

15.5.1: Investing in Mutual Funds

Mutual Funds

When you buy a mutual fund, you are pooling your money along with other investors. You put money into a mutual fund by buying units or shares of the fund. As more people invest, the fund issues new units or shares. The investments in a mutual fund are managed by a portfolio manager. All mutual funds have a stated goal for the assets they invest in and a philosophy for how they will invest. According to Statista, there were approximately 7,900 mutual funds in 2019, and they managed over \$21 trillion (2020). There are many mutual fund management companies, and each company offers many different types of mutual funds; trying to make an informed choice can make you dizzy. There are four broad categories of mutual funds: those that invest in stocks (equity funds), bonds (fixed-income funds), short-term debt (money market funds) or both stocks and bonds (balanced or hybrid funds). There are also many mutual funds that invest in specific sectors, such as technology, real estate, gold, or the bank sector.

The Advantage of a Mutual Fund

The overwhelming advantage of a mutual fund is diversification. The benefits of diversification include the following:

- It minimizes the risk of loss to your overall portfolio. (Risk is defined by the standard deviation of the returns of your portfolio).
- It exposes you to more opportunities for return.
- It safeguards you against adverse market cycles.
- It reduces volatility in your portfolio.

In *A Random Walk Down Wall Street*, author Burton Malkiel, explains these benefits:

By the time the portfolio contains close to 20 [similarly weighted] and well-diversified issues, the total risk (standard deviation of returns) of the portfolio is reduced by 70 percent. Further increase in the number of holdings does not produce any significant further risk reduction (2019).

Other investment advisors agree, saying that 20 to 30 stocks is good diversification. However, here's the rub: one share of Amazon on August 19, 2020, cost \$3,284, and one share of Google on the same day costs \$1,561. Meanwhile, Facebook costs \$271 per share, and Netflix costs \$486 per share. (Along with Apple, these are known as the "FAANG" stocks). For us mere mortals who are not billionaires, how can we diversify into 20 or more stocks? The answer is, of course, a mutual fund.

Warren Buffet, Chairman and CEO of Berkshire Hathaway, once said, "Ninety-eight percent or more of people who invest should extensively diversify and not trade. Specifically, these investors should buy a very low-cost index fund." By buying into an S&P 500 Mutual fund, you can own shares of all the stocks in the S&P 500 Index. You can also buy into diversified fund that owns a mix of 70% stocks and 30% bonds.

Before we discuss what mutual fund you should buy, let's explore whether you should choose an actively managed fund or an index fund. John Bogle, the founder of Vanguard Mutual Funds, became convinced from his research that not a single actively managed mutual fund consistently beat the market. That is, none had a better return than the index that was used to benchmark them. Benchmarks are indices of various stock market and stock market sector prices that can be compared on a day to day or annual basis. Below are the most watched stock markets indices.

The Dow Jones Industrial Average (DJIA)

This is not actually an index but the daily sum of the 30 largest U.S. companies' current stock prices of. Almost all of them are household names, like McDonald's, Facebook, ExxonMobil, and Proctor and Gamble. The stocks are weighted in the sum according to their relative prices. For example, a \$200 per share stock is weighted four times as much as a \$50 per share stock.

The Standard and Poor 500 Index (S&P 500)

Standard and Poor is a credit rating company that created this stock index in 1957. It is composed of 500 of the largest U.S. publicly listed companies. It further disaggregates the U.S. economy into eleven sectors, and it then selectively chooses stocks from each of these sectors to match the total market capitalization of all the public stocks in those sectors. In the chart below, you see these eleven sectors and their weights.

1. Information Technology: 24.4%

2. Health Care: 14%
3. Financials: 12.2%
4. Communication Services: 10.7%
5. Consumer Discretionary: 9.9%
6. Industrials: 8.9%
7. Consumer Staples: 7.2%
8. Energy: 3.6%
9. Utilities: 3.5%
10. Real Estate: 3.1%
11. Materials: 2.5%

The NASDAQ Composite (NASDAQ Index)

The National Association of Securities Dealers Automated Quotation Index has over 2,500 stocks in its index, all stocks, both domestic and international that are listed on the NASDAQ stock exchange. The NASDAQ stock exchange began operations on February 8, 1971 as the first electronic stock market. The NASDAQ Composite Index is made up of 40% tech stocks, so it is a heavy tech index compared to public stocks overall (which are only 20% tech stocks).

