

Chapter 5 - Mutual Funds

written for Economics 104 Financial Economics by Prof Gary R. Evans
First edition, September 24, 2012, this edition September 24, 2019

© Gary R. Evans. This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.



If you are reading this because you are a student in Economics 104, even if you find the subject of this class interesting, there is still a very good chance that you will never open a brokerage account or buy a single stock. As is stressed in the lectures, managing a personal stock portfolio and doing the proper research to buy and sell stocks can be a lengthy and tedious exercise if your heart isn't in it. Investing directly in stocks is not a pastime for the casual investor.

Nonetheless, if you are employed then the likelihood that you will buy stocks *indirectly* and *in abundance* is nearly certain. More than that - you will actually have to make some hard choices about what stocks to buy - or at least about what *groups* of stocks to buy.

This is because when you are employed your employer will likely offer some kind of tax-deferred retirement plan, such as a **401-k** plan over which you have some discretion. If your situation is typical, every month a given percentage of your income will be invested on your behalf for your retirement, and a high percentage of the amount is likely to end up as stock investments.

Although there are some other options for such investments, such as the related *exchange traded products* explained in the next chapter, most of your retirement funds, if not all of them, will likely be invested in a class of investments assets called *mutual funds*.

In fact, because of the relative simplicity of the research and management of mutual funds, many of you will also select mutual funds as the primary investment vehicle for discretionary financial savings unrelated to your retirement. In other words, when you say "Let's put some money in the markets!", the proceeds will end up in mutual funds.

Let's see why this is true.

1. Some Interesting Facts about Mutual Funds

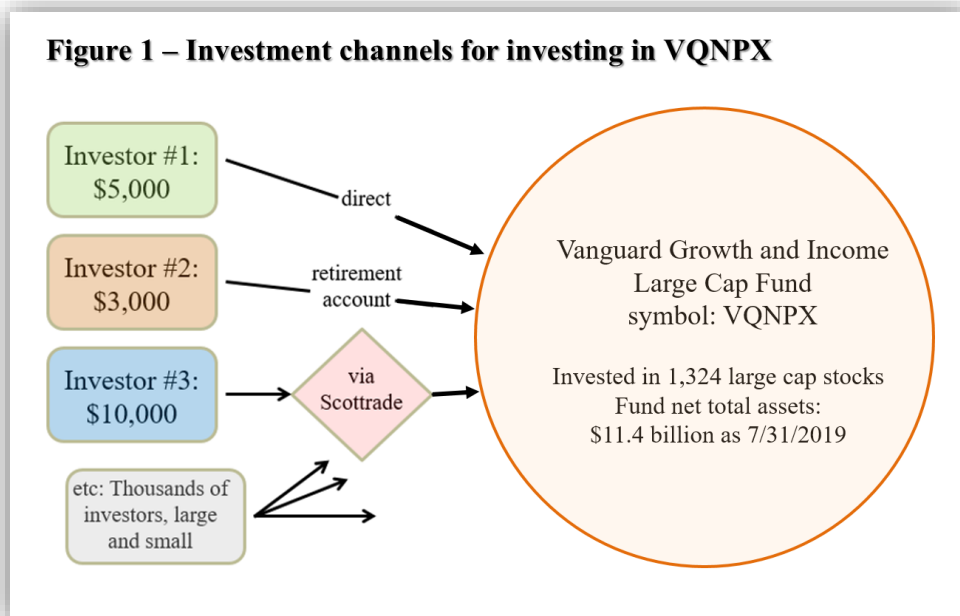
Mutual funds are investment pools with a specifically stated investment objective. The funds are available to even the smallest of investors. The money collected in the name of the fund is pooled and used to invest in a portfolio that may include only stocks or only yield-bearing financial assets (like bonds) or some combination of the two. Because mutual funds are conservative investments, the stock investments are only *long* investments (no short-selling).¹

Mutual Funds are offered (marketed and managed) by specialized investment companies. The largest (as measured by assets managed), is Pennsylvania-based Vanguard, which is typical of a well-run mutual fund. Vanguard was founded in 1975 and manages more than \$5.2 trillion in assets through about 190 different mutual funds² for than 30 million investors, tiny to huge. An investor can invest in mutual funds through many different channels. You can buy mutual funds directly from the investment company that manages the fund (in this example, by buying shares in a Vanguard mutual fund directly through the Vanguard online portal), through a brokerage account (e.g. by using a TD Ameritrade or Interactive Brokers account, ordinarily used to buy and sell stocks, to buy or sell a Vanguard mutual fund), or if enrolled in a retirement investment account managed by your employer, invested on your behalf by your employer into a mutual fund that has been designated as a candidate fund for your monthly retirement investment.

¹ The mutual fund industry is huge, diverse, and slowly changing, especially in competition with other emerging assets like *exchange traded products*, which are discussed in the next chapter. For that reason, there are some exceptions to almost everything that is said here in this section. But at the time of this writing, such exceptions are rare.

² From the "Fast facts about Vanguard" section of Vanguard's website, September 23, 2019.

Figure 1 - Investment Channels for Investing in VQNPX visually shows the concept associated with mutual fund investments by using an actual mutual fund as an example. **VQNPX** is the trading symbol (mutual funds have trading symbols just like stocks) for the **Vanguard Growth and Income Large Cap Fund**, which is a stock mutual fund which has the investment objective of outperforming (having a higher yield than) the S&P 500 Index, which you may recall from an earlier chapter, tracks 500 large-cap stocks. Basically, this mutual fund try to meet this objective by investing long in more than 1,300 stocks that the fund managers believe will outperform the index. As of the date shown in **Figure 1**, this fund had more than \$11.4 billion invested in 1,324 stocks.³



As the diagram also shows, tens of thousands of investors will have contributed to this large fund, some directly, some through a brokerage, and some through retirement accounts. This fund requires a single investment of \$3,000 minimum or larger for direct investments, although such funds allow much smaller monthly investments through retirement accounts. Minimum required investments, discussed below, vary by mutual fund and by type of contribution.

According to the mutual fund research company *Investment Company Institute*,⁴ in 2018 total

worldwide assets invested in mutual funds equaled a staggering \$46.7 trillion, of which \$21.1 trillion was managed by United States investment companies. 101.6 million individuals and 44.8% of all households in the United States owned at least one mutual fund. This industry has experienced phenomenal growth since the 1990s, given that in 1995 mutual fund assets equaled only \$2.81 trillion. Generally, the higher the income of the household, the more likely the household owns mutual funds. For example, in 2018, 80% of all households with incomes higher than \$100,000 annually owned mutual funds, but only 18% of households with incomes between \$ 25,000 and \$34,999 owned mutual funds.

