

Our Investment Methodology

CONTENTS

Dynamic Asset Allocation	04
Smart Weighting	08
Stock Selection	13
Tax Optimization	16
Disciplined Rebalancing	19
About Us	21
Disclosures	22



We augment the traditional index approach with innovative solutions made possible by our proprietary technology & decreasing trading costs.

The result is a portfolio equipped for the modern age, enhanced by the value of a personal advisor relationship and backed by the expertise of our Investment Committee. Our ultimate goal is to establish and maintain a strategic investment portfolio for every client. This includes portfolio construction, security selection, portfolio monitoring and trade oversight.

Personalized Asset Allocation

An asset class is a group of investments with similar characteristics and return drivers. We utilize all six high-level liquid, broadly investable asset classes:

U.S. Stocks

Equity in companies domiciled in the United States. These assets have high growth expectations and significant volatility.

International Stocks

Equity in companies domiciled outside of the United States, including both developed and emerging markets. These assets are primarily recommended for growth, and provide moderate diversification from U.S. stocks. They have high levels of volatility.

U.S. Bonds

Debt issued in the United States, primarily by governments and corporations. These assets are recommended for income and strong diversification benefits when coupled with stocks. Inflation-protected bonds add a hedge against inflation.

International Bonds

Debt issued outside the United States, primarily by governments and corporations. These assets are recommended for income and diversification benefits.

Alternatives

We define alternative assets as hard assets such as real estate (through real estate investment trusts, or REITs) and commodities like gold and energy. Alternative assets are primarily recommended for diversification benefits and as a hedge against inflation. REITs generate income and have high expected total return.

Cash

This asset class is primarily recommended for liquidity. Cash has historically provided a return near inflation with very low volatility.

Each asset class has its own risk and return profile.

We consider current interest rates and equity valuations, and their likely impact on future returns, but use historical risk and return data as an objective starting point for determining an optimal asset class mix. We consider the earliest reliable data available for each asset class, which is 1926 for domestic equities, domestic fixed income, and cash. Data for international equities and alternatives starts in 1970, while international fixed income starts in 2002. Based on that data, we calculate the historical characteristics seen in Figure 1. All figures are annual through 2018.

Our process for determining the optimal asset class mix is based on a common-sense application of modern portfolio theory (MPT). Developed in the 1950s by Nobel Prize-winning economist Harry Markowitz, MPT attempts to maximize a portfolio's return for any given level of risk. It does this through a process called mean-variance optimization, or MVO, which finds the optimal combination based on expected return, volatility and covariance.

As seen in the matrix in Figure 2 (below), no two asset classes are perfectly correlated with each other (i.e., correlation = 1.0). Some of the correlations are even negative, meaning those assets tend to move in opposite directions. By combining low or negatively correlated assets it is possible to increase a portfolio's expected return while simultaneously reducing risk.

The combination of domestic fixed income and alternative asset classes is an example of the kind of risk reduction in which a negatively correlated asset class can act as a counterweight to another asset class. As seen in Figure 1, domestic fixed income has a historical return of 5.2% and a standard deviation (risk) of 5.7%. Alternatives have a return of 5.9% and a standard deviation of 16.1%. As a stand-alone asset class, alternatives are much more volatile, yet when combined with fixed income, they can actually reduce the aggregate portfolio's standard deviation. A portfolio invested 50% in each asset class would have an expected (historical) return and standard deviation of 5.7% and 7.9%, respectively.

FIGURE 1

Historical Asset Class Risk/Return

	average return	risk/STD deviation
Domestic Equities	10.0%	19.8%
International Equities	8.7%	22.2%
Domestic Fixed Income	5.2%	5.7%
International Fixed Income	5.0%	9.0%
Alternatives	5.9%	16.1%
Cash	3.3%	3.1%

FIGURE 2

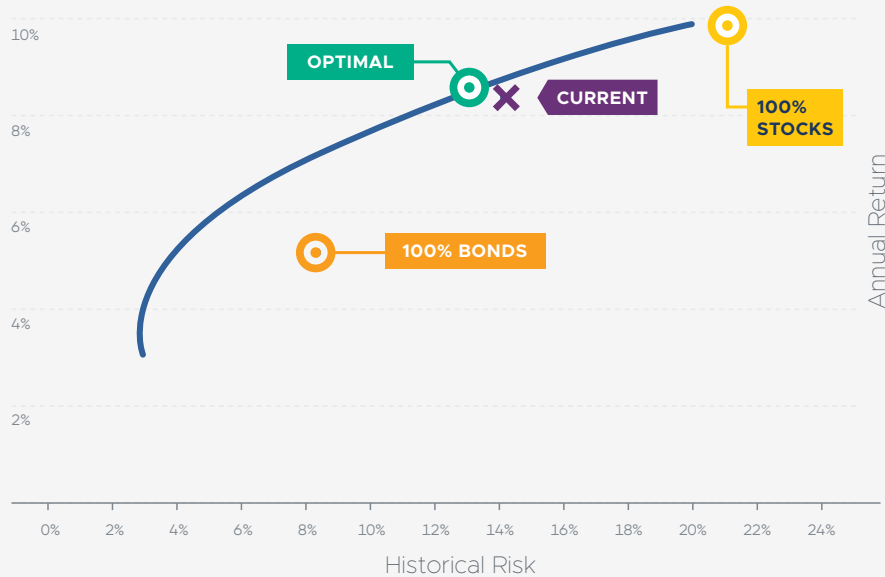
Correlation of Asset Classes Utilized in Personal Strategies

Domestic Equities	1.00								
International Equities	0.66	1.00							
Domestic Fixed Income	-0.03	-0.14	1.00						
International Fixed Income	-0.08	0.21	0.29	1.00					
Alternatives	-0.21	-0.07	-0.17	0.28	1.00				
Cash	-0.02	0.02	0.44	0.22	0.16	1.00			

Source: See Disclosures.

FIGURE 3

The Efficient Frontier Expected Growth/Risk*



*For illustrative purposes only

All of Our model portfolios fall on or near the efficient frontier. A portfolio inside the efficient frontier would be suboptimal since it's possible to achieve a higher return for the same amount of risk.

We apply mean-variance optimization to all six asset classes to produce a set of optimal portfolios that maximize return for each level of risk. To achieve that, our approach combines real-time financial account aggregation, deep investor profile data, a Monte Carlo projection engine and the expertise of financial professionals.

When plotted on a graph, these portfolios represent the efficient frontier. All of Our model portfolios fall on or near the efficient frontier. A portfolio inside the efficient frontier would be suboptimal since it's possible to achieve a higher return for the same amount of risk.

We combine math and qualitative assessment to categorically dictate asset allocation. While historical results are a good starting point, they can result in data biases, depending on the time period. A "black box" approach favors allocating larger investment amounts to negatively correlated asset classes or those with historically high returns. For example, an investment strategy based solely on data would result in unreasonably heavy weighting in alternatives and emerging markets stock assets. Owning nearly 50% in emerging markets stocks does not pass the "common sense" test and wouldn't be prudent. Likewise, our investment approach accounts for the current investment environment, which is characterized by low interest rates and cash yields. This means putting constraints on certain asset classes and positioning portfolios to be firmly grounded in reality. History does not always repeat itself.

Methodology Overview

Our approach combines real-time financial account data, deep investor profile data, a Monte Carlo projection engine paired with the expertise of Certified Financial Planners.

