

# Passive Investing Perspectives

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*A Look Under the Hood*

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- Despite seemingly uniform offerings within passive investing, nuances to asset class, manager and vehicle selection can materially impact investor outcomes.
- Developing a methodology to evaluate a manager’s ability to deliver desired outcomes is not mutually exclusive to actively managed portfolios, having a process to evaluate passive strategies is key to prudent diligence.

## Selecting the Proper Index

Skill is not a word commonly associated with passive management. Instead, cost is the primary, if not sole, differentiator across like index products. However, using cost as a short hand for due diligence exposes a number of pitfalls. Lower cost, in the absence of skill, is a recipe for failure in passive investing, whose primary purpose is the efficient replication of an index.

Prudent selection of an index fund provider goes further in depth relative to a cost-minimizing exercise. Beginning with the selection of an index provider, there are nuances to each of the large index mutual fund managers. Vanguard, for example, contracts with The Center for Research in Securities Prices (CRSP) for many of its domestic equity index funds. Fidelity and Schwab, conversely, employs Standard & Poor’s 500 and Russell indexes for various index funds. Why does this matter? A mid-cap or small-cap index should comprise the same sectors and securities with the same weights; correct? Wrong. Evaluating methodologies for index construction across the three primary index providers illuminates differences:

Index	Construction	Market Cap Segmentation	Growth vs. Value	Rebalancing	IPOs
CRSP	Quantitative	Mega: Top 70% Mid: 70-85% Small: 85-98% Micro: 98-100%	Multi-factor model with separate growth which are averaged to determine style	Quarterly	Fast Track IPO must be trading for at least 5 days. If not will be added at the next quarter
Russell	Quantitative	Companies: Large: 1-1,000 Small: 1,001-3,000 All Cap: 3,000+	Growth and Value determined by averaging style probability	Annually	Added at the end of a quarter
Standard & Poor’s	Qualitative/ Quantitative	Companies Large: 1-500 Mid: 501-900 Small: 901-1,500	Growth factors include earnings and sales growth and momentum. Value factors include Book to Price, Earnings to Price, Sales to Price	As Needed	Security must be on the open-market for at least 6-12 months before consideration

Source: Morningstar

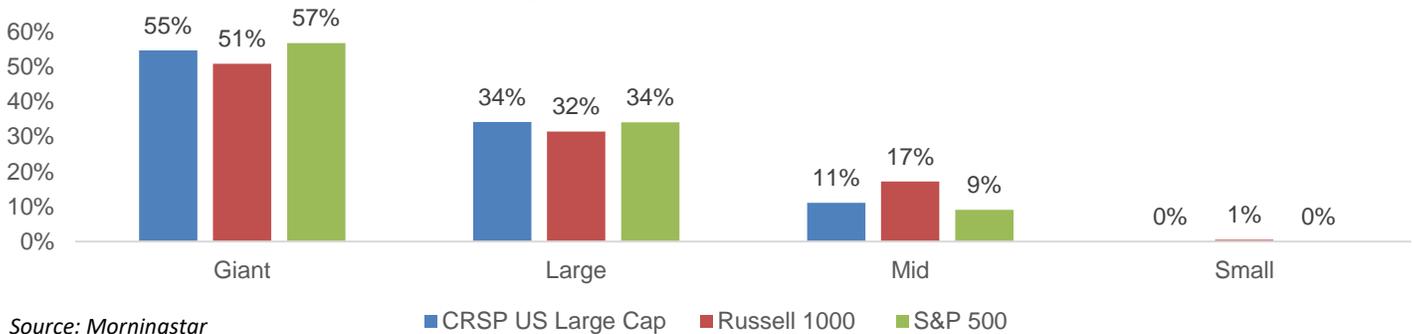
The differences in methodologies yield substantially different representations of what are intended to be analogous asset classes. For example, within large-cap, the broadly accepted representation of the largest companies in the United States, is usually the S&P 500, a subjective representation of the largest 506 companies (not 500) in the U.S. market. Securities are added and dropped from the index based on committee debates. IPOs are incorporated into the index after 6-12 months to

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ensure market cap stability and sufficient trading liquidity. The differences are illustrated below in market cap distribution and performance of each index within the large-cap equity asset class, as defined by each methodology.