The total number of 846 global financial companies offered approximately 8,000 mutual funds to the U.S. market at the end of 2018, an astonishing figure when you realize that the number of mutual funds offered is well more than half of the number of individual stocks offered! Certainly you have a great deal of choice when deciding between mutual funds. But despite this choice the industry is extremely concentrated. In 2018, the top five companies controlled 51% of fund assets and the largest 25 controlled 79%. The industry is extremely competitive and the failure rate, especially for individual funds, is quite high.⁵

³ From the annual report for this fund on July 31, 2019. Although this \$11.4 billion may seem like a very large number, the enormous **Vanguard 500 Index Admiral Shares Fund**, which tracks the S&P 500 index directly, managed \$486.4 billion on August 31, 2019! This famous fund is not used as an example because the fund is closed to new investors. They cannot accept any more money!

⁴ This research group offers extremely detailed public information about mutual funds and is a very valuable resource for statistics. Data cited here are from the annual factbook, *2019 Investment Company Factbook, A Review of Trends and Activities in the U.S. Investment Company Industry*, 59th edition, available for free at <http://www.icifactbook.org>. The interested student is encouraged to review this document. This institute and the document also has detailed information about exchange-traded products, discussed in the next chapter.

⁵ This number includes ETFs. This suggests that the smart investor will shop only from the largest fund families, and even then select funds that have a high asset value. Reasonable thresholds are discussed later in this chapter.

As was stated at the beginning of this chapter, mutual funds can be purchased and managed online, which makes management of the mutual fund portfolio very convenient.

2. Types of Mutual Funds (Categories) and Mutual Fund Families

Mutual funds are distinguished by their stated investment objectives which are declared in their prospectuses. These investment objectives typically declare that the fund will attempt to accomplish the objective by investing only in certain categories of assets, such as stocks only or bonds only, and then often only subcategories, such as only technology stocks

Figure 2 - Mutual Fund Categories

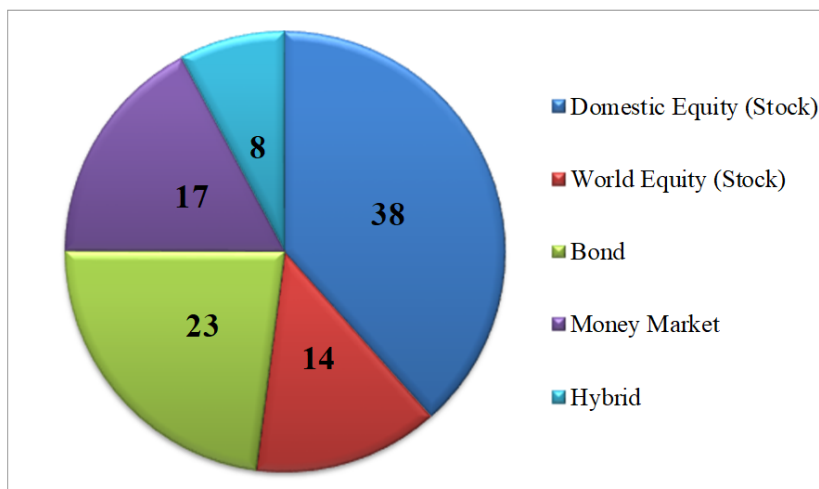
Fund Type	Characteristics
Money Market	The original mutual funds, these invest only in very short-term interest-bearing debt assets, like U.S. Treasury Bills and Commercial Paper.
U.S. Equity (Stock)	These invest in stocks listed in the U.S. markets exclusively. Some stress capital gains (growth), others stress dividends (value). Many are segregated by market cap *(such as large-cap, mid-cap, and small cap).
Index	These also invest in stocks (typically) but with a selection of stocks at weights designed to perfectly track an index, like the S&P 500 index.
Target Date	These are typically hybrid (stock and bond) funds designed for retirement accounts targeted for specific retirement years (for example a Target-Date 2055 fund is designed for those intending to retire around the year 2055).
International Equity	These also invest in stocks exclusively, but in the global market, including stocks from around the world.
Taxable Bond Funds	These invest in bonds that are not tax exempt. These are divided into subcategories like U.S. Treasury Bonds and Corporate Bonds, and further divided according to risk, such as investment grade bonds and high-yield "junk" bonds.
Municipal Bond Funds	Interest earned on the bonds in this category is not taxed (with some exceptions). These are bonds issued by state and local governments.
Sector Equity Funds	These invest in stocks specific to only one sector, like technology, health, financial, natural resources and so forth.
Hybrid and Other	These invest in a mix of stocks and bonds that are allocated according to some stated investment criteria, aside from Target Date, which has its own category above. And of course there are other funds that don't neatly fit into the criteria above.

or only U.S. Treasury bonds. Therefore, the most useful starting taxonomy for classifying mutual funds is by class of investment asset.

Figure 2 - Mutual Fund Categories offers a classification that includes most mutual funds. The description under the **Characteristics** column might include investment categories that you don't yet understand (like "Commercial Paper" in the first row) but these assets will eventually be explained somewhere in this book. The point here is that essentially every kind of investment asset that can be purchased is represented somewhere by a mutual fund.

Before continuing you should peruse **Figure 2** to see how much of this you can already understand. Many of the terms and fund categories, like *Target-Date* funds, will be explained later in this chapter.

Figure 3 – Percentage composition of total U.S. mutual fund assets by type of fund, year-end 2018



Total mutual fund assets: \$17.7 trillion

Source: The Investment Company Institute, *2019 Investment Company Factbook, A Review of Trends and Activities in the U.S. Investment Company Industry*, 59th edition, Table 3

These Mutual Funds are offered by specialized investment corporations that might be referred to as *mutual fund families*. Vanguard, the largest of them has already been mentioned. Large fund families like Fidelity, Vanguard, PIMCO and T. Rowe Price have excellent educational web sites. Consequently, the novice investor might benefit from perusing the sites of these four companies. More can be learned there about their offerings and fees that can be learned from reading this text.

Figure 3 - Percentage composition of total U.S. asset by type of fund shows how the \$17.7 trillion worth of mutual funds owned in the U.S. were broken down in 2018. As can be seen, 38% of the funds were made up of U.S. stocks (the Vanguard

VQNPX fund is an example of that), another 14% consists of investments in stocks traded on foreign markets, 23% are funds dedicated to owning only yield-bearing financial assets, such as corporate or U.S. Treasury notes and bonds, and only 8% are hybrid mutual funds, which means typically that they are made up of some combination of stocks and bonds.