We take the perspective that asset allocation should be personalized, data-driven, and designed to provide the best chance for individual's to reach their personal goals.

All our model portfolios are designed to maximize expected growth by selecting and maintaining the right level of risk for each individual.

Our Financial Dashboard tracks assets, liabilities and cash flows. It also helps calculate actual saving and spending totals.

The client indicates how much he or she wants to spend each year in retirement. We assist the client in determining how much Social Security and other retirement income to expect.

Our Monte Carlo-based Retirement Planner incorporates spending goals and projected income to calculate:

How much money is needed to retire and the growth rate required to achieve it, If the client is still working.

The projected withdrawal rate and the percentage of portfolio used for spending each year, If the client is retired or retiring soon.

Our internal algorithm takes into account the aforementioned information in conjunction

with traditional factors like current age, retirement age, risk tolerance, time horizon, legacy wishes and non-liquid asset values, to arrive at the recommended optimal asset allocation.

A dedicated advisor and our Investment Committee provide additional layers of oversight and review.

It's based on what matters: actual cash flow needs. The Monte Carlo engine shows how much growth is required to meet the client's needs and which portfolio makes the most sense for the individual.

Account aggregation keeps the plan on track and updated, finally making it possible to use data to drive decisions about when asset allocation should change.

Smart Weighting

High-level asset allocation is the most important driver for long-term returns. Construction and security selection within each asset class also make a big difference.

It is widely accepted that picking hot stocks or buying active mutual funds does not provide the highest return. Standard & Poor's 2018 SPIVA study shows that more than 80% of active large-cap U.S. stock mutual funds lagged the S&P 500 on a 5, 10 and 15 year basis. Index investing, in which a bundle of stocks are chosen according to a predetermined set of rules, is a step in the right direction. The most commonly followed indexes, such as the S&P 500, are capitalization weighted. In a capitalization-weighted index, the weight of each stock is equal to the total value of the company divided by the value of all the companies in the index.

For example, if Apple is the largest stock in the S&P 500, valued at over \$800 billion, and the value of all 500 stocks is around \$25 trillion, then Apple represents more than 3% of the index. For comparison, the weight of the smallest 100 companies in the index is less than 4% combined as of 2018 year end.

For U.S. stocks, We use a sampling of individual company stocks to create our own index.

The goal is to achieve more even exposure to the important factors of size, style and economic sector. Doing so creates several benefits when compared to traditional capitalization-weighted indexes:



Better factor diversification



Avoidance of sector bubbles



Increased return potential



Elimination of fund costs



Increased tax management opportunities

Academics and institutional investment managers are increasingly recognizing the pitfalls of capitalization weighting. First, it guarantees buying high and selling low. If a stock is overpriced in the market, owners of capitalization-weighted indexes will own more than the “fair value.” Conversely, if a stock is undervalued by the market, it will be owned at a lower amount than “fair value” would suggest. As prices revert to long-term fundamental values, these indexes will suffer.

Another pitfall of capitalization weighting is concentration risk, or the risk of overexposure to a given asset or group of assets. Owning a capitalization-weighted index fund means taking big bets on whatever stocks and sectors happen to be big, for no reason other than they’re already big. This can increase volatility and risk.

Figure 4 shows how S&P 500 investors had their biggest sector bets burst, first in technology before the dot-com bust, then in financials before the sub-prime crisis. In each case, the sector value decreased by 80%.

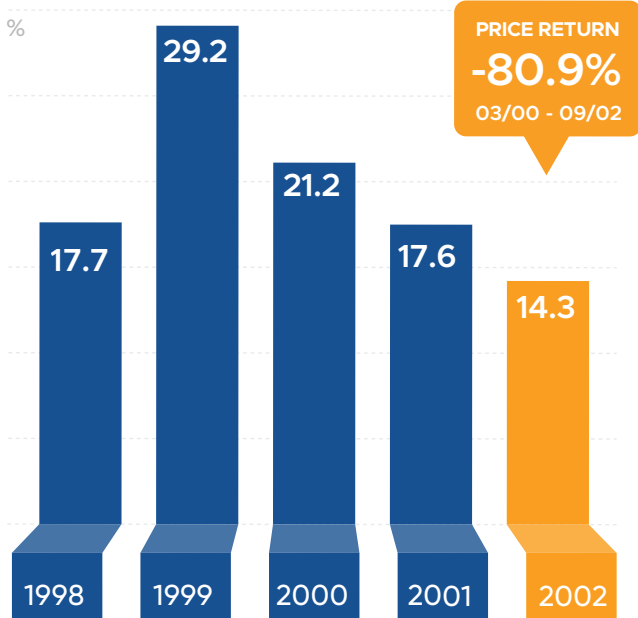
One of the early alternatives to cap weighting simply weighted each stock equally within an index. The first major equal weighted exchange-traded fund (ETF) to do this was the Guggenheim S&P 500 Equal Weight ETF (RSP). Since its inception in 2003, it has significantly outperformed its cap-weighted parent index, the S&P 500, through year end 2018. However, it has also experienced higher volatility.

FIGURE 4

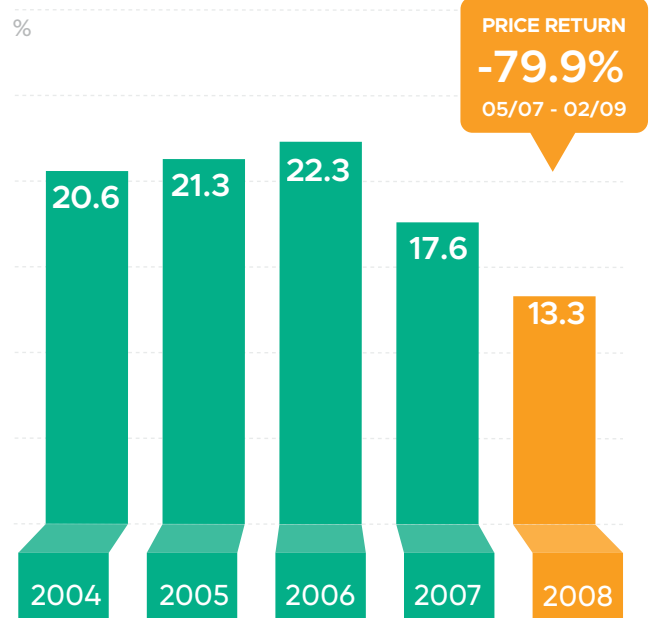
Sector Weight Values Over Time Percentage Of S&P 500 In:
Source: Standard & Poor's

■ Largest Sector in S&P 500

Technology



Financials



Approach To Equal Weighting

When it comes to equal weighting, traditional strategies assign the same weight to every stock in a portfolio or index. We go a step further by applying the same concept to a core group of factors. This approach attempts to maintain the performance edge relative to cap weighting while simultaneously reducing overall portfolio volatility.

For one of these factors to be considered, it had to have constituents (stocks) that could easily be classified and didn't excessively change categories. Economic sector was a logical starting point because performance amongst sectors varies meaningfully year to year, but not much over longer periods of time.