### Large Cap Market Cap Distributions



Calendar Year Returns (9/30/2018)						
	YTD	2017	2016	2015	2014	2013
CRSP US Large Cap	10.49	22.07	11.75	1.11	13.47	32.71
Russell 1000	10.49	21.69	12.05	0.92	13.24	33.11
S&P 500	10.56	21.83	11.96	1.38	13.69	32.39

Source: Morningstar

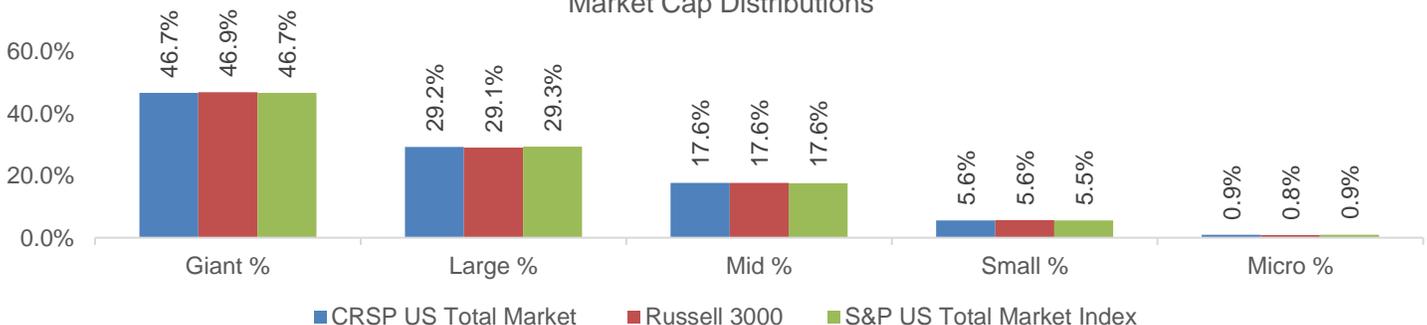
	Trailing Returns (9/30/2018)				Trailing Standard Deviation (9/30/2018)			
	1 Year	3 Years	5 Years	10 Years	1 Year	3 Years	5 Years	10 Years
CRSP US Large Cap	17.81	17.18	13.78	11.91	9.07	9.22	9.56	14.36
Russell 1000	17.76	17.07	13.67	12.09	8.86	9.21	9.56	14.64
S&P 500	17.91	17.31	13.95	11.97	9.11	9.18	9.55	14.40

Source: Morningstar

Returns represent total returns and all metrics are annualized for periods greater than one year.

It's clear from the above charts there is not unanimity across the three index providers. Fortunately, however, when evaluating each approach to the entire domestic equity market, the results are more aligned.

### Market Cap Distributions



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	Calendar Year Returns (9/30/2018)					
	YTD	2017	2016	2015	2014	2013
CRSP US Total Market	10.60	21.19	12.68	0.40	12.58	33.64
Russell 3000	10.57	21.13	12.74	0.48	12.56	33.55
S&P US Total Market	10.58	21.16	12.65	0.47	12.46	33.40

Source: Morningstar

	Trailing Returns (9/30/2018)				Trailing Standard Deviation (9/30/2018)			
	1 Year	3 Years	5 Years	10 Years	1 Year	3 Years	5 Years	10 Years
CRSP US Total Market	17.62	17.07	13.45	12.09	8.71	9.30	9.64	14.84
Russell 3000	17.58	17.07	13.46	12.01	8.69	9.30	9.65	14.90
S&P US Total Market	17.58	17.06	13.43	11.99	8.70	9.30	9.66	14.92

Source: Morningstar

Returns represent total returns and all metrics are annualized for periods greater than one year.