Money market mutual funds, the first category in **Figure 2**, are regarded as ultra-conservative low-yield funds because they invest only in yield-bearing (interest-bearing) financial assets that have maturities of less than one year, such as 13-week, 26-week, or 52-week U.S. Treasury bills or short-maturity corporate commercial paper.⁶ These were among the first mutual funds developed when the mutual fund industry was embryonic and they soared again in popularity, especially for retirement accounts, after the financial crisis that began in 2007. Such funds currently have yields of less than 2% annually. But they are regarded as the safest of all funds and among the safest of all categories of investment assets.

Within the equity division of mutual funds there are sub-categories of funds matched to the investment objectives of potential investors. What follows are some of the major sub-categories.

⁶ These assets are discussed in later chapters on bonds on other yield-bearing financial assets.

2.1 Equity Growth Funds

The stock portfolio of a growth fund will consist of companies that are perceived to have high sales growth rates with the potential for higher future profits, such as fast growing technology companies like Apple and Alphabet. Such companies are less likely to pay high dividends than companies that are in the Income Fund category (below) and this fund category is typically perceived as riskier than the Income Fund counterpart.

2.2 Income Funds (also called Value Funds)

The stocks in this fund category tend to be from companies that are large and well-established with conservative management, high profit margins, and pay dividends. Companies represented in these funds are not likely to have sales growth rates that are as high as their counterparts in the Growth Funds category. Oil companies, banks, and large consumer products companies are often found in value portfolios. These are companies that do not have the torrid growth rates of the new technology companies but are in established businesses with good profit margins from which they pay dividends. Increasingly, though, many technology companies are represented in this category.

2.3 Index Funds

This type of mutual fund is pegged to a stock index, like the **S&P 500** or the **NASDAQ 100**, and will comprise the stocks that are in that index, typically with the weights that are assigned in the index. As goes the index, so goes this mutual fund. This is currently the most popular fund category of all those listed here. This is also the fund category that your teacher always recommends if you are in doubt of what category to choose.

2.4 Specialty Funds (also called Sector Funds)

Mutual funds can be divided and subdivided into divisions based upon sectors, industries, capitalization size and many other categories. For example, there are mutual funds that invest only in technology companies, such as the **Waddell & Reed Science and Technology A (UNSCX)** fund, or something more specific within the technology sector, such as the **Fidelity Select Software and Computer (FSCSX)** fund, which invests only in software service companies. Mutual funds specialize in financial services, health care (or hospitals only), mining (or gold mining only), real estate, pharmaceuticals - if there is an identifiable industry or sector, there will be a mutual fund that represents it. Specialty funds allow very targeted investing, especially for an educated investor who is knowledgeable about certain industries and who understands emerging trends in such industries.⁷

2.5 Equity Funds Broken Down by Capitalization Size

It is common to cluster stocks into small-cap, mid-cap, or large-cap compositions for mutual funds, including subcategories like small-cap growth funds or mid-cap value funds. Indexes representing different cap sizes do not perform identically over time (in other words, sometimes small-cap stock indexes like the Russell 2000 will outperform a large-cap index like the Dow Jones Industrial Average, and sometimes its the other way around) so presumably some investors will opt for choices within sectors or growth or income funds that are further subdivided into company size.

2.6 Target Retirement Funds

In recent years a new type of heavily promoted mutual fund has appeared - the *target retirement fund*. As the name implies, these funds are oriented toward providing a relatively safe hybrid package of assets targeted toward a specific retirement date, such as the year 2050. These funds are designed to turn more conservative as the investor ages, typically by rebalancing away from a stock-based portfolio to relatively more yield-bearing assets as the target date approaches.

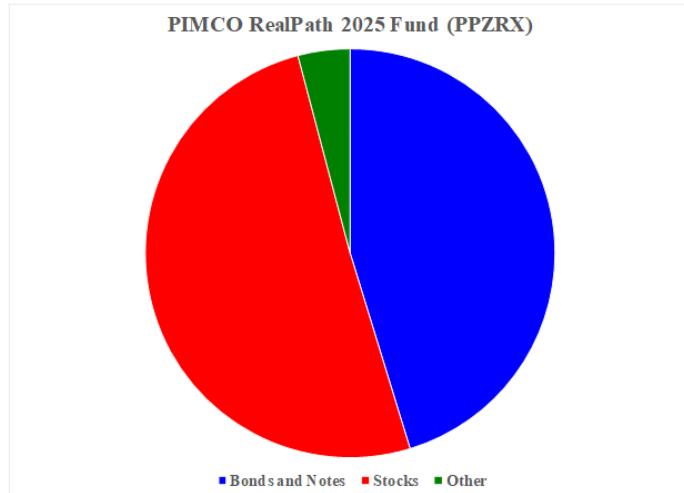
⁷ Some of the author's most successful investments were realized in 2003 when he foresaw emerging opportunities in oil and oil services companies and gold mining companies and made a series of timely investments in specialty mutual funds in the areas.

Refer to **Figure 4 - The Composition of Two Pimco Target Date Funds in 2019**. The top fund is intended for investors who intend to retire in just a few years (2025) whereas the bottom fund is intended for younger investors targeting retirement around the year 2055. The most notable difference between these two funds is the relative percentage invested

Figure 4 – The Composition of Two Pimco Target Date Funds in 2019

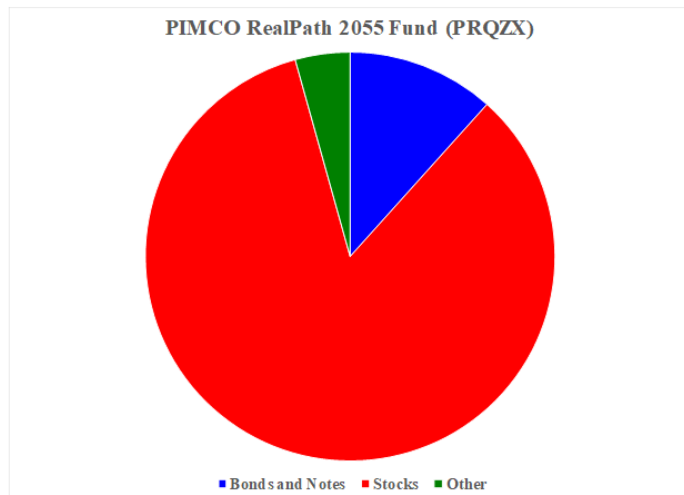
Pimco RealPath (Target-Date) 2025 Fund		
PPZRX: (as of 9/22/2019)		
Assets		%2019
Core US bonds		13.72
Long-Term US Treasuries		6.91
Inflation-linked bonds & TIPS		11.69
High Yield bonds		10.62
Global bonds		1.48
Global equities		10.81
US large cap stocks		28.12
US small cap stocks		2.22
Emerging market stocks		8.52
Real Estate		4.03
Commodities		0.00

