University Honors Theses   University Honors College

Spring 5-26-2023

Globalizing Investments: Enhancing Retail Investor Portfolios through Cross-Asset International Diversification

Charlotte T. Kline
Portland State University

Globalizing Investments: Enhancing Retail Investor Portfolios through Cross-Asset International Diversification

by

Charlotte T. Kline

An undergraduate honors thesis submitted in partial fulfillment of the

requirements for the degree of

Bachelor of Arts

in

University Honors

and

Business

Thesis Adviser

Daniel Rogers

Portland State University

2023

Abstract

Diversification is frequently reiterated, but for the standard retail investor, the what, how, and why often slide between the cracks. Diversifying internationally appears even more seldom discussed. A wealth of research has been integrated throughout this paper to focus on the what, how, and why of foreign diversification, all from a retail investor's perspective. This synthesis provides a comprehensive background followed by a discussion of a variety of asset classes available for diversification and biases and factors that lead to these gaps in diversification. The findings were divided into two categories: possible asset classes favorable to international diversification and causes of international diversification. Numerous asset classes available for international diversification have been identified through synthesis research, including bonds, equities, real estate, gold, cryptocurrencies, and currency, as well as several techniques of international exposure through US products. Numerous explanations for the lack of (international) diversification have also been discovered, including biases such as home bias, familiarity bias, relative optimism, and sociodemographic characteristics such as gender, age, income/wealth, and financial knowledge.

Keywords: Diversification, international diversification, asset class, retail investor, portfolio diversification

Table of Contents

Introduction

Diversify, diversify, diversify. When it comes to finance, especially personal finance, this mantra is constantly drilled in. Diversification is touted among finance experts and rookies alike as a means of risk reduction. Although diversification is uncontroversially valuable, and sits at the center of modern portfolio theory, most investors' portfolios do not diversify across asset classes in a single geography region, let alone across borders. While the mention of diversification may seem intimidating, the additional cost is negligible and the process is relatively straightforward. With increased globalization and financial markets becoming more widely available to the retail investor, it is more accessible than ever to diversify internationally. Despite these advancements, diversification is widely underutilized. From the standpoint of a retail investor, this literature review combines research identifying techniques for diversification and the causes of the absence of diversification across asset classes and worldwide.

Ideally, one should earn more money than they spend. The money saved is used for a variety of reasons, such as a down payment on a house, an emergency fund in case the unthinkable happens, a college fund for your children, retirement, etc. The ease of saving and investing comes differently for everyone; for some, money is a complex subject, while for others, it is automatic. Although thinking about and planning for these life events may be a financial burden at the time, the decisions can make circumstances much better in the years to come. When the savings is done effectively it can equip individuals to manage the unfathomable, send children to college debt-free or retire in the house of choice in Florida.

The majority of people recognize the importance of saving and take steps to incorporate it into their lives, but what happens next? They now have money that is not being spent. Could the money be stashed in an immense pile beneath the bedroom mattress? If there were a fire or

robbery, that would be both uncomfortable and hazardous. Can it be deposited in a bank? Maybe

some of it. Should they max out their 401k considering if they have one? There are different

ways to save and invest money when reviewing the options. These are things to consider while

determining what to do with your money to safeguard and gain from it.

During the peak of the US inflationary period in 2022, a professor commented on saving

money during an inflationary period. The professor explained that money became less valuable

due to inflation; as a consequence, more money is needed to purchase the same things than one

would have needed to purchase them a short time ago. This can be witnessed in the price

increase of a house, a dinner, or a cup of coffee from your favorite coffee shop. Based only on

the change in the dollar's value, the spending power of $150,000 in 2000 would be equivalent to

$264,253.48 in 2023 spending power (*Inflation Calculator | Find US Dollar's Value From 1913-

2023*, 2023). The dollar's purchasing power has shifted. If money was stored beneath a mattress,

it would still be $150,000, but it would be worth 43.2% less in 2023 spending power than it was

when it was left there (see Appendix A, Figure 1 for a visual representation of the change in

purchasing power of the US dollar). If money is in a bank account, the return (lack thereof) is

comparable, albeit a small interest rate in exchange for permitting them to borrow the money.

According to the FDIC, the national average rate for a savings account in April 2023 was 0.39%,

and the national average rate for an interest checking account was 0.06% (Federal Deposit

Insurance Corporation, 2023). This tiny profit still is dismal when compared to the nearly 2%

(annualized over the past 23 years) sacrificed in purchasing power due to inflation each year.

Fortunately, consumers have many alternative options. Options exist because no one is obligated

to use any of the numerous asset classes accessible for short and long-term investment. The

various asset classes accessible allow investors to effectively manage risk and return in an effort

to reach financial objectives. Various asset classes transform individuals' hard-earned money into an evolving tool to suit present and prospective needs through a delicate balance and sometimes chance.

Methodology

The strategy used to discover and synthesize information will be the first step in this literature review. A review of crucial subjects such as asset class definitions, diversification, international diversification, and retail investors will follow this. Foreign diversification approaches, including overseas products sold locally, will also be investigated. Following that, biases and causes of a lack of international diversification will be reviewed. Finally, an interpretation will be presented, including a discussion of the findings of the literature review.

Search Strategy

The search process included research published on ProQuest, American Economic Association, ScienceDirect, Research Gate, Wiley Online Library, and other sites and a full search of the Portland State University library database. The search largely focused on content from relevant peer-reviewed journals, but it also included material from books and non-academic sources. Definitions were supported by non-academic sources such as the CFA website and Investopedia. The terms used in the search were 'assets AND retail investor', 'international diversification', 'asset class', 'retail investor AND investing', 'currency AND investing AND portfolio diversification', 'currency fluctuations', 'inflation AND investing', 'currency environment AND impact' and 'currency AND international diversification'.

Inclusion Criteria

Articles submitted during the last 15 years were given priority. A small number of older papers were included, notably those that introduced essential concepts to the finance discourse as

well as those that fit well into the study niche. There were a few major topics covered. First, definitions and background information. Following that, international diversification in practice; how it is/can/has been used. Finally, the reasons for a lack of international diversification are explored including a comparison of standard portfolio theory to behavioral finance as well as socioeconomic factors impacting diversification.

Exclusion criteria

Articles that focused on the perspective of institutional investors were excluded. This includes articles surrounding the behavior of large funds and portfolio managers. This also generally excludes ultra high net worth investors that may still be considered retail investors. Discussion of complex alternative and generally less accessible asset classes was also excluded.

Assessments and Measures

A thematic analysis approach was used to synthesize the literature. This process involved analysis of a vast quantity of research to identify patterns. These patterns were then utilized as discussion themes throughout the paper. In order to aid in theme development, definitions of essential subjects such as asset classes, diversification, international diversification, and the retail investor were all the key themes required for background. During the literature review, key elements discovered included diversification approaches' effectiveness or lack thereof, financial theories and their influence on international diversification, and socioeconomic factors influencing diversification. There were also gaps throughout the literature, such as a lack of conclusive study on the usefulness of various methods of diversification, as well as insufficient research on topics like familiarity bias and relative optimism in relation to international diversification.

Limitations

  Some relevant articles were excluded from the search strategy because they were not found in the Portland State University library database or due to general search oversight. Although the focus is on regular investors, there may be some areas where research includes insight from institutional investors. Some potentially helpful literature may have been excluded due to limited search criteria. Finally, particular literature may provide more relevance on US based information due to its presence in the global economy, among other factors.

<div align="center">

Background

</div>

  A substantial body of literature supports the benefits of portfolio diversification. The main focus of this literature analysis will be on the specifics of foreign diversification for the average investor. International diversification, according to Arte and Larimo (2022), is defined by the level of participation in value-added operations in overseas markets. Arte and Larimo also communicate that international diversification is a desirable investment strategy since it allows investors to have a share in foreign resources, overcoming domestic limits and gaining a competitive advantage. Pan and Mishra (2022) recognize the importance of diversification, noting that one of the primary goals of portfolio management is to optimize the risk return profile (getting the maximum return for the lowest risk), which can be accomplished by diversifying worldwide. Sharpe (1964) conducted some of the seminal studies on the issue of diversification, discovering that portfolio diversification might eliminate unsystematic risk. Unsystematic risk refers to the risk faced by a company or industry, as opposed to systematic risk, which pertains to the market as a whole.

  Diversification is regularly advocated in portfolio theory and finance, yet it needs to be more utilized. This has been stressed regarding its challenge to traditional portfolio theories that

advocate diversification. The significant lack of diversity is one of the most prevalent and costly financial missteps, particularly among individual investors (Abreu & Mendes, 2010; Gomes et al., 2021). Under-diversification is defined by Kramer and Broekema (2021) as "a portfolio that provides a subpar expected return given the amount of risk taken." That could be summed up as follows: (international) diversification leads to a higher return for less risk. While neither flashy nor spectacular, this strategy is fundamental and, shockingly, needs to be more utilized. Much more may be written about diversification, but the goal of this literature study is to look at it through the eyes of a retail investor.

A retail investor is characterized as a non-professional investor, who is marked by a lack of knowledge, discipline, and skill (Bada et al., 2021). It is not true that all retail investors lack investing knowledge, but it is expected that retail investors are not professionals and hence lack the training, experience, and capital that institutional investors have. Because they are not investing for a company or specific clients, most retail investors invest for themselves or their households and have a lower portfolio balance than institutional investors. Although not all retail investors work with a small portfolio balance, an average individual is likely to invest with less money compared to an institutional investor. This ideally places this topic in a more relevant context for the typical person, as neither financial training nor a big quantity of wealth is expected.

Asset classes have historically been defined in a variety of ways. Asset classes are differentiated by their drivers, returns, risks, and/or volatility. While there are apparent differences between asset classes, the increasing complexity of financial assets has made it challenging to define an "asset class." According to Greer (1997), an asset class is "a set of assets that bear some fundamental economic similarities to each other and have characteristics that

distinguish them from other assets that are not part of that class" (Greer, 1997, p. 86). Greer emphasized the contrasts in underlying economic similarities and asset characteristics the most. The economic characteristics of assets in the same class, such as their sensitivity to economic trends, industry dynamics, and market conditions, are fundamental economic commonalities. The qualities that characterize assets include their risk and return profile, liquidity, and legal implications.