Let's look at some examples of benchmarks. If the actively managed mutual fund had a broad range of hundreds of stocks in it, its annual returns would be measured against the S&P 500 Index, tracking the performance of the overall stock. If the actively managed mutual fund had a broad range of international stocks, its annual returns would be measured against a stock index of international stocks, such as the MSCI Europe, Australasia, Far East Index(EAFE), which is a broad index that represents the performance of foreign developed-market stocks. This Index was created by Morgan Stanley Capital International (MSCI) to track foreign developed markets. Many of the largest mutual fund companies, such as Fidelity Investments and Charles Schwab Company have created mutual funds that mimic this index.

Unfortunately, the number of actively managed funds that beat their benchmarks is well below 50%. In Barrons, Daren Fonda reported on this:

Fund managers gave investors yet another reason to avoid their products last year: Well below 50% of actively managed mutual funds beat their benchmark in 2019—and it would have taken a stroke of luck to pick a winner. Just 29% of active U.S. stock fund managers beat their benchmark after fees in 2019. That declined from 37% of funds beating their benchmarks in 2018, the average success rate over the past 15 years (2020).

In November 2019, Barrons gave a similar report card to actively managed funds:

Fund flows continue to favor index funds over actively managed funds...We found that 22% of active funds (182 out of 840 with 10-year records) beat the S&P 500 Index's 13.35% annualized return for the last decade through Nov. 21. The vast majority of them were growth funds (Coumarios).

Further, Wallick et al. summarize the research on whether investors can rely on past performance to predict future performance for a mutual fund:

It has long been stated that past performance is not indicative of future results, but many investors are still tempted to select mutual funds by recent performance. Philips (2012) confirms that past performance is no more reliable than a coin flip in identifying active managers who will outperform in the future. Not only is past performance an unreliable predictor, but according to significant research, most other quantitative measures of fund attributes or performance (such as fund size, star ratings, active share, etc.) are equally undependable when used to identify future outperformers (2013).

The other issue to note here is the cost of actively managed funds. Wallick et al. report that the average annual fees of actively managed funds are 0.87% while the average annual fees of index funds is 0.17% (2013). Nerdwallet reported almost the same fee structure averages for 2020. Vanguard states:

However, the traditional value proposition for many advisors has been primarily based on their investment acumen and their prospects for delivering better returns than those of the markets. No matter how skilled the advisor, the path to better investment results may not lie with the ability to pick investments or strategies. Historically, active management has failed to deliver on its promise of outperformance over longer investment horizons. (Bennihoff and Kinniry, 2018).

Can we as individual investors predict the funds that will best the indices each year? For the Wall Street Journal, Mark Halbert, a financial analyst who audits and reports on the advice of investment newsletters, says the answer is a resounding no; rather, it is more dependent on luck than skill (2020). Halbert reports that similar studies by a number of prominent researchers come to remarkably similar conclusions. Bradford Cornell, a retired finance professor at UCLA, measures the role of luck by comparing the greater dispersion of short-term versus long-term returns of mutual funds. Halbert applied Cornell's algorithm to analyze several hundred investment newsletters, many of which are popular with day traders:

When applying Prof. Cornell's formula to this data, 92% of the differences in newsletters' annual returns is due to luck. When he [Cornell] applied the same formula to a sample of large-cap U.S. equity mutual funds, he reached the almost-identical conclusion (2020).

Further, according to Halbert, Michael Mauboussin, a managing director at Counterpoint Global, a division of Morgan Stanley Investment Management, analyzed how quickly a top-ranked manager falls back to the middle of the pack. Mauboussin's rationale is that the faster this happens, the more luck is playing a role.

Halbert applied Mauboussin's algorithm to forty years of investment returns from the advice given by investment newsletters (1980 to 2020). He tracked newsletters whose returns put them in the top 10% of all newsletter returns in a given year. Halbert states that if skill were involved, the newsletter's return should be in the top 10% again in the following year. Unfortunately, on average, the top performing newsletters for one year ended up on average at the 51st percentile performance mark the next year. This is only slightly better than chance. Finally, the Dow Jones Indices (owned by the company that owns the Wall Street Journal) found that only 3.84% of U.S. equity funds that were in the top half of performers in 2015 (above 50% of all funds) were still in the top half of performers in 2019. (Halbert, 2020)

So, this is the bottom line: even the experts cannot beat the indices on a regular basis. It is impossible to guess who will be the lucky few who do beat them in any particular year. The best path to riches is to invest your money in a diversified index mutual fund with a non-profit mutual fund company like Vanguard or TIAA, reaping annual average returns of 9% to 10%.