From the market cap distributions and return and risk profiles of each index, especially over the long-term, the selection of a total market index provider effectively is the same, though short-term dispersions are possible. For this reason, when constructing an index portfolio, the pieces to the puzzle matter. To illustrate there are nine different combinations of index portfolios allocating to the U.S. market, which comprises 76 percent large and giant cap names, 18 percent mid-cap and 6 percent small-cap:

	Large Cap (76%)	Mid Cap (18%)	Small Cap 6%
Bench 1	S&P 500	S&P MidCap 400	S&P SmallCap 600
Bench 2	S&P 500	S&P MidCap 400	CRSP US Small Cap
Bench 3	S&P 500	S&P MidCap 400	Russell 2000
Bench 4	S&P 500	CRSP US Mid Cap	S&P SmallCap 600
Bench 5	S&P 500	CRSP US Mid Cap	CRSP US Small Cap
Bench 6	S&P 500	CRSP US Mid Cap	Russell 2000
Bench 7	S&P 500	Russell Mid Cap	S&P SmallCap 600
Bench 8	S&P 500	Russell Mid Cap	CRSP US Small Cap
Bench 9	S&P 500	Russell Mid Cap	Russell 2000

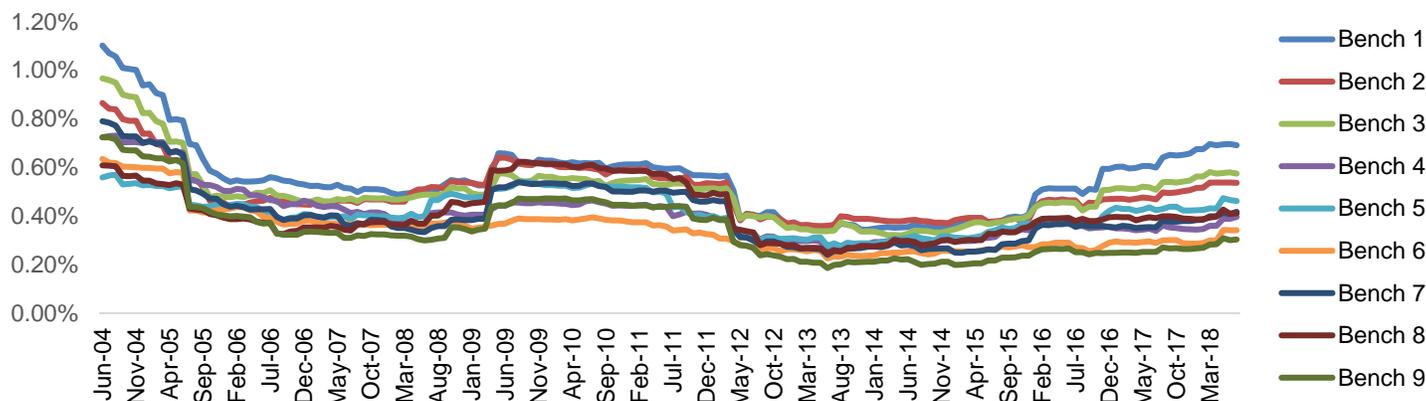
Source: Morningstar

These combinations yield fairly different results when evaluated relative to a broad market index. This is driven, again by the constituents in each sub-index and varying weights relative to one another depending on differences in methodology. Investors would be hard pressed to find a combination of managers and sub-index that will consistently minimize tracking error relative to a broad market index. Given the objective of passive investing, a full understanding of relative risks carries more weight in an index selection process. Beyond the index provider, manager selection and fee evaluation complement diligence relative to a surface level evaluation.

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Rolling 3-Year Tracking Error (Russell 3000)



Source: Morningstar

**The Goal of Passive Investing and Manager Evaluation**

Remember the goal of passive investing is to gain efficient exposure to a market or asset class. When evaluating passive strategies, diligence focuses on managers’ ability to minimize tracking error. This can be qualified with the manager’s skill, firm evaluations, team and risk management processes evaluated throughout diligence. Quantitative assessments of passive strategies are unique to the asset class. The evaluation of passive strategies requires a separate metric to properly compare one manager’s skill relative to others.