FIGURE 5 Periodic Table of US Sector Returns

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
61.7%	27.2%	19.7%	28.4%	42.7%	28.7%	9.9%	28.0%	34.3%	6.3%
48.6%	26.7%	14.1%	23.6%	41.4%	25.1%	6.9%	22.8%	24.0%	3.9%
41.3%	22.2%	12.4%	17.4%	40.6%	17.8%	6.8%	22.8%	24.0%	1.6%
29.5%	20.5%	6.0%	16.6%	35.5%	15.7%	5.5%	20.0%	22.8%	-1.7%
20.9%	19.6%	2.8%	15.3%	26.3%	15.1%	2.7%	16.8%	22.0%	-8.1%
19.7%	15.1%	2.6%	14.9%	26.2%	10.4%	-1.8%	16.1%	21.8%	-13.1%
17.2%	12.1%	-1.1%	14.7%	26.2%	9.5%	-4.3%	15.0%	13.0%	-13.2%
14.9%	10.2%	-2.2%	10.7%	26.0%	7.2%	-4.9%	6.0%	12.0%	-14.9%
13.8%	5.5%	-10.9%	5.2%	24.3%	1.3%	-8.7%	5.0%	-0.9%	-16.7%
11.9%	2.9%	-17.1%	0.1%	13.1%	-8.7%	-21.5%	-2.8%	-5.5%	-18.2%

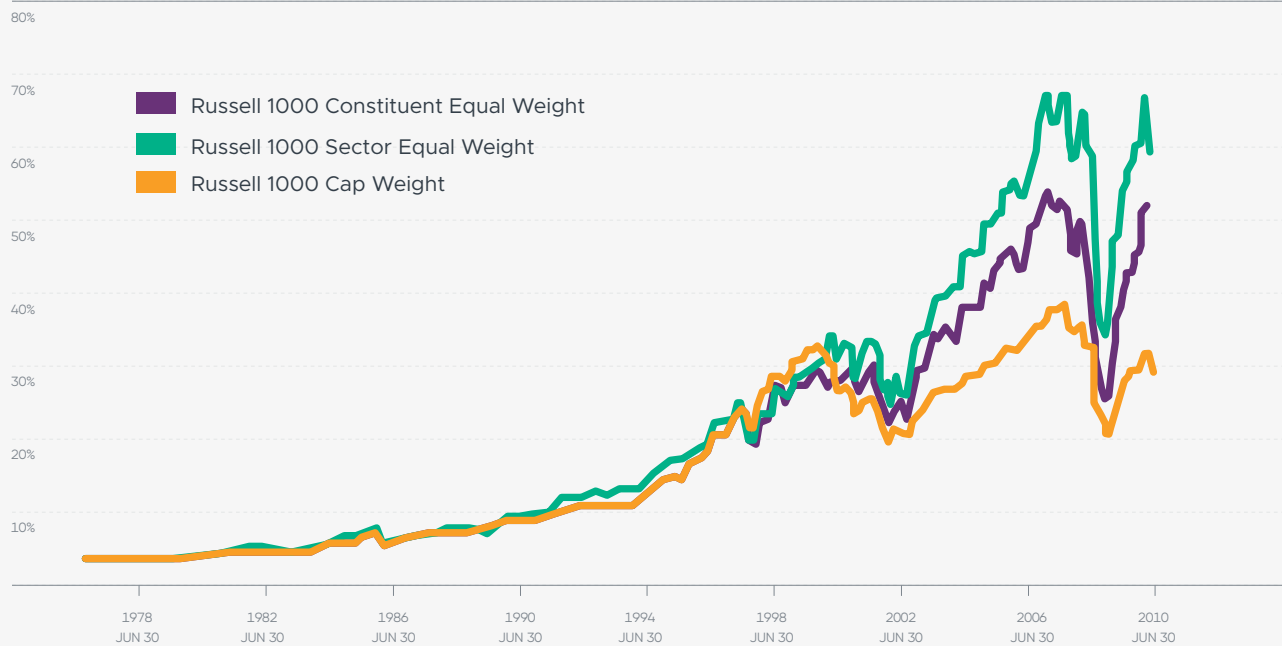
- Health Care
- Utilities
- Consumer Cyclical
- Technology
- Consumer Staples
- Financials
- Industrials
- Materials
- Telecom
- Energy

Traditional indexing can create unintended risks such as improper diversification across sectors. By equal weighting each sector, you can achieve better results over time, often with less risk. More equally weighting sectors is one component of our approach.

FIGURE 6

Growth Of A Dollar For Russell 1000 SEW, CEW & Cap-Weight Indexes

Source: Russell Investments, 6/30/1978 - 6/30/2010



Others have reached similar conclusions on the benefits of equal sector weighting. In a 2010 study by Russell Investments, *The Russell Equal Weight Indexes: An Enhancement to Equal Weight Methodology*, author Pradeep Velvadapu measured the impact of equal weighting at the sector level from 1978 to 2010. Spanning over 30 years, the study found an investor in the equal-weighted sector approach, based on the Russell 1000 universe, accumulated roughly double the final portfolio value as compared to one who used capitalization weighting.

Some of Russell's findings include:

- > **“Sector equal-weighted indexes provided a better absolute return** with lower volatility for the time period tested compared to traditional equal-weighted and cap-weighted indexes.”
- > **“These results are consistent across the domestic large-cap**, mid-cap and small-cap spectrum and the global developed and emerging regions.”

In 2013 Andrew Clare, Nick Motson, and Steve Thomas of Cass Business School in London published their study, *An Evaluation of Alternative Equity Indices*. In it, the authors examined the impact of various weighting schemes for the 1,000 largest U.S. stocks from 1968 to 2011. They found that all of the alternative indexes they created (including equal-weighted) produced better risk-adjusted returns than passive exposure to a market cap-weighted index. One of their primary conclusions was “since the late 1990s the market-capitalization weighted index has proved to be a relatively poor-performing investment strategy.”

We researched several factors relative to the S&P 500 & found that more equally weighted:¹



Economic sectors offered better performance with lower risk



Individual stocks offered better performance but with higher risk



Size offered better performance with similar risk



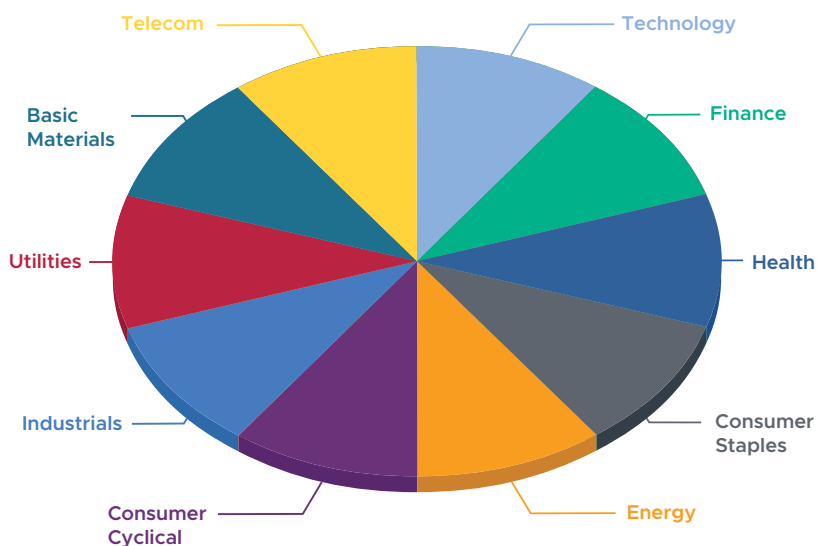
Style (growth, value, core) offered better performance with slightly higher risk.