For-Profit Mutual Funds

In the United States, there were 7,900 mutual funds in 2019, managing assets worth approximately \$21 trillion U.S. dollars. The three largest mutual fund companies are BlackRock, Vanguard, and Charles Schwab. As of the third quarter of 2019, Blackrock had approximately \$7 trillion in assets under management. As of the third quarter of 2019, the Vanguard Group manages approximately \$5.6 trillion under management, while Charles Schwab managed \$3.7 trillion in assets as of the second quarter of 2019. Almost all mutual fund companies are for profit, but there are a number of mutual fund companies that are nonprofits, and these are worth considering.

Nonprofit Mutual Funds

Vanguard

Vanguard was started by John Bogle, who had a cult following similar to Warren Buffett's. Bogle's research showed that no actively managed mutual funds beat their benchmark for more than two years in a row but were still charging 1% or more per year to manage the mutual funds. Because of this, Bogle invented Index Funds that had all the same stocks as the benchmarks; therefore, he did not need to actively manage them. Vanguard has 17,600 employees worldwide and offers 170 mutual funds and 80 Exchange Traded Funds (ETFs). There is a fund to meet every investor's interest and risk tolerance. The good thing about

Vanguard is that their average mutual fund fee is 0.10%. The industry average mutual fund fee is 0.63%. The owners (that is, the customers) of the Vanguard Funds own the company. The low fees at Vanguard are possible because the fees only have to cover the salaries of the Vanguard employees plus the overhead of the buildings, utilities, and other operating costs. Vanguard does not have to generate any profit over and above its expense to run the funds.

TIAA

The Teachers Insurance and Annuities Association (TIAA) and its sister organization, College Retirement Equities Fund (CREF) both offer insurance, annuities, and mutual funds to individuals. TIAA used to be identified as TIAA-Cref but in the past few years has shortened its acronym to TIAA. It has 17,500 employees and manages approximately \$1 trillion in accounts. Although TIAA started out as an insurance company and retirement fund manager for teachers, anyone can now use its services. Similar to Vanguard, TIAA offers over 100 mutual funds. However, reviews from some investment websites claim that TIAA's mutual fund management fees are somewhat higher than Vanguard's.

Load vs. No-Load and Open End Funds vs. Closed End Funds

Load vs. no-load and open vs. closed end funds are technical terms in the mutual fund industry. No load mutual funds sell directly to investors. These are the types of funds you want. Load mutual funds charge a commission when you purchase them and are usually sold through stockbrokers. Do not buy load mutual funds. All or almost all mutual funds from the top mutual fund companies (BlackRock, Vanguard, Charles Schwab, TIAA) are no-load funds.

Open-end funds are the ones you want. Open end funds sell shares directly to investors, and the funds will redeem the shares (that is, buy back the shares) when the customer wants to sell them. All or almost all of the top mutual fund companies' mutual funds are open end funds.

Closed end funds sell shares to investors at the creation of the funds but do not redeem them when the customer wants to sell them. The closed end funds are listed on stock exchanges, and any buying and selling takes place on the stock exchange. A fund manager actively manages the closed end fund but, as I said, does not redeem the shares. Closed end mutual funds have been in existence for almost one hundred years. ETFs are relatively new but will have many advantages over closed end mutual funds. Therefore, you would do better with an ETF than a closed end fund.

Exchange Traded Funds (ETFs)

An Exchange Traded Fund (ETF) is a collection of tens, hundreds, or sometimes thousands of stocks or bonds in a single fund. ETFs are traded on major stock exchanges, like the New York Stock Exchange and Nasdaq. Of course, you will buy and sell them through a brokerage account at your mutual fund company. Although ETFs and mutual funds share many similarities, there are a couple of distinguishing characteristics that may make ETFs more attractive to some investors, including lower investment minimums when you first start investing and real-time pricing every time you buy and sell.

Mutual funds themselves are not traded on any stock market. The mutual fund owns stocks that are traded on the stock market(s) and the value of the mutual fund is calculated at the end of each day based on the closing price of the mutual fund's stocks. This is similar to owning a stock portfolio and calculating at the end of each day what your stocks are worth based on its closing prices. ETFs are listed stocks themselves, and the ETF owns a portfolio of stocks just like a mutual fund. However, the ETF price in the market fluctuates just like a listed stock, depending on the buying (demand) and selling (supply) of that ETF. For example, Vanguard offers 80 ETFs with various portfolios of stocks and bonds and levels of risk.