These distinctions can be seen in stocks versus bonds. Stocks are fundamentally comparable in economic terms due to their nature as an equity instrument (a stock represents a share in a firm) and their potential to be influenced by factors such as corporate profitability, industry trends, investor mood, and overall economic conditions. Stocks have distinguishing qualities, such as the capacity to repay value through capital appreciation and dividend income. The risk, volatility, and liquidity of stocks (equities) are generally determined by the company's size, industry, and location. Bonds are also fundamentally comparable in economic terms due to their status as a debt instrument. Bond returns are generated through interest payments and the repayment of the principal at maturity. Bonds are influenced by interest rates, credit quality, and economic situations. Bonds are distinguished by their different maturities, credit ratings, and coupon rates. Factors such as the issuer's creditworthiness, the tenure of the bond, and interest rates in the economy of issuance all influence risk.

According to Joachim Klemet (2019), Chartered Financial Analyst (CFA), an asset class is defined by its reaction to fundamental economic factors like growth, inflation, human integrity, labor, land, resources, infrastructure, and greed. These drivers are notable because they lead distinct assets to react differently, allowing assets to be classified into multiple classes. The return on equities, for example, grows with economic development and falls with inflation,

whereas the return on a TIPS bond (Treasury Inflation-Protected Security) falls with economic growth and rises with inflation. Investors can develop a portfolio of asset classes that are positioned to achieve the lowest risk for the highest return by investing in assets with diverse drivers and low correlation. Correlation is a statistical measurement in finance and investments that acknowledges the degree to which two assets move together (Hayes, 2022) (see Appendix A, Figure 2 for a chart displaying the correlation of returns across a variety of investments). A higher correlation suggests they may be impacted by some of the same or similar drivers whereas a lower or negative correlation suggests they have fewer common drivers or different drivers. Recognizing these variables is important for our subsequent discussion of diversity because the variation in exposure and reaction to these drivers lowers correlation and makes diversification desirable.

Some assets, such as REITs or commodity ETFs, may be designed, respond to drivers, or exhibit correlation in such a way that we question their placement in a specific asset class. These investment instruments may respond to the same variables as the asset/fund they track, but they are also likely to be correlated with other asset classes. With so many complicated assets accessible, it's difficult to identify a single all-encompassing definition, and there's bound to be some disagreement. While some of these labels remain officially unverified, others are more widely accepted.

When considering what asset classes are available, we frequently see assets classified as traditional or alternative. Stocks, bonds, and cash are examples of traditional asset classes. These are the asset groups that most people think of when they think of investing. Alternatively, alternative classes cover a considerably larger area and offer more opportunities for diversification. Real estate, cryptocurrencies, venture capital funds, private placements (angel

investment), commodities, private equity, and hedge funds are some of the other asset classes available to investors. Each of these asset types (conventional and alternative) has unique underlying drivers, entry barriers, and returns. Volatility, hazards, and regulation all have an impact on each.

<div align="center">**Asset Classes**</div>

Asset classes also have varied levels of accessibility in terms of who can engage in them. The stock market is accessible to almost anyone; stocks can be acquired in whole or in part online in seconds, making them incredibly accessible. Investment vehicles such as venture capital funds or hedge funds, on the other hand, may require hundreds of thousands (if not millions) of dollars, as well as time, education, and status, to engage in. Having said that, inaccessible opportunities should not dissuade an investor from diversifying within accessible options.

Investors hold many types of assets in a collection known as a portfolio. A portfolio is "a collection of financial investments such as stocks, bonds, commodities, cash, cash equivalents, closed-end funds, and exchange-traded funds (ETFs)" (Tardi, 2023, p. 1). The "60/40 rule" is perhaps the most well-known concept when discussing portfolios. This rule suggests allocating 60% of one's investment portfolio to stocks and 40% to bonds with the goal of balancing a higher risk, higher return asset class (equities) with a lower risk, lower return asset class (bonds) to create a portfolio with an optimal combination of risk and return. The "100-age rule" is another prominent portfolio allocation method. This rule suggests taking 100 and subtracting your age to get your stock-bond allocation. For example, if you are 30 years old, you would have 70% in bonds and 30% in stocks, and at 50, you would have 50% in stocks and 50% in bonds. While all of these examples begin with stocks and bonds, adding other asset types can give additional

diversification benefits (see Appendix A Figure 3 & 4 for visual representations of the impact of

diversification on risk & return including a 60/40 portfolio and a 60/20/20 portfolio with real

estate). This additional diversification contributes to the bottom line of generating the maximum

return with the lowest risk.

As an investor, international diversification may appear to be a daunting topic, given the

complexity of diversification in general. However, understanding the range of asset classes

available to investors both domestically and internationally can help demystify the concept. In

this regard, the following discussion will cover a variety of classic and alternative asset types that

are commonly offered to ordinary investors. Bonds, shares, real estate, gold, cryptocurrencies,

and currency are among the classes described here.

Bonds

A bond is a debt instrument issued by a borrower, generally a government or corporation.

Bonds are used to raise capital and are sold with the expectation of being paid back on a later

date. While bonds can follow many structures, some important elements include the issuer, face

value, coupon rate, maturity date and yield. The entity that borrows money from the bondholder

is known as the issuer. The fixed sum that the bond's issuer will pay the bondholder upon the

bond's predetermined maturity is known as face value, also known as par value or principal. The

rate that the issuer consents to pay the bondholder over the course of the bond's life is known as

the coupon rate. Coupon rates can be structured in many ways and can include fixed rates,

variable rates or both. Coupon rates can be paid out throughout the ownership of the bond or

upon maturity. The maturity date is the date the issuer must repay the bondholder and bring

closure to the debt agreement. Yield represents the bonds interest rate factoring in the bonds

price, coupon rate and remaining time until maturity date. These factors are present in many

bond obligations but there is no overarching constant structure. Bonds exist in a variety of structures, values, time frames and risk levels.

Although no investment is completely risk free, bonds are considered to be a lower risk investment. The issuer's creditworthiness and the bond's tenure are two variables that affect this risk. Default risk refers to the risk arising from the possibility the issuer will fail to make the agreed upon payments (Langager, 2021). A credit rating is issued to governments and other entities (such firms and municipalities) to indicate how likely it is that they will default. Generally bonds issued by governments with strong credit ratings are considered the least likely to default. Bonds are impacted by a variety of economic drivers. Rising interest rates generally lower previously issued bond prices as new higher yielding bonds enter the market. Bond demand often declines during economic expansion as investors shift to riskier investments with potential for higher return. While inflation erodes purchasing power when it comes to some bonds; this is not always the case. I bonds (US based) are designed to pay interest relative to inflation and include a fixed rate set at issuance and a variable rate that changes semi-annually based on the rate of inflation. Lastly, geopolitical instability leads to higher default risk (which can result in higher yields due to the higher risk) while political stability leads to lower default risk (and potentially lower yields).

In research by Bhuiyan et al. (2018), the role of bonds in a portfolio is highlighted, commending their ability to preserve capital and offer diversification. Bhuiyan et al. also acknowledge the increased integration in the global bond market since the 1980s, which resulted from the removal of government barriers. This increased integration has made global bond diversification more accessible to investors. Furthermore, Fletcher et al. (2019) and Liu (2016) have also remarked on the advantages global bonds bring in relation to increased diversification

and risk reduction. Fletcher et al. (2019) focus on international government bonds, noting the increased benefits when the US treasury bill has a lower than normal return. Liu (2016), on the other hand, studies international corporate bonds and finds that they can bring different and significant risk reduction benefits, even when held alongside international equities. Specifically, Liu (2016) found that investors diversifying into foreign corporate bonds, compared to holding only US corporate bonds, could reduce their portfolio risk by 80% (Liu, 2016). Overall, the research surrounding the benefit of international bonds was positive and lacked the contention many other assets and investment vehicles experienced, particularly when considering international diversification.

Equities

Equity refers to ownership in a company or asset. There are several ways to use equity as an investment vehicle, including on public exchanges, private equity, venture capital, and angel investing. One of the most popular and accessible methods for purchasing and selling equity is through public equity exchanges, also known as stock markets. These markets enable publicly listed businesses to issue and sell stock to investors, as well as for investors to purchase those shares and become shareholders. Stock exchanges exist globally such as the NYSE (New York Stock Exchange) in America, LSE (London Stock Exchange) in England and TSE (Tokyo Stock Exchange) in Japan. In order to be listed on a stock exchange companies go through a listing procedure where they are first offered through an IPO (initial public offering). Companies that decide to list themselves on public markets are subject to regulation and oversight, and they are required to disclose financial and material (i.e., important) information in the public domain. Once shares are listed, they can be purchased and sold by individuals, businesses, and institutions through brokers or online trading platforms. Prices are continuously modified in

accordance with supply and demand. Indexes, which track the performance of a certain group of securities, are frequently used to group stocks. Stocks are also often sold through ETFs (exchange traded funds). ETFs can replicate indexes, incorporate specific groups of securities, and track a wide range of asset classes, such as commodities, in addition to trading like individual stocks on a stock exchange.

Compared to bonds, equities are often a higher risk and return investment. Stock performance is linked to company earnings and economic conditions. As a result, equities do well when the economy is doing well but lose value during recessions, downturns, and other times when the economy is turbulent. Interest rates and geopolitical events can also impact equity volatility as uncertainty rises and corporate profitability declines (see Appendix A, Figure 5 for a visual representation of US volatility during significant economic and geopolitical events). Equity markets have been praised and criticized for their role in diversification. Due to their limited relationship to home markets, studies like O'Hagan-Luff and Berrill (2019) and Sharpe (1964) seminal article have underlined the importance of global stock market diversification. On the other hand, research comparing international real estate and international stocks, such as that by Qayyum and Khan (2021), has discovered a greater correlation between international equities and domestic equities. This correlation may be a result of the growing number of multinational corporations (MNCs), which will be covered in more detail below. Across a variety of research, the usefulness of equities' global diversification has been contested and challenged. This indicates a topic for additional investigation to ascertain the true diversification benefits available.

Real Estate

Real estate includes the acquisition, ownership, administration, and sale of properties. Real estate investments can be made in a wide range of property markets, including residential, commercial, agricultural, retail, industrial, and more. Returns in real estate investment are generated both through appreciation and cash flow generation (rental income). Over time, it is likely due to changes in housing markets and inflation the value of real estate will rise, this is appreciation. Cash flow can be generated through renting out all or parts of the property. The tangible nature of the asset, the asset's low(er) correlation with other asset classes, the opportunity for leverage as home equity rises, and potential tax advantages are further advantages of real estate.

