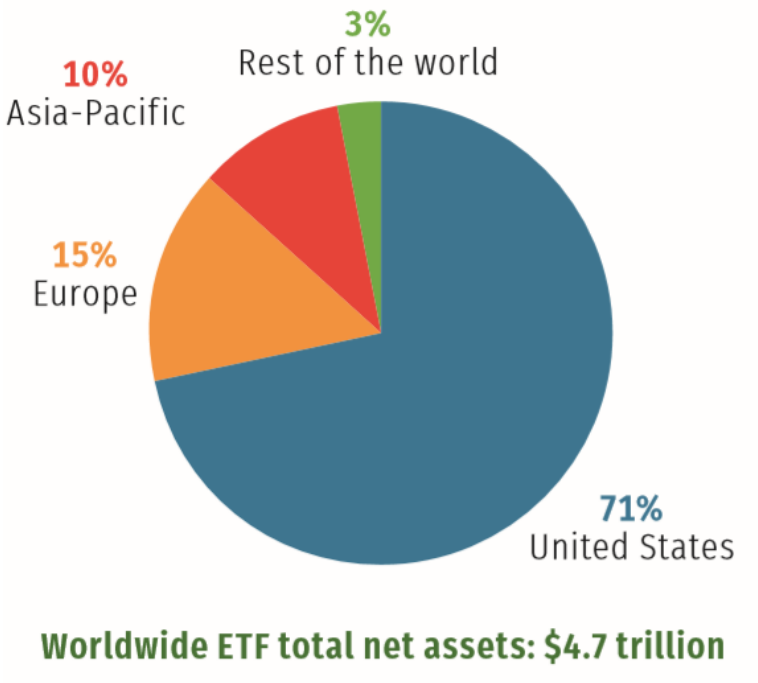


Source: Investment Company Institute

Index mutual funds experienced a 436% asset growth during the considered period, accounting for a nine-year record of positive net inflows. There are three predominant asset classes with the vast majority of capital being concentrated in equity funds, that make up 79,96 % of the total. Equities increased by 432% while bond and hybrid funds 450% for the decade. All in all, TIF assets rely heavily on broad market diversification, such as the one provided by the S&P 500 as derived by their long-term nature.

Figure: 14 ETF market size and geographical segregation

(% of total net assets by region, year-end 2018)



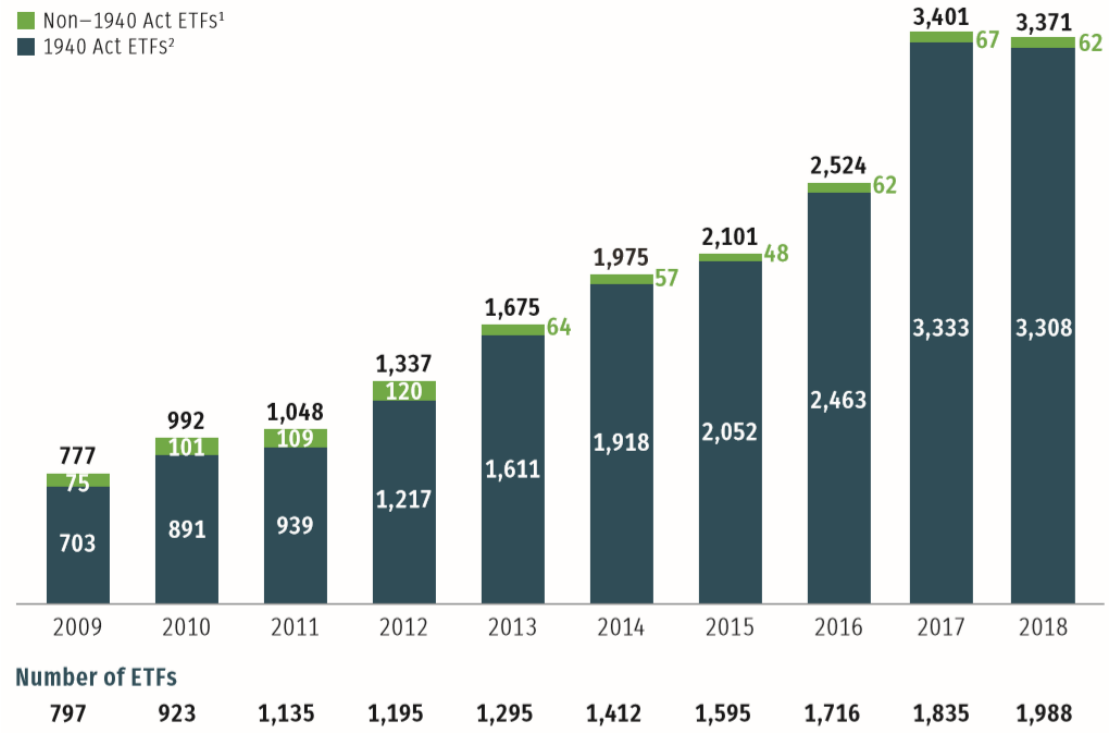
Source: Investment Company Institute and ETFGI

After its inception by Nathan Most in 1993, the ETF market has grown drastically as to become a vital component of the mutual fund industry. In essence, ETFs and TIFs are identical as both rely on an underlying index which they emulate. The contradiction arises from the investor's behavior to both financial products as measured from the annual turnover rates. TIF portfolios experience an average annual turnover rate of 10%, in contrast to 1400% by the average ETF. Narrow segment specialization (commodities, derivatives, etc.), in addition to leverage and derivative utilization by some ETFs (leveraged, inverse ETFs), highlight the participant's speculative spirit.

Assets are predominantly concentrated in the US market, which makes up 71% of the global market. The rest of the world lags notably behind as it accounts for 29% of assets, underlying the preponderance of the US market. ETFs thrived during the 9-year period, averaging 17,7% growth per annum, competing with both TIFs (16,57%) and the general regulated open fund category (6,49%) for the investor's favor. At year-end 2018, Assets slightly exceeded TIF assets by 52 billion $, with non-1940 Act ETFs (active managed ETFs) accounting for 62 billion $. Finally, it is crucial to cite the absolute number of available ETFs as opposed to TIFs, numbering a total of 1.998 possible investment baskets (497 for TIFs), indicating their extraordinary market segmentation focus.

Figure: 15 Total Net Assets and Number of ETFs

(Billion $, year-end)

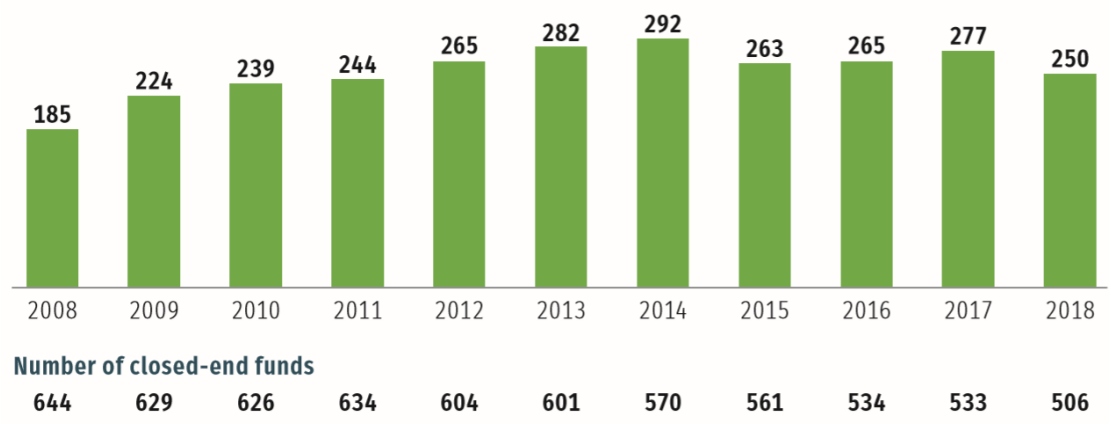


Source: Investment Company Institute

Closed-end funds issue a fixed amount of stocks that are distributed via an initial IPO, although subsequent stock issuance may occur. Fund shares are traded in stock exchanges according to the price designation of supply and demand or OTC. Due to their structure, cash reserves or asset liquidation for shareholder redemptions are not required. Thus, closed-end funds can invest in highly illiquid markets such as international small-cap stocks in emerging markets or special dept instruments. As of year-end 2018, 64% of total closed-end fund assets or 159 billion $ are invested in bonds (35% Domestic, municipal bond, 21% Domestic taxable bond, 9% International bond) with 36% or 91 billion $ being invested in stocks (27% Domestic equity, 9% International equity). Growth has stagnated (3,06%) since 2008, as asset expansion dramatically diverges from the overall trend experienced by the rest of the mutual fund industry. The above may also be induced by the fact that the absolute number of available closed-end funds during the considered period has declined substantially, as funds are merged, liquidated or converted into ETFs or open-end mutual funds. However, since 1999, closed-end funds have failed to present the needed edge to attract the investor's interest.

Figure: 16 Total Assets and Number of Closed-End Funds

(Billion $, year-end)



Source: Investment Company Institute

6 Cost structure

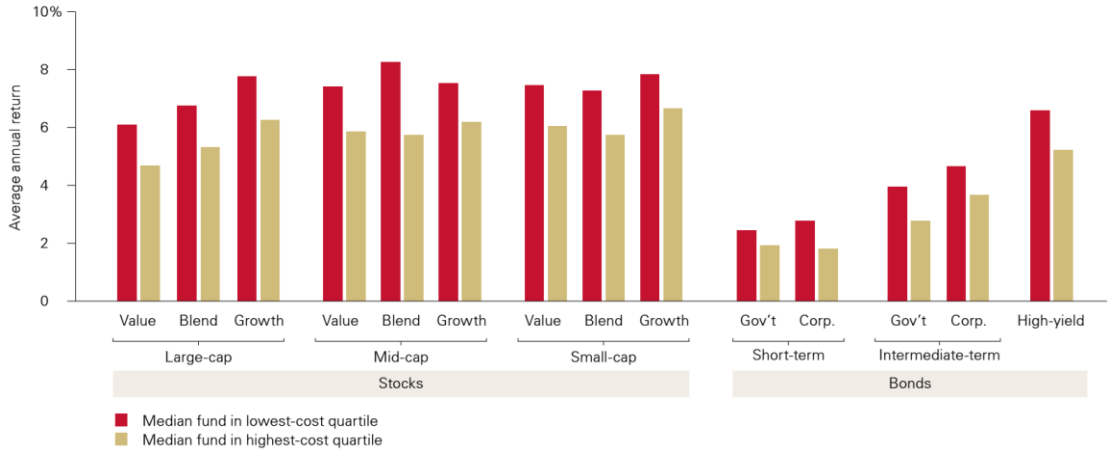
Even though, the economic cycle seems to be moving in long term (depressions) and short term (corrections, recessions) cycles according to historical data, the consistent prediction of them -more commonly known as timing the market- is rightly believed to be a futile expectation by the financial sector's leading corporations and individuals. In no case should the common investor attempt to time the ups and downs of the market or reside in one's ability to pick assets in pursuit of higher than average returns. Acts as these result in speculative ventures that may end up in disaster, costing a considerable portion of the initial capital and consequently evaporating possible future gains. Thus, the rational investor is faced with two viable options either choose a professional to produce alpha or aim at average market returns while keeping costs at a minimum. Based on our current knowledge, markets are unpredictable; however, minimizing the corrosive effect of costs is within reach of every investor. Mutual funds have a long list of upfront and hidden costs undermining the investor's long-term success and future gains. All investors are advised to examine thoroughly the costs that are entailed by investing in a financial product. In due time the size of them will eventually determine the net return on investment accomplished by the investor.

Cost act as a strong predictor of performance as research regarding the mutual fund industry indicates that low-cost investments tend to outperform expensive alternatives. Expense ratios, portfolio turnover, and load fees are significantly and negatively related to performance (Carhart, 1997). Over any specified time period, the return provided by the market will be a weighted average of the securities which comprise it; thus, investors as a whole prior to cost deduction realize exactly the average return. After costs, net returns must by definition be less than the gross ones. Exceeding or matching after costs

the market's returns is feasible solely by engaging in a zero-sum game, which signifies that for an investor to outperform net of costs, another investor has to underperform by the exact amount.