Total expenses 0.43%



Pimco RealPath (Target-Date) 2055 Fund		
PRQZX: (as of 9/22/2019)		
Assets		% 2019
Core US Bonds		0.65
Long-term US Treasuries		0.43
Global bonds		0.06
High Yield bonds		9.60
Inflation-linked bonds & TIPS		0.70
US large cap stocks		47.33
US small cap stocks		4.01
Global stocks		20.56
Emerging market stocks		10.68
Real estate		4.25
Commodities		0.00

Total expenses 0.23%



Source: PIMCO website and prospectuses for these funds.

in stocks and bonds. Bonds (and other yield-bearing financial assets) are nearly half of the portfolio of the 2025 fund, representing 44% as opposed to 50% for stocks. In contrast, the 2055 fund holds 83% of the portfolio in stocks and only 11% in bonds. This balance represents the general perception that in the short run, bonds are a lot safer than stocks. This perception of safety is enhanced by the fact that ultra-safe inflation-linked bonds and U.S. Treasury bonds are also well represented within the bond portion of the portfolio.

In contrast, the heavy weighting of stocks in the 2055 portfolio accepts the common dual proposition that (a) stocks will outperform bonds in the long run with a higher mean rate of return and (b) although volatile in the short run, when you have more than three decades to work with, troubled stocks eventually will return to that higher mean rate of return (similar to the mean-reversion theory of the Shiller-CAPE model as discussed in **chapter 4**).

At the time this was written, there were more than 2,000 of these mutual funds and they are growing in popularity for use in **401-k** and similar tax deferred retirement plans.

It is important for the investor to understand that, unlike traditional mutual funds, which invest *directly* in stocks, and bills, notes, and bonds, most of these target funds *invest in other funds*, sometimes ETFS and sometimes other mutual funds offered by the same fund family. This *may* have the effect of compounding whatever risk is present (there are no examples yet of where that has been the case) and it may also have the effect of rolling in hidden fees. Each target funds has its own fee structure, which is sometimes quite high and typically higher than index funds, and it is possible that fees from the held funds are structured into the price. There are many critics who claim that the fee structure for these funds are too high for retirement accounts, although competition has pushed fees down some in recent years.⁸

The presence of the important *world equity (stock)* category implies that Americans are willing to invest at least a portion of their portfolio in foreign stocks traded in overseas markets (rather than, say, ADRs of foreign companies traded in the United States). A popular representative fund in this category in recent years has been the **American Funds EuroPacific Growth Fund Class A (AEPGX)**. More than 90% of this fund's assets are invested in stocks from Europe and the Pacific Basin, including such stocks as Novartis (Switzerland), Bayer (Germany), Taiwan Semiconductor (Taiwan), SoftBank (Japan), Samsung (South Korea) and Alibaba (China). These world equity mutual funds offer considerable diversity from U.S. funds and are a little riskier, partly because the overseas markets are generally more volatile than the U.S. markets (especially the less-developed or *emerging* markets, as they are sometimes called, like the markets in Brazil, India, Thailand, Russia, Argentina, and Mexico) and because U.S. investors face exchange rate risk, the possibility of losing money because of an adverse exchange rate movement while the investors funds are tied up in a stock denominated in a foreign currency.⁹

3. Benefits of mutual funds

Mutual funds, despite their conservative structure, are still the primary investment vehicle in the United States for most retirement funds and small retail investors, and are likely to retain that status for a long time to come, despite the growing popularity of their primary competitor, exchange-traded products. For the long-term retail investor, they offer five strong advantages: (1) a huge variety of choice, (2) relatively low fees and expenses (if the investor chooses the right funds), (3) the benefit of investment diversity, which lowers risk without lowering yield, (4) easy access (meaning that they are easy to trade online), and (5) complete transparency, which means that they are easy to research. Mutual funds are heavily regulated and must comply with detailed reporting requirements, which insures that good research can discover all that the potential investor needs to know when considering investment options.

The large variety of choice has already been discussed, and the benefits of low fees and expenses will get special treatment later in this chapter. Ease of access will be demonstrated in the next section of this chapter when we discuss the special transactions requirements of Mutual Funds (they are not purchased nor sold in the same way as stocks). The remainder of this section will be dedicated to the primary benefit of mutual fund investments, *diversity* and the resulting substantial reduction in risk *without* a necessary loss in yield. It is *this* feature that primarily justifies the use of mutual funds for long-horizon investment portfolios.

Diversity is the direct result of the fact that a mutual fund is an investment vehicle explicitly designed to pool money, including from small retail investors who can't afford to invest very much, for the purpose of investing in a large portfolio of many stocks. It is this spreading out of investment (diversity) that lowers risk without necessarily reducing yield.

The demonstration of the benefit of diversity is best made with a stochastic mathematical model which could be easily understood by any Harvey Mudd student, but unfortunately the model requires a very detailed setup and justification of a conceptual structure, including an array of assumptions that must be justified. That is too much to ask here so an appeal by example must suffice.¹⁰

⁸ For example, see William Baldwin, "The Trouble with Target Funds," *Forbes*, June 24, 2013.

⁹ For example, if you were to buy shares in SoftBank, the Japanese telecommunications company, you would first have to convert Dollars to Yen. Suppose when you buy SoftBank the exchange rate is 90 Yen to the Dollar, then when you sell the stock the exchange rate has risen to 100. Regardless of SoftBank's performance, you would take more than a 10% exchange rate loss.

¹⁰ If you are a student in Economics 104, if time allows this math model, or at least an elementary version of it, might be introduced in the lecture. This model is taught in Economics 136 and the curious student can easily find the lecture where it is explained by surveying the online lectures made available on the website for Economics 136

Suppose as a young engineer or biologist you see a bright future in technology companies in general, so you decide that you want to invest \$10,000 or so in the technology sector. You know that one option is to buy shares in a representative company, like **Apple** or **Cisco**. You might even decide to split your \$10,000 investment between the two. But you already know enough about stocks to realize that this can be a very risky investment. **Apple**, for example, can be very volatile, and you know from history that a stock that has been long favored by the market can quickly fall from grace with a turn of events.