Demand for real estate is cyclical. During economic prosperity, real estate markets offer consistent cash flow through rental income and positive capital appreciation. During economic downturns, it may be more difficult to find/hold renters and the property value may decline. Interest rates may also impact real estate negatively due to changes in mortgage rates. A notable factor in real estate investing is the general illiquidity of physical real estate as an asset. In order to generate cash return real estate must either be rented or sold. Purchasing and selling real estate requires locating a buyer or seller, as opposed to public equities, which instantly match buyers and sellers and may be bought/sold on demand. However, illiquidity can be avoided with REITS (real estate investment trusts) which provide exposure to real estate and are sold on exchanges like stocks. REITs are companies that own, operate and/or finance a portfolio of real estate that generates income. In order to return value to shareholders, REITs are required to return a percentage of their returns (usually around 90%) to shareholders in the form of dividends. While REITs experience some of the diversification benefits of real estate, they also have a risk return

profile unique to them. This profile categorizes them in between stocks and fixed income securities, in terms of risk and return (Lee and Stevenson 2005, as cited in Qayyum & Khan, 2021).

A diversification benefit of global real estate is expressed by Qayyum and Khan (2021) who find that through direct real estate investment, portfolio risk and volatility can be lowered. They expand on the upside of real estate for diversification with their findings that global real estate is less correlated with US stocks than global stock markets, therefore making it a better asset class to diversify into internationally. Past this, they identified that the benefits of diversification can continue to be expanded past three or four countries. These findings were also supported by numerous other studies such as that by Yunus (2018) which supported the heightened diversification benefits of direct global real estate compared to global equities, which tend to be more internationally correlated. Due to its minimal country-to-country connection, direct real estate presented another undeniably useful international diversification method. This makes sense given that trends in the housing market are far less universal than those in other financial markets, including the stock market.

Gold

Another asset class worth mentioning is gold. With its global accessibility and the ability to be traded in various values/weights through ETFs or physically, gold stands as a widely sought-after commodity, not to mention its ability to be free from the constraints of internet connectivity. Because of its metal qualities, gold has historically been employed in various applications, including coinage, jewelry, decorative use, and industrially in electronics. Many investors prefer gold because of its tangibility. Gold's advantages as an asset class include its consistent store of value, diversification possibilities, and hedging capabilities. Hedging, in

finance, refers to taking a position with the intention of lowering risk should an adverse price movement take place. Gold is utilized for hedging in numerous ways but in general when there is uncertainty with other assets, the value of gold rises therefore allowing it to offset potential losses (see Appendix A, Figure 6 for a visual representation of the change in the value of gold over time).

Gold is a low-risk investment that is frequently referred to as a "safe-haven asset" due to its steady store of value. Because gold is a limited resource, supply and demand influence its value. The price of gold is influenced by economic factors. During periods of economic and geopolitical instability, gold prices tend to increase as investors seek a less risky asset to store value. During times of economic and political boom, on the other hand, investors may choose a higher yielding asset. Cohen (2012) identifies these characteristics and highlights gold's diversification benefit, recognizing that most portfolios concentrate on equities and bonds, which have a low connection to gold. He further describes gold's long history as an asset class and its potential to store wealth. Additionally, he acknowledges that gold's historical role as a hedge against inflation and deflation adds to its desirability (Cohen, 2012). Gold stands as an indisputable asset class with an extensive history and hedging capabilities but also as an avenue for wealth preservation and growth.

Cryptocurrency

Cryptocurrency is a digital currency traded on a decentralized network using blockchain technology. Cryptocurrencies come in a variety of forms, including Bitcoin (BTC), Ethereum (ETH), and Litecoin (LTC). Cryptocurrencies are unusual due to their decentralized nature, which allows them to function without a regulatory organization such as a government or financial institution. Many cryptocurrencies are well-known for their high volatility (see

Appendix A Figure 7 for a visual representation of cryptocurrency volatility compared to crude

oil, a global equity index and gold). Something to consider when thinking about cryptocurrencies

is that there are few regulations in place because of their relative youth as an asset class and

decentralized nature, leaving investors vulnerable to fraud.

The value of cryptocurrencies is affected by their use of blockchain technology, investor

sentiment, economic growth, and technological advancements. Because bitcoin is still in its

formative stages as an asset class, investor sentiment is a significant determinant of its use and

perception. Despite being a relatively young asset class, cryptocurrencies have shown potential

benefits for international diversification. Almeida and Gonçalves (2023) revealed the potential

for cryptocurrencies as a hedge against stock and currency volatility and geopolitical and

economic risk in a recent study. However, it is crucial to emphasize that this research is new and

has sparked controversy and disagreement. With more research and market time, the qualities of

cryptocurrencies as a tool for diversification will become clearer.

Currency

Currency is utilized worldwide and is an asset that nearly every individual is familiar

with. Currency is a subtype of money that refers to digital or physical bills and coins. Currency

and money serve three primary functions: a store of value, a unit of account, and a means of

exchange. Currency is used as a store of value since it may be saved and used as needed. While

many things are valuable, some, like food, are perishable rendering it unable to serve as a store

of value over time. Currency can be stored for years before being used. The worth of the good or

service is denominated in the currency exchanged for it, rendering its purpose as a unit of

account. When one goes grocery shopping, the food purchased has a value commensurate with

the value of the currency required to purchase it. Currency is used as a medium of exchange due

to the fact that it is recognized as legal tender. Since currency is legally recognized, the belief currency will be accepted wherever we go or may be exchanged for something feasible gives it value. The caveat with currency is that it holds value due to it being a legal tender, as opposed to gold, which has intrinsic value. The value of a currency is constantly changing and is often expressed through an exchange rate between currencies. The value (and desirability) of currency is driven by factors such as interest rates, inflation, economic performance, political stability, trade balance and market speculation.

While at face value currency may appear a mundane investment vehicle, its intricacies become apparent, especially when considering global currencies. Ackermann et al. (2017) concluded a study that underlines a fundamental aspect of currencies: the variation in interest rates. They follow this up noting a classic example of capitalizing on this difference by using a carry trading strategy. The carry trade strategy involves borrowing in a low-interest rate currency and using that money to lend in a high-interest rate currency. Although this strategy poses a strong opportunity to leverage global currency markets, it should be noted this does not come without risk, it is difficult to predict how interest rates or market conditions will change therefore impacting potential returns. In his 2013 study, Hassan attempts to shed light on some of this uncertainty, looking at why interest rates in developing markets are generally larger. Hassen reveals that the currencies of larger economies, such as the US, tend to appreciate during bad economic times due to the larger portion of the global economy they take up. Additionally he emphasizes that, in terms of consumption risk, bonds denominated in currencies of larger global economies will be a better hedge (2013). While this gives some transparency to the strategy, arbitrage opportunities in global currencies still carry a significant degree of unpredictability.

      This asset class research demonstrates how different asset classes behave and how international diversification has been examined across a variety of asset classes. It is crucial to highlight that, while there are several methods, there is no one-size-fits-all approach for portfolio diversification. There are numerous tactics that can be used, and these asset classes are just a subset of those available. Having stated that, these classes were chosen for their general usefulness and accessibility.

<p style="text-align:center">International Diversification with US Products</p>

      As our world has become more internationalized and financial products have become more widely available, so have the prospects for diversification into international assets. Today, many local products have exposure to international markets or replicate overseas assets. These products, which can be purchased through US brokers, are an alternative to investing directly in foreign assets while providing additional international exposure due to their nature. Multinational corporations (MNCs), American depository receipts (ADRs), single-country exchange-traded funds (ETFs), iShares, and closed-end country funds (CCFs) are some examples. These alternatives expose investors to global trends through items sold in the United States. If you invest, you almost certainly inadvertently or knowingly invest in MNCs. Many well-known organizations nowadays are MNCs, which are corporations having operations in multiple countries. Companies such as Google (GOOGL), Pepsi (PEP), and Mcdonald's (MCD) are established in the United States but have branches all over the world and are thus influenced by the economic factors of the various nations in which they operate. If you own these or other indexes (such as the S&P 500), you have exposure to MNCs and thus to worldwide economies.

      Other internationally exposed US products necessitate further forethought. ADRs enable foreign-based companies to be listed on US stock exchanges. Alibaba (BABA), for example, can

be purchased as an ADR on the NYSE. ADRs are useful when an investor wants to invest in a specific firm and wants to do so on a US exchange. A disadvantage of diversification through ADRs, as observed by Peterburgsky and Yang (2013), is that they are traded during US exchange hours, making them less responsive than the underlying stock they represent (O'Hagan-Luff & Berrill, 2019). One advantage of owning the stock on its home exchange is the opportunity to trade in real-time. BlackRock's iShares imitate particular countries, industries, commodities, and more. International iShares can be used to invest in specific regions, countries, or the global economy as a whole. Although iShares are a convenient vehicle for international diversification, studies such as those conducted by Zhong and Yang (2005) have found that iShare returns are highly correlated with US markets, reducing the effectiveness of their international diversification potential for those already exposed to US markets. Single country ETFs and CCFs are two other domestically based international diversification options. A single country ETF allows investors to invest in a single country by purchasing an ETF for that country. These products provide exposure to a certain country and attempt to replicate the returns of stock indices from that country. CCFs are a form of mutual fund that allows investors to invest in foreign securities that trade on US marketplaces. CCFs work a little differently in that an IPO releases a predetermined number of shares, which are subsequently traded, but no new shares are generated after the IPO. Although the use of CCFs has declined since the launch of iShares, CCFs are still a viable option for domestic international diversification.

While these possibilities exist, research has yielded varied results about their effectiveness for the objective of international diversification. Numerous studies have been published, both supporting and refuting the benefits of international diversification. O'Hagan-Luff and Berrill (2019) evaluated exposure to MNCs, ADRs, iShares, and CCFs and discovered

that MNCs provided significant worldwide diversification due to the firm's international presence. Previous research, such as that conducted by Pennathur et al. (2002), discovered a substantial link between US market betas and US international securities, reducing the value of investing in these assets for the goal of international diversification. The link with US markets, as well as the perceived lag that happens while trading in different time zones, tended to be the key issues across research. Overall, additional research is needed to determine the usefulness of these domestically based internationally exposed assets for the objective of international diversification.