Figure: 17 Lower costs can indicate higher returns

(Average annual returns for the 10 year-period ending on Dec ,31 2016)



Source: Vanguard with Morningstar data

Vanguard, a mutual fund provider in a 2017 report, compared the 10-year returns of the median funds in two groups. The first group was comprised of 25% of funds that had the lowest expense ratios while the other with 25% of the funds with the highest ones as of year-end 2016. In every asset and sub-asset class evaluated, the lower expense ratio funds produced superior returns relative to their more expensive counterparts. Concluding, the lower the costs an investor has to bear, the greater the return he gets to keep, and ultimately, the more impactful the compound effect over time.

I. Expense ratio: This cost factor sums up several sub costs imperative for the fund's smooth operation and survivability as a profit-making scheme. The expense ratio represents the most significant cost incurred by the investor as a result of owning a mutual fund. It usually consists of operating, marketing cost (prior frond-end load sales cost for most load funds), and management fees. These outflows are subtracted by the gross return of the fund annually. Most investors abide by the misconception that the above upfront expenses sum up the total cost of owning a mutual fund. The sub costs below are calculated and paid as a percentage of the fund's assets; thus, they are paid indirectly by the investor. Finally, it should be mentioned that they take effect in every mutual fund scheme registered under the Investment Company Act of 1940.
    a. Management fees: This expense aims to compensate for portfolio supervision services provided by the financial professionals or third-party affiliates working for the financial institution. Ongoing operational expenses are also accounted here. Incentive or penalty provisions may be included according

to management performance. Professional remuneration usually is deemed to be at least half percent of the total management fee figure.

b. Distribution fees (12b-1): In 1980 SEC introduced an amendment to the Investment Company Act of 1940, establishing the 12b-1 rule. The new rule implied that mutual funds have the ability to compensate financial intermediaries through asset-based fees, which are paid indirectly by the mutual fund investors. Distribution fees are by no means essential for the fund's operation; however, they are exercised by the majority of mutual funds in pursuit of greater fund assets. The 12b-1 fee is also moderately used to pay for marketing and advertising campaigns. When imposed by the management, 12b-1 fees, contrarily to sale loads that impact the individual investor solely, will allocate the distribution cost evenly to every fund participant.

c. Administrative costs: This cost category accounts mainly for supplementary purposes. Legal accounting and recordkeeping expenses, custodial and transfer agent costs, as well as transaction service costs for the shareholders, are in their entirety included here. The above services may be outsourced to third parties, such as fund service organizations. In a few instances, part of the cash flow is directed to amplify the management fee category.

d. Other costs: This category may include the fund's excess costs, which stem from a plethora of investing or supplementary activities. Costs associated with Investment strategies, intended to provide additional hedging such as exposure to non-liquidate markets or by making use of OTC derivatives and structured financial instruments. Lastly, third party services provided to the fund's investors for instructional or educational purposes (shareholder service fees) can be found here.

II. Shareholder fees (1): These expenses apply exclusively to mutual funds and not to ETFs. They are charged directly to investors on an asset basis according to the time period a transaction is executed, such as a redemption or purchase of the fund's shares. However, sometimes these fees are charged annually as part of the expense ratio.

a. Sales charge on purchase (front-end load): Usually, during the initial purchase of shares in a mutual fund, a sales charge is being paid to the third party who acts as an intermediate in the distribution of the fund's shares. The fee, when charged, is calculated as a percentage of the total assets being invested by the individual. To justify the above expense, the investor should aim for an adequate holding period. Meaning that an initial 5%

sales load equals to a 1% annually if held for a 5-year period but only to 0,5% if held for a decade.

Figure: 18 Example of a front-end sales load [17]

Initial Capital	Front-end sales load %	Capital invested*
100	5%	95

b. Deferred Sales Charge (back-end load): Similarly, to front-end loads, back end loads are applied when the mutual fund shareholder sells or redeems his/her share position. The typical back end load is accompanied by what is known as a contingent deferred sales load (CDSC or CDSL). The CDSC acts in essence as a deduction at a maximum of 1% (0.25% 12b-1 fee included) of assets annually. For the sales load to be paid in full, an exit fee is established to prevent prime redemptions from escaping the total sales cost. The above dictates that the exit fee paid by the investor is related to the retention period, and it is regularly reduced to zero when certain holding periods are achieved. For certain funds, alternative share classes which do not integrate a 12b-1 fee do exist and automatically replace the old share class when the sales load is paid in full. The investor prior to investing in a fund with a back-end load should under any circumstance make sure that the 12b-1 fee does not carry on after the sale load is paid in full. Otherwise, the effective sales load is increased annually, diminishing whatever net returns may have been. When charged, back end loads will reduce the final return on investment. In any case, the investor should be aware that exit fees, when still on effect, act as a flexibility barrier for individual portfolio alternations.
c. In extreme cases -although, now almost extinct due to competition- there is the application of initial sale charges to DRIP's (Dividend Re-Investment Plan). When investment in funds that entail such charges is unavoidable, the investor is advised to receive the dividends due in cash.

[17] Assuming that no other costs apply at the time of purchase.

Figure: 19 Example of how CDSL work during a 10-year period [18]

Year	Annual 12b-1 fee	Cumulative 12b-1 fee	Applicable exit fee	Cumulative sales load
1	1%	1%	5%	6%
2	1%	2%	4%	6%
3	1%	3%	3%	6%
4	1%	4%	2%	6%
5	1%	5%	1%	6%
6	1%	6%	0%	6%
7	1%	7%	0%	7%*
8	1%	8%	0%	8%*
9	1%	9%	0%	9%*
10	1%	10%	0%	10%*

No load and low load funds do exist, although the current trend implemented by most funds is the reintroduction of the sales charge as a spread load (12b-1), as mentioned above. Added to the expense ratio, the result is a higher indirect annual fee paid by every investor participating in a mutual fund. No load and low funds should not be confused, as a greatly alternated cost structure may be present.

When sale loads are charged, the mutual fund ought to provide superior returns to justify the extra cost to its participants. However, higher returns, almost by definition, require greater risk to be assumed by the fund manager. Data as it will be presented later on, reveal that higher costs almost always lead to underperformance.

d. Purchase /Redemption fee: In contrast to front-end back loads, purchase or redemption fees are not paid to a broker but to the mutual fund itself as a percent of the investor's assets. The intend for imposing these kinds of fees is to mitigate costs that are paramount to the fund's investment strategy (e.g., involvement in low liquidity markets) and otherwise would have diluted the returns for the rest of the mutual fund's investors. SEC limits redemption fees to 2%.
e. Exchange fee: a charge imposed to investors who alter their assets within the same fund family.
f. Account fee: A maintenance fee charged by some mutual funds mostly on low asset accounts.

[18] A maximum load of 6% may be applicable for some funds.

III. Shareholder fees (2): These expenses are applicable exclusively to ETFs. Due to their structure, ETFs are designed to represent a mutual fund in the form of a common listed stock trading in a stock exchange. Consequently, most of the expenses required to trade a stock are identical in nature to the ones required to trade an ETF.
    a. Brokerage commissions: Individual investors participate in the financial markets with the help of a financial intermediator. Most commonly known as a broker, the intermediator not only fills the investor's orders but usually provides them with supplementary services like analyst reports, databases, and interactive internet environments. When an order is executed, the investor usually pays a flat fee for remuneration to the broker's services.
    b. Bid-ask spread: Every security traded in the stock exchange has a spread. The spread acts as a fee paid to the market maker for linking demand and supply together. It is comprised of two sub-prices the bid and the ask with bid always being inferior to the asking price. The bid is the highest price in which the market maker is willing to buy the stock from the selling party and ask is the lowest price in which the market maker is willing to sell the stock to the buying party. When a potential link is identified, and both parties accept the prices offered, the exchange proceeds and the market maker is rewarded with the spread or the difference between the two prices. The spread is related to the liquidity of a security with less liquidity, meaning a wider spread for the buyers and sellers.
    c. Premiums/Discounts to NAV: Market efficiency theory has numerous times been proven wrong, especially in the short term, resulting in asset valuations that greatly underestimate or overestimate the asset's intrinsic value. An ETF's underlying value is calculated by using the NAV (Net Asset Value) formula. In many instances, the market price -formed by the powers of supply and demand- creates potential losses or gains for the investor when compared to the NAV price.

IV. Share classes: Mutual funds -excluding ETFs- usually incorporate various share structures with alternative cost specifications. Under the current consensus, three generic kinds of mutual fund shares are established, with unique classes being available to individual funds.
    a. Class A: Usually, they include a front-end sales load and smaller than average 12b-1 distribution fees and consequently, a minimized expense ratio. Breakpoint discounts are available for some funds.
    b. Class B: A deferred sales load might be added in this share class in substitution of a front-end sales charge, along with 12b-1 fees and other annual expenses. CDSL charges may decline over time, or shares convert automatically to other classes

requiring lower annual expenses if specific holding periods are achieved by the investor.

c. Class C: In this share class, either a front-end or back-end load is presented in addition to 12b-1 fees and other annual expenses. Although the sales load tends to be lower than in other share classes, conversion to other share types like B Class is not possible, meaning that the back-end load is not reduced over time. Finally, higher expense ratios are expected here in relation to A and B share classes.

V. Transaction costs: Fund managers usually perform portfolio alterations during the year, trying to reposition the fund's assets so possible depreciation can be avoided in favor of new asset prospects, trends, and insights. Transaction costs are arduous, if not impossible to calculate precisely. The reason behind this challenging task lies in the fact that every fund's assets not only comprise a unique basket of securities with different levels of liquidity, but managers as well perform singular portfolio adjustments. Portfolio turnover frequency, fund asset size, and investment strategy are factors that significantly affect the overall transaction cost paid by the fund. It is pivotal to mention that the transaction cost cannot be considered an upfront cost by any means. Meaning that it is not disclosed to the investor despite acting as a drag to the gross return. Turnover cost is divided into three distinct parts.

a. Brokerage commissions: This cost derives from commissions that fund managers pay to brokers so they can buy and sell securities.

b. Market impact cost: Institutional investors usually represent the majority of the trading volume each day, mainly because their positions are enormous relative to individual investors. Thus, when buying or selling, they greatly influence demand and supply balance, especially for less liquid positions. This affects the final price they have to accept for buying and selling. Moreover, managers face even more limitations when trying to mitigate impact costs. These come in the form of fund strategy adjustment by picking more liquidate assets at the expense of future prospects or by extending the turnover time horizon.

c. Spread cost: Similarly, to brokerage commissions, this cost is related to buying and selling securities. It accounts for the spread between the current bid/ask price and the best bid/ask price. The spread cost is higher when a fund's strategy aims exposure at illiquid market segments.

Figure: 20 Example of how transaction costs work

Transaction Cost %	Portfolio Turover %	Sale	Buy	Total Transaction Cost
0,6 % (per $)	50% annually	0,30%	0,30%	0,6% annually

VI. Tax costs: Considering that taxation varies widely across countries, financial instruments, and individual demographics and income characteristics, we are going to narrow our field of view on US investors and income or capital gains attained from mutual fund ventures. Mutual funds by law are not subjected to federal taxes, meaning that even though they manage the overall portfolio, the investor group is taxed as if they own the securities directly. Consequently, income and capital gains realized by the mutual fund actions are passed to the investors after expense deduction is made by the fund. Active mutual funds due to their high portfolio turnover (based on total assets, the average stock is held by the average active mutual fund for an average period of 31 months or 38,7% annual portfolio turnover) are notorious for their tax inefficiency. Usually, the active fund inefficiency is the aftermath of buying and selling whole positions in tandem with hyperactive portfolio turnover and short-term capital gain distribution. In contrast, the average TIF has achieved an annual 3% portfolio turnover. Capital gains, when realized, are taxed in numerous modern jurisdictions. Specifically, short term (securities held for a year or less) capital gains are taxed on the investor's ordinary tax rate, contrarily, to long-term capital gains (securities held for more than a year), which are taxed on 0%,15% or 20% rate. Moreover, the tax burden is paid based on nominal returns meaning before the deduction of inflation. For the US investor, it is imperative to make use of tax-deferred accounts like 401(k) corporate thrift plan, federal thrift saving plan (TSB), 403(b), IRA, Roth IRA, etc. which greatly reduce the tax burden. Thoughtful use of the advantages they provide, such as pre-taxed income contributions e.g., 401(k) or after-tax income contributions with tax-free subsequent growth e.g., ROTH 401(k) contribute a risk-free boost to the real return realized by the prudent investor.