FIGURE 7

Equal Sector & Style Weighting Factor Exposure

CAP	VALUE	CORE	GROWTH
Mega	10%	10%	10%
Large	10%	10%	10%
Mid	6.7%	6.7%	6.7%
Small	6.7%	6.7%	6.7%

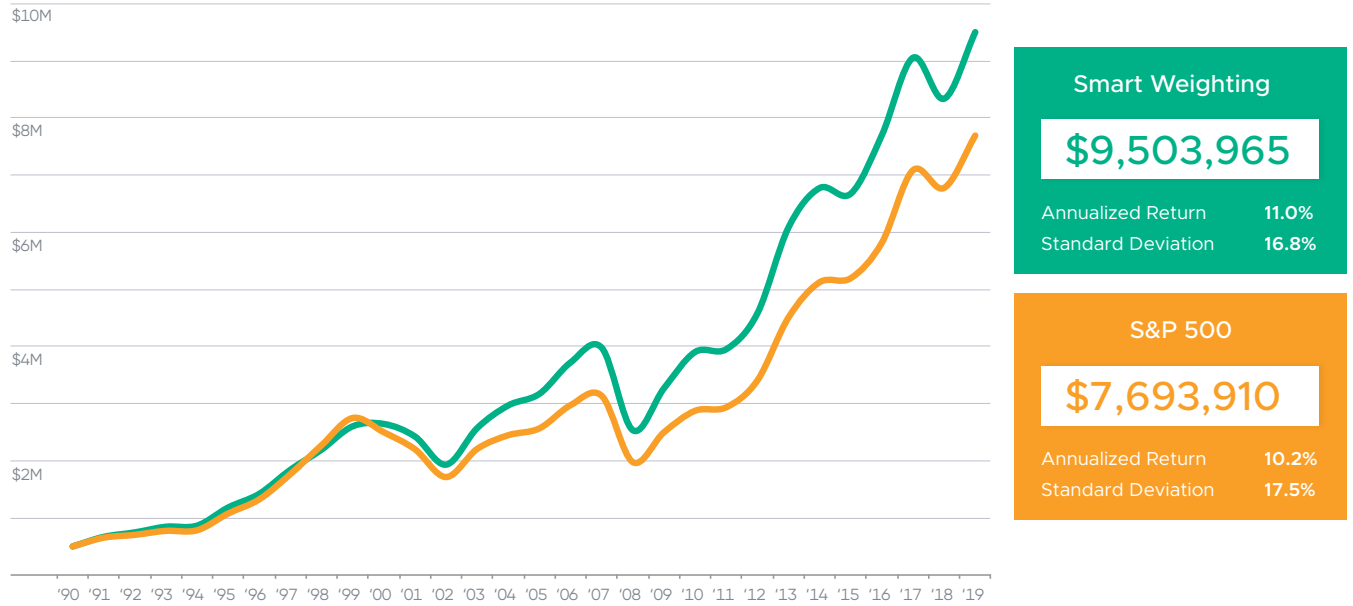
Smart Weighting provides more even exposure across sector and style, when compared to the S&P 500.



Using a sampling of individual stocks, our portfolios are designed to benefit from all four of these factors.

FIGURE 8

Smart Weighting vs. S&P 500 Growth of \$500,000 (12/31/90 - 03/31/19)



In a hypothetical back-test of the period from 12/31/1990 to 3/31/2019, the combination was shown to increase returns relative to the S&P 500 by 0.8%, while simultaneously lowering risk. In each case, risk is defined as the standard deviation of annual returns, with portfolios rebalanced annually. Morningstar classifications are used for economic sector and style box.

Our equally weighted portfolios typically contain 80 to 120 stocks, which sufficiently minimizes stock-specific risk while providing the necessary granularity to achieve desired factor weightings.

Periodic rebalancing is necessary to maintain factor allocations and contain stock-specific risk. It is the act of rebalancing that drives much of the empirical and theoretical outperformance relative to capitalization-weighted indexes.

The ability to implement this type of portfolio for individual investors was only recently made possible by advances in technology and falling trading costs. Our clients do not pay any trade commissions.

Stock Selection

Our goal for equal weighting is to create a portfolio of individual stocks and ETFs which maximizes diversification and spreads risk more effectively than traditional indexes.

Defining The Universe

Our portfolios are broken down into 12 style box categories and 10 economic sectors. This is slightly different than the traditional “nine-box” methodology defined by Morningstar, which consists of three size categories: large, mid and small. The large-cap universe is too diverse to be lumped into one single category. Our approach is to break large cap down further into mega cap and large cap.

Mega cap is defined as the biggest stocks, whose sum accounts for 35% of the total value of the market. As of December 2017, that implies a market capitalization of roughly \$115 billion or higher. At the other end of the spectrum, we include a selection of Small Cap index ETFs for a significant portion of our Small Cap equity exposure. Our use of index ETFs in this segment further limits portfolio dispersion by mitigating the higher volatility of individual Small Cap stocks.