What are the reasons why retail investors do not diversify?

Traditional vs. Behavioral Finance

Traditional finance theory has served as the basis of understanding our interactions as investors within the market. Dating back to the mid-late 1900s, traditional finance theory includes a number of well respected financial principles such as Von Neuman and Morgenster's Expected Utility Theory (1940s), the Capital Asset Pricing Model (CAPM) (1960s) and Efficient Market Hypothesis (EMH) (1960s) (Gul & Akhtar, 2016; Shiller, 2006). The basis of traditional finance theory follows the assumption that investors are rational and the market is efficient (Kamoune & Ibenrissoul, 2022; Gul & Akhtar, 2016). Traditional finance theorists hold the belief that in an efficient market, investors carefully consider all facts and information before making any investment decisions and make investment decisions with the goal of maximizing profit and minimizing risk (Kamoune & Ibenrissoul, 2022). Essentially, traditional finance theory suggests that humans are perfect investors who consider all the possible options rationally and that their decisions are not influenced by emotions.

Due to these assumptions, which do not translate accurately into reality, traditional finance models were unable to explain deviations resulting from human behavior that did not align with these models. This led to criticism of the existing models being based on unrealistic assumptions of investors' rationality (Hillenbrand et al., 2020). While traditional fiance is still widely used today, the acknowledgement of its shortcomings has led to further research and analysis. This is where the demand for behavioral finance emerged.

Behavioral finance came about as a sub-discipline of behavioral economics in the 1980s and has more recently gained popularity for its attempts to explain deviations from rationality (Paisarn et al., 2021). Kamoune and Ibenrissoul (2022) describe the basis of behavioral finance as following the premise that investors tend to behave irrationally due to psychological and emotional biases (realistically investors will make decisions based on emotions). They further note this irrationality can lead to systematic errors and psychological biases that impact investor decision making. Theories within behavioral finance include Kahneman and Tversky's Prospect Theory (1979) and French and Poterba's Home Bias Puzzle (1991) (Kamoune & Ibenrissoul, 2022; Graham et al., 2009). Overall, behavioral finance takes a more human centered approach, recognizing that the assumptions of humans always being rational are unrealistic. This has led to numerous previously unexplainable deviations being studied and explained through behavioral finance theories.

The deviation from recommended portfolio diversification discussed throughout this review provides a prime example of where traditional finance theory fails to explain investor actions, in this case, a lack of diversification. This lack of diversity can be explained using behavioral finance principles such as home bias, familiarity bias, and relative optimism. Each of these biases is examined below in terms of its impact on international diversification.

Home Bias

When we look at the global economy we see a multitude of countries contributing to global GDP. As an investor, one has the opportunity to invest in these countries and have some stake in their economy. While it may seem logical to invest internationally and experience this international diversification, most investors' portfolios hold predominantly domestic assets. This phenomenon was first documented by French and Poterba in 1991 and was later labeled as the home bias puzzle (Graham et al., 2009). In other words, home bias represents a skew towards more domestic assets when observing the difference between the optimal weight of foreign assets relative to domestic assets held in a portfolio (Mishra, 2013). This was observed by Misha (2013) who found that between 2001 and 2011 US investors held roughly 80% domestic equities in their portfolios. When compared to the US share of the global GDP in 2010 of 19.5%, it is clear that US investors exhibit home bias (International Monetary Fund, 2011). It is important to note home bias is not unique to US investors, it is a phenomenon that impacts countries globally to varying degrees (see Appendix A, Figure 8 for a visual comparison of Home Bias across five countries).

Home bias can be explained through a number of factors, all of which provide relatively logical explanations for the emphasis in investor portfolios placed on domestic assets. One explanation is the higher net return available on domestic assets versus foreign assets due to a number of barriers and costs. (Ardalan, 2019). International assets are subject to high regulations and transaction costs therefore impacting the return (Ardalan, 2019; Filgueira & Cicada, 2015 as cited in Grossi & Malaquias, 2019; Heathcote & Perri, 2013 as cited in Grossi & Malaquias, 2019). These fees and regulations may impact investors' desire to diversify abroad, irrespective of the benefit of decreased risk.

Along with this, information asymmetry between domestic and foreign assets suggests retail investors hold more information about domestic stocks and would therefore favor domestic stocks due to this higher knowledge leading to higher returns (Badía et al., 2021; Van Nieuwerburgh & Veldkamp, 2007 as cited Grossi & Malaquias, 2019). Information asymmetry, in this case, refers to the disproportionate information investors have between domestic and foreign assets. Generally, there is a tendency for investors to have more knowledge about domestic companies and trends. Information asymmetry tends to be highly interconnected to other factors leading to increased home bias.

Other explanations include currency and political risk. Political risk represents the risks that investments face as a result of political changes or unrest (Chen, 2020). This risk arises when political action causes volatility in investment returns. Due to factors such as information asymmetry discussed above, it is possible that investors may display the impact of political risk disproportionately in foreign investments since they are less familiar with the political environment. Currency risk observes the risk of changing exchange rates impacting currency valuation (Chen, 2022). Political risk and currency risk are not specific to international investing, both impact domestic investments as well. These are considered within the home bias phenomenon as investors may disproportionately weigh these with foreign assets compared with domestic assets.

While these factors, such as lower fees, fewer regulations, and greater familiarity and knowledge, make investing domestically more attractive, they do not consider the benefits of international diversification. Investors should not solely rely on these factors when making investment decisions but should instead focus on achieving the highest return with the lowest risk. It is important to acknowledge the drawbacks of home bias, such as the lack of international

diversification. Traditional portfolio theory considers factors impacting prices, but home bias is different in that it leads to a preference for domestic assets even when the risk-return on international assets surpasses other factors. Therefore, investors should carefully evaluate the advantages and disadvantages of both domestic and international investments to make informed decisions.

Familiarity Bias

Investment decisions are significantly influenced by familiarity bias, by a cognitive bias that leads people to prefer what is familiar to them (Kamoune & Ibenrissoul, 2022). Tversky's (1979) research supports this notion, as he found that individuals tend to consistently choose the option that is most familiar to them, even when both options have an equal probability of success (Tversky, 1979 as cited in Kamoune & Ibenrissoul, 2022). This bias can affect international diversification since investors may feel more comfortable and familiar with domestic assets, leading them to favor them over foreign assets, even if the foreign assets may be a more rational choice based on objective factors. The preference for familiarity in investment decisions can be attributed to various factors. Firstly, individuals often feel more confident and knowledgeable about their domestic market and the companies operating within it. Investors tend to have access to more information and have a better understanding of the local political, social and economic climate domestically. This sense of familiarity can create a perception of reduced risk and increase their comfort level when investing domestically. Secondly, familiarity bias may be impacted by language and cultural factors. People naturally gravitate towards investments that align with their cultural norms and values. Language barriers and unfamiliarity with foreign markets can make international investments appear more daunting and less appealing.

Relative Optimism

Relative optimism is essential in understanding investor behavior in terms of international diversification. According to this idea, investors are more optimistic about the performance of their native market than foreign markets (Solnik & Zuo, 2017). As a result, people may allocate a more significant portion of their investments to domestic assets, believing that these assets will outperform their overseas equivalents. Investors who favor domestic assets may be swayed by their optimistic view of the domestic market's future, causing them to miss the possible benefits and risk-reward trade-offs offered by international assets. Understanding the theories driving relative optimism and familiarity bias sheds light on the occurrence of home bias among investors (Solnik & Zuo, 2017). Familiarity bias, or the tendency to favor familiar investments, adds to relative optimism by reinforcing investors' preference for domestic assets due to their comfort and understanding of their home market, which supports the home bias puzzle.

These biases highlight investors' deviations from rationality concerning classic portfolio theory. While research has successfully identified and addressed these biases, there is still a need to investigate solutions that can lessen their influence and prevalence among investors. We can get insights into the factors that drive these biases and their implications on diversity, particularly international diversification, by investigating the impact of socioeconomic determinants on diversification. These insights aid in identifying methods and treatments that reduce the impact of biases and encourage a more diverse investment strategy. Understanding and resolving these sociocultural elements can help investors improve their decision-making process and potentially overcome prejudices, resulting in more diverse portfolios.

Socioeconomic Barriers to Diversification

Other factors that have been found to impact investor behavior include financial literacy, wealth, education and gender. Abreu and Mendes (2010) defined financial literacy as "the ability to obtain information, analyze, manage and communicate about one's personal financial situation as it affects one's material well being" (Abreu & Mendes, 2010, p. 14). They saw financial literacy as a multi faceted privilege with three dimensions, including one's knowledge about financial markets, one's education level and the sources of one's financial information (Abreu & Mendes, 2010; Graham et al., 2009). Along with financial literacy, Graham et al. (2009) observed the impact of investor competence, finding that investors that feel more competent trade more frequently and are more internationally diversified. Competence is linked to a number of factors including gender, portfolio size and education. Male investors, investors with larger portfolios and more educated investors have an increased perception of competence which leads to more investing and greater international diversification (Graham et al., 2009).

The impact of wealth and cash flow on diversification has been observed through net worth, income and wealth (Abreu & Mendes, 2010). No matter the indicator of wealth, it has been found that investors with more money, cash flow or more access to money hold more diversified portfolios. In the opinion of Abreu and Mendes (2010), when an investor's wealth climbed, portfolio rebalancing occurred more frequently, irrational behavior decreased, and the number of stocks grew. This same principle rings true for investors with more education. Whether that education is related to finance or not, investors with more education are more likely to hold diversified portfolios (Abreu & Mendes, 2010; Graham et al., 2009). These findings were also supported by Fuertes et al. (2014) who found that higher wealth, education and experience in the finance sector led to increased diversification. The reasoning for this was assumed to be

due to their ability to obtain and process information at a greater level then those with less wealth, education and financial experience.

These findings highlight the impact of sociodemographic factors such as financial literacy, gender, perceived competence, and wealth on investor behavior. While this objectively identifies areas that may cause disparity in an ideal diversification strategy it also emphasizes the existence of privilege that may impact financial competence. Ultimately, men and investors with higher wealth, education, and financial experience possess the ability to obtain information at a greater level, potentially leading to improved diversification strategies and overall investment outcomes. However, this can be combated through factors such as increased education, financial literacy and the feeling of competence towards investing.