The investor prior to acquiring a mutual fund should always consider the following two critical issues: If the fund has realized but not yet distribute the capital gains at hand and secondly the size of the yet to be realized capital appreciation or depreciation. In the first instance, for a taxable investor, the initial investment value would remain the same after the ex-dividend date, but the effective value would be reduced by taxes induced during the distribution.

The trouble stems from the manager's notion that a mutual fund should be handled as a tax-exempt scheme when, in reality, it is not. Part of the blame

resides to the fund's partial disclosure as well, which fails to weight the tax burden accordingly. The result is an inflated total return figure, which acts as a manager evaluation parameter. Everyday investors fail to comprehend that for the "superior return" to be achieved; more resources were needed. Eventually, when excess costs are deducted, the delusion is revealed.

VII. Cash drug: Mutual funds whose shares do not trade like stocks in the stock exchanges (ETF's) ought to make provisions for potential future redemptions by fund owners. The cash is usually kept in money market funds, which ensure the safety of principal and sufficient liquidity in exchange for depreciation due to inflation and opportunity cost.

VIII. Soft dollar: Maybe one of the most difficult costs to estimate accurately is the choice made by fund investors to select broker houses, which in exchange for a premium provide benefits such as crucial information and research. This cost varies significantly among funds, but more importantly, the monetary benefits provided cannot be evaluated, so a conclusion cannot be achieved.

IX. Advisory fees: This expense is solely applicable to investors who outsource their portfolio management to professional investment advisors.

6.1 Expense ratio

Expense ratios are in constant decline across the mutual fund industry since the beginning of the century. Due to the inversely proportional correlation between induced costs and net returns, this comes as a great benefit to the common investor. This decline is explained by the rise in assets under management, extensive competition among mutual fund providers, and the tendency of individual investors to prefer funds with minimal charges. As shown in table 21, the effects of the mentioned root causes can be seen shaping the investment fund industry year by year. During the last 18-year period, equity fund investors have improved their position by a whopping 44 bps, meaning a cost reduction of 44,4%. The 10-year decrease alone accounts for an astoundingly 33,7% or 28 bps decline. Despite, hybrid[19] and bond mutual funds forming a smaller group compared to equities, they too experienced an unprecedented cost decline resulting in a 25,8 % and 36,8 % respectively for the 18-year period. The discounts mentioned above may seem trivial for the inexperienced investor but compounded over long periods of time; these differences tend to lead to utterly different results.

[19] Also known as asset allocation funds, a hybrid fund is a mutual fund that is diversified among two or more asset classes. These funds typically invest in a mix of stocks and bonds e.g., 60/40 stock bond mutual fund.

Figure: 21 Mutual fund expense ratios, since 2000

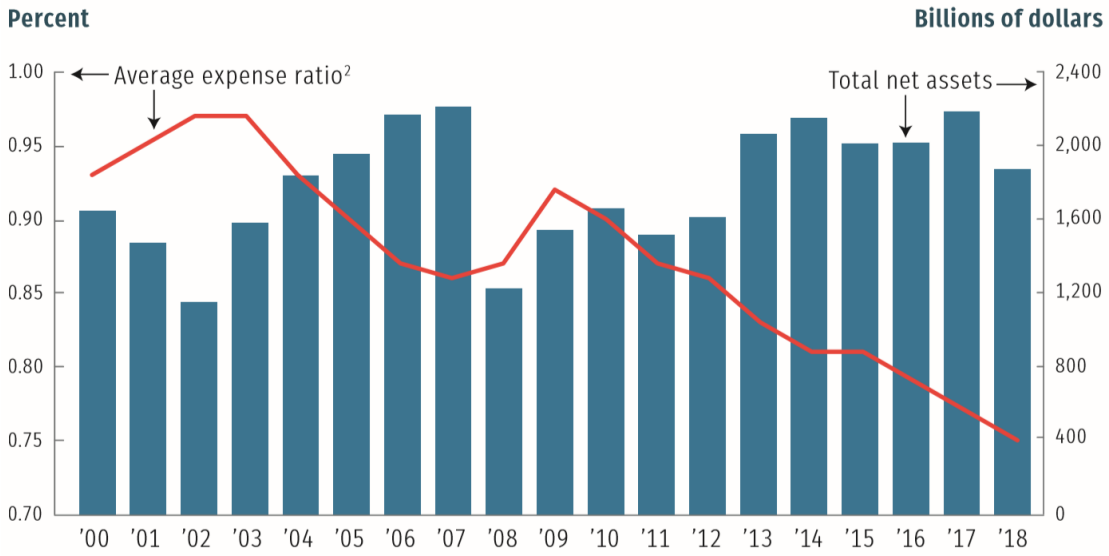
(Asset-weighted averages)

Year	Equity mutual funds	Hybrid mutual funds	Bond mutual funds
2000	0.99	0.89	0.76
2001	0.99	0.89	0.75
2002	1.00	0.89	0.73
2003	1.00	0.90	0.75
2004	0.95	0.85	0.72
2005	0.91	0.81	0.69
2006	0.88	0.78	0.67
2007	0.86	0.77	0.64
2008	0.83	0.77	0.61
2009	0.87	0.84	0.64
2010	0.83	0.82	0.63
2011	0.79	0.80	0.62
2012	0.77	0.79	0.61
2013	0.74	0.80	0.61
2014	0.70	0.78	0.57
2015	0.67	0.76	0.54
2016	0.63	0.73	0.51
2017	0.59	0.70	0.48
2018	0.55	0.66	0.48

Source: Investment Company Institute, Lipper, and Morningstar

6.1.1 Expense ratio decline pattern

Figure: 22 Mutual Fund Expense Ratios Tend to Fall as Fund Assets Rise



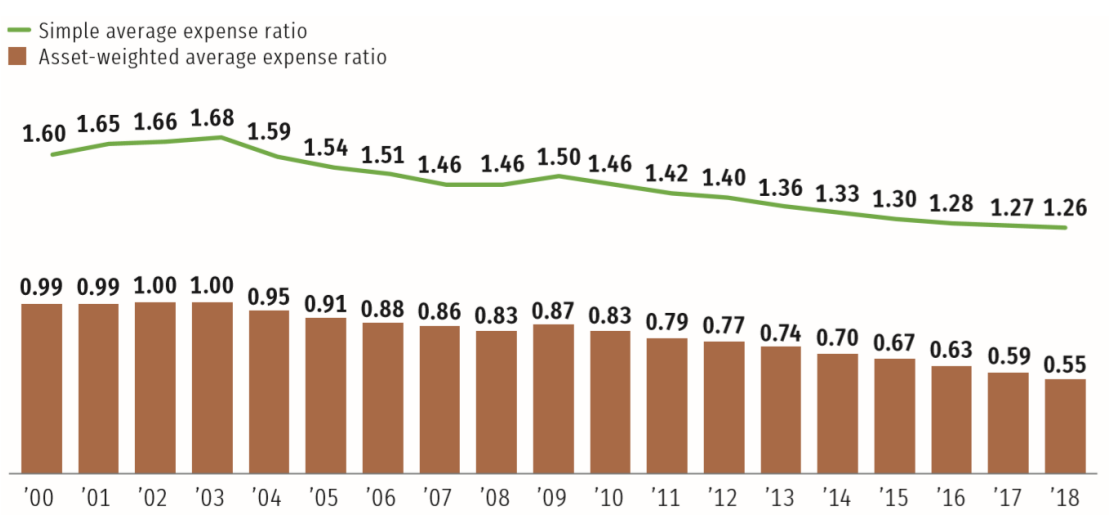
Source: Investment Company Institute, Lipper, and Morningstar

With the help of table 22, we can visualize the inversely correlated relation linking asset size and average expense ratio. As mentioned, the expense ratio acts as a total sum for various sub-costs and is expressed as a percentage of assets invested. Sub-costs are not always related to asset size, meaning that

they are charged as flat fees. Thus, when assets rise, fixed costs contribute less to the expense ratio. Pleasantly, due diligence concerning the cost basis is carried out by the investor group, as shown by the data. Specifically, the simple expense ratio average for the 18-year period greatly overlaps the equivalent average asset-weighted one. Meaning that even though mutual funds with excessive expense ratios do exist, they are not picked as much by the investors. This is relevant to the fact that investors show the tendency to stay clear of funds that require a sales load in favor of no-load funds. Institutional no-load share classes usually consist of a reduced expense ratio, as distribution (12b-1) fees when applied tend to be considerably smaller. Furthermore, the equity fund 18-year trend shows that a constant flow of assets is directed every year into funds that contribute to the lower and lowest cost quantiles. For 2018 alone, the spread between the two averages reached an enormous 71 bps gap.

High demand led to severe competition not only between new and established firms but also among modern financial products (ETF's). Technology obsolescence, parallel to rigorous competition among financial service providers, serves not only the individual investor but also financial institutions. To sum up, as the industry continues to expand, economies of scale become not only feasible but even more efficient than thought possible.

Figure: 23 Fund Shareholders Paid Below-Average Expense Ratios for Equity Mutual Funds



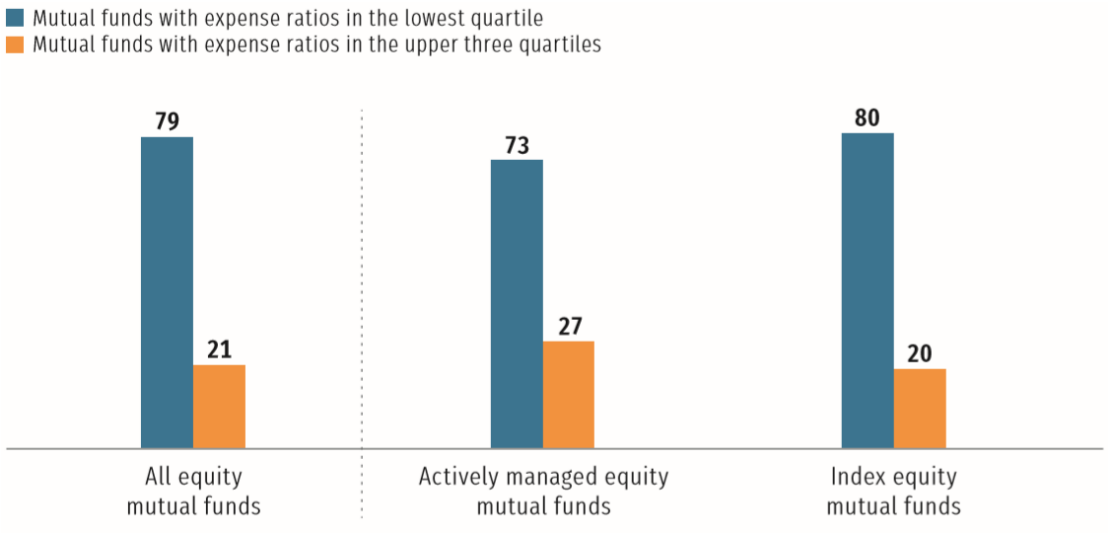
Source: Sources: Investment Company Institute, Lipper, and Morningstar

As the net asset concertation diagram shows for both actively managed and index funds, the asset majority inhabits the lowest possible cost quantiles. A total asset average of 79% inhabits the lowest possible cost quantile, with approximately a fifth of the assets invested in the top three most expensive ones. Specifically, for actively managed funds, the top three quantiles contribute 27% of the total assets, 6% more than the average. This is explained by the fact that investors choosing an actively managed fund may do so in pursuit of superior returns or trust in a manager's skill to synthesize a

unique portfolio otherwise unavailable through benchmark tracking. A trade-off between desired fund preferences and cost is made by the investor represented by every fifth asset invested in the mutual fund industry.