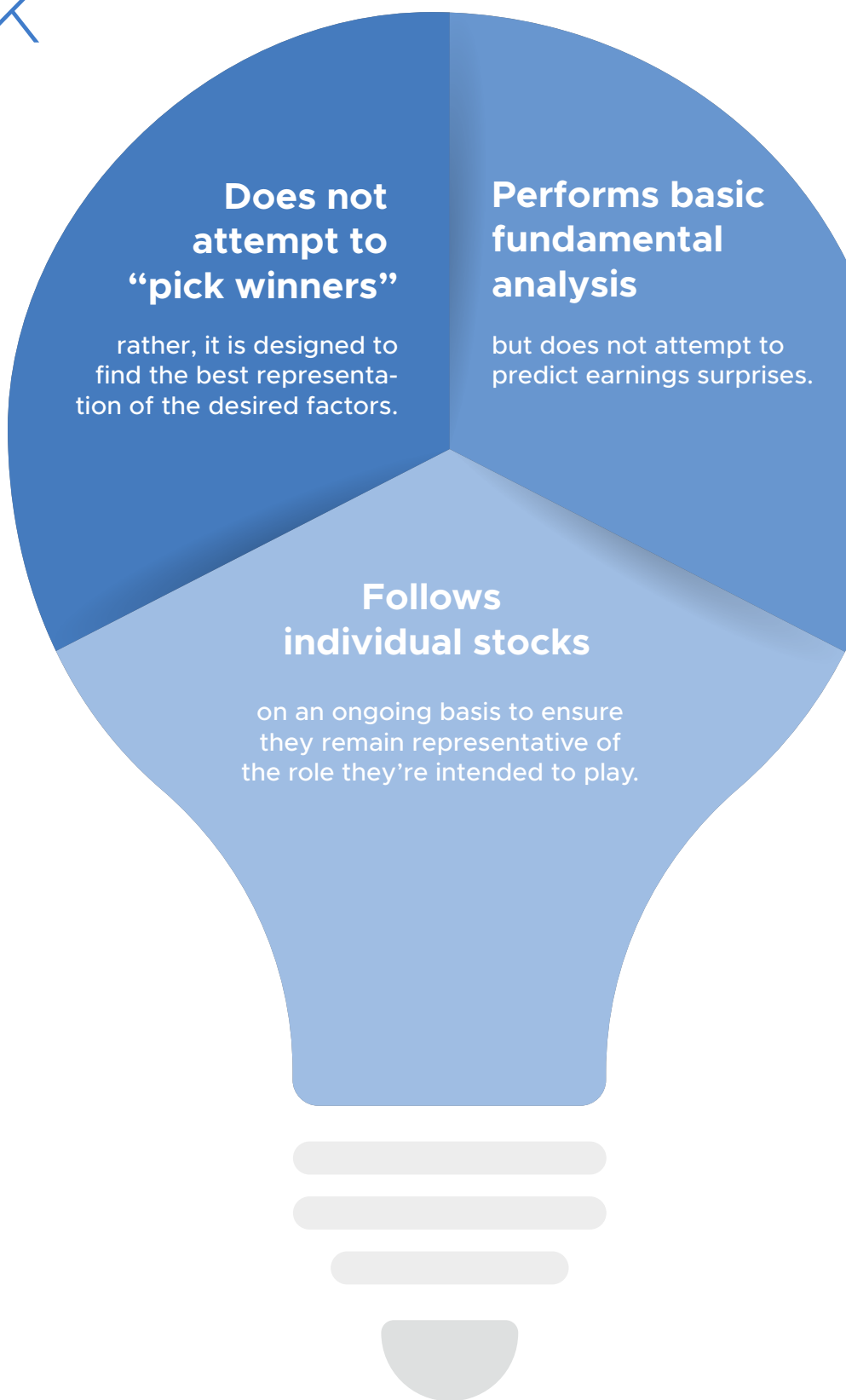
Choosing Stocks

Each stock in the portfolio plays a role. The goal is to fill up each of the 12 style boxes in a way that adds up to roughly equal exposure to each of the 10 economic sectors across the portfolio. Within mega cap, the choices are very limited. In large- and mid-cap style boxes, there are significantly more choices. We narrow these down by diversifying at the industry level. It is often possible to remove some options by eliminating niche companies not representative of their industry.

For example, we might eliminate Hawaiian Airlines in selecting stocks for exposure to the airline market because it's more representative of Hawaiian tourism trends than of the airline market overall. Before selecting stocks, we conduct a series of red-flag checks while seeking to maintain diversified exposure to quality, market exposure (beta) and momentum. If there are still multiple options to choose from after finishing red-flag checks, the final selection is randomized.

Our stock selection process

This approach is designed to be objective and to minimize potential bias. The overall portfolio is reviewed to ensure there are no unintended themes, such as similar performance trends, balance sheet strengths, betas or dividend yields, and includes a balance of industry leaders and second-tier players. We aim to create a portfolio that captures the intended higher-level factor exposure and otherwise exhibits random results.



How many stocks?

The number of stocks held in a portfolio is an important consideration. Since it isn't practical to invest in all stocks within the investment universe, a subset of companies is chosen.

The goal is to own enough stocks to achieve proper diversification and capture the higher-level factor exposures. This means a portfolio of stocks that eliminates the majority of unsystematic risk (or stock-specific risk) relative to the larger market portfolio. In his 1949 book, *The Intelligent Investor*, professional investor and Columbia Business School professor Benjamin Graham argued that 10 to 30 stocks were necessary to achieve diversification. This was further refined in the 1987 study by Meir Statman, *How Many Stocks Make a Diversified Portfolio?* He concluded a minimum of 30 stocks was necessary.

As can be seen in the table in Figure 9, which is detailed in his 1987 study, holding 30 stocks eliminates roughly 95% of the excess standard deviation over the market portfolio (i.e., "infinity").

But markets evolve over time, as does the underlying economy. What was true in 1987 is not necessarily true today. A more recent study was published in *The Journal of Finance* in 2001 by John Campbell, Martin Lettau, Burton Malkiel and Yexiao Xu: *Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk*. The authors point out that the market as a whole has not become more volatile, but in the 35-year period leading up to 1997 the level of volatility for individual stocks increased substantially. This led to lower correlations over time. As a result, it took a portfolio of at least 50 stocks to achieve the same level of diversification previously achieved with 20 stocks. They define this as an excess standard deviation above the market index of 5% or less.

FIGURE 9

Expected Standard Deviation Of Annual Portfolio Returns

Number of stocks	Expected Std. Deviation
1	49.236
2	37.358
4	29.687
6	26.643
8	24.983
10	23.932
12	23.204
14	22.670
16	22.261
18	21.939
20	21.677
25	21.196
30	20.870
35	20.634
40	20.456
45	20.316
50	20.203
75	19.860
100	19.686
200	19.423
300	19.336
400	19.292
450	19.277
500	19.265
600	19.247
700	19.233
800	19.224
900	19.217
1000	19.211
INFINITY	19.157

Diversification is one of our highest priorities. Long-term performance should be driven primarily by market exposure (beta) and secondarily by exposure to size, style and sector factors.

We typically build portfolios with 90 - 120 stocks in addition to the small cap index ETFs in order to achieve a desired level of expected stock-specific dispersion. As a test, we analyzed a random stock selection over a six year period (2011 - 2016). For each year, we calculated the full-year performance for 100 portfolios consisting of 90 randomly generated stocks from the Mega, Large and Mid Cap stock universes, controlling for size and sector. Small cap exposure was modelled with an index ETF. For each "position" in our model portfolios, a stock was randomly selected from the same size and sector pool. Where none were available (mega-cap utilities, for example), a randomly selected stock from that respective sector was chosen.

After controlling for these factors, the average annual standard deviation among portfolios was 1.8%, which means about 2/3rds of portfolios were within 1.8% of the average. The results are presented in the table in Figure 10. While 1.8% dispersion is relatively modest, it becomes even less impactful when put it into a long-term perspective. Dividing by the square root of "n" years creates an annualized expected stock-specific dispersion number. Assuming a 25-year time horizon (appropriate for most long-term investors), the annualized dispersion drops to:

$$(1.8\%) / (\sqrt{25}) = 0.36\%.$$

This number is not a cost. Stock-specific randomness is roughly equally likely to help or hurt and does not meaningfully change the expected return. Since Personal Capital launched in 2011, our actual performance has tracked very closely to the expected result. In the end, we believe that the expected long-term benefits of Smart weighting are easily worth this modest amount of expected stock-specific dispersion. Over time, the factor exposures and the expected benefits of periodic rebalancing are the dominant drivers of relative performance.

FIGURE 10

Standard Deviation of Randomly Generated Portfolios by Calendar Year, Controlled for Size & Sector

Year	Std. Deviation
2016	2.07%
2015	1.80%
2014	1.64%
2013	2.10%
2012	1.75%
2011	1.48%
Average	1.81%

Source: Yahoo Finance & Personal Capital

Tax Optimization

Comprehensive tax optimization can increase after-tax return by up to 1% per year.² For tax allocation and tax loss harvesting, the use of individual securities significantly enhances the ability to add value when compared to use of ETFs or mutual funds alone.

Tax Allocation

Investors who have both tax-advantaged retirement accounts like individual retirement accounts (IRAs) and traditional taxable investment accounts can improve after-tax return by strategically locating different investments among them. A general rule is to place higher-yield investments in tax-deferred or exempt accounts and low-yield investments in taxable accounts. This is because IRAs are able to shield income from immediate taxation.

