

## Risk-Adjusted SPIVA® Scorecard: Evaluating Active Managers' Performance through a Risk Lens

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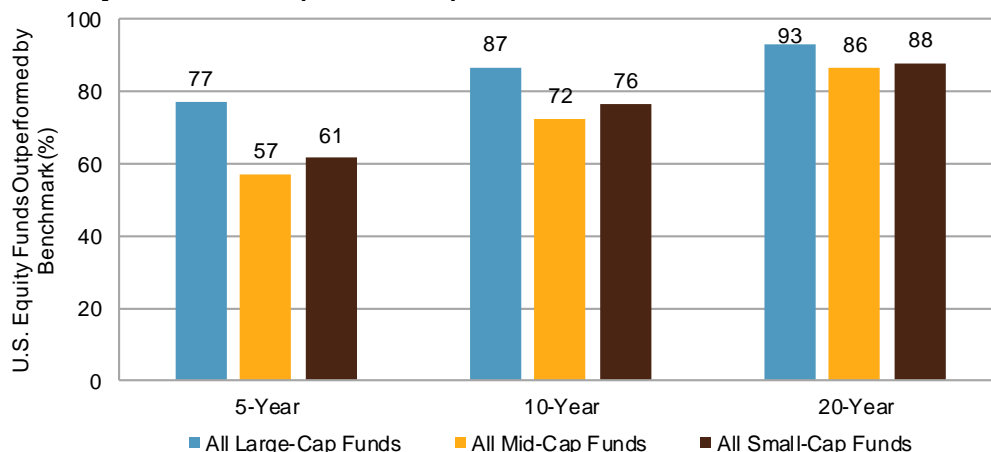
### SUMMARY

Since 2002, SPIVA scorecards have shown that active funds typically underperform their benchmarks on an absolute return basis. However, active funds could compare favorably to passive investments after adjusting for volatility, if lower active returns were a consequence of risk reduction.

The Risk-Adjusted SPIVA Scorecard considers this possibility by comparing the risk-adjusted returns of actively managed funds against their benchmarks on a net-of-fees and gross-of-fees basis. We use the standard deviation of monthly returns as a measure of risk and evaluate performance by comparing return/volatility ratios.

After a relatively quiet decade following the Global Financial Crisis, volatility returned with a vengeance in 2020. Backed by fiscal and monetary stimulus, the [S&P 500®](#) gained 18.4% on the year, though this bout of volatility and positive returns did little to help the case for active management. **After adjusting for volatility, the majority of actively managed domestic funds across market cap segments underperformed their benchmarks on a net-of-fees basis over mid- and long-term investment horizons.**

**Exhibit 1: Percentage of U.S. Equity Funds Outperformed by Benchmarks – Risk-Adjusted Returns (Net of Fees)**



Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Mid-cap and small-cap growth funds were interesting exceptions in a sea of underperformance. Over a five-year period, nearly two-thirds of funds in both categories outperformed, whereas only one-quarter of large-cap growth funds outperformed. Active managers focusing on smaller-capitalization companies may have skewed their portfolios toward the market-leading larger companies recently, but this peculiarity faded away over the long term. Over the 10- and 20-year periods, mid-cap and small-cap growth funds reverted to form and matched their large-cap compatriots, with fewer than 10% managing to outperform in any of the three categories (see Report 1).

Naturally, the risk-adjusted performance of active funds improves on a gross-of-fees basis, but even then, outperformance is scarce. Viewed over a five-year period, a majority of funds in only 6 of the 18 domestic equity categories tracked were able to outperform their benchmarks. **Over a 20-year window, only two domestic equity categories showed the majority of funds outperforming their benchmarks** (see Report 1).

**As in the U.S., the majority of international equity funds across all categories generated lower risk-adjusted returns than their benchmarks when using net-of-fees returns over the previous five-year period.** International equity funds also matched their domestic peers over the longer term, as fewer than 15% surpassed their benchmarks over a 20-year horizon. On a gross-of-fees basis, the only bright spot was international small-cap funds in the 10-year window, of which 64% cleared their hurdle rate (see Report 2).

**When using net-of-fees risk-adjusted returns, the majority of actively managed fixed income funds in most categories underperformed across all three investment horizons.** The only exceptions were government long funds and investment-grade long funds over the 5- and 10-year periods (see Report 3).

The importance (and performance-sapping nature) of fees is well highlighted when analyzing fixed income fund performance in a low-yield world. A respectable 9 of the 14 fixed income categories showed a majority of funds outperforming their benchmarks on a gross-of-fees basis over the past 15 years (see Report 3).

**On a net-of-fees basis, asset-weighted return/volatility ratios for active portfolios were higher than the corresponding equal-weighted ratios, indicating that larger firms have taken on higher-compensated risk than smaller ones.** On an asset-weighted basis, large-cap value, small-cap value, mid-cap core, multi-cap value, and REIT funds were the only domestic equity categories to provide better return/volatility ratios than the benchmark over 20 years. On an equal-weighted measure, this fell to just three categories: large-cap value, small-cap value, and real estate funds (see Report 4a).

Most fund categories produced higher return/volatility ratios than their benchmarks, gross of fees, on an equal-weighted basis. However, their outperformance diminished once fees or fund size were accounted for, especially in domestic and international equity funds. In general, equal-weighted return/volatility ratios improved more than the corresponding asset-weighted ratios when fees were ignored, indicating that fees play a more prominent role in smaller funds' performance (see Report 4b).