Figure: 24 Total Net Assets Are Concentrated in Lower-Cost Mutual Funds

(% of total net assets, year-end 2018)



Source: Investment Company Institute and Morningstar

Figure: 25 Mutual Fund Expense Ratios Across Investment Objectives

(%, year-end 2018)

Investment objective	10th percentile	Median	90th percentile	Asset-weighted average	Simple average
Equity mutual funds[1]	**0.65**	**1.16**	**2.02**	**0.55**	**1.26**
Growth	0.66	1.10	1.91	0.71	1.19
Sector	0.77	1.31	2.15	0.73	1.40
Value	0.68	1.10	1.88	0.66	1.17
Blend	0.39	0.98	1.77	0.33	1.03
World	0.77	1.25	2.10	0.68	1.35
Hybrid mutual funds[1]	**0.61**	**1.16**	**2.09**	**0.66**	**1.28**
Bond mutual funds[1]	**0.44**	**0.81**	**1.63**	**0.48**	**0.94**
Investment grade	0.35	0.69	1.50	0.34	0.79
World	0.64	1.00	1.81	0.60	1.13
Government	0.29	0.76	1.60	0.39	0.84
High-yield	0.62	0.95	1.75	0.73	1.05
Municipal	0.46	0.76	1.59	0.52	0.90
Money market funds[1]	**0.17**	**0.43**	**0.87**	**0.26**	**0.47**
Memo:					
Target date mutual funds[2]	**0.35**	**0.74**	**1.46**	**0.40**	**0.82**
Index equity mutual funds[1]	**0.06**	**0.33**	**1.53**	**0.08**	**0.62**

Source: Investment Company Institute and Morningstar

Mutual funds are classified according to an array of goals, objectives as well as management involvement. Investment goals are associated with risk tolerance in relation to expected returns. Fund objectives are strongly related to costs induced, as various investment strategies require different costs for their execution. To illustrate, the comparison between two generic asset class categories proves that hybrid mutual funds tend to cost more per unit of asset than bond mutual funds. Across asset classes but inside the bounds of the same quantile, costs also alter drastically. Taking a look among the sub-categories comprising the bond class for the 10th quantile we can observe the stunning contrast, in more detail, government and world bond categories have a cost spread of 120,69%, meaning that an investor's choice of allocating his capital in the latter category will cost him 121% more on average in addition to excess risk implied by the fact that government T-bonds are considered risk free on top of that they are tax exempted. Moreover, less liquidity commonly found in small and mid-cap stocks as well as international assets -notably emerging markets-and niche domestic market sectors always results in excessive transaction costs. Besides, portfolio management for low liquidity assets such as the above requires extensive research in order to mitigate the existing information asymmetry. Even if other cost factors remain the same, a fund's strategy may dictate, for instance, overweight exposure to small and mid-cap issues in contrast to large-cap stocks or specific market sectors, driving the expense ratio upward and the fund into a more costly quantile. Aforesaid is the basis for the divergence between identical assets inhabiting different cost quantiles (e.g., equity mutual funds invested in value stocks and reside in the 90th quantile and not in the 10th).

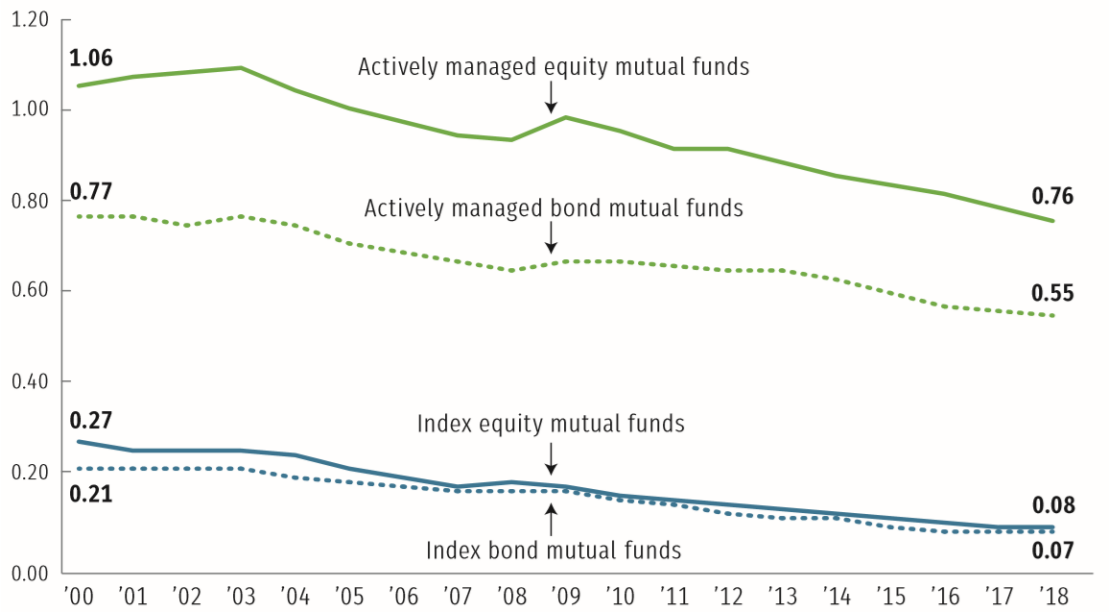
6.1.2 Expense ratio - Index/Active equity mutual funds

There is an array of motives leading investors to choose an actively managed mutual fund; some of them may be: expectation for bragging returns, hedging, or taking advantage of volatility and unique exposure to sectors and assets as part of the fund's portfolio allocation strategy. In theory, a manager's perceptiveness will be able to provide a satisfactory outcome to the fund's participants. Nevertheless, a manager is prone to overweight or underweight specific sectors or assets, in essence, undertaking a bet which may prove to be wrong. Furthermore, the required costs to do so corrode whatever desired effects may eventually turn out to be. On the other hand, index funds track the progress of a specific benchmark over long periods of time. Their competitive advantage lies in risk reduction by only assuming market risk. The above becomes feasible through their oversimplified investment strategy, which demands to own a fraction of the benchmark they track. By doing so, costs are diminished to ultra-low figures; the reduction ultimately contributes to investors' real returns. To illustrate the above, let us compare the average asset-weighted expense ratio for actively managed equity mutual funds and index equity mutual funds found on table 26. The cost assumed by the active equity managed fund investor is 0,76% in contrast to 0,08% assumed by the passive one, which accounts for an excess average cost burden of 850% encumbered by the first investor (685,7% for bond mutual funds). For a

manager to rectify the fund's net return as a result of the average expense ratio alone, he has to beat the market or the relative benchmark for at least 0,68%, assuming no other costs apply. Sadly, for the active fund investor, the expense ratio is not the sole expense charged for mutual fund ownership. When taking into account potential sale loads, indirect transaction costs due to high portfolio turnover, and the possible tax inefficiency when a tax-exempted account is not used, costs start to irreversibly pile up, leading eventually to underperformance.

Figure: 26 Expense Ratios of Actively Managed and Index Mutual Funds

(%, since 2000)



Source: Investment Company Institute, Lipper, and Morningstar

The 18- year expense ratio trend diagram for both index and active mutual funds reflects in its entirety the fundamental investment strategy contrast between the two. The cost gap (or net return discount) splitting in two the diagram represents the additional risk that must be assumed by the active fund manager in order to break even with the relevant benchmarks. The manager may be successful in navigating through the dire implementations associated with a fund during the short or mid-term, but that is hardly the case for the majority of mutual fund managers for the long term.

Other reasons liable for the low expense ratios charged by the index mutual funds may include the following. The majority of assets are densely invested in large-cap core index funds, which track major indices like the S&P 500. On the other hand, active fund assets are spread in greater uniformity among different cap levels, asset classes, and markets. Ultimately, portfolio management, which involves less recognized assets equals to excess costs. The average index fund in 2018 managed approximately 6.3 billion $ as

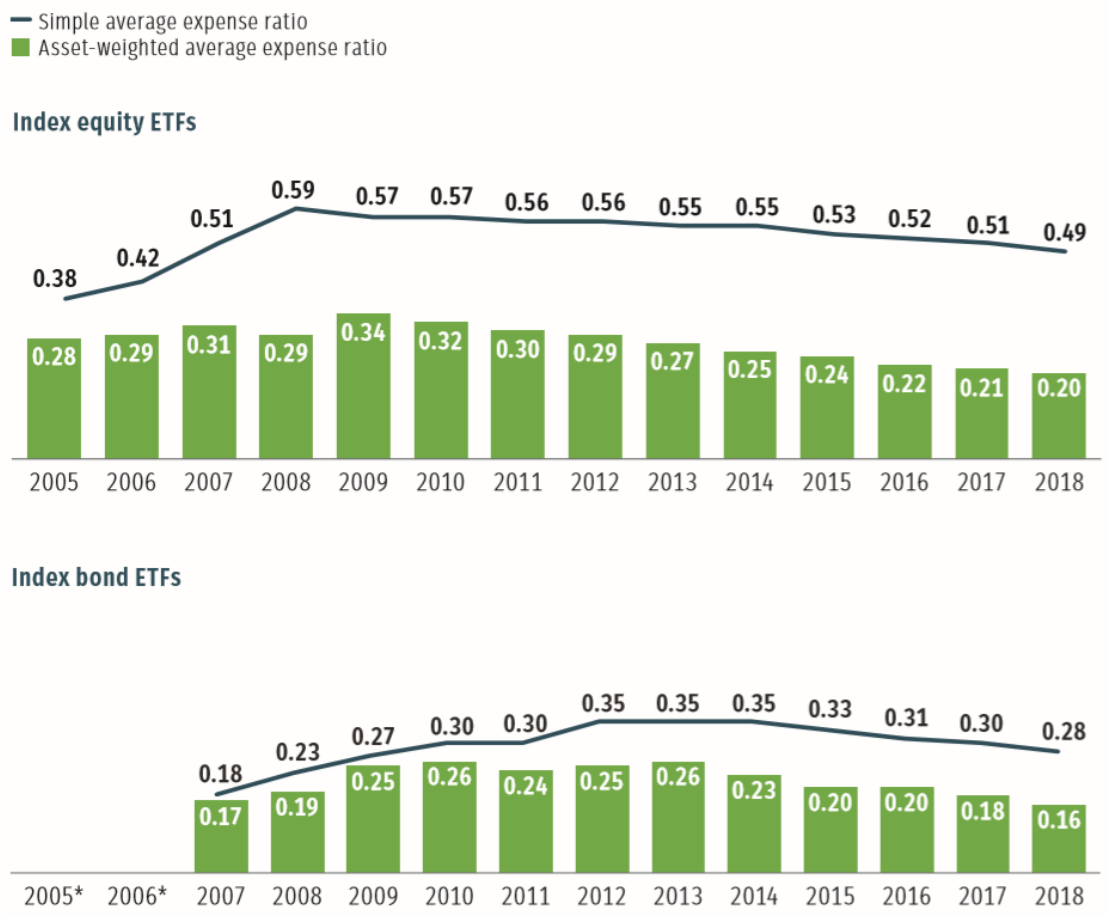
opposed to 1.5 billion $ by the average active mutual fund. Greater asset concertation per fund leads to further economies of scale, resulting in fewer costs.

6.1.3 Expense ratio - ETF

Exchange-traded funds represent a mutual fund in common stock terms, traded in organized markets. Most ETFs are managed passively just like index funds, although an actively managed minority representing 4% of ETF assets do exist. ETFs represent a major competitor to the mutual fund industry as their cost structure, as well as their variety and transaction convenience, render them invaluable for the effortless diversification they can provide. Their expense ratio reassembles the ones found in TIFs as their index nature implies. In 2018, 16% of assets managed by investment companies were part of an ETF, with 79% of those assets invested in equities.

Figure 27 Expense Ratios Incurred by Index ETF Investors Have Declined in Recent Years

(%, since 2005)



Source: Investment Company Institute and Morningstar

The behavior pattern observed in the ETF expense ratio, resemble the ones found in other mutual fund structures. Assets are concentrated in cheaper

quantiles, especially in equities, where the average overlap for 2018 is 145%. Higher than average expense ratios may derive from specialized investment objectives materialized through narrow market sectors. Finally, although there is a distinct disparity between bond and equity overlap magnitude, the expense minimalism principle still holds true.

6.2 Load fees

Mutual fund firms usually delegate the promotion of their services to third parties, since asset growth benefits both the institution and the shareholders monetarily. Financial intermediaries are compensated directly or indirectly by the fund's shareholders, although some may prefer to do so outside of the fund's bounds. For the fund to defray the distribution and marketing costs, the utilization of numerous means is necessary, predominantly having to do with fund share structures as well as additional to the expense ratio annual asset-based fees (12b-1). Ordinally, funds offer alternative share classes to provide investors with a preference capability on how to compensate financial intermediaries. It is essential to mention that the percentage of households actively engaging in owning a mutual fund (outside of employer-sponsored programs) through a financial professional is 78%. When financial professionals like RIAs (Register Investment Advisor) act as true fiduciaries to the common investor, they are invaluable as they can prevent pitfalls parallel to superior portfolio management (proper rebalancing and asset allocation-diversification) and counsel services.