Types of Mutual Funds

Bond Mutual Funds

Bond mutual funds invest their money in bonds. Bonds are basically IOUs and can be issued by governments, states, local municipalities, and corporations. Instead of these entities borrowing money from the bank, it is considerably cheaper to go directly to the investors themselves. I talked about bonds in the previous chapter, and we saw that the average annual return on bonds for 94 years was 5.3%. Bond mutual funds tend to specialize in specific types of bonds, and these include the following:

- International Government Bond Funds
- U.S. Treasury Bond Funds
- Mortgage Bond Funds
- Corporate Bond Funds

- Municipal Bond Funds
- International Bond Funds
- Index Bond Funds

Stock Mutual Funds

Stock mutual funds invest their money in stocks (also called equities). There are many types of stock mutual funds. Some of the more popular ones are below:

- Growth Funds
- Capital Appreciation Funds
- Small-Capitalization Funds
- Mid-Capitalization Funds
- Large-Capitalization Funds
- Equity Income Funds
- Balance Growth and Income Funds
- Sector Funds
- International Stock Funds
- Index Funds
- Socially Responsible Stock Funds

Real Estate Mutual Funds

Real estate mutual funds invest the money in real estate stocks. The funds also tend to be specialized, so there are real estate stock mutual funds that invest exclusively in things like these examples:

- Large Shopping Mall Stocks
- Industrial Building Stocks
- Office Building Stocks
- Apartment Building Stocks

Mixed Mutual Funds

Traditional, conservative investment advisors will tell you that you should have a mix of 70% stocks and 30% bonds in your portfolio. This is because stocks rise in price when the economy is in an expansion, and bonds rise in price when the economy is in a recession. There are plenty of mutual funds that offer a mix of stocks and bonds in various proportions, according to your risk tolerance. These usually have “Balanced Fund” in their name to signify that they have a mix of stocks and bonds.

Hedge Funds

Many people have heard that hedge funds have been a great investment for well-connected and wealthy people and institutions. A recent article in the Wall Street Journal that while this may have been the case from 1990 to 2009, hedge funds have seriously underperformed the S&P 500 since 2010 (Chung, 2019):

Table 15.5.1.1. Percent Return Above/ Below S&P 500

	Average 1990 to 2009	Average 2010 to 2019
Hedge Funds	Outperform S&P 500 by 5.2% annually	Underperform S&P 500 by 8.9%

Source: HFR, Inc. and WSJ

A hedge fund is a mutual fund that by its mission and charter can invest in any multitude of assets. It can buy and hold stocks and bonds, but it can also sell short stocks and bonds; that is, it can make a bet that stocks or bonds will drop in price. Some hedge funds invest in commodities like gas and oil or corn and wheat. Some use people to pick the assets, but increasingly more and more are using computers to analyze tons of data to find assets to invest in.

The underperformance of the hedge funds hurts investors further by the exorbitant fees they charge. Normal mutual funds charge their investors 1% or less of assets annually. Hedge funds typically charge their clients 2% of assets annually plus keep 20% of the profits they make each year (called 2 and 20). Critics say this fee structure means that hedge funds are a vehicle to “transfer all the

fund money from the pockets of the investors to the pockets of the fund managers.” Indeed, there have been a lot of billionaires minted out of hedge fund managers. So what happened to hedge funds?

1. Quants and Index Funds: the increase in trading by computers and passive investing funds (like Index Funds and ETFs) have distorted the way stocks move. Currently, only about 15% of stocks traded are traded by humans. The quants’ computers can spot small mis-pricings in stocks and take advantage of them.
2. Competition: there were just 530 hedge funds in 1990, and they managed \$39 billion. Now there are 8,200 hedge funds managing \$3.2 trillion of investors’ money.
3. Stock Correlations: in recent years, stocks moved in correlation when financial news hit the market (such as a Federal Reserve Bank action), and this means less mis-pricing of individual stocks for hedge funds to take advantage of.
4. Low Interest Rates: low interest rates keep shaky companies alive that would have died in higher interest rate environments. These are the companies that hedge funds sell short.

There seems to be no advantage to owning hedge funds now, so do not do it, even if you could.