Given this, consider the possibility of effectively investing your \$10,000 in 60 or more technology companies instead of one or two. This is what you would be doing if you purchased shares in the **T. Rowe Price Science and Technology Fund (PRSCX)**. That mutual fund holds a portfolio of 39 technology companies, including **Alphabet**, **Alibaba**, **Facebook**, **Micron Technology**, **Microsoft**, **TenCent Holdings**, (but not **Apple**!), none of which represented more than 12% of the portfolio¹¹

With this strategy, the effect of an unanticipated catastrophe on one of the components is dampened by the weighting of the other companies in the portfolio. In fact, it may be the case that poor performance by one company, like **SanDisk**, might actually benefit the performance of a competitor in the fund, like **Seagate Technology**, leaving a neutral effect on the portfolio as a whole. On a more moderate scale, volatile variations in the earnings of the various individual companies in the portfolio dampen each other out, which is effectively the primary characteristic that actually reduces risk, especially if avoidance of risk is defined as something like the elimination of the possibility of a 50% loss of capital.¹²

Also, this reduction of risk, the primary goal of diversification, can be ideally accomplished without reducing *yield*, or at least without reducing yield very much.

This argument is also best illustrated by example.

Suppose you believe that the various technology companies will offer effective annual yields (from capital gains and dividends, mostly the former) ranging between 6% and 9%. Of course this is just a guess, you don't really know how they are going to do (if you did, why would bother to take this class or read this book)? You also believe generally that the companies offering higher yield are also exposing you to greater risk (usually but not always true). It should be easy to see that you can choose to invest in a company that has a projected yield of as little as 6% or as high as 9%, but at relatively great risk, or invest in a mutual fund made up of these companies, which will have a projected yield that will more or less offer the weighted average of the components, which may be somewhere around 7.5%.

It should be obvious that the benefits of diversification are limited. Even though investing in a technology sector fund will diversify volatility within the technology sector, past experience tells us that the technology sector as a whole can itself be volatile. For this reason, a retirement portfolio invested *entirely* in the technology sector would make no sense at all. As was made obvious in the dot-com crash of 2000, technology stocks across the board plunged, and there was no more safety to be found in a technology mutual fund than there was in any single company.

True diversity is found only if a complete portfolio is invested in a full range of sectors and industries and only if the portfolio also includes non-equity investments, like money market funds or notes and bonds. We return to the issue of diversity and investment strategies designed to mitigate risk later in the course.

The benefit of *transparency* is also worth mentioning. The reporting requirements for mutual funds are exhaustive. The most elementary research will expose at a minimum (a) all fees and expenses, (b) performance metrics for the fund (such as one-year, two-year, and five-year rates of return), (c) the composition of the fund portfolio (the names and proportions of the stocks and other assets in which the fund has invested), (d) the fund's investment strategy, and (e) the name of the management team. All of this is generally provided on the fund's website. Additionally, federal law requires that the fund provide this information and much more in a detailed *prospectus* which must be provided to any prospective investor and is typically available as a download in *pdf* format on the fund's website.

¹¹ As of March 31, 2019.

¹² To be a little more precise, the goal might be to lower the probability of catastrophic loss, however defined, to a very low probability.

I always advise students and prospective investors to download and carefully peruse the full prospectus for a mutual fund before investing. It requires a little time but is worth the effort.

4. Pricing conventions and procedures for buying and selling mutual funds

Mutual funds are as easy to trade as stocks and ETPs because, like stocks, modern online accounts at brokerages like **TD Ameritrade** or **Interactive Brokers** offer the same easy interfaces, order conventions, and account management features for a large selection of mutual funds as they do for stocks. In other words, the interested investor can research and select mutual funds and buy many of them (not all) directly in the brokerage trading account, as though buying 100 shares of **Ford** stock. Additionally, you can buy a mutual fund online at the website of the sponsoring fund family. This merely requires opening an account at the fund family website and funding that account.

To be clear about this, if you want to buy any of the mutual funds used as examples already in this chapter, such as the **Vanguard Growth and Income Large Cap Fund (VQNPX)**, you can do that by either logging on to your **TD Ameritrade** account, finding the fund by its name or symbol, then making the purchase or sale, or logging on to your **Vanguard** account and do the same.

It should be noted that most online brokerages offer a full range of mutual funds for which they charge no transaction fee.

When buying mutual funds, though, even though you will end up buying a certain number of shares, instead of specifying the number of shares you want, instead you normally designate the *dollar value* of the amount that you want to buy.

A mutual fund has a special quoted price called the **Net Asset Value (NAV)**, a value that is calculated at the end of the trading day, 4:00 PM New York time. The NAV is equal to the total closing market value of all of the securities in the portfolio (their closing market price times the number of shares owned by the fund) divided by the number of issued shares in the mutual fund. (A mutual fund web site will often simply refer to the NAV as the “price”). For example, the **T. Rowe Price Science and Technology Fund (PRSCX)** on September 23, 2019 had net assets of \$6.03 billion with a NAV of **\$41.40**. When you submit an order to buy, say, \$1,000 of the mutual fund, the order is not actually executed until after the market close and then it is executed at the NAV that was calculated at the end of the trading day. For example, if you submitted an order to buy \$1,000 worth of **PRSCX** and the **NAV** equals **\$41.40**, then you will be sold 24.15 shares (fractional shares are allowed) after the stock market has closed. In effect you are buying a portfolio full of stocks whose prices were fluid throughout the day, but were fixed at the end of the day to consummate your transaction.

So although both can be traded conveniently online, this pricing convention distinguishes the salient difference between stocks (and ETPs, which trade exactly like stocks) and mutual funds. The investor must be content to accept the daily closing price, as represented by the NAV, of the portfolio being purchased. So no matter what time the order is entered and whatever prices happened to be at that time, the order is not executed until after 4:00 PM New York time. This implies, of course, that limit orders and the like cannot be used.

And unlike stocks and ETPs, you cannot buy a mutual fund and then sell it right away. You can’t do day trading or even swing trading with mutual funds. Because these are treated as long-term investment vehicles, most funds have restrictions upon trading. Typical would be where if you buy a mutual fund you cannot sell it or any part of it for at least three months either absolutely or without incurring a penalty. On the other hand, adding to an established fund or selling off portions of a fund already owned is allowed even if day by day. Restrictions are only on opposing transactions.

5. Fees and expenses when buying mutual funds

That you should manage your own retirement account, rather than rely upon advisers, is one the persistent themes of this course. The fees that you would pay, directly or indirectly, so substantially cut into your effective return over an investment lifetime that the net cost of not doing it yourself for your own retirement account could easily exceed \$100,000.