Our research has determined that savings can be up to 0.30% per year, depending largely on marginal tax rate. A 2005 study by Daryanani and Cordaro, Asset Location: A Generic Framework for Maximizing After-Tax Wealth, estimated an average of around 0.20% annualized benefit. A Vanguard study showed benefits of “up to 0.75%” per year.

To maximize the benefit, we rank investments based on tax-equivalent yield (TEY), which is automated through our platform. TEY differs from gross yield in that it factors in different tax rates for each investment type. Income from bonds and REITs, for example, is taxed as ordinary income. Dividends from most common stocks, however, are considered “qualified” and are taxed at a more favorable rate. This means if a REIT and stock both exhibit the same percentage gross yield, Personal Capital would likely attempt to place the REIT in the IRA first since its income is less efficient on an after-tax basis.

Taxable

- > Individual
- > Joint
- > Trust

Tax Deferred

- > Traditional IRA
- > Rollover IRA
- > 401K
- > SEP IRA

Tax Exempt

- > ROTH IRA
- > ROTH 401K
- > CRUTs / CRATs

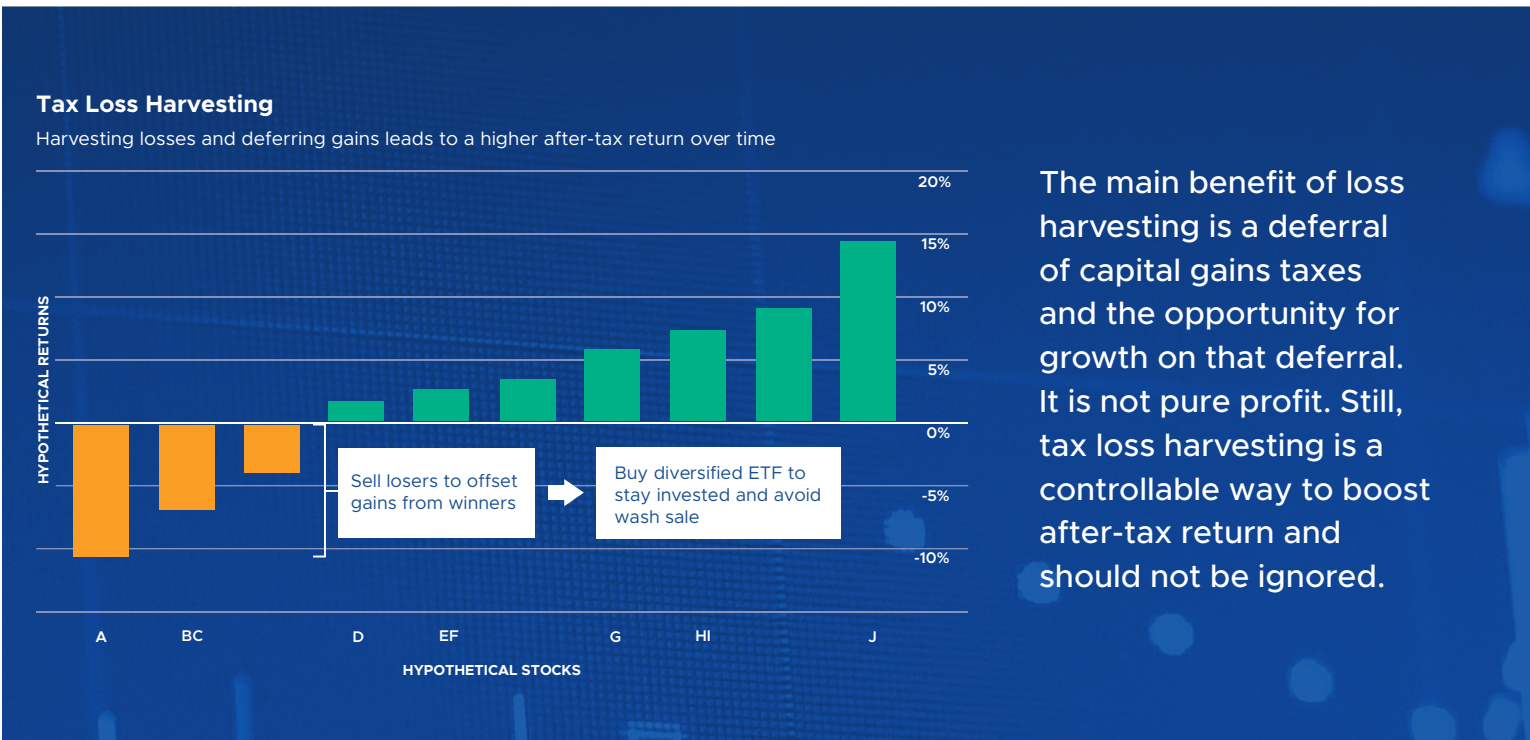
Tax Loss Harvesting

Tax loss harvesting refers to the intentional selling of securities at a loss to turn an unrealized loss into a realized loss. This may sound counterintuitive, but there are two main ways loss harvesting can save money and improve after-tax return.

- 1 Each individual or family is entitled to deduct up to \$3,000 per year in realized losses from ordinary income.
- 2 Losses can be used to offset gains. Loss harvesting allows investors to maintain properly rebalanced portfolios even while deferring gains. By deferring the payment of taxes, more money can appreciate in a compound fashion.

Our loss harvesting approach is tied to each individual's tax return and only harvests losses when it makes sense.

There are a wide range of claims related to the benefits of loss harvesting. We contend that many are inappropriately overstated. At the upper end, the income deduction for a high-income individual in California with a small portfolio could save 0.78% alone. But more common results lead to savings in the 0.2% to 0.4% range. Even then, if securities are eventually to be sold and proceeds spent, capital gains taxes must eventually be paid. Therefore, aside from the \$3,000 deduction, it's important to realize that the main benefit of loss harvesting is a deferral of capital gains taxes and the opportunity for growth on that deferral. It is not pure profit. Still, tax loss harvesting is a controllable way to boost after-tax return and should not be ignored.



The main benefit of loss harvesting is a deferral of capital gains taxes and the opportunity for growth on that deferral. It is not pure profit. Still, tax loss harvesting is a controllable way to boost after-tax return and should not be ignored.

Tax Efficiency

There are thousands of investment vehicles to choose from, and each can have radically different tax implications. Knowing which are tax-efficient is vital to reducing taxes.

Given their greater tax efficiency, Personal Capital portfolios are built on a combination of individual stocks and ETFs. Personal Capital excludes mutual funds.

Mutual Funds are notoriously bad from a tax perspective. High turnover often creates large annual tax bills. According to Morningstar.com, the 10 largest mutual funds by assets had an average turnover ratio of almost 75%. Most of these are actively managed funds where managers attempt to outperform a benchmark by selling winners to lock in gains. A 2010 study by Lipper (Taxes in the Mutual Funds Industry – 2010; Assessing the Impact of Taxes on Shareholder Return) showed owners of mutual funds in taxable accounts gave up an average of 0.98% to 2.08% in annual return to taxes over the previous 10 years. Profits are also usually distributed to shareholders once per year, so it's likely that mutual fund owners will have to pay taxes on gains they didn't individually realize.