Often, investors see the manager’s fee as the biggest hurdle to passive performance. While fee is the most obvious, tracking error can be more detrimental when the purpose is to meet – not beat – index returns. Tracking error (the standard deviation of excess returns relative to a benchmark) included in the equation is all too often forgotten. To incorporate both fee and tracking error, we focus on a combined metric referred to as “Tracking Efficiency.” It combines the skill, based on gross returns (lower tracking error) and fees paid to each manager. So as to not penalize a manager twice for fees charged, gross returns are evaluated. As in golf, we want to be low; the lowest Tracking Efficiency is the most attractive. Let’s evaluate three investment managers’ similar strategies in two market segments: the S&P 500 and small-cap equities.

5-Year Trailing Evaluation (9/30/2018)							
Investment	Gross Return	Std Dev	Excess Return	R2	Gross Tracking Error	Expense Ratio	Tracking Efficiency
Vanguard Institutional Index I	13.96	9.55	0.013	100.00	0.011	0.035	0.046
Fidelity® 500 Index	13.96	9.55	0.013	100.00	0.021	0.015	0.036
Schwab® S&P 500 Index	13.94	9.53	-0.003	100.00	0.052	0.030	0.082
S&P 500 TR USD	13.95	9.55	0.00	100.00	0.00	--	--

Source: Morningstar

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Vanguard, Fidelity and Schwab all have considerable assets invested in passive strategies designed to replicate the S&P 500 Index. The race to the bottom in fees has dominated headlines as to how the firms compete. Much less attention, however, has been paid to the effective implementation of their strategies.

Over the last 5-year trailing period, gross returns were in-line for Vanguard and Fidelity; each generated 1.3 bps in positive excess annualized returns. Schwab wasn't able to control negative excess returns as much. It trailed the benchmark even gross of fee by an additional 0.3 bps over the same period. In more efficient markets, such as domestic large cap equities, the manner in which managers are compared is akin to splitting hairs. Split hairs, amplified several billion times (especially for larger investors) have meaningful differences in outcome.

Back to the numbers. Across the three portfolios, gross tracking error has more variability. Vanguard has a clear advantage over its two peers, generating half of the tracking error relative to Fidelity and only 20 percent of the tracking error relative to Schwab. This leads us to give Vanguard a competitive edge; relative to its peers with the combination of excess return and tracking error. In our view tracking error is a key differentiator and indicative of the manager's skill. Excess return could be highlighted, but our opinion is it can be controlled, through fees charged; to an extent. When combining gross tracking error and fee, Fidelity is the best of the three options.

As stated, this was the example cited for an efficient marketplace. In less efficient markets, the results were considerably wider and more meaningful. For example, when Vanguard, Fidelity and Schwab compete in small-cap equities, the goal is to replicate the Russell 2000 Total Return Index. Relative to large-cap equities, the outcomes below tell a different story.

5-Year Trailing Evaluation (9/30/2018)							
Investment	Gross Return	Std Dev	Excess Return	R2	Gross Tracking Error	Expense Ratio	Tracking Efficiency
Vanguard Russell 2000 Index I	11.26	13.47	0.189	100.00	0.029	0.080	0.109
Fidelity® Small Cap Index	11.36	13.47	0.289	99.99	0.099	0.025	0.124
Schwab Small Cap Index	11.26	13.45	0.189	100.00	0.072	0.050	0.122
Russell 2000 TR USD	11.07	13.47	0.00	100.00	0.00	--	--

Source: Morningstar

First, notice the gross tracking error is significantly larger over the same 5-year trailing period. Expenses are also meaningfully higher relative to domestic large-cap equities. In this market, both of these factors give Vanguard the competitive advantage. Although Fidelity fee is lower, it exhibits the highest tracking efficiency, which indicates inferior skill managing tracking error in this less efficient market segment.

In addition to a quantitative evaluation of manager skill across passive investments, a formal evaluation of investment teams, process and portfolio construction methodologies is required. An attractive team structure includes deep resources in both portfolio management and trading. This is especially important within fixed income markets as bond trading is still conducted over-the-counter in many markets. This opens the door for potential mismatches in cash flows and elevated tracking error.