Conclusion

The goal of this study was to look at how retail investors participate in international diversification across a variety of asset classes and to determine the factors that drive this participation. This synthesis resulted in the discovery and discussion of several international asset classes, biases, and sociodemographic factors influencing (international) diversification. The data have revealed two major themes: asset classes used for international diversification and causes of international diversification. Through synthesis research, several globally available asset classes, including bonds, equities, real estate, gold, cryptocurrencies, and currency, as well as a number of strategies to get foreign exposure through US goods, were uncovered. Numerous causes of a lack of international diversification have been found, including prejudices such as home bias, familiarity bias, relative optimism, and sociodemographic characteristics such as gender, income/wealth, and financial knowledge.

Throughout the research, several difficulties arose. Because there is no single obvious method for international diversification, the proverb "personal finance is personal" became apparent. A plethora of studies explored the lack of international diversification and its causes, but information on how to adequately diversify globally was harder to come by. Another difficulty noticed is the overall lack of accessibility of information to the typical individual outside of finance. This was offset by a lengthy introduction and history, as well as resources such as a table defining abbreviations and definitions in the appendix (see Appendix A for helpful abbreviations and Appendix B for helpful definitions).

Further research might look into the true advantages of foreign diversification in terms of domestic vs. international equities, cryptocurrency, and US-based internationally exposed products. Research on foreign equities and US-based internationally exposed goods has repeatedly demonstrated that the US correlation reduces the benefits of international diversification. This allows future research to investigate the magnitude of this correlation and whether their use still provides international diversification benefits. Cryptocurrency is still in its infancy as an asset class; hence, conclusive and broad research is needed. More reliable data showing its genuine diversification benefits will become available as it spends more time on the market. Further research from the perspective of smaller economies may also be beneficial. This study questioned whether worldwide diversification benefits investors in smaller economies more because of its potential to lower country-specific risk. Finally, there was little research on the effect of familiarity bias and relative optimism in international diversification or under-diversification. Further research could lead to a more precise understanding of the source of inadequate diversity, particularly with respect to international diversification, and help solve the home bias conundrum.

References

Abreu, M., & Mendes, V. (2010). Financial literacy and portfolio diversification. *Quantitative Finance*, *10*(5), 515–528. https://doi.org/10.1080/14697680902878105

Ackermann, F., Pohl, W., & Schmedders, K. (2017). Optimal and Naive Diversification in Currency Markets. *Management Science*, *63*(10), 3347–3360. https://doi.org/10.1287/mnsc.2016.2497

Almeida, J., & Gonçalves, T. C. (2023). Portfolio Diversification, Hedge and Safe-Haven Properties in Cryptocurrency Investments and Financial Economics: A Systematic Literature Review. *Journal of Risk and Financial Management*, *16*(1), Article 1. https://doi.org/10.3390/jrfm16010003

Ardalan, K. (2019). Equity Home Bias: A Review Essay. *Journal of Economic Surveys*, *33*(3), 949–967. https://doi.org/10.1111/joes.12302

Arte, P., & Larimo, J. (2022). Moderating influence of product diversification on the international diversification-performance relationship: A meta-analysis—ScienceDirect. *Journal of Business Research*, *139*, 1408–1423.

Badía, G., Ferruz, L., & Cortez, M. C. (2021). The performance of social responsible investing from retail investors' perspective: International evidence. *International Journal of Finance & Economics*, *26*(4), 6074–6088. https://doi.org/10.1002/ijfe.2109

Bhuiyan, R. A., Rahman, M. P., Saiti, B., & Mat Ghani, G. (2018). Financial integration between sukuk and bond indices of emerging markets: Insights from wavelet coherence and multivariate-GARCH analysis. *Borsa Istanbul Review*, *18*(3), 218–230. https://doi.org/10.1016/j.bir.2017.11.006

Broekema, S., & Kramer, M. (2021). Overconfidence, Financial Advice Seeking and Household Portfolio Under-Diversification. *Journal of Risk and Financial Management*, *14*(11), 553. https://doi.org/10.3390/jrfm14110553

Chen, J. (2020, March 24). *Political Risk*. Investopedia. https://www.investopedia.com/terms/p/politicalrisk.asp

Chen, J. (2022, May 25). *Currency Risk: Definition, Examples, and Ways to Manage*. Investopedia. https://www.investopedia.com/terms/c/currencyrisk.asp

Cohen, J. (2012). Good reason to keep gold in diversified portfolios: Metal is hedge against printing money, weakening currencies. *Indianapolis Business Journal*, *33*(29), 19A.

Dow Jones—DJIA - 100 Year Historical Chart. (n.d.). MacroTrends. Retrieved May 25, 2023, from https://www.macrotrends.net/1319/dow-jones-100-year-historical-chart

Federal Deposit Insurance Corporation. (2023, May 15). *National Rates and Rate Caps*. Bankers Resource Center. https://www.fdic.gov/resources/bankers/national-rates/index.html

Financial Markets. (2019, April 6). https://www.occ.treas.gov/topics/supervision-and-examination/capital-markets/financial-markets/index-financial-markets.html#

Fletcher, J., Paudyal, K., & Santoso, T. (2019). Exploring the benefits of international government bond portfolio diversification strategies. *The European Journal of Finance*, *25*(1), 1–15. https://doi.org/10.1080/1351847X.2018.1450279

French, K. R., & Poterba, J. M. (1991). Investor Diversification and International Equity Markets. *The American Economic Review*, *81*(2), 222–226.

Fuertes, A.-M., Muradoglu, G., & Ozturkkal, B. (2014). A behavioral analysis of investor diversification. *The European Journal of Finance*, *20*(6), 499–523. https://doi.org/10.1080/1351847X.2012.719829

Gomes, F., Haliassos, M., & Ramadorai, T. (2021). Household Finance. *Journal of Economic Literature*, *59*(3), 919–1000. https://doi.org/10.1257/jel.20201461

Graham, J. R., Harvey, C. R., & Huang, H. (2009). Investor Competence, Trading Frequency, and Home Bias. *Management Science*, *55*(7), 1094–1106. https://doi.org/10.1287/mnsc.1090.1009

Greer, R. J. (1997). What is an Asset Class, Anyway? *The Journal of Portfolio Management*, *23*(2), 86–91. https://doi.org/10.3905/jpm.23.2.86

Grossi, J. C., & Malaquias, R. F. (2019). International Diversification in Brazilian Equity Mutual Funds: Understanding Asset Allocation to Emerging and Developed Countries. *Latin American Business Review*, *20*(4), 295–316. https://doi.org/10.1080/10978526.2019.1661780

Gul, F. (2016, October). Conventional vs. Behavioral Finance: A Historical Literature Survey. *ISSDM*. International Symposium on Sustainable Development and Management, Kuala Lumpur, Malaysia. https://www.researchgate.net/publication/332071558_Conventional_vs_Behavioral_Finance_A_Historical_Literature_Survey

Gul, F., & Akhtar, N. (2016, October). *Conventional vs. Behavioral Finance: A Historical Literature Survey*. International Symposium on Sustainable Development and

Management, ISSDM, Kuala Lumpur, Malaysia.
https://www.researchgate.net/publication/332071558_Conventional_vs_Behavioral_Finance_A_Historical_Literature_Survey

Hassan, T. A. (2013). Country Size, Currency Unions, and International Asset Returns. *The Journal of Finance*, *68*(6), 2269–2308. https://doi.org/10.1111/jofi.12081

Hayes, A. (2022a, July 4). *Correlation: What It Means in Finance and the Formula for Calculating It*. Investopedia. https://www.investopedia.com/terms/c/correlation.asp

Hayes, A. (2022b, September 18). *I Bond: What It Is, How It Works, Where to Buy*. Investopedia. https://www.investopedia.com/terms/s/seriesibond.asp

Hayes, A. (2022c, December 13). *Behavioral Finance: Biases, Emotions and Financial Behavior*. Investopedia. https://www.investopedia.com/terms/b/behavioralfinance.asp

Hillenbrand, C., Saraeva, A., Money, K., & Brooks, C. (2020). To Invest or Not to Invest?: The Roles of Product Information, Attitudes Towards Finance and Life Variables in Retail Investor Propensity to Engage with Financial Products. *British Journal of Management*, *31*(4), 688–708. https://doi.org/10.1111/1467-8551.12348

Hume, M., & Pagan, J. (2022, April 4). *Understanding Trends in the Cryptocurrency Market in 7 Charts*. Morningstar, Inc. https://www.morningstar.com/stocks/understanding-trends-cryptocurrency-market-7-charts

Inflation Calculator | Find US Dollar's Value From 1913-2023. (2023, May 10). US Inflation Calculator. https://www.usinflationcalculator.com/

Kamoune, A., & Ibenrissoul, N. (2022). Traditional versus Behavioral Finance Theory
[La théorie de la finance traditionnelle contre la théorie de la finance comportementale]. *Post-Print*, Article hal-03634756. https://ideas.repec.org//p/hal/journl/hal-03634756.html

Klement, J. (2019, December 30). *What Is an Asset Class?* CFA Institute Enterprising Investor. https://blogs.cfainstitute.org/investor/2019/12/30/what-is-an-asset-class/

Langager, C. (2021, December 9). *What Are the Risks of Investing in a Bond?* Investopedia. https://www.investopedia.com/ask/answers/05/bondrisks.asp

Liu, E. X. (2016). Portfolio Diversification and International Corporate Bonds. *Journal of Financial and Quantitative Analysis*, *51*(3), 959–983. https://doi.org/10.1017/S002210901600034X

McKenna, K. (2021, January 25). Stocks vs. Bonds: Differences in Risk and Return Make a Case for Both. *Darrow Wealth Management*. https://darrowwealthmanagement.com/blog/stocks-vs-bonds-different-risks-returns/

Mishra, A. (2013). Measures of Equity Home Bias Puzzle. *MPRA Paper*, Article 51223. https://ideas.repec.org//p/pra/mprapa/51223.html

O'Hagan-Luff, M., & Berrill, J. (2019). The international diversification benefits of U.S.-traded equity products. *International Journal of Finance & Economics*, *24*(3), 1238–1253. https://doi.org/10.1002/ijfe.1714