Exchange-traded funds (ETFs) are generally more tax efficient than mutual funds. This is one of the primary reasons they were created. Unlike most mutual funds, ETFs are usually passively managed, which often translates into lower turnover, thus lower tax bills. Certain passively managed mutual funds also fall into this category. But ETFs have another advantage: they trade on the secondary market like stocks and are structured to be easily created and redeemed. In other words, the securities that make up the ETF do not need to be sold to raise cash for redemptions. This largely eliminates the problem of forced distributions and results in greater tax efficiency.

Individual stocks, when properly managed, are the most tax-efficient way to gain exposure to equities. They leave control over realizing gains entirely in the hands of the investor. Of course, certain stocks pay taxable dividends. But the choice to own dividend-paying stocks is up to the investor – this is not the case with mutual funds or ETFs where investors lack control over underlying securities. Individual stocks can also be tax-located more precisely.

Bonds, Just like stocks, bond ETFs and passive bond mutual funds are generally more tax-efficient than actively managed bond funds. But the tax treatment of income generated from bonds is different than equities. It is currently taxed as ordinary income, which can be much higher than the rate on qualified stock dividends. There are also exceptions. Municipal bonds are not taxed at the federal level, and if the owner lives in the state in which they're issued they can avoid state income tax as well.

Real Estate Investment Trusts (REITs) are companies that invest in physical properties and assets. In general, they tend to focus on specific segments of the market such as retail, healthcare and office properties. To qualify as a REIT, a company must pay out at least 90% of its income (e.g., rental income) in the form of dividends. But unlike stocks, these dividends are generally taxed as ordinary income to shareholders.

Disciplined Rebalancing

- > Keeps portfolios on track with long-term goals
- > Eliminates costly emotional mistakes
- > Enhances risk-adjusted return by creating a systematic way to buy low and sell high

It's uncomfortable to add money to poor-performing categories, but doing so is proven to add value over time. It works at the asset class level (U.S. stocks, international stocks, US bonds, etc.) and it works within asset classes (individual stocks, certain types of bonds, etc.).

Our software reviews portfolios daily for rebalancing opportunities. Rather than set hard triggers, our approach relies on exception reporting to identify when to evaluate whether a rebalance is beneficial. As a general rule, high-level asset classes will be rebalanced if they deviate more than a few percentage points from target, while specific securities are reviewed if they move more than 0.5% from target. Taxes are strongly considered in the decision. Our goal is to keep turnover under 15% in most years, a threshold that should be sufficient to capture the full power of rebalancing. Depending on market volatility, we may conduct a few or several small rebalances per year.

We performed a hypothetical back-test using historical market returns for the six major liquid asset classes: U.S. stocks, international stocks, US bonds, international bonds, alternatives and cash. We then selected six of the commonly utilized model client asset allocations, ranging from highly aggressive to conservative, and ran a performance analysis from 1980 to 2017. Two sets of returns were calculated for each asset allocation: one with annual rebalancing and one without. As seen in the Figure 11 table, rebalancing added approximately 0.2% to 0.3% to annual returns and reduced volatility.

FIGURE 11

Asset Allocation Annualized Returns (1980 - 2018)

Results shown are rounded to the nearest tenth of a percentage point.

	Allocation % Stocks	Rebalancing		Rebalancing Benefit
		Yes	No	
1	86%	10.0%	9.7%	0.3%
2	75%	9.7%	9.5%	0.3%
3	63%	9.5%	9.2%	0.3%
4	50%	9.0%	8.8%	0.2%
5	40%	8.7%	8.5%	0.2%
6	30%	8.3%	8.2%	0.1%

Annualized benefit from rebalancing up to: 0.2%

Source: See Disclosures

Mean Reversion

In any given quarter or year, a multi-asset-class portfolio will perform better than the worst asset class and worse than the best asset class. Yet over time, if properly rebalanced, performance rises toward the top of the group. This is due to the natural tendency of markets to “mean revert.” The end result may not beat whatever happens to be the best asset class in that period, but it’s usually close. Meanwhile, there is less risk along the way.

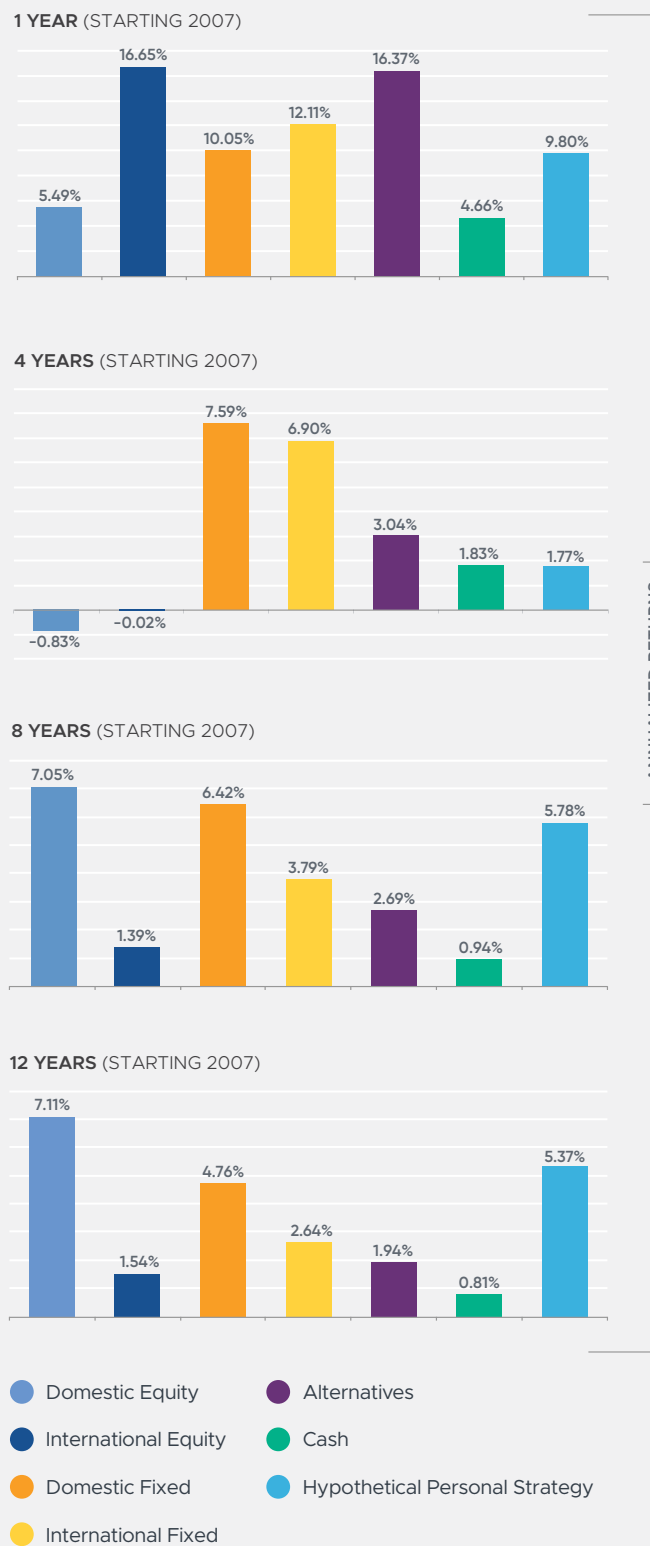
Figure 12 shows annualized returns for each of the major asset classes, as well as a diversified portfolio similar to one of Personal Capital’s more common investment strategies, which is rebalanced annually. Initially, some asset classes are big winners while others lag badly. The diversified approach sits in the middle. Note that over time, due to the power of rebalancing, the diversified approach slowly floats toward the top. As of 2018, it is ahead of five of the six asset classes and trails only U.S. stocks. Meanwhile, it got there with almost 20% less volatility. This represents why diversification and rebalancing is such an important part of Personal Capital’s investment process.