Regarding the process, strategies vary deploying cash flows to establish the liquidity required to execute trades, deploy capital inflows and or meet redemptions. Many managers will cross trades across portfolios to minimize the impact on tracking error from transaction costs before accessing public markets. Trading liquidity varies across equity and fixed income markets, but, historically, there are more liquid times in a trading session based on the trading patterns of a passive manager. For example, managers may choose to trade exclusively at the close of markets, when there are, often, the highest levels of intraday liquidity

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in equity markets. This period in fixed income usually occurs prior to the market close in London, but, when Asian, American and European markets are still trading.

Firms have invested heavily in technology to establish efficient trading strategies and review holdings to ensure risk characteristics align with replicated markets. Although commoditized, these extra resources, give asset managers a competitive advantage.

### **Portfolio Construction Methods and Applications**

There are several methodologies portfolio managers use to replicate an index. They include: full replication, stratified sampling and optimization.

#### **Full Replication**

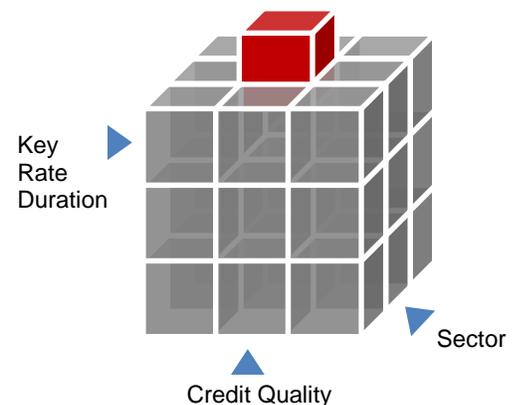
The full replication method can be employed in indices where all securities are highly liquid. As the name implies, using this approach includes purchasing all securities in the index in proportion to their weightings. As a result, this method achieves its primary objective and typically yields the lowest tracking error. Accuracy and simplicity are beneficial to full replication, however, this technique is not always practical. Liquid, efficient markets such as the S&P 500, generally, are the best candidates, as the constituents can be traded at a low cost. Still, this method isn't possible in more fragmented asset classes, including international equity and emerging markets debt, where market constructs and limited supply diminish liquidity making the exercise to replicate the market a "fool's errand."

Another consideration, due to the capital intensive nature of covering an index, is portfolio size. The more securities are required to replicate an index, more capital is needed to efficiently construct a portfolio. Depending how an index is created, structural tracking error can also be a concern. For example, an equal-weighted index will require more rebalancing to maintain uniformity across each constituent, whereas a market cap-weighted index will self-rebalance as prices fluctuate. As a result, the expected return of the replicating fund should be the return of the underlying index, minus transaction costs and administrative fees.

#### **Stratified Sampling and Optimization**

Indexes with a large number of constituents and low trading liquidity, including multi-country or fixed income indices, may be unrealistic for portfolio managers to replicate. Generally, these markets come with higher trading costs. To mitigate unnecessary transactions that would adversely impact tracking error, when replicating indices, portfolio managers employ stratified sampling.

Stratified sampling is an asset-replication method which arranges the population of the index into mutually exclusive and exhaustive sub-categories; or building blocks. By comparison to full replication, its approach can build a lower cost tracking portfolio with a relatively small amount of capital. Stratification includes separating the index by industry sector, size, and style characteristics. For fixed income, benchmark holdings may be divided by duration, quality and sector. Within each sub-category the manager selects representative stocks or bonds with the asset characteristics of the index to be replicated without purchasing all the underlying securities. Stratification does not perfectly replicate the index and this method results in higher tracking error. Generally, managers who stratify, among multiple dimensions, track the index closely.



Like stratified sampling, optimization requires less capital and is acceptable for replicating an index with a large number of constituents or illiquid securities. Optimization too focuses on mirroring the risk characteristics of an index, while accounting

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for covariance between risk factors. Alone, stratified sampling assumes the factors are uncorrelated. Optimization, conversely, can be conducted autonomously or in conjunction with stratified sampling to produce lower tracking error. However, a pitfall of optimization is risk factors included in the model are typically measured using historical market data; therefore, the model output may not apply for a future time period.