Domestic and International Stock Funds

In the last chapter, I mentioned that a portfolio of international stocks appears to consistently show an annual return of about 1% less than a portfolio of U.S. stocks. This means that there seems to be no advantage to diversifying internationally, especially in European stocks. You may, however, be enamored of emerging economies like the BRICS countries:

- Brazil
- Russia
- India
- China
- South Africa

There are mutual funds that invest just in stocks of those countries. I would not, however, put all of my investment in that one basket. Ten percent or twenty percent of your cash seems reasonable.

But why does a U.S. domestic firm mutual fund outperform a European portfolio of stocks? First, Europe (and the BRICS nations) do not have the innovative, high-flying tech companies that we do. The top tech companies are often referred to as the FAANGs: Facebook, Apple, Amazon, Netflix, and Google (now called Alphabet). Some investment gurus put Microsoft in this exclusive club (the FAANGMs) and some do not. Those who do not say that the recent growth of Microsoft’s stock has not been as meteoric as the FAANG stocks.

Twenty years ago it was a better idea to diversify with European stocks, as at the time the economies of the U.S. and Europe were countercyclical. That is, when the U.S. was in a recession, Europe was not; European companies were doing well when U.S. companies were slumping. This is no longer true. Globalization is so widespread that the U.S. and European economies are now procyclical.

Finally, most of the largest European companies are listed on both a European stock exchange and the New York or NASDAQ stock exchange. If you buy a widely diversified stock mutual fund like an S&P 500 Index Fund, you will still get stock of the largest European companies in the fund.

Diversification Advice

My advice is that, when you are investing (especially for retirement), put all your money into an S&P 500 Index Fund. (Of course, having said that, I am also going to make the case in the next section for investing in an ESG Fund.) In the last chapter, I showed you that this will return you an average annual return of 10.1% per year. That return from 1926 to 2018 included both the bear and the bull markets. Of course, you must have the patience to endure recessions and not panic and sell stocks when it enters a bear market. This panic is the hallmark mistake of amateur investors.

However, recessions are a short run phenomenon. We have had 12 recessions (and expansions) since the end of World War II, including the current Pandemic Recession. The average length of these recessions has been 11 months. As long as you are not within five years of retirement, you have the time to ride out the recession and achieve your 10.1% annual return. One more note, if you want to be risky and try your own luck at the stock markets, do not invest any more than ten percent of your current cash/stocks in the market. If you make a big mistake, you can recover from a ten percent loss.

Social Investing Funds (ESG Funds)

What is loosely called Social Investing is the wave of the future. You should strongly consider investing in them instead of an S&P 500 mutual fund. Companies that pollute, do not treat their stakeholders fairly, or engage in unethical behavior will not survive for long. The public and investors are demanding more and more that firms engage in ESG behavior. An ESG Fund is essentially an S&P 500 mutual fund that filters out any company that is not

- Environmentally Responsible
- Socially Responsible
- Governance Responsible

There are a number of different interpretations that mutual funds use to claim that their ESG funds fulfill the above responsibilities. Therefore, you need to read about what the fund means by this to assure yourself that it is a true ESG fund. However, here's what these terms should mean, although this is not a complete list:

Environmentally Responsible

This should mean that the firms in the portfolio, minimize greenhouse gas emissions, minimize air and water pollution, manage energy appropriately, and create recyclable packaging for their products.

Socially Responsible

This should mean that the firms in the portfolio respect human rights, exercise fair labor practices, promote diversity in hiring and promotion, insist on fair labor standards in its supply chain, engage in good community relations, and treat their customers fairly.

Governance Responsible

This should mean that the firms in the portfolio engage in good safety and health practices for its workers, are transparent and honest in their financial reporting, have fair and equal compensation practices, are ethical in their business practices, source their materials from fair trade suppliers, and do not engage in anti-competitive behavior.