Table 28 illustrates the total mutual fund asset distribution based on how investors choose to compensate third-party intermediaries. To avoid misconceptions, a no-load fund is characterized by the fact that it does not charge front or back end fees, instead, it may charge a 12b-1 fee up to 0,25%, or the investor may choose to reimburse third parties separately in which case the fee is not taken into account. First and foremost, the growth rate spread between load and no-load funds throughout the 9 year-period indicates the investors' distaste toward load funds. Even though the mutual fund industry's annual asset growth is 7,28% per year during the 10 year-span, that does not correspond to a cohesive growth across every fund category. Specifically, the growth rate for no-load mutual funds is 10,43% contrarily to a -0,63% disinvest rate for the load group. The asset majority in the load category is concentrated in front end funds with the back-end category virtually evanesced with 4 billion $ in assets (0,19% of the load fund category). On aggregate, the load fund assets dwindled from 28,03% of the total asset figure to 14,06% a decade later, accounting for a 49,84% drop. To summarize, the altered preference regarding the distribution structure derives from better-defined contribution channels, individual investment initiative, and third-party reimbursement outside of the mutual fund's bounds.

Figure: 28 Total Net Assets of Long-Term Mutual Funds Are Concentrated in No-Load Share Classes

(Billion $, year-end)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
All long-term mutual funds	**$7,793**	**$9,028**	**$8,939**	**$10,360**	**$12,331**	**$13,152**	**$12,903**	**$13,625**	**$15,917**	**$14,670**
Load	**2,184**	**2,350**	**2,175**	**2,360**	**2,650**	**2,613**	**2,439**	**2,369**	**2,382**	**2,063**
Front-end[1]	1,749	1,881	1,750	1,892	2,148	2,115	1,989	1,946	1,989	1,763
Back-end[2]	98	78	50	39	32	24	15	9	6	4
Level[3]	327	381	367	417	459	467	429	408	378	280
Other[4]	8	8	7	11	10	7	6	6	7	6
Unclassified[5]	1	2	(*)	1	1	(*)	(*)	1	2	10
No-load[6]	**4,248**	**5,090**	**5,226**	**6,264**	**7,601**	**8,388**	**8,381**	**9,105**	**11,077**	**10,378**
Retail	2,658	3,066	2,990	3,463	4,141	4,639	4,586	4,874	5,644	5,072
Institutional	1,590	2,024	2,235	2,801	3,460	3,749	3,795	4,231	5,433	5,307
Variable annuities	**1,129**	**1,290**	**1,249**	**1,396**	**1,628**	**1,671**	**1,596**	**1,636**	**1,793**	**1,587**
"R" share classes[7]	**233**	**297**	**290**	**340**	**452**	**480**	**487**	**514**	**666**	**642**

Source: Investment Company Institute, Lipper, and Morningstar

6.3 Tax efficiency

According to research, taxes are potentially the most malicious cost an investor has to bear. Mutual funds are commingled investing vehicles meaning that they are comprised of both taxable and non-taxable investing accounts. As a result, more often than not, fund managers do not consider the tax implementations of their strategies as an evasive tax approach may significantly handicap the potential return of tax-deferred accounts. Besides, managers are evaluated based on their pre-tax returns. Vanguard estimates that for the 15 year-period ended at year-end 2014, domestic stock funds lost, on average, 1% annually on taxes. Tax-efficient investing demands for both selection of tax efficient assets and vehicles as well as careful portfolio structuring and maintenance. Allocation of assets between taxable and non-taxable accounts when synthesizing a portfolio is one way of efficiently mitigating the tax burden. Thoughtful portfolio structuring by keeping tax efficient investments such as broad market index funds, ETFs, and municipal bonds in taxable accounts while concentrating inefficient ones (taxable bonds, REITs, actively managed funds) in non-taxable accounts can provide a significant annual benefit. The investor must acknowledge that indexing incorporates various schemes and structures which may differ considerably in matters of cost, taxation, and income distribution. Thus, two identical index mutual funds or indexed ETFs may provide dissimilar returns. Last but not least, the investor prior to investing in a fund must prioritize according to the following characteristics: benchmark, costs, tracking precision, and tax-efficiency.

6.3.1 Tax efficiency - Index fund/Index ETF

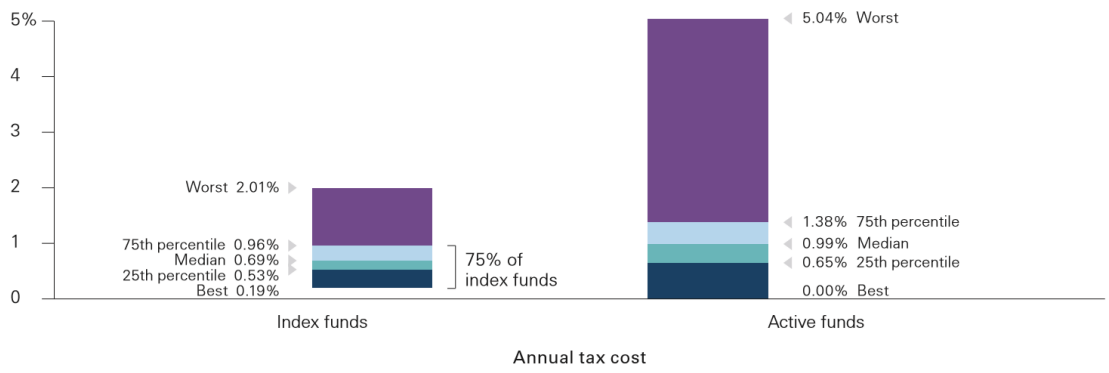
Passive funds are by their nature tax-efficient as opposed to actively managed mutual funds. Indexing's sole investing aim is to replicate the composition of the relative benchmark; thus, passive funds do not trade in and out of positions regularly; hence they do not realize short- or long-term capital gains. Active fund portfolio management is associated with high turnover as managers tend to eliminate entire underperforming holdings and execute concentrated purchases in promising securities. Thus, it is highly likely that existing capital gains are realized entirely, which is even more detrimental for short term ones. On the other hand, passive funds continually perform incremental changes emulating their relative benchmark with a wholesale liquidation occurring solely in case a security is entirely removed from the benchmark. The ongoing marginal trades happen either due to investor cash flows or for index weight adjustments. Incremental trades enhance the passive fund's tax efficiency capability by dispersing a position into a wide selection of price lots. Consequently, and parallel to utilizing appropriate accounting methods such as HIFO (highest in first out), redemptions will result only in the liquidation of the highest price lots, mitigating the distribution of capital gains to the absolute minimum. Index ETFs provide an additional tax benefit as share transactions by the shareholders do not require security trading by the fund.

6.3.2 Embedded capital gains

Potential mutual fund shareholders should always implement ample due diligence regarding the extent of accumulated capital gains as well as their distribution policy. Specifically, the taxable investor must always avoid investing prior to an upcoming capital distribution. Falling to do so, will result in the investment value remaining the same while the distribution taxes effectively reduce it. Secondly, awareness of the fund's portfolio cost basis relative to its present value is of great importance. An individual can anticipate possible future tax-labilities or benefits by estimating the size of unrealized gains or losses in addition to historical distribution patterns.

Figure: 29 Tax cost percentiles of US equity mutual funds

(for the 15 year-period ended September 30,2014)



Source: Vanguard and Morningstar

Table 29 shows the tax cost superiority of passive funds compared to their actively managed counterparts for the 15-year period ended September 30, 2014. According to data, 75% of passive funds had a lower annual tax cost that the active fund median cost, while the spread between the two median values is 30 bps. The range between all four passive quartiles is much narrower when collated one by one. Bottom quantile ranges, as well as extreme prices, differ substantially between both categories. Tax-inefficiency does not apply exclusively to actively managed funds, as proved by the data. Passive funds that are tax-inefficient, mainly those that reside in the bottom 25% quantile track illiquid or highly specialized parts of the economy e.g., small-cap growth stocks, in general, broader aim result in better cost-efficiency.

Figure: 30 How HIFO work (Hypothetical example)

Date	Number of shares purchased of stock "X"	Stock "X" price	Cost basis	Total basis	Total shares	Portfolio value	Portfolio unrealized gain/loss
January 3	100	$10	$1,000	$1,000	100	$1,000	$0
January 4	100	12	1,200	2,200	200	2,400	200
January 5	100	14	1,400	3,600	300	4,200	600
January 6	100	15	1,500	5,100	400	6,000	900
January 7	100	16	1,600	6,700	500	8,000	1,300
January 10	100	14	1,400	8,100	600	8,400	300
January 11	100	13	1,300	9,400	700	9,100	–300
January 12	100	14	1,400	10,800	800	11,200	400

Date	Number of shares sold of stock "X"	Stock "X" price	Total market value of sale
January 21	200	$14	$2,800
Sell 100 shares at cost basis of $16 per share			1,600
Sell 100 shares at cost basis of $15 per share			1,500
		Realized capital loss using HIFO	($300)

Source: Vanguard

7 SPIVA report

The Standard and Poor's Indices Versus Active (SPIVA) scorecard, is a semi-annual report conducted and published since 2002 by S&P DJI, that seeks to act as an objective scorekeeper for the active versus passive debate in the marketplace. SPIVA reports are designed to offer robust insight that discloses the real persistence of actively managed mutual funds in outperforming their relative benchmarks. For that reason, data is corrected and adjusted to eliminate preconceptions; in light of this, SPIVA utilizes CRSP as the underlying data source. Created in 1995, the CRSP database is the only integrated survivorship bias-free source available in the U.S., comprised of mutual fund data that trace back to 1961 that account for both active and liquidated or merged mutual funds. Furthermore, data is extensively reviewed to incorporate the following factors in measuring active management performance. First, survivorship bias correction achieved through CRSP

ensures that funds that were liquidated or merged during the referred period are accounted as part of the original opportunity cost. Secondly, any comparison between mutual fund returns and benchmarks must be identical in nature, meaning that a small-cap mutual fund cannot be benchmarked against the S&P 500, which is comprised of the five-hundred largest capitalization companies. To address the above, mutual funds are compared to their appropriate benchmark. Thirdly, group returns are weighted according to AuM of every mutual fund and not equally. Fourthly, SPIVA accounts for alternations in style consistency during any examined time frame. Mutual funds may diverge from their original investing strategy resulting in a different style portfolio e.g., a manager may rotate the portfolio composition from growth to blend. Lastly, in the case of multiple existing share structures, SPIVA scorecards address for double-counting by including only the share class, which represents most assets. Indexed based investments, as well as leveraged and inverse funds, are excluded since the relative indices or benchmarks depict them. Finally, it must be mentioned that every major capitalization level (large, mid, small, multi-cap), as well as investment style (value, core, growth), is covered.

Consistency in outperforming the relative benchmark net of costs is the single most accurate measure of success. Bottomline line returns are at the end of the day, what matters most for the investor. There is no viable reason for the common investor to pick a fund that fails to consistently achieve net returns or even more so, risk-adjusted returns similar to the ones available by the relative benchmarks. SPIVA results are deemed to be eye-opening as they demonstrate that, on average, active management fails *spectacularly* to add value for the investor group. The premise that if enough expertise, skill, resources, and experience is harnessed, the outcome would be the persistent beat of the market benchmarks on average, which is empirically proven false when every factor is accounted for.

The common investor embodies a time horizon that focuses on long term retention periods to minimize risk and benefit from the compound effect. The 15 year-period ended on the 31 of December 2019, incorporates a wide spectrum of market conditions and interest rate environments that render the period suitable for this study's illustrative purposes. When examining historical data, the investor must always bear in mind that past performance is not a guarantee of future results and avoid the assumption that an investment will continue to do well on the grounds that it did well in the past, the reverse is also true. Despite short-term volatility during the long run, asset class returns tend to regress to their historical mean. Considering the above, 89,1% of all domestic actively managed equity funds underperformed the respective index in the course of the 15 year-period. This suggests that if the investor was to choose any domestic equity mutual fund at the beginning of the 15 year-period, he had a 10,9% chance of picking one that overperformed during the upcoming period. Even more so, during the short term -1 year-period-, 70,01% of domestic equity funds underperformed the broad S&P Composite

1500[20]. Large-cap funds and, in particular, large-cap core funds, regarded as the portfolio's backbone, lagged behind the S&P 500 for the 15 year-period by 90,46 % and 91,95% respectively. In contrast to value funds that underperformed extensively during 2019 (large-cap value – 97,23%), growth funds seem to fare better during the short-term (1-3 years). However, no long-term conclusions can be made, since that may be the product of circumstance (economic cycle). Overall, throughout the 15 years, every equity fund category underperformed the corresponding index substantially.