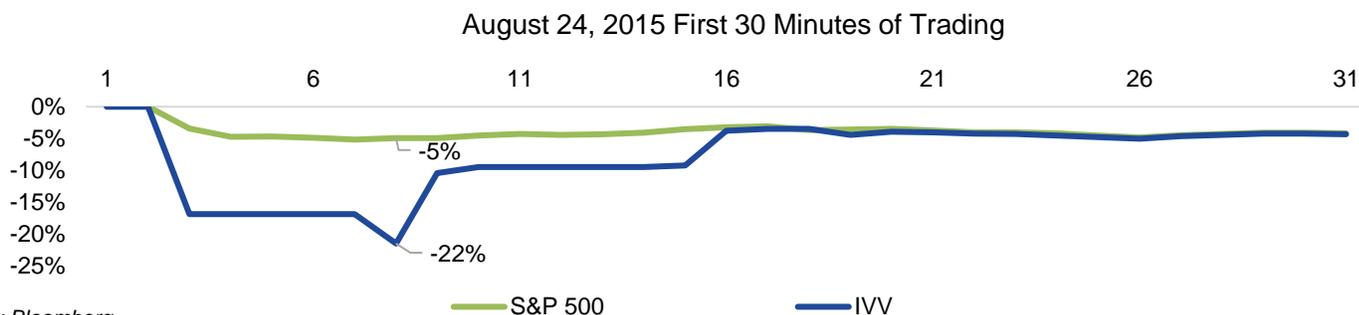
### **Implementation and Vehicle: How to Increase Probabilities of Success**

Traditionally, investors' access passively managed strategies through an open-ended fund structure; be it a 1940-Act mutual fund or other commingled vehicle. These open-ended structures provide investors with daily valued investments redeemable at the fund's net asset value ("NAV") at the close of that day's trading. The ability to execute at NAV removes the uncertainty inherent in exchange-traded fund (ETF) pricing. Given the mutual fund's structure, after executing a trade, investors can access liquidity within one to three days. ETFs offer investors the advantages of open-ended mutual funds plus intraday trading. This feature offers investors more flexible liquidity, but also introduces added complexity and risk.

For the taxable investor, ETF's structure offers additional advantages. ETFs are treated as listed stocks, and so, the only time an investor incurs a taxable event, related to capital gains, is when an ETF is sold. This is different from the open-ended fund structure which must account for purchases and sales of securities as asset flow into and out of the fund. It's for this reason, ETFs provide taxable clients with a tax-advantaged vehicle to access passive investments.

ETFs can also offer an advantage when it comes to fees, depending on share class. They are, however, not without blemishes of their own. Remember, open-ended structures are insulated from intraday market volatility because the vehicle strikes a NAV at the close of each trading day. For passively managed funds, portfolio managers account for investor flows and trade throughout the day to minimize the funds tracking error relative to their stated benchmark. The equation is more complicated for ETFs, their NAV is designed to track the underlying index. There is an additional level of supply and demand as investors trade the ETF. This adds a layer of complexity as the portfolio managers of ETFs also seek to minimize the dispersion between the price and NAV of the fund.

Here's how this complexity leads to adverse outcomes during market stress. On Monday, August 24, 2015, the Chinese government abruptly announced a material devaluation of the country's currency, sending global markets into a frenzy. When U.S. markets opened that morning, the heightened levels of volatility and rapid price movements triggered halts in trading of some individual securities to allow time for the volatility to pass and mitigate any market manipulations from high frequency trading. A number of these halted securities were constituents of the S&P 500, tracked by the iShares Core S&P 500 ETF (IVV). In addition to the underlying securities being halted, trading of the ETF was also halted. This resulted in a sizeable divergence between the ETF and the underlying index. The following chart shows the ~17 percent divergence approximately seven minutes after the market opened. Since ETFs, like single stocks, can be traded intraday, the fund structure was exposed to trading rules enforced at stock exchanges. This exposed the vehicle to much greater volatility in comparison to open-ended



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funds that calculate NAV at the end of the day; after the divergence had closed. The investor who traded at the lower ETF prices in the first minutes of trading received an extremely unattractive price relative to the index they attempted to replicate. A long-term investor holding IVV prior to that day and continued to hold the position wouldn't have experienced anything outside of a normal day. However, for an investor seeking to take advantage of the intraday liquidity, the potential for a poor outcome is much higher with an ETF than an equivalent open-ended fund.