Paisarn, W., Chancharat, N., & Chancharat, S. (2021). Factors Influencing Retail Investors' Trading Behaviour in the Thai Stock Market. *Australasian Accounting, Business and Finance Journal*, *15*(2), 26–37. https://doi.org/10.14453/aabfj.v15i2.3

Pan, L., & Mishra, V. (2022). International portfolio diversification possibilities: Can BRICS become a destination for US investors? *Applied Economics*, *54*(20), 2302–2319. https://doi.org/10.1080/00036846.2021.1988045

Pennathur, A. K., Delcoure, N., & Anderson, D. (2002). Diversification Benefits of iShares and Closed-End Country Funds. *Journal of Financial Research*, *25*(4), 541–557. https://doi.org/10.1111/1475-6803.00036

Perry, B. (2017, November 6). *3 Practical Reasons Why Global Diversification Makes Sense*. PURE Financial Advisors. https://purefinancial.com/learning-center/blog/3-practical-reasons-why-global-diversification-makes-sense/

Peterburgsky, S., & Yang, Y. (2013). Diversification potential of ADRs, country funds and underlying stocks across economic conditions. *Applied Financial Economics*, *23*(3), 199–219. https://doi.org/10.1080/09603107.2012.714069

Qayyum, A., & Khan, W. A. (2021). Impact of Global Residential Real Estate on Portfolio Diversification. *Journal of Real Estate Portfolio Management*, *27*(2), 149–165. https://doi.org/10.1080/10835547.2021.2003531

Ritholtz, B. (2011, January 4). Long Term Stock Market Growth (1871-2010). *The Big Picture*. https://ritholtz.com/2011/01/long-term-stock-market-growth-1871-2010/

Scott, B., Balsamo, J., McShane, K., & Tasopoulos, C. (2017). The global case for strategic asset allocation and an examination of home bias. *Vanguard Research*. https://www.fa-mag.com/userfiles/white_papers/wp_5.pdf

Segal, T. (2022, August 13). *What Is Diversification? Definition as Investing Strategy*. Investopedia. https://www.investopedia.com/terms/d/diversification.asp

Sharpe, W. F. (1964). Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk. *The Journal of Finance*, *19*(3), 425–442. https://doi.org/10.2307/2977928

Shiller, R. J. (2006). Tools for Financial Innovation: Neoclassical versus Behavioral Finance. *Financial Review*, *41*(1), 1–8. https://doi.org/10.1111/j.1540-6288.2006.00129.x

Solnik, B., & Zuo, L. (2017). Relative Optimism and the Home Bias Puzzle. *Review of Finance*, *21*(5), 2045–2074. https://doi.org/10.1093/rof/rfw021

Tardi, C. (2023, April 25). *Financial Portfolio: What It Is, and How to Create and Manage One*. Investopedia. https://www.investopedia.com/terms/p/portfolio.asp

U.S. Bureau of Labor Statistics. (1913, January 1). *Consumer Price Index for All Urban Consumers: Purchasing Power of the Consumer Dollar in U.S. City Average*. FRED, Federal Reserve Bank of St. Louis; FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/CUUR0000SA0R

World Economic Outlook. (2011). *Slowing Growth, Rising Risks*. International Monetary Fund. https://www.imf.org/en/Publications/WEO/Issues/2016/12/31/Slowing-Growth-Rising-Risks

Yunus, N. (2018). Transmission of shocks across global real estate and equity markets: An examination of the 2007–2008 housing crisis. *Applied Economics*, *50*(36), 3899–3922. https://doi.org/10.1080/00036846.2018.1430343

Zhong, M., & Yang, H. (2005). Risk Exposures and International Diversification: Evidence from iShares. *Journal of Business Finance & Accounting*, *32*(3–4), 737–772. https://doi.org/10.1111/j.0306-686X.2005.00612.x

Appendix A

Figures and Tables

Figure A.1: Consumer Price Index for All Urban Consumers: Purchasing Power of the Consumer Dollar in US City Average
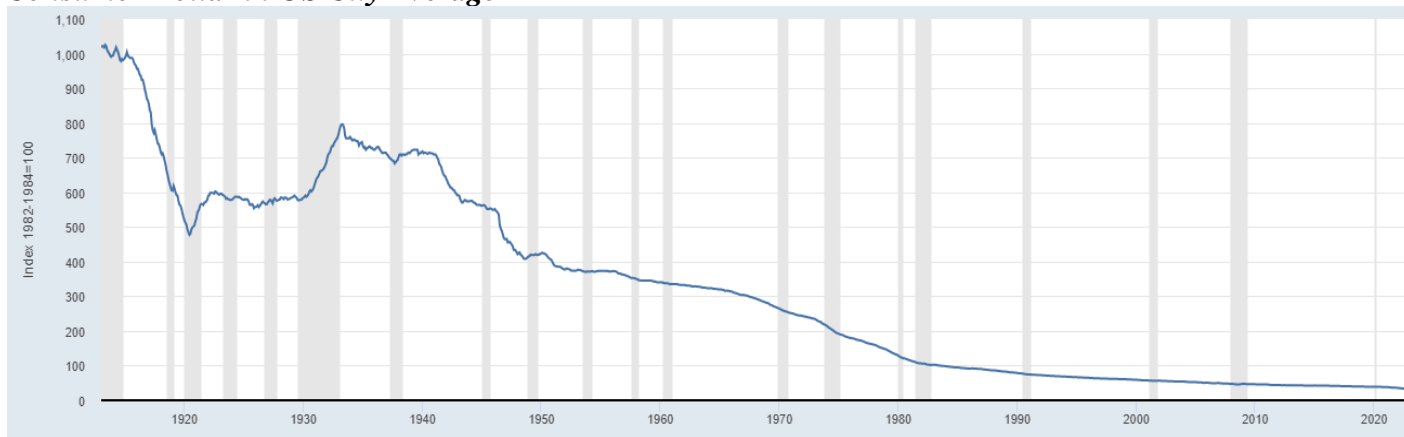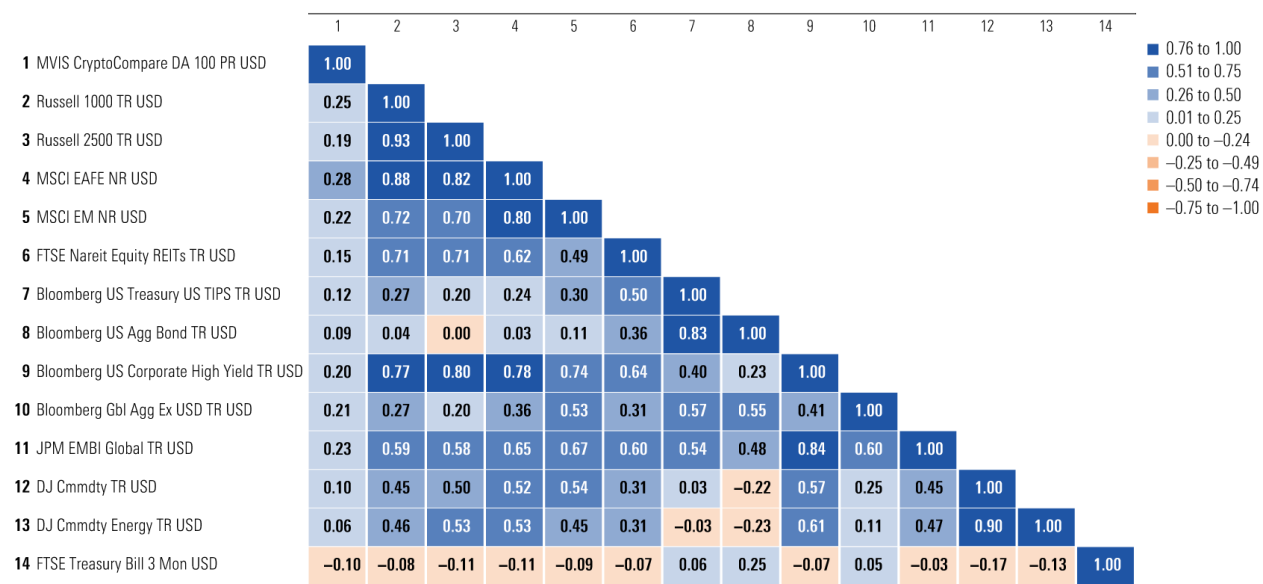

Note: Shaded bars indicate US recession.

Source: U.S. Bureau of Labor Statistics. (1913, January 1). *Consumer Price Index for All Urban Consumers: Purchasing Power of the Consumer Dollar in U.S. City Average*. FRED, Federal Reserve Bank of St. Louis; FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/CUUR0000SA0R
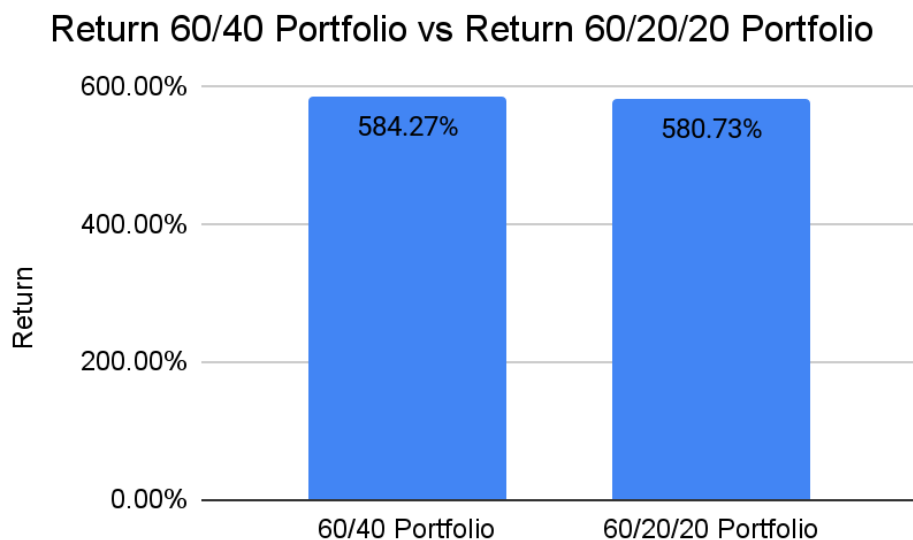
Figure A.2: Correlation of Returns Across Fourteen Indices, 2015-2022