Bond mutual funds did not defy the pattern through the referring period. Long term government funds investing in treasury bonds with higher than 10-year maturity, performed poorly during any time interval, averaging 98,15% for the period. The same can be said for mutual funds that invest in long-term investment-grade corporate bonds performing only slightly better at 96,77%. In retrospect, it can be stated that for the long term, treasury and investment-grade category managers were almost or totally inadequate (100% - 5-year government) to deliver excess or at least equal value to what could have been gained by passively tracking the corresponding benchmarks. However, the 15-year track record that for both categories displays at best a 95,32% (1-year investment grade) underperformance is considerably abated when returns are risk-adjusted. Performance for shorter maturities of government and investment-grade funds is enhanced significantly, although overall results are deemed insufficient for the long term. For the intermediate group, government and investment-grade funds concluded the 15-year period with 89,09% and 68,68% underperformance. The short-term group during the exact period ensued aggregate results of 83,33% and 70,77%, respectively. Investment-grade intermediate and short-term funds for the 10-year period yielded results of 53,39% and 45,16%, almost matching the market returns in the case of the intermediate group, whereas short term funds outperformed the relative benchmark. Last in line, high yield funds in outperformed the corresponding index by a mere 0,79% and 2,87% for the 15-year and 10-year period, respectively. In general, even though half of the bond fund categories addressed provide excess value during the very short term (1-year), only two out of the fourteen continue to do so on average for the decade and non-remain successful in the 15-year course.

[20] S&P Composite 1500: Is a broad market index representing 90% of U.S. equities. It is a market capitalization weighted index accounting for 1500 stocks. The index is comprised of three sub-indices: the S&P 500, S&P MidCap 400, and S&P SmallCap 600, which measure the performance of large, mid, and small capitalization stocks, respectively.

Figure: 31 Percentage of U.S. Equity Funds Outperformed by Benchmarks

FUND CATEGORY	COMPARISON INDEX	1-YEAR (%)	3-YEAR (%)	5-YEAR (%)	10-YEAR (%)	15-YEAR (%)
All Domestic Funds	S&P Composite 1500	70.01	71.92	83.27	89.33	89.10
All Large-Cap Funds	S&P 500	70.98	71.13	80.60	88.99	90.46
All Mid-Cap Funds	S&P MidCap 400	31.67	45.97	64.41	84.22	88.27
All Small-Cap Funds	S&P SmallCap 600	38.50	61.02	77.37	88.61	89.08
All Multi-Cap Funds	S&P Composite 1500	69.25	68.17	82.31	89.02	90.21
Large-Cap Growth Funds	S&P 500 Growth	33.33	42.28	60.00	89.46	92.72
Large-Cap Core Funds	S&P 500	69.53	83.57	93.83	97.38	91.95
Large-Cap Value Funds	S&P 500 Value	97.23	82.21	88.92	91.89	81.41
Mid-Cap Growth Funds	S&P MidCap 400 Growth	9.30	19.23	51.22	78.28	85.71
Mid-Cap Core Funds	S&P MidCap 400	40.54	59.83	82.46	92.09	95.24
Mid-Cap Value Funds	S&P MidCap 400 Value	65.00	78.43	88.71	88.30	93.67
Small-Cap Growth Funds	S&P SmallCap 600 Growth	13.79	21.79	67.71	82.35	93.37
Small-Cap Core Funds	S&P SmallCap 600	41.35	74.71	91.36	96.72	92.35
Small-Cap Value Funds	S&P SmallCap 600 Value	80.00	82.57	92.04	96.77	92.77
Multi-Cap Growth Funds	S&P Composite 1500 Growth	45.24	59.60	75.81	87.80	91.28
Multi-Cap Core Funds	S&P Composite 1500	74.45	88.38	94.01	93.12	91.11
Multi-Cap Value Funds	S&P Composite 1500 Value	91.80	92.17	96.04	96.38	86.96
Real Estate Funds	S&P United States REIT	26.58	54.76	63.41	81.61	83.10

Sources: S&P Dow Jones Indices LLC - Data as of Dec. 31, 2019

Figure: 32 Percentage of Fixed Income Funds Outperformed by Benchmarks

FUND CATEGORY	COMPARISON INDEX	1-YEAR (%)	3-YEAR (%)	5-YEAR (%)	10-YEAR (%)	15-YEAR (%)
Government Long Funds	Barclays US Government Long	97.96	98.21	100.00	98.73	98.15
Government Intermediate Funds	Barclays US Government Intermediate	68.75	84.21	100.00	80.00	89.09
Government Short Funds	Barclays US Government (1-3 Year)	73.08	84.00	82.76	69.70	83.33
Investment-Grade Long Funds	Barclays US Government/Credit Long	95.35	97.80	97.85	97.58	96.77
Investment-Grade Intermediate Funds	Barclays US Government/Credit Intermediate	32.16	42.51	48.50	53.39	68.69
Investment-Grade Short Funds	Barclays US Government/Credit (1-3 Year)	37.11	48.39	50.57	45.16	70.77
High Yield Funds	Barclays US Corporate High Yield	64.82	89.20	94.34	97.13	99.21
Mortgage-Backed Securities Funds	Barclays US Aggregate Securitized - MBS	70.83	73.58	81.48	78.57	93.75
Global Income Funds	Barclays Global Aggregate	38.83	63.39	61.26	55.81	60.00
Emerging Markets Debt Funds	Barclays Emerging Markets	49.09	75.81	86.21	100.00	93.33
General Municipal Debt Funds	S&P National AMT-Free Municipal Bond	40.28	53.25	63.75	52.44	81.13
California Municipal Debt Funds	S&P California AMT-Free Municipal Bond	32.35	42.86	47.22	44.44	84.09
New York Municipal Debt Funds	S&P New York AMT-Free Municipal Bond	26.92	37.04	53.57	54.84	84.21
Loan Participation Funds	S&P/LSTA U.S. Leveraged Loan 100	100.00	97.92	87.50	78.95	90.00

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2019

Portfolio theory suggests that higher returns are associated with a higher risk in the financial markets. To exemplify, if two returns are equal in absolute terms but to acquire them, different standard deviations or volatility figures (risk measures) were needed, then returns diverge after they are risk-adjusted. Hence, comparisons of this nature cannot be deemed as accurate or objective if risk is not incorporated in the prior estimates. To address the risk factor absence effectively, SPIVA estimated volatility by calculating the standard deviation of monthly returns. The risk-adjusted performance is

presented in both net and gross of fees (expense ratios) basis in three-time frames (5-, 10-, 15-, year periods). It is important to note that in addition to mutual fund returns, benchmark returns are also risk-adjusted based on their volatility on the grounds that they represent market segments and not the entire market.

Even on a pre-cost basis, most actively managed funds are unable to beat the corresponding index. For any interval of time, only large-cap value (15-year-period), mid-cap growth (5-year period), and real estate (5-, 15-year-period) fund categories overperformed for the better part in risk-adjusted terms. In aggregate, prior to the deduction of expenses, domestic funds underperformed by 77,36% on the long-term horizon and 90,9% during the decade. Net of costs, domestic funds overperformed the SP Composite 1500 scantly, averaging 6,45% and 3,43% for the 15 and 10 year-period. None of the examined equity fund groups achieved majority overperformance during any of the three-time intervals when risk and cost factors are addressed. The fixed income comparison verifies the severe impact of expenses in bottom-line returns. Specifically, despite bond funds overperforming gross of fees on eleven out of the fourteen categories for the 15-year period, following the deduction of expenses, none of the fixed income categories remain by which continue to overperform the relative indices. This is equally true for the 10- and 5-year periods where equivalent results can be observed. In what concerns risk in bond fund performance, it is essential to note that adjusted and non-adjusted returns, even though both insufficient on average, demonstrate significant discrepancies. To illustrate, risk-adjusted returns greatly improve the bottom-line for the long-term government and investment-grade groups while the opposite is happening for the intermediate and short-term investment-grade categories. The above reflects that some bond fund categories on average are far better risk-managed than others. Nonetheless, the cost is deemed as a far more significant factor in diminishing bond fund returns. Overall, for both asset classes, risk-adjusted returns do not indicate that actively managed funds were better risk-managed than their corresponding benchmarks during the referring periods.

Figure: 33 Percentage of U.S. Equity Funds Outperformed by Benchmarks (Risk Adjusted Returns)

FUND CATEGORY	COMPARISON INDEX	NET OF FEES (%)			GROSS OF FEES (%)		
		5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR
All Domestic Funds	S&P Composite 1500	88.22	96.57	93.55	81.22	90.90	77.36
All Large-Cap Funds	S&P 500	83.92	96.81	91.88	73.95	89.20	69.23
All Mid-Cap Funds	S&P MidCap 400	65.29	80.28	86.31	51.47	67.52	68.16
All Small-Cap Funds	S&P SmallCap 600	76.64	89.12	86.90	64.42	73.47	69.00
All Multi-Cap Funds	S&P Composite 1500	88.45	95.81	91.81	79.96	90.46	74.80
Large-Cap Growth Funds	S&P 500 Growth	84.62	100.00	99.51	75.38	96.99	89.81
Large-Cap Core Funds	S&P 500	90.58	97.38	94.30	79.87	90.70	66.78
Large-Cap Value Funds	S&P 500 Value	80.24	82.43	76.38	70.66	74.66	48.74
Mid-Cap Growth Funds	S&P MidCap 400 Growth	58.54	82.32	87.43	46.34	69.70	68.57
Mid-Cap Core Funds	S&P MidCap 400	84.21	84.89	89.52	67.54	71.94	70.48
Mid-Cap Value Funds	S&P MidCap 400 Value	66.13	78.72	88.61	51.61	58.51	55.70
Small-Cap Growth Funds	S&P SmallCap 600 Growth	72.40	90.50	92.82	60.94	80.09	70.17
Small-Cap Core Funds	S&P SmallCap 600	86.01	94.26	88.27	73.25	78.69	72.45
Small-Cap Value Funds	S&P SmallCap 600 Value	84.96	86.29	85.54	70.80	67.74	57.83
Multi-Cap Growth Funds	S&P Composite 1500 Growth	90.32	97.56	96.64	81.72	95.61	81.21
Multi-Cap Core Funds	S&P Composite 1500	95.51	97.13	91.43	89.89	91.98	74.92
Multi-Cap Value Funds	S&P Composite 1500 Value	90.10	92.03	86.34	82.18	83.33	63.35
Real Estate Funds	S&P United States REIT	54.88	74.71	80.28	35.37	51.72	45.07

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2019

Figure: 34 Percentage of Fixed Income Funds Outperformed by Benchmarks (Risk Adjusted Returns)

FUND CATEGORY	COMPARISON INDEX	NET OF FEES (%)			GROSS OF FEES (%)		
		5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR
Government Long Funds	Barclays US Government Long	34.48	44.30	66.67	12.07	13.92	11.11
Government Intermediate Funds	Barclays US Government Intermediate	81.82	82.86	81.82	31.82	14.29	23.64
Government Short Funds	Barclays US Government (1-3 Year)	93.10	84.85	91.67	24.14	18.18	36.11
Investment-Grade Long Funds	Barclays US Government/Credit Long	19.35	29.03	59.68	9.68	5.65	18.55
Investment-Grade Intermediate Funds	Barclays US Government/Credit Intermediate	71.50	65.68	92.93	34.00	29.66	56.57
Investment-Grade Short Funds	Barclays US Government/Credit (1-3 Year)	44.83	87.10	96.92	16.09	19.35	55.38
High Yield Funds	Barclays US Corporate High Yield	70.75	87.93	84.92	48.58	64.94	42.06
Mortgage-Backed Securities Funds	Barclays US Aggregate Securitized - MBS	81.48	78.57	95.83	29.63	30.36	45.83
Global Income Funds	Barclays Global Aggregate	60.36	65.12	77.50	44.14	41.86	42.50
Emerging Markets Debt Funds	Barclays Emerging Markets	98.28	100.00	100.00	86.21	100.00	60.00
General Municipal Debt Funds	S&P National AMT-Free Municipal Bond	73.75	69.51	85.85	17.50	28.05	40.57
California Municipal Debt Funds	S&P California AMT-Free Municipal Bond	63.89	77.78	93.18	8.33	27.78	38.64
New York Municipal Debt Funds	S&P New York AMT-Free Municipal Bond	71.43	93.55	97.37	10.71	38.71	47.37
Loan Participation Funds	S&P/LSTA U.S. Leveraged Loan 100	45.83	36.84	80.00	8.33	5.26	20.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2019

The SPIVA persistence scorecard tracks the consistency of top-performing mutual funds in maintaining their momentum. Consistent outperformance of the market averages indicates the existence of skill rather than luck in

attaining above average results. Nassim Nicholas Taleb in his acclaimed book *"Fooled by Randomness"* notes that, if 10.000 managers are expected to over or underperform on a random basis as it happens during a coin toss[21], then by the fifth year we expect to have 313 (3,125% chance) managers who outperformed persistently throughout the 5-year period. Taleb indicates that even if the population sample is entirely comprised of bad managers, a small minority will still produce great track records due to chance. Therefore, the absolute number of successful managers is more a function of the initial sample size rather than the sum of each manager's odds of success.