### Hidden Costs

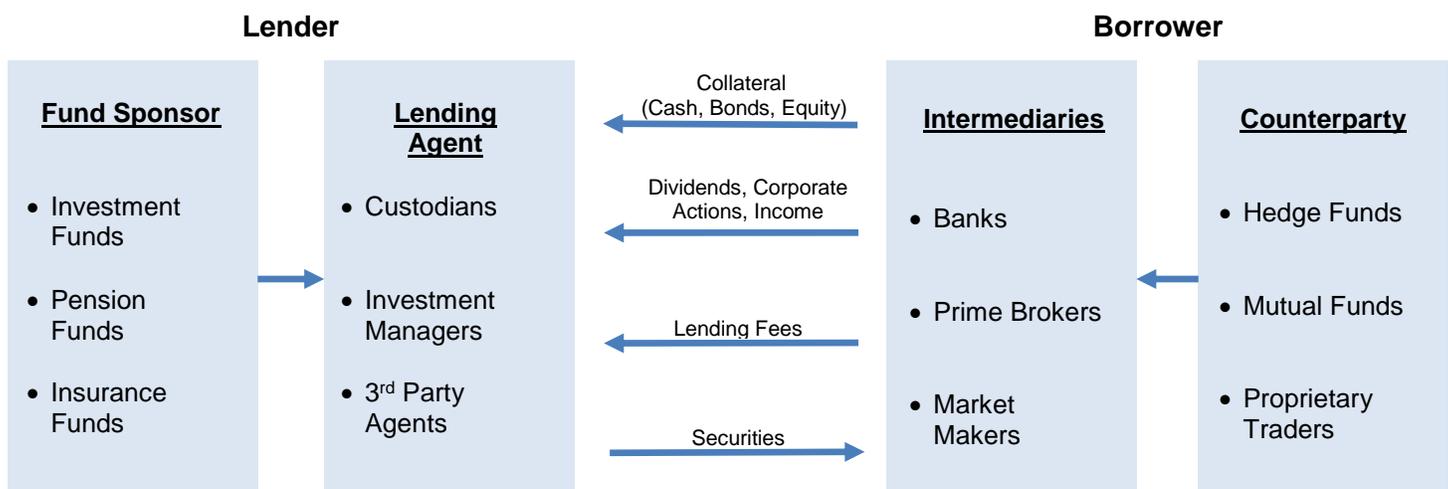
When selecting vehicles, various costs, known and unknown may impact outcomes. For example, the prospectus net expense ratio for mutual funds and ETFs are typically the sole fee charged to investors (barring deferred tax liabilities in unique circumstances). Other structures, such as collective investment trusts (CITs) for qualified investors carry costs beyond the stickered management fee. These costs include trustee fees, fund accounting (dual accounting for LLCs), custody, transfer agent, legal and audit, among others.

These costs, in total, can double management fees. Managers will generally cap these expenses, however, sometimes the costs are passed through to investors. Recognizing the impact costs, both fixed and variable, have on performance permits investors to have a more informed decision.

### Securities Lending

#### What is Securities Lending?

Outside of asset class selection, process evaluation and vehicle selection, investors must also be aware of risks that may be hidden in a prospectus. Securities lending is when a fund sponsor loans a stock, bond, or other security to a counterparty to short in exchange for a pre-negotiated lending fee. Mutual funds and other collective vehicles often engage in securities lending and could introduce an unknown risk to the portfolio and have meaningful impact on outcomes. Often, it requires the borrower to post collateral in the form of cash, securities or a letter of credit. The loan is executed through a lending agent, who seeks a counterparty who is typically represented by a prime broker or bank.



The terms of the loan are either left open until one party terminates the agreement, or made callable where the fund sponsor has the right to recall the security before the loan matures. Through the lending agent, the fund sponsor will typically reinvest the cash collateral in conservative assets that are high quality and extremely liquid such as U.S. government securities, agency,

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CDs, corporate credit, or commercial paper, and in return earn a fee on the collateral equal to the predetermined lending rate. Paid by the fund sponsor, the lending agent receives a percentage of the return generated from the transaction. If cash collateral was posted for the loan, the borrower will earn a “rebate” or interest paid by the fund sponsor. The lower the rebate, the more the fund sponsor earns.