Figure 5 – Acceptable Mutual Fund Fees

Fee	What it is for	Acceptable Level
Expense ratio	This is the bottom-line fee, and is a summary of all fees <i>except loads</i> expressed as a percentage of the fund NAV. This is what you look for first.	For <i>index funds</i> , 0.75% or below. For <i>conventional equity funds</i> , like growth or value funds, 1% or below. For <i>specialized sector funds</i> , 1.5% or below. For bond funds like <i>treasury funds</i> , <i>investment grade bonds</i> , 0.5% or below or even 0.25% or below.
Front-end Load	A sales charge for selling you the fund, taken from the balance when the fund is initiated.	0 - none
Back-end Load	Same as front-end load, except taken from the fund value at liquidation.	0 - none
Management fee	The fee assessed for the costs of managing the fund, a legitimate expense if reasonable. For funds with low fees, this fee will constitute the entire expense ratio, or nearly all of it.	Same as expense ratio.
12b-1 fee	An advertising fee (you pay for their advertising), typically 0.25%.	0 - none
CDSC, deferred sales charge, or any form of trailing commission.	Contingent Deferred Sales Charge, deferred sales charge, or anything that sounds like a trailing commission. These rip-off charges should be avoided at all costs. If in doubt, look for them in the prospectus.	0 - none

Earlier in this chapter it was stated that mutual funds are very attractive long-term investment vehicles because their fees *can be* very, very low, *but only if you shop for the funds yourself*. If you walk into a bank or investment advisory firm and ask an advisor to choose your investments for you, you might be sold a mutual fund with a very respectable track record and one well-suited to your investment goals, but nonetheless it will be a fund with high fees. It has to be. You and others like you will be the person who pays the salary of your adviser, and part of his boss's salary, and his boss's salary as well, plus the cost of the office building and the television advertising that you see when you watch football games. It is very likely that you will pay a **front-end load** (the fancy name for a one-time sales fee) of as much as 5% of the investment value, plus higher recurring annual expenses during the time you own the fund.

If you instead shop for an online mutual fund through a fund family with a reputation for low fees, like **Vanguard**, you can avoid all **loads** (sales fees) and can expect much lower annual expenses. And as was stated in a previous section, mutual funds are *required* to offer full disclosure of all fees and expenses, so these are very easy to research. The first

objective in researching mutual funds is to find one that fits your investment goals. The second objective is to find one that does this with very low fees. This is because the sales and serving costs of online accounts are very low compared to marketed funds.

Figure 5 - Acceptable Mutual Fund Fees provides a full list of mutual fund fees and expenses and reasonable upper limits to seek when shopping. As can be seen, **Figure 5** allows little latitude for high fees. Despite the seemingly restrictive guidelines offered in **Figure 5** there are thousands of mutual funds that meet those guidelines. Generally speaking, high loads and fees are targeted to uneducated and naïve investors, and the mutual fund industry is so competitive that a huge number of low-fee options remain for the rest of us.

First, as **Figure 5** suggests, you should never pay any kind of *load*, or front-end, back-end, or deferred sales charge of any kind. Ever. The smart investor shops only for *no-load* mutual funds.

Second, mutual funds are required to classify their advertising fees in the prospectus as *12b-1* fees. That fee can equal a maximum of 0.25% of the funds market value. Why pay for advertising the fund? You should avoid this fee.

Finally, the single most important published variable for the mutual fund is the *expense ratio*, which is always expressed as a percentage of the market value of the fund. For example, if the expense ratio is advertised as 0.5%, then for every \$100 balance that you have in your mutual fund, 50 cents is deducted annually for fund expenses. Most, if not all, of these expenses are management expenses, which is used to pay the fund managers and process general account support costs.

You can see in **Figure 5** that the suggested maximum expense ratio for many funds, including the popular index funds, is less than 0.5%. Some large index funds are in fact very likely to offer expense ratios as low as 0.25%. Given that the investment rate of return on such funds might only be 5% or less in some years, these low fees can really make a difference over a lifetime of investment.

Some specialty sector or industry funds, such as a precious metal fund that your teacher invested in 2003, will have expense ratios higher than 1%. In this case the investor must consider whether the investment objective is worth the higher fee (in the case of the precious metal fund it was – the fund tripled in value between 2003 and 2007).

All mutual funds have some *hidden fees* or implicit fees. The fund managers, just like retail investors, must pay transactions costs for buying and selling securities. These transactions costs are not reflected in the advertised fee structure of the mutual fund. Instead they simply result in a reduction in the fund rate of return. Although these transactions costs as a percentage of the size of the transaction are much lower for mutual funds than they are for retail customers, they can still impact the final rate of return if the mutual fund has a high *turnover rate*, also called a *churn rate*. Such heavily managed funds, which in effect are trying to beat the market through judicious buying and selling of securities, are gambling that they can earn a rate of return higher than the rate represented by the indexes and enough to overcome the higher transactions costs of the resulting churn.

As was stated above, target retirement funds have very high churn rates because the fund managers must constantly rebalance their portfolios as the funds age. As we saw above in **Figure 4**, the only way that a target retirement fund can be rebalanced to reduce stock holdings is to gradually sell off the stocks in order to buy the bonds. Equally important, within the stock component of the portfolio, individual stocks are being bought and sold in an effort to beat the market.

It is also likely that mutual funds with high churn also reduce yield because of the *market impact* of their transactions. Generally, if you must buy or sell huge blocks of stock through dark markets, there is a real possibility of strongly and adversely impacting market price, even if a large order is broken up into many small transactions, which will effectively reduce yield but not in a way that would be reflected in published fees and expenses.

This is one of the reasons that your teacher recommends index funds for long-term investment portfolios. Not only are the expense ratios characteristically low, so are hidden fees. Because the investment objective of the fund is to match an index, which they do by buying the stocks in the index at proportions equal to the weight represented in the index, they are the ultimate *buy and hold* mutual funds. They have extremely low churn rates and hence few hidden fees associated with high turnover.