Table 15.5.1.1. Examples of Authentic ESG Funds

Fund Name	Investment Type	# Stocks or Bonds
Global ESG Select Stock Fund (VEIGX)	Mutual Fund	50
ESG U.S. Stock ETF (ESGV)	ETF	1,500 (Indexed)
ESG International Stock ETF (VSGX)	ETF	3,000 to 4,000 (Indexed)
FTSE Social Index Fund (VFTAX)	Mutual Fund	500 (Indexed)
ESG U.S. Corporate Bond ETF (VCEB)	ETF	200 to 300 (Indexed)

ESGs excludes companies that do the following:

- Produce alcohol, tobacco, gambling, and adult entertainment
- Produce civilian, controversial, and conventional weapons
- Produce nuclear power
- Do not meet certain diversity criteria
- Have violations of labor rights, human rights, anti-corruption, and environmental standards defined by UN Global Compact Principles
- Own proved or probable reserves in fossil fuels such as coal, oil, or gas*

*This excludes any company that FTSE determines has a primary business activity in the exploration and drilling for, as well as producing, refining, and supplying, oil and gas products; the supply of equipment and services to oil fields and offshore platforms; the operations of pipelines carrying oil, gas, or other forms of fuel; integrated oil and gas companies that provide a combination of services listed in above, including the refining and marketing of oil and gas products; or the exploration for or mining of coal.

Here are a few examples of BlackRock's ESG Funds.

BlackRock Advantage ESG International Equity Fund

Invests at least 80% of its assets in equity securities or other financial instruments that are components of, or have market capitalizations similar to, the securities included in the MSCI EAFE® Index.

BlackRock Advantage ESG U.S. Equity Fund (BIRIX)

Invests in a portfolio of equity securities of companies with positive aggregate societal impact outcomes, as determined by BlackRock.

BlackRock Advantage ESG Emerging Markets Equity Fund (BLZIX)

Invests at least 80% of its assets in equity securities or other financial instruments that are components of, or have market capitalizations similar to, the securities included in the MSCI Emerging Markets® Index.

BlackRock ESG Aware Moderate Allocation Index

The BlackRock ESG Aware Moderate Allocation Index is designed to measure the performance of a portfolio composed of equity and fixed income iShares ESG ETFs intended to represent a moderate risk profile strategy with a 60% allocation to fixed income and 40% allocation to equities.

BlackRock ESG Aware Growth Allocation Index

The BlackRock ESG Aware Growth Allocation Index is designed to measure the performance of a portfolio composed of equity and fixed income iShares ESG ETFs intended to represent a growth risk profile with a 60% allocation to equities and 40% allocation to fixed income.

BlackRock ESG Aware Conservative Allocation Index

The BlackRock ESG Aware Conservative Allocation Index is designed to measure the performance of a portfolio composed of equity and fixed income iShares® ESG ETFs intended to represent a conservative risk profile with a 70% allocation to fixed income and 30% allocation to equities.

Buy a Vanguard ESG Fund because the fees are generally lower than BlackRock funds. Research also shows that adding international stocks to a portfolio does not increase returns, nor does adding a greater number of stocks increase the return. My advice is to invest in the FTSE Social Index Fund (VFTAX), a U.S. stock fund that has 500 stocks in it, like the S&P 500 Index Mutual Fund but with an ESG filter.

The United Nations has 17 Sustainable Development Goals that can work as a framework for your investments. Every large American company (and every large company in the world) is now a global company, so the goals of the U.N. have relevance here. You can evaluate how your ESG fund meets each of these goals.

Non-Fossil Fuel Funds

Since you are investing for the long term and not day-trading on the volatility of the stock market, you should avoid investing in companies whose business is in fossil fuels. Over the next twenty years (and maybe sooner), these companies will perform very poorly. A number of coal mining companies are declaring bankruptcy right now as electricity generating plants switch to natural gas, which is cheaper and pollutes less. Every automobile manufacturing company is adding electric vehicles to their lineups in anticipation of national and state standards mandating cleaner vehicles. Finally, clean energy is becoming cheaper and competitive with fossil fuels. On top of this, the principal way to reduce greenhouse gasses is to eliminate fossil fuel burning.

Divestment Movements

The fossil fuel divestment movement began with student protests calling for their university endowments to divest from any company involved with fossil fuels. The movement was quite effective over time as university endowments pulled out of fossil fuels. In addition, the divestment movement has expanded to demand that mutual fund managers pull out of fossil fuel companies and that endowments and mutual funds invest in clean energy. A 2013 study by HSBC bank found that between 40% and 60% of the market value of BP, Royal Dutch Shell and other European fossil fuel companies could be wiped out because of stranded assets caused by carbon emission regulation.

The reaction of energy companies has been mixed in response. For example, BP announced they will be pivoting from fossil fuel exploration to become a clean energy company. ExxonMobil, on the other hand, has announced it will continue exploring fossil fuel and has committed to a massive new investment program in fossil fuel exploration (Matthews, 2020).

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