### **Securities Lending in Practice**

Generally speaking, securities lending helps drive market efficiency by encouraging price discovery. Since passively managed funds hold large numbers of securities with no intention of selling, they are available to lend. Approximately \$2 trillion of the \$20 trillion in assets in the lendable market today are on loan, of which more than 60 percent is derived from passively managed assets.

With passive investments becoming a meaningful component of portfolios, it is important investors look under the hood to understand the impact of securities lending in their passive vehicles. In normal markets, securities lending can have minimal, if not positive, impact on a portfolio’s performance. The chasm is many investors are unaware of the lending practices the investments are engaged. The investor, or owner of a unit of shares in the fund, is effectively floating working capital to the investment manager to generate additional return. In some portfolio structures 100 percent of the revenues are passed through to the fund; in others the distribution is not as favorable. Sometimes, portfolios are constructed with no management fee, with the fee generated from revenues through securities lending. In uncertain and volatile markets however, securities lending can be negative on portfolios.

During the financial crisis it was estimated \$2.5 trillion of lendable assets were on loan. When portfolios are falling rapidly due to market movements and investor outflows, but there aren’t enough securities in the portfolio to sell and meet redemptions, this poses a problem for managers. In many instances, passively managed portfolios are gated (outflows limited) to manage the dislocation between outflows and the securities available.

### **Primary Considerations of Securities Lending**

Lenders who participate in a securities lending face a number of decisions associated with risk and reward. In addition to liquidity risk, market risk, operational risk and legal risk, lenders are exposed to counterparty default risk and collateral reinvestment risk. The lending agent should have strict audit procedures, operational discipline and controls, and resources to monitor the daily activity.

Counterparty default risk is if the borrower is unable to return the loaned securities and the lender experiences significant losses when the collateral on hand is insufficient to replace the defaulted securities. It can be mitigated by the lending agent if it is able to indemnify against borrower default, mark-to-market the collateral value daily, and carefully scrutinize the counterparty’s financial health and creditworthiness.

To mitigate counterparty default risk, portfolios are over collateralized between 102 percent - 105 percent of the loan value. Additionally, the fund sponsor should familiarize themselves with the indemnification procedures the lending agent has in place.

Collateral reinvestment risk arises when cash collateral is aggressively invested in lower quality securities with longer or mismatched maturities. Price declines in the securities purchased with cash collateral can adversely affect liquidity of the collateral pool, used to provide daily liquidity. Since the lending agent often manages the cash collateral pool, they should have strict guidelines regarding eligible securities for reinvestment based on liquidity, quality, maturity, and ensure the duration of the loans is closely matched by the maturity of the securities to mitigate liquidity risk. In addition, the lending agent should have risk management in place to avoid impairment of assets, and ensure the return from reinvestment exceeds the loan rebate.

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## Conclusion

When selecting passive investments, the path of least resistance is to focus on the lowest cost option across an asset class. Investment diligence goes much further and deeper. It borrows many of the same principles as with actively managed portfolios. Creativity is required when quantitatively evaluating these strategies, as previously mentioned. Constructing a prudent metric to standardize outcomes and make an informed decision as it relates to “tracking efficiency” is a concept proven to be highly effective in culling less skilled managers.

There’s more than one way to shoe a horse. Portfolio managers employ a number of processes when constructing index portfolios that can either enhance or reduce desired outcomes. Acknowledging the approach which makes sense in specific markets better informs the decision making processes. As we’ve stated in previous articles, passive investing is far from a passive exercise.

## About the Authors:



Ryan researches and performs operational due diligence on core investment managers. He is a member of our Global Public Markets Team. Prior to joining the firm in 2014, Ryan served as a Research Assistant in U.S. Public Finance for S&P Ratings Services. He received a BS in Management from Indiana University’s School of Public and Environmental Affairs. He is a CFA® charterholder and member of the CFA Society of Chicago and CFA Institute. Ryan is a member of the Children’s Research Fund Junior Board and enjoys competing in triathlons

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