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	MVIS CryptoCompare DA 100 PR USD	1.00													
2	Russell 1000 TR USD	0.25	1.00												
3	Russell 2500 TR USD	0.19	0.93	1.00											
4	MSCI EAFE NR USD	0.28	0.88	0.82	1.00										
5	MSCI EM NR USD	0.22	0.72	0.70	0.80	1.00									
6	FTSE Nareit Equity REITs TR USD	0.15	0.71	0.71	0.62	0.49	1.00								
7	Bloomberg US Treasury US TIPS TR USD	0.12	0.27	0.20	0.24	0.30	0.50	1.00							
8	Bloomberg US Agg Bond TR USD	0.09	0.04	0.00	0.03	0.11	0.36	0.83	1.00						
9	Bloomberg US Corporate High Yield TR USD	0.20	0.77	0.80	0.78	0.74	0.64	0.40	0.23	1.00					
10	Bloomberg Gbl Agg Ex USD TR USD	0.21	0.27	0.20	0.36	0.53	0.31	0.57	0.55	0.41	1.00				
11	JPM EMBI Global TR USD	0.23	0.59	0.58	0.65	0.67	0.60	0.54	0.48	0.84	0.60	1.00			
12	DJ Cmmdty TR USD	0.10	0.45	0.50	0.52	0.54	0.31	0.03	−0.22	0.57	0.25	0.45	1.00		
13	DJ Cmmdty Energy TR USD	0.06	0.46	0.53	0.53	0.45	0.31	−0.03	−0.23	0.61	0.11	0.47	0.90	1.00	
14	FTSE Treasury Bill 3 Mon USD	−0.10	−0.08	−0.11	−0.11	−0.09	−0.07	0.06	0.25	−0.07	0.05	−0.03	−0.17	−0.13	1.00

Legend:
- 0.76 to 1.00
- 0.51 to 0.75
- 0.26 to 0.50
- 0.01 to 0.25
- 0.00 to −0.24
- −0.25 to −0.49
- −0.50 to −0.74
- −0.75 to −1.00

Note: Displays correlation between fourteen different indices.

Source: Morningstar Direct. Data as of Jan. 31, 2022 as cited in Hume, M., & Pagan, J. (2022, April 4). *Understanding Trends in the Cryptocurrency Market in 7 Charts*. Morningstar, Inc.
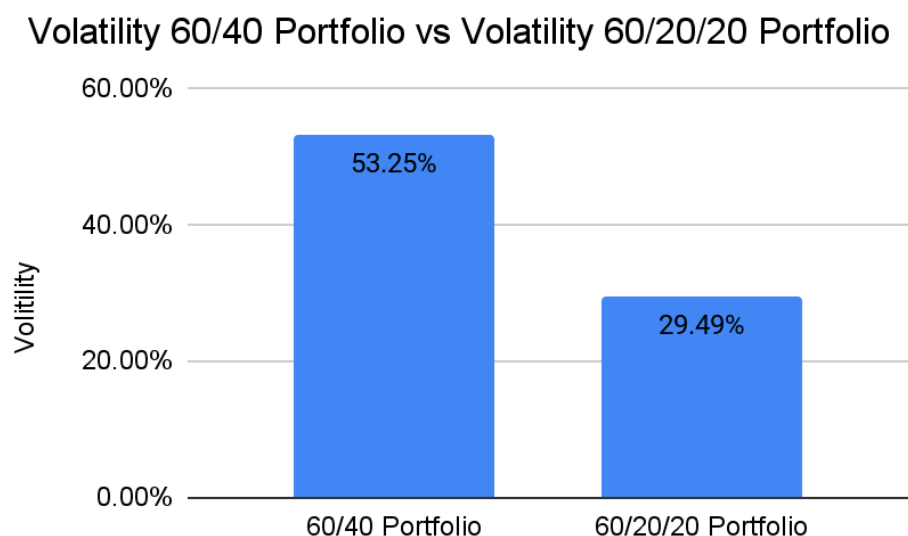https://www.morningstar.com/stocks/understanding-trends-cryptocurrency-market-7-charts

Figure A.3: Portfolio Return: 60/40 vs 60/20/20

Return 60/40 Portfolio vs Return 60/20/20 Portfolio

Note: Display of portfolio return in a 60/40 equity/bond portfolio vs 60/20/20 equity/bond/real estate portfolio over a 30 year period with an initial investment of $10,000 i.e. a 30 year old investor invests $10,000 once for retirement and takes it out at 60. Figure A.3 is intended to be paired with figure A.4 in order to visualize how diversification can lead to the optimal risk/return balance.

Source: 1) Board of Governors of the Federal Reserve System (US). (2023, March 9). *Financial Soundness Indicator; Residential Real Estate Prices (Year-Over-Year Percent Change), Level [BOGZ1FL010000076A].* FRED. https://fred.stlouisfed.org/series/BOGZ1FL010000076A;
2) Ice Data Indices, LLC. (2023, May 25). *Ice BofA AAA US corporate index total return index value [BAMLCC0A1AAATRIV].* FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/BAMLCC0A1AAATRIV;
3) Yahoo! (2023, May 25). *S&P 500 (^GSPC) historical data.* Yahoo! Finance. https://finance.yahoo.com/quote/%5EGSPC/history?p=%5EGSPC

Figure A.4: Portfolio Volatility: 60/40 vs 60/20/20

Volatility 60/40 Portfolio vs Volatility 60/20/20 Portfolio

Note: Display of portfolio volatility in a 60/40 equity/bond portfolio vs 60/20/20 equity/bond/real estate portfolio over a 30 year period with an initial investment of $10,000 i.e. a 30 year old investor invests $10,000 once for retirement and takes it out at 60. Figure A.4 is intended to be paired with figure A.3 in order to visualize how diversification can lead to the optimal risk/return balance.

Source: 1) Board of Governors of the Federal Reserve System (US). (2023, March 9). *Financial Soundness Indicator; Residential Real Estate Prices (Year-Over-Year Percent Change), Level [BOGZ1FL010000076A].* FRED. https://fred.stlouisfed.org/series/BOGZ1FL010000076A;

2) Ice Data Indices, LLC. (2023, May 25). *Ice BofA AAA US corporate index total return index value [BAMLCC0A1AAATRIV].* FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/BAMLCC0A1AAATRIV;

3) Yahoo! (2023, May 25). *S&P 500 (^GSPC) historical data.* Yahoo! Finance. https://finance.yahoo.com/quote/%5EGSPC/history?p=%5EGSPC

Figure A.5: Long-term real growth in US Stocks, 1871 - 2010

Note: Displays the impact of significant geopolitical and economic events on US stocks. Shaded bars indicate recession. Annual price index adjusted for inflation.

Source: Data from IrrationalExuberance.com as cited in Ritholtz, B. (2011, January 4). Long Term Stock Market Growth (1871-2010). *The Big Picture*. https://ritholtz.com/2011/01/long-term-stock-market-growth-1871-2010/

Figure A.6: Change in Value of Gold Indexed to $100 (USD) in 1982

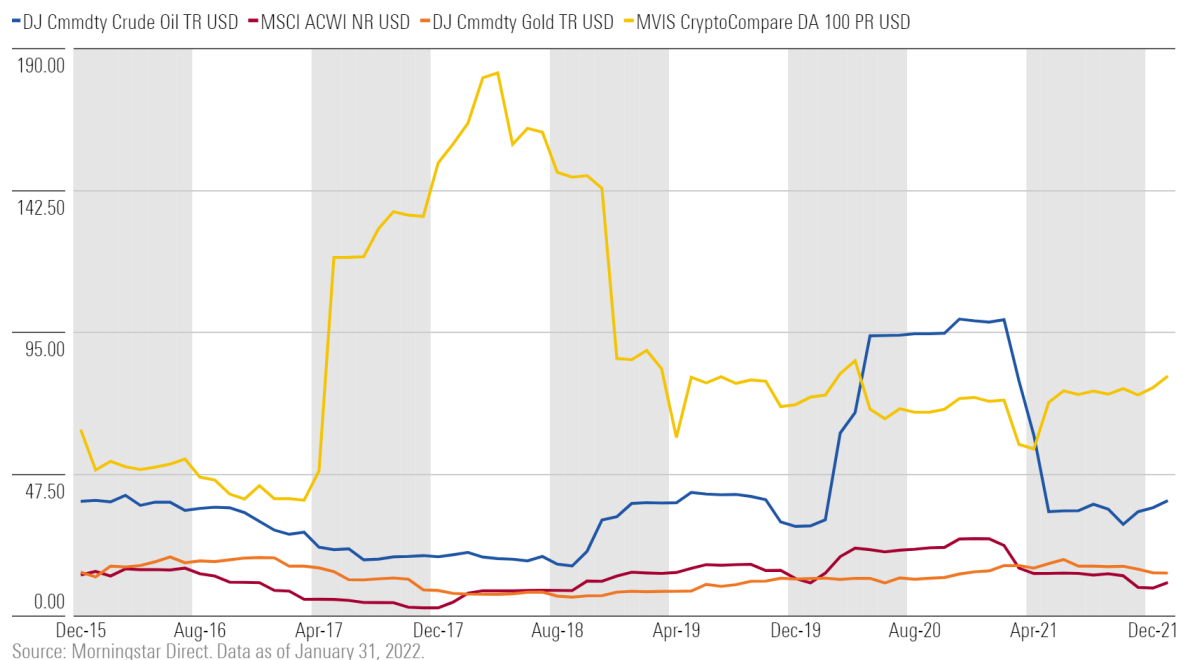Change in Value of Gold Indexed to $100 (USD) in 1982
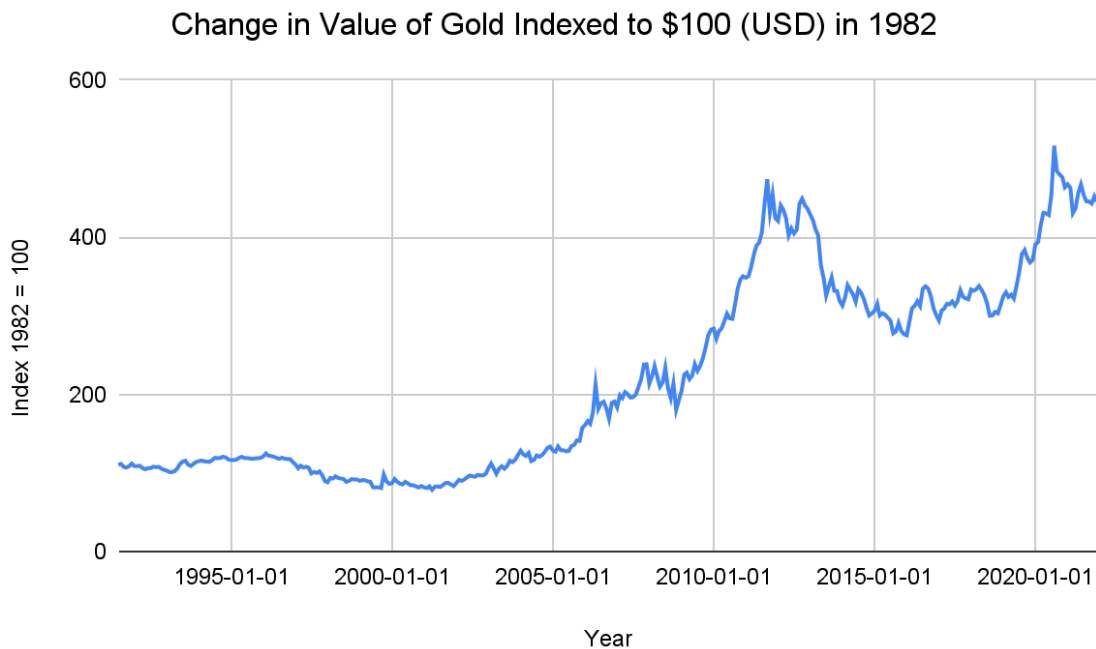
Note: Price of gold is indexed to 100 in 1982.
Source: U.S. Bureau of Labor Statistics. (2022, February 15). Producer price index by Commodity: Metals and metal products: Gold Ores [WPU10210501]. FRED, Federal Reserve Bank of St. Louis. https://fred.stlouisfed.org/series/WPU10210501