Our Investment methodology is a foundational element of creating strong, efficient portfolios. If you have questions or want more clarification, please contact us.

FIGURE 12

Asset Allocation Returns

Over time, a diversified, rebalanced approach rises toward the top.



Disclosures

FIGURE 1 & 2 Data sources: Ibbotson Associates, MSCI, Standard & Poor's, World Gold Council, BP.com, US Energy Information Administration, Robert Shiller Online, MIT Center For Real Estate, Yahoo Finance. Calculations are based on the long-term historical performance of asset classes using a combination of indexes and ETFs as proxies: S&P 500, MSCI EAFE and MSCI ACWI ex-US, 10 Year U.S. Treasuries, S&P/Citigroup International Treasury Bond Ex-US, 30 Day T-Bills, as well as IEF, IGOV, VNQ, IAU, and DBC. Prior to 2007, the Alternative asset class is represented by a hypothetical index of 50% real estate and a 50% gold/oil combination. Each year thereafter it is comprised of 50% real estate and a 50% blend of diversified commodities and gold ETFs. Portfolio standard deviation, correlation, and expected returns are based on average annual performance included in source data: domestic equities since 1926, international equities since 1970, domestic fixed since 1926, international fixed since 2002, alternatives since 1970 and cash since 1926.

FIGURE 5 The S&P 500 is market-value weighted index; each stock's weight in the index is proportionate to its market value. Equal Weight Sector returns are a simple average of the annual sector returns, represented partially by the nine Select Sector SPDR ETFs, as well as the Vanguard Telecommunications Services ETF (VOX). These are hypothetical index results that assume the reinvestment of dividends and are net of ETF expense ratios. Past returns are no guarantee of future performance. There can be no assurance that any strategy will be profitable, or that the Equal Weight sector index described above will perform better than the S&P 500 or other market-weighted index.

FIGURE 8 The S&P 500 is a market-value-weighted index; each stock's weight in the index is proportionate to its market value. The S&P 500 is designed to be a leading indicator of U.S. equities and is commonly used as a proxy for the overall market. The equal weighting strategy shows hypothetical index results, and does not reflect an actual account or trading. Nor does it reflect the impact of fees and expenses that would be incurred by a managed account or fund attempting to follow an indicated index strategy. It is not possible to invest directly in an index or strategy. Based on available data, the hypothetical results are time-linked equal returns of size, style and sector indexes. From 1991 to 1995, results are calculated using an average of equal weighted S&P sectors and an equal weight of the S&P 500 and Russell 2000. Post 1995, results are calculated using an average of equal weighted S&P sectors and the nine Russell Style box indexes. Results assume the reinvestment of dividends. These retroactive results do not include the effects of cash flows, fees, commissions or taxes, all of which would have reduced the returns shown. All investments are subject to the risk of loss. This information is intended only to illustrate a potential index strategy. Past returns are no guarantee of future performance. There can be no assurance that any strategy will be profitable, or that the equal weighting approach described above will perform better than the S&P 500 or other market-weighted index. Actual results for Personal Capital's Composite Personal Strategies are available upon request.

FIGURE 9 Portfolios are equally weighted. Elton and Gruber reported variances of weekly returns. Statman has converted these to standard deviations of annual returns. Source: E.J. Elton and M.J. Gruber, *Modern Portfolio Theory and Investment Analysis*, 2nd ed. (New York: John Wiley & Sons, 1984), p. 35, quoted in Meir Statman, "How Many Stocks Make a Diversified Portfolio?" *Journal of Financial and Quantitative Analysis*, Vol. 22, No. 3 (Sept. 1987), p. 355.

FOOTNOTE 1 (Page 11) Economic sector comparison - Compared annual returns of S&P 500 to an equal weighted average of all economic sectors within the S&P 500, from 1991 to 2018. Individual stock comparison - Compared annual returns of S&P 500 to the Invesco S&P 500 Equal Weight ETF (RSP) from 2004 to 2018. RSP weights each individual stock within the S&P 500 equally, compared to the standard S&P 500 which is capitalization weighted. Size comparison - compared annual returns of S&P 500 to an equal 50/50 blend of the Russell 1000 Index and Russell 2000 Index from 1991 to 2018. Style comparison - compared annual returns of the S&P 500 to the nine Russell Style box indexes, from 1996 to present.

FOOTNOTE 2 (Page 17) The average tax cost ratio of equity mutual funds is 1.0% to 1.2%, according to Morningstar. By avoiding tax inefficient funds and adding the benefit from tax location and tax loss harvesting, our research shows proper tax management can improve portfolio returns by up to 1.0% annually.

Sources: Rushkewicz, Katie. "How Tax-Efficient is your Mutual Fund?" 15 February 2010. Morningstar. 17 January 2011; Vanguard Study, <https://personal.vanguard.com/pdf/ISGTEEL.pdf>. Average tax cost is calculated based upon Morningstar data for all domestic equity stock funds with 15 years of performance history as of September 30, 2014. Calculations assume account is not liquidated at the end of the period. When after-tax returns are calculated, it is assumed that an investor was in the highest federal marginal income tax bracket at the time of each distribution of income or capital gains. State and local income taxes are not reflected in the calculations. After-tax distributions are reinvested, and all after-tax returns are also adjusted for loads and recurring fees using the maximum front-end load and the appropriate deferred loads or redemption fees for the time period measured.

FIGURE 11 & 12 Data sources: Ibbotson Associates, MSCI, Standard & Poor's, World Gold Council, BP.com, US Energy Information Administration, Robert Shiller Online, MIT Center For Real Estate, Yahoo Finance. Calculations are based on the long-term historical performance of asset classes using a combination of indexes and ETFs as proxies: S&P 500, MSCI EAFE and MSCI ACWI ex-US, 10 Year U.S. Treasuries, S&P/Citigroup International Treasury Bond Ex-US, 30 Day T-Bills, as well as IEF, IGOV, VNQ, IAU, and DBC. Prior to 2007, the Alternative asset class is represented by a hypothetical index of 50% real estate and a 50% gold/oil combination. Each year thereafter it is comprised of 50% real estate and a 50% blend of diversified commodities and gold ETFs. Portfolio standard deviation, correlation, and expected returns are based on average annual performance included in source data: domestic equities since 1926, international equities since 1970, domestic fixed since 1926, international fixed since 2002, alternatives since 1970 and cash since 1926.

Benefit to rebalancing derived using historical asset class returns for various multi-asset class portfolios. It represents the difference in annualized return since 1980 for a portfolio rebalanced annually versus a non-rebalanced portfolio with the same starting asset class weights. Given a lack of historical performance data for international fixed income, from 1980-2001 the aggregate fixed income weight was assumed to be entirely domestic. The figure does not include the effects of cash flows, fees, or securities transactions, all of which would have impacted returns. Based on the data, the most common Personal Capital allocations realized an annual net benefit of 0.2% from rebalancing.

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