Figure 6 – Fees and expenses for the T. Rowe Price Science and Technology Fund

Fees & Expenses		Account Minimums	
Gross Expense Ratio ³	0.79%	To open an account	\$2,500.00
Net Expense Ratio ³	0.79%	To add to an account	\$100.00
Expense Waiver Type	N/A	To open an IRA account	\$1,000.00
Expense Limitation Expires	N/A	To add to an IRA account ⁴	\$100.00
Transaction Fee	None	Recurring Purchase Minimum ⁴	\$100.00
³ The gross expense ratio reflects the fund expenses as stated in the fee table of the fund's prospectus prior to the deduction of any waiver or reimbursement. The net expense ratio reflects fund expenses after the deduction of any waiver or reimbursement. Expense ratios are as of the most recent prospectus.		⁴ Per account per transaction after opening minimum is satisfied.	
		This is a No-Load Fund	
		Front-End Load	None
		Back-End Load	None
		Load History	N/A

Figure 6 - Fees and expenses for the T. Rowe Price Science and Technology Fund, extracted from the prospectus for the fund used as an example earlier in the chapter, shows what the fee schedule for a mutual fund should look like - mostly "none" and zeroes.

6. Mutual Fund Taxes

The tax status of mutual funds held in retirement accounts, like **IRAs** and **401-ks**, are very simple. Earnings and capital gains are not taxed during the life of the fund, and capital gains are never taxed as such. Instead, when the funds are slowly liquidated during retirement the amount of money withdrawn from the fund is taxed as earned income.¹³

Unfortunately, the tax status of mutual funds *not* held in retirement accounts is complicated to the point of being ridiculous.

Let us begin by describing how the system does *not* work.

When you buy a stock, like 100 shares of **INTC**, you have to pay annual taxes on any dividends earned. These dividends are reported to you and the IRS on **IRS Form 1099-DIV** and then you dutifully report your earnings when you file your income taxes. But you do not have to pay taxes on *capital gains*, the amount of profit you made if the stock rose in value, until you sell the stock. And then, the type of tax you pay depends upon how long you owned the stock. If you owned the stock for *less than one year* you treat the gain as earned income and are taxed at the personal income tax rate. If instead you owned the stock for *more than one year* you do not report the gain as earned personal income but instead as a **capital gain** that is subject to the special **capital gains tax**, which is always much lower for all investors - especially high-income investors.

¹³ The tax treatment of retirement accounts is covered in the book appendix about retirement funds. What was said in this paragraph has many exceptions. For example, capital gains and withdrawals from Roth IRAs are *never* taxed.

With the passage of the Tax Cuts and Jobs Act (TCJA) legislation passed in 2017 capital gains tax rates were set at 0%, 15%, or 20%, with the amount determined by declared income. Prior to 2017 capital gains taxes were determined by the income tax bracket of the taxpayer.

Figure 7

2019 Long-term Capital Gains (LTCG) Tax Rates as determined by earned income tax brackets			
LTCG bracket	Earned income		
	Single	Joint	Head of Household
0% bracket	\$0 - \$39,375	\$0 - \$78,750	\$0 - \$52,750
15% bracket	<\$ 434,550	< \$488,850	<\$461,700
20% bracket	> \$434,550	> \$488,850	>\$461,700

To qualify for LTCG, the asset in question must be held for one year or more. Assets held for less than one year are taxed at ordinary income rates. These rates also apply to qualified dividend payments.

Source: Internal Revenue Service

Figure 7 shows the relevant federal tax rates for capital gains from the sale of stock and other securities (the one-year rule and the effective rates generally apply to all securities transactions for individuals) for tax year 2019.¹⁴

For example, in tax year 2018, a married couple with joint income of \$160,000

(where many employed Harvey Mudd alumni find themselves) selling stock or mutual funds held for more than one year pay only a 15% capital gains tax. As can be seen, the upper 20% bracket does not come into play until incomes are well above \$400,000! Had the same couple sold the stock or mutual fund within a year a buying it, the personal income tax rate would apply instead. For this couple with this income, that rate would be 32% instead of 15% (personal tax rates are not shown here).

So one might think that if you invest in a mutual fund, either by buying a large block all at once or contributing a monthly amount, that no capital gains are reported and no taxes paid on capital gains until such time as you sell the mutual fund.

Unfortunately, that is not how it works.

The explanation for why it does not work this way requires an explanation of mutual fund **distributions**. When stocks owned by a mutual fund pays dividends, technically the mutual fund sends the proceeds to the share owners of the mutual fund. This process is called *distribution*. Also, however, when the managers of a mutual fund sell one of the stocks in the mutual fund portfolio, *the realized capital gain must also be distributed to the mutual fund shareholders*. This distribution of realized gain, if the fund-holder accepts it, will actually lower the **NAV** of the mutual fund, which means that a mutual fund **NAV** does not have the same meaning of the price of an individual stock. A declining **NAV** does not necessarily reflect poor performance - it may merely reflect that cash distributions are happening.

When you buy a mutual fund, you *elect* whether you want such distributions to actually be paid to you in cash or whether you want the distributions to be reinvested back into the fund. In most cases investors choose the latter (and it is automatic in retirement accounts if the client is not yet at retirement age). *But even if you elect to have distributions rolled back into the mutual fund*, you are taxed as though you took the distribution in cash!

In other words, even though as an investor you don't trade the mutual fund, if the fund's manager sells stock internally within the fund then if a capital gain is realized, the transaction must be taxed. Further, if the internal realized gain was realized for a stock that was held for less than one year (usually *not* the case), the effective tax rate for the gain will be the personal income tax rate rather than the lower capital gains tax rate.

This means that mutual funds that have a high turnover (churn) rate will often generate sizeable internal tax liabilities

¹⁴ The reader should realize that there are also state income and capital gains taxes that vary considerably from state to state. Capital gains tax rates in California are exceptionally high, for example, with a 2019 maximum of 13.3%.

for the holders of these funds. This is yet *another* reason why your teacher favors index funds - they have low or no churn and therefore do not generate spurious taxes.

Fortunately, this complicated tax picture does not pose a record-keeping problem for the taxpayer. The law requires that the mutual fund report the full tax liability to both the taxpayer and the IRS on **IRS Form 1099-DIV** (both dividend and capital gains distributions are reported on this same form) so the taxpayer at least knows what amount to report and how to report it. Nonetheless, an actively traded (churned) mutual fund can produce a surprising tax liability, especially for the trader who has elected to reinvest distributions back into the fund.

Finally, when you actually liquidate your fund, any remaining capital gains not already covered on a previous **Form 1099-DIV** is reported to the investor and the IRS on **IRS Form 1099-B**. The one-year rule also applies to any final gains made that are reported in the **Form 1099-B**.

Keep in mind that none of this applies to mutual fund investments that are in dedicated retirement accounts, like **401-k** or the various **IRA** accounts. These are all tax-exempt or tax-deferred so what was written above obviously does not apply to such accounts.