Equity persistence appears to follow a worse than random probability trend for the initial 3-year period, which by the remaining 2-year term improves at above random results. Aforesaid, for a performance timeline to be deemed as random, it must resemble the probabilities of a coin toss binomial distribution. In our case, for the first year, only funds in the top half of performance are sampled and then tracked during the upcoming four years. Hence, random results for the second, third, fourth, and fifth years are 50%, 25%, 12,5%, and 6,25%, respectively. On average, 45,64% of domestic funds overperformed throughout the second year, and 24,49% continued to do so during the third, both lagging behind the random success threshold. During the final two years, domestic funds on averaged exceeded the random expected performance baseline, accounting for 16,83% and 8,37% consistency. Hence, if an investor was to pick an equity mutual fund based on last year's above-average performers, he had an 8,37% chance of choosing a mutual fund that consistently outperformed during the upcoming four-year period. Fixed income categories, on the other hand, presented a diverse persistence pattern across tenors. For example, government long and intermediate funds continued to overperform by 75,86% and 72,73% respectively during the second year, while investment-grade long and high yield funds failed to do so, demonstrating a 30,43% and 45,54% persistence. In general, it can be safely assumed that for both asset classes, an inverse relation between persistence and time exists.

[21] By this point, it must be mentioned that exceptional results in the markets are possible. However, they must not be attempted with capital originating from "common" investors meaning the ones that need the future returns to have a proper pension, health insurance, savings, university endowments, etc. in due time. The above should first guarantee the safety of principal and then be content with an expected return, totaling the one provided by the total market return. By doing that, the risk is minimized as well as required fees and the need for complicated investment tactics. The advantages provided by indexing during the past decade have sparked a global rise in demand for index mutual funds and index ETFs.

Figure: 35 Performance Persistence of Domestic Equity Funds over Five Consecutive 12-Month Periods

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF					
All Domestic Funds	1135	45.64	24.49	16.83	8.37
All Large-Cap Funds	440	41.82	20.00	15.68	6.36
All Mid-Cap Funds	160	40.62	18.75	15.00	12.50
All Small-Cap Funds	265	44.15	23.02	13.96	7.55
All Multi-Cap Funds	270	43.70	21.85	16.67	8.89

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019.

Figure: 36 Performance Persistence of Domestic Fixed Income Funds over Five Consecutive 12-Month Periods

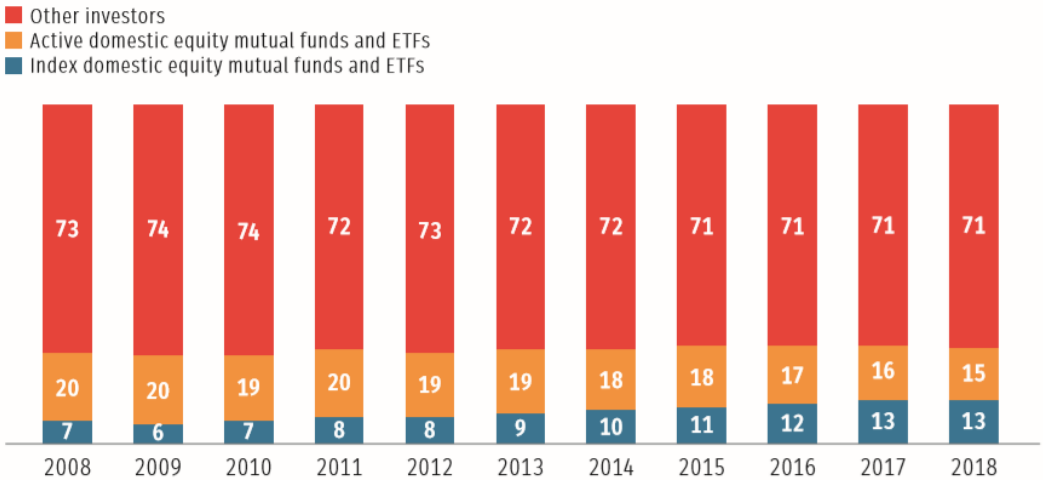
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018	SEPTEMBER 2019
TOP HALF					
Government Long Funds	29	75.86	20.69	17.24	10.34
Government Intermediate Funds	11	72.73	27.27	9.09	9.09
Government Short Funds	14	57.14	35.71	14.29	14.29
Investment-Grade Long Funds	46	30.43	10.87	4.35	4.35
Investment-Grade Intermediate Funds	95	60.00	29.47	13.68	10.53
Investment-Grade Short Funds	44	56.82	40.91	27.27	11.36
High Yield Funds	101	45.54	19.80	12.87	6.93
Mortgage-Backed Securities Funds	25	68.00	44.00	40.00	28.00
Global Income Funds	53	30.19	11.32	7.55	5.66
Emerging Markets Debt Funds	27	37.04	22.22	7.41	3.70
General Municipal Debt Funds	39	69.23	38.46	28.21	23.08
California Municipal Debt Funds	18	72.22	33.33	27.78	16.67
New York Municipal Debt Funds	14	57.14	28.57	21.43	7.14

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019.

8 What if?

Passive investment vehicles such as index funds and indexed ETFs are unambiguously the most significant financial discovery since their inception. Through their simplicity, they obtain their competitive advantage over active management, which is no other than the diminishing of incurred expenses. However, given their amassing popularity among investors and their growth momentum, passive management expansion may lead to peculiar phenomena not witnessed during any time interval in financial history. This brief chapter aims to indicate unique occurrences that may take place during extreme situations in the financial markets. By asking what would happen if certain conditions are met acts as a mental experiment to try to identify specific obstacles along the way.

Figure: 37 Percentage of US stock market capitalization owned by Index mutual funds and Indexed ETFs



Source: Investment Company Institute and World Federation of Exchanges

Index mutual fund's and indexed ETF's ownership in the total capitalization of the domestic market have increased by approximately 86% during the decade that started in 2008 and ended in 2018. Suffice it to say, that passive funds at year-end 2018 owned on average 13% of every publicly listed company in the U.S. However, the entire U.S. market is represented by the total market index Wilshire 5000, on the contrary, passive funds tend to track heavily not the total U.S. market but the S&P 500, which represents approximately 70% of the total market capitalization by measuring the performance of the 500 largest publicly listed companies. BusinessWeek, an American weekly business magazine on its January 13, 2020, edition, estimated that the common ownership of the three biggest passive fund providers or "Big Three" [22] as they are mentioned, amount to approximately 22% of the typical S&P 500 company. In theory, shareholders are responsible for hiring and voting on the decisions of the appointed management to decide the best course of action. Having said that, if the same organization or bloc owns a substantial and ever-growing interest in any given sector, then it is counterintuitive to vote on a competition related decision which, if successfully implemented, will impair the value of another holding. Hence, despite the reasonable notion of minimizing friction between competitors -that are inevitably owned by the same institutional bloc- in the marketplace, it is logical to assume that consumers will eventually pay the price. A high concentration of common ownership in a few institutional hands diminishes competition incentives, harming public interest in the form of less output, innovation, and excess inflicted price tags. Additionally, when indifferent, passive investors are accounted, great power is concentrated on the hands of a few asset managers who may be inclined to exercise it. John C. Coates (2018) professor of law and economics at Harvard Law School, stated the

[22] BlackRock Inc (7 trillion $ AuM), Vanguard Group Inc. (5,6 trillion $ AuM) and State Street Corp. (2,9 trillion $ AuM). The "Big Three" according to BusinessWeek manage approximately 80% of all indexed assets in the U.S.

following:" *A small number of unelected agents, operating largely behind closed doors, are increasingly important to the lives of millions who barely know of the existence much less the identity or inclinations of those agents."* Even if every vote is proxied, passive managers may still be able to influence corporate behavior subtly. Late Jack C. Bogle (2018), the founder of the Vanguard Group, noted on *Wall Street Journal* in regard to the growing accumulation of common ownership by the Big Three:" I do not believe that such concentration would serve the national interest." When considering the growth curve of passive management, the introduction of a cohesive regulatory framework based on a rigorous corporate governance foundation seems imperative in years to come. Index funds, like their name, imply buy a "pre-made" composition of a given index. Popular indices like the S&P 500 are market cap-weighted, indicating that market share price is often the most critical factor in determining a company's market valuation and its individual weight in the index. In practice, share prices stem from a combination of sound, intrinsic valuation models, and human behavior consensus regarding expectations. The aggregate result or price discovery, as is often called, requires active engagement in the marketplace. In its core, economics study the efficient allocation of scarce resources that have alternative uses. In our case, the investor group cannot simply allocate capital among market competitors efficiently if due diligence is not conducted. Therefore, passive funds that track market cap indices rely on the valuation consensus of active investors to allocate their capital. However, given the rising popularity of index funds, financial markets may reach a point where active management's reduced capital flows cannot substantially impact weights or valuation distortions. Nevertheless, a 2019 Federal Reserve Bank of Boston paper indicates that based on current research and understanding of financial markets, evidence of "index bubbles" does not exist. Finally, a passive investor must always consider overall fundamentals and other dominant risk factors prior to tracking a foreign or domestic market segment. Long term asset growth cannot be taken as granted when hyper-inflated asset prices relative to fundamentals or other significant risk factors prevail. An extreme illustration of the above would be the Japanese asset bubble of 1989, which led to Japan's lost decade of 1991-2001. Nikkei 225, at the height of the bubble, reached the all-time high of 38.957 on December 29, 1989, before plunging to 14.309 at the end of August 1992. Despite the passing of 31 years since the crash, Nikkei closed at 23.656 in the year-end 2019. Suffice it to say that indexing as any other investment is still in need of vigilance as well as prudence in the part of the common investor to bare fruits.

9 Conclusion

The purpose of this thesis was to offer knowledge comprised of both theoretical and empirical evidence to the common investor, to assist him in a pragmatic level with effectively addressing the subject of investing. The investment alternatives examined were those of allocating capital in actively or passively managed mutual funds. Initially, we assumed, that the main intention for the investor who resembles the profile of the "common investor"

persona is to maximize investment returns without risking the integrity of his invested capital. For our common investor capital is required to meet foreseen future obligations and hence financial markets are treated as a tool to mitigate the risk of falling to acquire the capital to successfully fulfill future liabilities.

Passive management is based on the notion that markets are efficient or at least semi-efficient. This indicates that financial markets reflect all available information which is translated by security prices that are correctly adjusted. Thus, in theory, there are not security valuations that can be exploited for profit either due to being overvalued or undervalued. Proponents of passive investing indicate that the best course of action is to bet on steady economic growth that will ultimately push valuation upwards over the years and hence own a low-cost, broadly diversified mutual fund. Since passive mutual funds emulate the composition of major indices their expenses are reduced to bare minimums leaving a higher percentage of the total return to be returned to the investor. By owning a segment of the economy, the investor is sure to inevitably capture the total return of the market (beta) by assuming only market risk. Contrarily, active management proponents propose that markets are not efficient and thus valuations tend to be occasionally wrong. The utilization of fundamental and technical analysis by accomplished asset managers is then required to exploit the inaccurate valuations. The pinnacle of success in active management is to provide returns above the market averages (alpha). However, to do so, a great sum of expenses must be inflicted for the fund to be able to operate, which are then deduced by the gross return provided by the fund to the investor group.