Figure A.7: One-Year Rolling Standard Deviation Across Crude Oil, Global Equities, Gold and Cryptocurrency, 2015-2022

One-Year Rolling Standard Deviation, 2015-22

- DJ Cmmdty Crude Oil TR USD - MSCI ACWI NR USD - DJ Cmmdty Gold TR USD - MVIS CryptoCompare DA 100 PR USD

Source: Morningstar Direct. Data as of January 31, 2022.

Note: Here standard deviation is used to represent volatility across four asset classes DJ Cmmdty Crude Oil TR USD (Crude Oil), MSCI ACWI NR USD (Global equity index), DJ Cmmdty Gold TR USD (Gold) and MVIS CryptoCompare DA 100 PR USD (Cryptocurrency index). This measure includes stablecoins, which often link to a fixed peg making them significantly less volatile. That means that unpegged cryptocurrencies in aggregate likely fluctuate even more than this figure suggests. All assets represented in USD.
Source: Morningstar Direct. Data as of January 31, 2022 as cited in Hume, M., & Pagan, J. (2022, April 4). *Understanding Trends in the Cryptocurrency Market in 7 Charts*. Morningstar, Inc. https://www.morningstar.com/stocks/understanding-trends-cryptocurrency-market-7-charts

Figure A.8: Equity Market Home Bias by Country
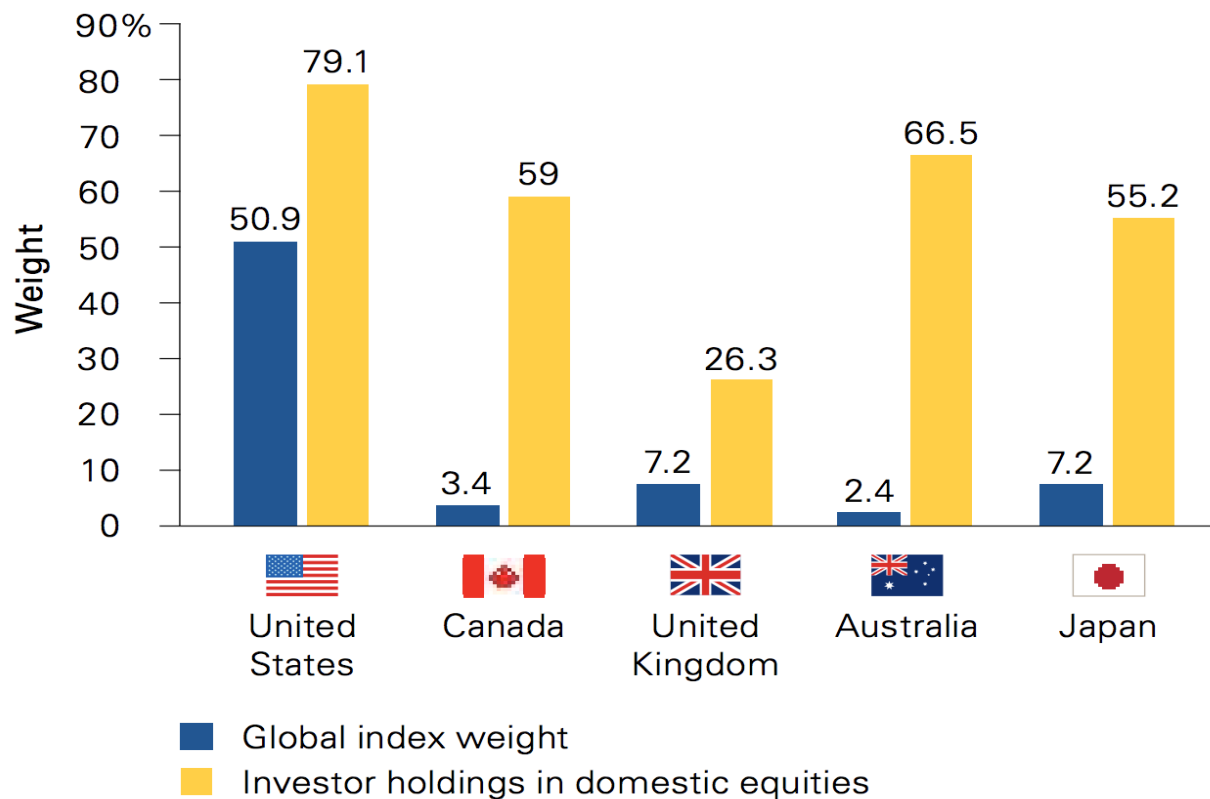
Notes: Domestic investment is calculated by subtracting total foreign investment (as reported by the IMF) in a given country from its market capitalization in the MSCI All Country World Index. Given that the IMF data is voluntary, there may be some discrepancies between the market values in the survey and the MSCI ACWI.

Sources: Vanguard, based on data from the IMF's Coordinated Portfolio Investment Survey (2014), Barclays, Thomson Reuters Datastream, and FactSet.

Appendix B

Abbreviations

Abbreviation	Definition
REIT (Real Estate Investment Trust)	Real estate asset vehicle that behaves somewhat in between a stock and fixed income security. They sell on the equities market but are required to pay out a high percent of earnings similar to dividends
TIPS (Treasury Inflation Protected Security)	Designed to protect buyers against inflation. Includes a fixed and variable rate. The variable rate changes with the CPI.
CPI (Consumer Price Index)	Used to measure the change in prices of goods and services over time. Uses the average change in prices of goods in services to observe changes in the economy.
MNC (Multi National Corporation)	Corporation with operations in more than one country.
ETF (Exchange Traded Fund)	Investment fund that follows the performance of an index, commodity, asset class or sector and trades like a stock.
ADR (American Depository Receipt)	A certificate traded on a US stock market that represents shares of a foreign company's stock.
GDP (Gross Domestic Profit)	GDP is used to gauge the overall growth of the economy by measuring the change in the total value of all goods and services produced over a period of time.
FDIC (Federal Deposit Insurance Corporation)	Helps maintain stability in the banking system by providing deposit insurance in US banks.
NYSE (New York Stock Exchange)	American stock exchange based in New York.
LSE (London Stock Exchange)	Stock exchange in the United Kingdom based in London.
TSE (Tokyo Stock Exchange)	Stock exchange in Japan based out of Tokyo.
IPO (initial public offering)	An IPO is when shares of a company are first made publically available to investors.

CCF (closed-end country fund)	A CCF is a type of mutual funds that IPOs with a fixed amount of shares that are then traded on an exchange. Shares are traded but no new value is created after the IPO.

Appendix C

Definitions

Word	Definition	Source
Asset class	A set of assets that bear some fundamental economic similarities to each other, and have characteristics that make them distinct from other assets that are not part of that class.	Greer, 1997, p. 86
Financial literacy	The ability to obtain information, analyze, manage and communicate about one's personal financial situation as it affects one's material well being.	Abreu & Mendes, 2010, p. 14
Diversification	A risk management strategy that mixes a wide variety of investments within a portfolio.	Segal, 2023, p. 1
International diversification	The extent of participation in value-adding activities in foreign markets.	Arte & Larimo, 2022
Behavioral finance	A subfield of behavioral economics that suggests "psychological influences and biases affect the financial behaviors of investors and financial practitioners."	Hayes, 2022
Traditional finance	A school of thought in finance that assumes that "in an efficient market, investors think and behave 'rationally' when trading, buying and selling stocks, and each investor carefully considers all available information before making any trading or investment decisions."	Kamoune & Ibenrissoul, 2022, p. 1
I Bond	A series I bond is a non-marketable, interest-bearing US government savings bond that earns a combined fixed interest rate and variable inflation rate (adjusted semiannually).	Hayes, 2022, p. 1
Relative optimism (within the home bias puzzle/international diversification)	The idea that domestic investors tend to be more bullish about their own equity market than foreign investors.	Solnik & Zuo, 2017

Familiarity bias	The bias people feel towards what is familiar to them; people tend to favor what is familiar to them.	Kamoune & Ibenrissoul, 2022
Home bias	Represents a skew towards more domestic assets when observing the difference between the optimal weight of foreign assets relative to domestic assets held in a portfolio.	Mishra, 2013
Currency risk	The risk of changing exchange rates impacting currency valuation.	Chen, 2022
Political risk	The risks that investments face as a result of political changes or unrest.	Chen, 2020
Financial Markets	Includes any place or system that provides buyers and sellers the means to trade financial instruments, including bonds, equities, the various international currencies, and derivatives.	Financial Markets, 2019