7. The role of mutual funds in retirement accounts

A glance at **Figure 8 - The Importance of Mutual Funds in U.S. Retirement Accounts**, copied from *The Investment Company Institute Annual Factbook*, makes it clear that mutual funds play a very important role in retirement accounts and will likely constitute a significant part of your retirement account.

The top half of the graph shows that **56%** of all financial assets controlled by **IRS 401(k)**, **403(b)**, **457**, and **Keogh** plans and **47%** of **IRAs** are invested in mutual funds.¹⁵ This is the reason why, as was stated in the opening of this chapter, that although you may never buy a single stock or bond in your life, you will almost certainly buy them indirectly by investing in mutual funds that, on your behalf, invest in stocks and bonds.

Given their generally conservative structure and the high level of transparency required by law, mutual funds make ideal investment vehicles for long-term retirement accounts. Likewise, as is discussed in the appendix about retirement accounts, many of the corporate-sponsored retirement programs that use mutual funds have a *matching provision* - the employer will often match or even contribute the bulk of funds that flow into the mutual fund account in the employee's name. In some cases, the employee is allowed to contribute a fixed amount and the employer will match the contribution. In more generous cases, the employer might cover 80% of the cost. And to add to the attractiveness, all contributions are usually tax-deferred, so the amount put into the mutual fund is reduced from taxable personal income in the year of the contribution!

There are, however, some serious limitations that the young investor should understand about these kinds of investments,

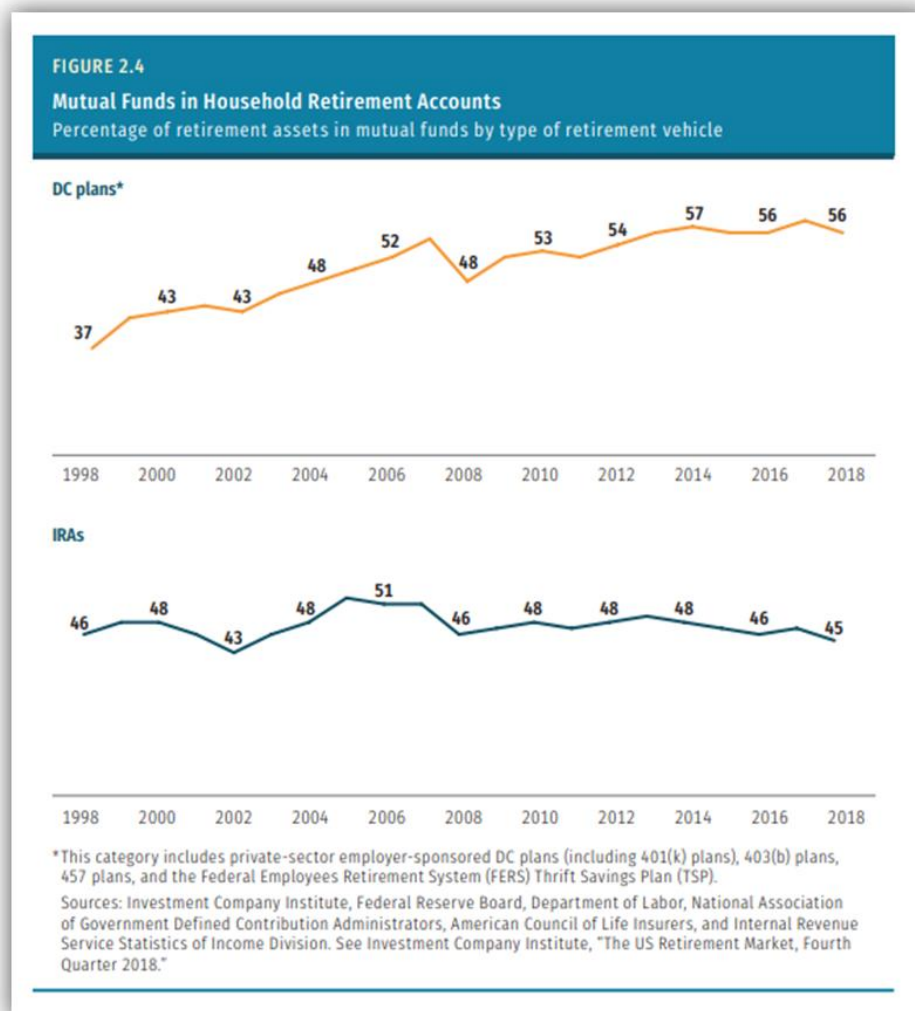
First, for most (not all) retirement programs that are offered to employees, the employer chooses the fund family and the selection of funds within that family and often the choices are extremely narrow - sometimes fewer than a dozen funds.

Far more important, employers over the years have not been as diligent as they might have been when researching funds, so some retirement funds come saddled with *excessive fees*, which can really cut into the lifetime rate of return for retirement funds.

This is, however, something that the young investor can do about this, so this is a lesson that you should not forget:

¹⁵ These categories of retirement accounts are discussed in detail in a later chapter. The portions of these retirement accounts *not* invested in mutual funds include investments in exchange-traded products, which are becoming competitive with mutual funds, and direct investments in stocks, bonds, futures, foreign exchange, and in some cases real estate.

Figure 8 – The Importance of Mutual Funds in U.S. Retirement Accounts



Source: Figure 2.4 from The Investment Company Institute, *2019 Investment Company Factbook, A Review of Trends and Activities in the U.S. Investment Company Industry*, 59th edition.

2019. That is an impressive number, but the same values for 2013 equaled 46.3% of all households. That is a notable decline. Most of that shift has been in the direction of exchange-traded products.

In the next chapter we discuss the fastest-growing and most popular alternative to mutual funds - exchange-traded products (ETPs).

When you leave a company for whatever reason, you have the right to claim whatever retirement account has been established at that company and transfer the proceeds from the liquidation of those assets to a new tax-deferred **Rollover IRA** account in the mutual fund family or brokerage of your choice! There is no tax penalty for doing this so long as it is done properly (the receiving mutual fund family or brokerage will be willing to be very helpful to you in walking through this - they want your business) so you can find mutual funds matched to your investment needs with very low fees.

In fact, the first time you ever consult **Figure 5** about low fees, it may be for the purpose of managing your new **Rollover IRA** account.

Although it is not shown in this chapter (but it was shown in **chapter 4** in the section about the **River of Money**), it has become increasingly clear over the last three years that mutual funds are falling out of favor with investors because they are being replaced with exchange-traded products. At the beginning of this chapter it was stated that 101.6 million individuals and 44.8% of all households in the United States owned at least one mutual fund in