Trend analysis since the starting of the century indicates that the preferred investment vehicle for both strategies is mutual funds. Assets under management have grown from 6,834 billion $ at year-end 1999 to 17,707 billion $ by year-end 2018. Additionally, ETFs are a newly adopted investment company scheme that incorporates the diversification of a mutual fund with the trading aspects of a stock. Investors favor the ETF structure as suggested by the total AuM figure. ETF assets have increased from just 34 billion $ at year-end 1999 to 3,371 billion $ by year-end 2018, underlying the amassing demand for investment products that are both diversified and liquid. Passive management gained immense momentum during the decade that started at year-end 2008. At the beginning of the period, just 18% of the total AuM in long-term mutual funds and ETFs were managed passively, by year-end 2018 that figure doubled to 36% denoting the swift in popularity between the two investment approaches.

Cost acts as a strong predictor of performance derived from the logical fact that it must eventually be deducted from the gross return that is provided to the investor by the fund. For a fund manager to break even on a net basis with the average market return, he must assume excess risk to compensate for the return lost due to higher induced expenses. Paradoxically, cost is the sole factor that can be predetermined by the investor prior to the allocation of his capital that immediately impacts his investment results. Mutual funds that

incorporate higher expenses have empirically proven by numerous studies to underperform corresponding funds as they are unable to recoup expenses by proving additional value. Investment companies integrate a great diversity of disclosed and oblique expenses with the most significant among them being the expense ratio. Generally, an expense ratio incorporates more specific cost subsets such as the operational, managerial, and marketing costs and it is expressed as a percentage of the mutual fund's AuM. As of year-end 2018, 79% of total assets invested in equity mutual funds were part of funds that occupied the lowest quartile in terms of expense ratio percentage per asset unit. During the same period, the spread between the simple average (1,26%) and the asset-weighted average (0,55%) for mutual fund expense ratios reveal that despite the existence of more expensive mutual funds' investors tend to refrain from costly alternatives. The declining long-term pattern of asset-weighted expense ratios (year-end 2000: 0,99%, year-end 2018: 0,55%) indicates the existence of ever going competitive forces, technology advancements, and economies of scales that innovate the mutual fund industry. Over the same 18-year period passively managed mutual funds proved their cost-efficient nature as their average expense ratio declined from 0,27% at the begging to an all-time low of 0,08%. In the meantime, actively managed mutual funds average expense ratios ranged at much higher levels (year-end 2000: 1,06%, year-end 2018: 0,76%) failing to reduce the ownership cost of their funds at the same rate as their passive counterparts. At the eve of 2019, owing the average actively managed mutual fund would bear an upfront cost of 850% more than its average passively managed counterpart (not addressing for undisclosed expenses e.g., tax implications, transaction expenses). Ultimately, the return loss due to the cost spread ought to be reimbursed by the assumption of excess portfolio risk -a practice that has been deemed unstainable during the long term-.

The SPIVA scorecard is a semi-annual report that tracks the performance of actively managed mutual funds against the S&P benchmarks as well as their outperformance persistence after the correction of biases. In essence, the report acts as a comparison for the passive versus active argument since passive managed mutual funds closely emulate the composition and returns of the S&P indices. For equity mutual funds there is not a single category that outperformed the relative indices during the mid (5-year) and long term (10-year, 15-year) time periods. Large-cap funds -the cornerstone of many portfolios-, drastically underperformed the S&P 500 during the 15-year period by 90,46%. The above translates to only 1 in 10 funds that survived during the period outperforming the market average. Even during the short (3-year) and very short (1-year) term large-cap funds underperformed by 71,13% and 70,98% respectively. In general, the all-domestic fund category when compared to the wide market barometer S&P Composite 1500 underperformed during every time interval. For fixed-income mutual funds, the long-term performance outlook (15-year) for any fund category does not contravene the subpar pattern. When objective and arbitrary factors are quantified with the help of the SPIVA report to mold a comprehensive

perspective for the subject in question we are able to pinpoint the shortcomings of the active management model.

The objective of the presented topics is to create a blueprint for the investor to follow that is universally applicable under any jurisdiction. However, if there is anything for the common investor to remember for the rest of his investment undertakings are the rules of simple arithmetic. Those, prove that exceeding the overall market return net of costs, in essence is a zero- sum game that is best left to professionals and speculators. By allocating capital efficiently through the use of proper mutual fund schemes the investor is sure to capture the approximate market return net of costs. After the deduction of inevitable expenses, passive index mutual funds and ETFs will require much less resources than identical active funds, thus returning more to the investor. Yet, despite these differences being relatively minor, the compound effect will gradually yield a much different outcome. Empirical data when corrected for biases confirm this pattern with increasingly accuracy for longer time periods. To reiterate, SPIVA pinpointed that large cap funds underperformed the S&P 500 by 90,46% for the 15-year period, ended in late 2019. Concluding, less means more in the case of the common investor, where a few calculated steps and well-informed decisions can mean a lifetime of satisfactory returns.

References

Ariel, R. A. (1987). A monthly effect in stock returns. *Journal of Financial Economics*, 18(1), 161-174.

Asness, C. (2006). The Value of Fundamental Indexing. Retrieved from https://www.institutionalinvestor.com/article/b150nsjcm4ph3y/the-value-of-fundamental-indexing

Bloomberg. (2019). Asset Managers With $74 Trillion on Brink of Historic Shakeout. Retrieved from https://www.bloomberg.com/graphics/2019-asset-management-in-decline/

Bloomberg. (2019). End of Era: Passive Equity Funds Surpass Active in Epic Shift. Retrieved from https://www.bloomberg.com/news/articles/2019-09-11/passive-u-s-equity-funds-eclipse-active-in-epic-industry-shift

Bogle, J.C. (1993). Bogle on Mutual Funds: New Perspectives for the Intelligent Investor. Wiley.

Carhart, M.M. (1997). “On Persistence in Mutual Fund Performance” *The Journal of Finance*, 52(1), 57-82

Chicago Booth Review. (2016). Are markets efficient? [Video]. Youtube. Retrieved from https://www.youtube.com/watch?v=bM9bYOBuKF4&feature=emb_title

Coates, J.C. (2018). “The Future of Corporate Governance Part I: The Problem of Twelve” *Harvard Public Law Working Paper*, 19-7.
Edelen, R.M., Evans, R.B., & Kadlec, G.B. (2007). Scale effects in mutual fund Performance: The role of trading costs. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=951367

Fama, E.F. (1970). “Efficient Capital Markets: A Review of Theory and Empirical Work” *The Journal of Finance*, 25(2), 383-417.

Fama, E.F. (1998). "Market efficiency, long-tern returns, and behavioral finance” *Journal of Financial Economics*, 49(3), 283-306.

Fama, E.F., & French, K.R. (2010). “Luck versus Skill in the Cross-Section of Mutual” *The Journal of Finance*, 65(5), 1915-1947.

Federal Reserve Bank of Boston. (2018). The Shift from Active to Passive Investing: Potential Risks to Financial Stability ?.

French, K.R. (1980). “Stock returns and the weekend effect” *Journal of Financial Economics*, 8(1), 55-69.

Horan, S.M., & Johnsen, D.B. (2004). Does Soft Dollar Brokerage Benefit Portfolio Investors: Agency Problem or Solution? Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=615281

Iachini, M. (2019). ETFs: How Much Do They Really Cost? Retrieved from https://www.schwab.com/resource-center/insights/content/etfs-how-much-do-they-really-cost

Investment Company Institute. (2019). *Investment Company Fact Book - A Review of Trends and Activities in the Investment Company Industry*.

Johnson, B. (2017). Assessing the Total Cost of ETF Ownership. Retrieved from https://www.morningstar.com/articles/802211/assessing-the-total-cost-of-etf-ownership

Johnson, B. (2019). Calculating the Total Cost of ETF Ownership. Retrieved from https://www.morningstar.com/articles/912482/calculating-the-total-cost-of-etf-ownership

Johnson, B. (2019). Fund-Fee Study: 3 Things to Know About What's Driving Fund Fees Down. Retrieved from https://www.morningstar.com/insights/2019/04/30/us-fund-fee-study

Johnson, B., & Bryan, A. (2019). Measuring ETFs' Tax Efficiency Versus Mutual Funds. Retrieved from

https://www.morningstar.com/articles/940313/measuring-etfs-tax-efficiency-versus-mutual-funds

Kahneman, D., & Tversky, A. (1979). “Prospect theory: An analysis of decision under risk*” Econometrica*, 47, 263-291.
Kahneman, D. (2011). Thinking, Fast and Slow. Farrar, Straus and Giroux.
Malkiel, B.G. (1973). A Random Walk Down Wall Street. W. W. Norton & Company.

Malkiel, B.G. (2003). “The Efficient Market Hypothesis and Its Critics” *Journal of Economic Perspectives*, 17(1), 59-82

McCullough, A. (2019). 2018 Morningstar Fee Study Finds That Fund Prices Continue to Decline. Retrieved from https://www.morningstar.com/articles/925303/2018-morningstar-fee-study-finds-that-fund-prices-continue-to-decline

Morgan Stanley. (2016). *What no one told you about passive investing*.

Morningstar. (2010). *How Expense Ratios and Star Ratings Predict Success*.

Morningstar. (2016). *Predictive Power of Fees - Why Mutual Fund Fees Are So Important*.

O'Rielly, W., & Preisano, M. (2000). Dealing with The Active. Retrieved from https://www.etf.com/publications/journalofindexes/joi-articles/1159.html

Petticrew, M., & Roberts, H. (2006). Systematic Reviews in the Social Sciences: A Practical Guide. Blackwell Publishing
Rushkewicz, K.R. (2010). How Tax-Efficient Is Your Mutual Fund? Retrieved from https://www.morningstar.com/articles/308356/how-tax-efficient-is-your-mutual-fund

Sharpe, W.F. (1991). “The Arithmetic of Active Management” *The Financial Analysts’ Journal*, 47(1), 7-9.
Shiller, R.J. (2000). Irrational Exuberance. Princeton University Press.

Shiller, R.J. (2003). “From Efficient Markets Theory to Behavioral Finance” *Journal of Economic Perspectives*, 17, 83-104.

S&P Dow Jones Indices. (2018*). SPIVA Institutional Scorecard: How Much Do Fees Affect the Active versus Passive Debate?*

S&P Dow Jones Indices. (2019). *Does Past Performance Matter? The Persistence Scorecard.*

S&P Dow Jones Indices. (2019). *SPIVA U.S. Scorecard.*

S&P Dow Jones Indices. (2019). *Risk-Adjusted SPIVA Scorecard: Evaluating Active Managers' Performance through a Risk Lens.*

Sushko, V., & Turner, G. (2018). The implications of passive investing for securities markets. BIS Quarterly Review, (March).

Taleb, N.N. (2001). Fooled By Randomness. Random House.

The Research Foundation of CFA Institute. (2013). *Manager Selection*.
Total World Domination. (2020, January 13). Bloomberg Businessweek. 20-25.

U.S. Securities and Exchange Commission. (2014). *Investor Bulletin: How Fees and Expenses Affect Your Investment Portfolio*. Retrieved from https://www.sec.gov/investor/alerts/ib_fees_expenses.pdf

U.S. Securities and Exchange Commission. (2014). *Investor Bulletin: Mutual Fund Fees and Expenses*. Retrieved from https://www.investor.gov/introduction-investing/general-resources/news-alerts/alerts-bulletins/investor-bulletins-20

U.S. Securities and Exchange Commission. (2016*). Mutual Funds and ETFs: A Guide for Investors*. Retrieved from https://www.investor.gov/sites/investorgov/files/2020-04/mutual-funds-ETFs_2_0.pdf

Vanguard. (2015). *Tax-efficient equity investing: Solutions for maximizing after-tax returns*.

Vanguard. (2015). *What is 'survivorship bias' and why does it matter ?*

Vanguard. (2017). *Vanguard's framework for constructing globally diversified portfolios.*

Vanguard. (2017). *Vanguard's Principles for Investing Success.*