## METHODOLOGY

Modern Portfolio Theory (MPT), introduced by Harry Markowitz (1952), Jack Treynor (1962), William Sharpe (1964), and John Lintner (1965), argues that an expectation of returns must be accompanied by an expectation of risk—the variation (or volatility) around the expected return. MPT assumes that higher risk should be compensated, on average, by higher returns.

We believe the same principle can apply to evaluating active managers' performance. Moreover, critiques of passive investing often argue that indices are not risk-managed, unlike active management. However, research by S&P Dow Jones Indices has revealed that active funds typically had higher risk than comparable benchmarks and relative fund volatility tended to be persistent (Edwards et al. 2016). This motivated us to examine the performance of actively managed funds on a risk-adjusted basis.

As with any analysis involving risk-adjusted performance, it is important to define the measurement of risk. In our analysis, we used the standard deviation of monthly returns over a given period to define and measure risk. The monthly standard deviation was annualized by multiplying it by the square root of 12.<sup>1</sup>

**The return/volatility ratio looks at the relationship and the trade-off between risk and return. A fund with a higher ratio is preferable since it delivers a higher return per unit of risk taken. To make our comparison relevant, we also adjusted the returns of the benchmarks used in our analysis by their volatility.**

We acknowledge that there are other measures of risk that may be of interest to market participants, such as the downside variance or Sortino ratio. Those ratios are suitable for strategies with positively skewed or negatively skewed returns, such as options-based or CTA strategies (Rollinger and Hoffman 2013). Since our study universe comprises long-only, 40 Act mutual funds, for purposes of simplicity and comprehensiveness, we chose the Sharpe ratio to represent risk-adjusted returns.

The selection and the appropriateness of benchmarks were critical in evaluating risk-adjusted performance. The [SPIVA U.S. Scorecard](#) ensures that the benchmarks used in the analysis are determined based on managers' investment styles. For example, large-cap value funds are compared against the [S&P 500 Value](#), rather than the S&P 500. As such, we are confident that the benchmarks used in our study reflect the risk profiles and the characteristics of the corresponding managers' investments.

Through this analysis, we can now observe whether managers, on average, were able to outperform their benchmarks after adjusting for risk and fees. Given that indices do not incur costs, we also present the gross-of-fees performance figures by adding the expense ratio back to net-of-fees returns. In this way, all else being equal, higher risk taken by a manager should be compensated by higher returns.

<sup>1</sup> It can be mathematically expressed as  $\sigma_A = \sqrt{12} * \sqrt{\frac{1}{n-1} \sum_{i=1}^n (R_i - \bar{R})^2}$  where

$\sigma_A$  = annualized standard deviation  
 $n$  = number of months  
 $R_i$  = return of the fund in month  $i$   
 $\bar{R}$  = average monthly return of the fund

## DATA

For our study, the underlying data source was the University of Chicago's Center for Research in Security Prices (CRSP) Survivorship-Bias-Free US Mutual Fund Database, which is the same source used by the headline SPIVA U.S. Scorecard. The universe used for the study only included actively managed domestic U.S. equity, international equity, and fixed income funds. Index funds, sector funds, and index-based dynamic (leveraged or inverse) funds were excluded from the sample. To avoid double counting multiple share classes, only the share class with the highest previous period return of each fund was used.

The CRSP database reports fund returns on a net-of-fees basis. To calculate gross-of-fees returns, we added the annual expense ratio of the fund to the net-of-fees returns.

## RESULTS

The evaluation of active managers' performance through a risk lens is an integral part of the investment decision-making process. Beyond the relative performance of funds, market participants are economically interested in whether funds are able to generate sufficient returns to compensate for the risk taken.

Reports 1-3 show the percentage of actively managed domestic equity, international equity, and fixed income funds that were outperformed by their respective benchmarks, using both net-of-fees and gross-of-fees performance figures, on a risk-adjusted basis. Equity funds are analyzed over 5-, 10-, and 20-year investment horizons while fixed income funds are analyzed over 5-, 10-, and 15-year horizons due to a shorter availability of benchmark history.

Reports 4a-4b show the asset-weighted and equal-weighted average return/volatility ratios of active managers against their benchmarks, using net-of-fees and gross-of-fees bases, respectively. To compute this, we build a composite portfolio in each category and calculate the annualized return and volatility over the specified investment horizons. The risk-adjusted returns are measured as the ratio of these two. Asset-weighted and equal-weighted composite portfolios are rebalanced monthly. All else equal, compared with the benchmark, a higher return/volatility ratio indicates that funds in the category were collectively better at taking compensated risk.

From these reports, we did not see evidence that actively managed funds were better risk-managed than passive indices. Actively managed domestic and international equity funds across almost all categories did not outperform the benchmarks on a risk-adjusted basis. The figures improved for some categories when gross-of-fees returns were used. In fixed income, fees, not risk, were the biggest detractor from performance. The role of fees in the underperformance of fixed income funds is a phenomenon highlighted in numerous research studies (Poirier et al. 2017; Dobrescu and Motola 2018).

**Report 1: Percentage of U.S. Equity Funds Underperforming Benchmarks – Risk-Adjusted Returns**

FUND CATEGORY	COMPARISON INDEX	NET OF FEES (%)			GROSS OF FEES (%)		
		5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR
All Domestic Funds	S&P Composite 1500	78.76	90.70	90.51	70.64	83.14	78.86
All Large-Cap Funds	S&P 500	77.03	86.61	92.61	68.57	77.62	84.52
All Mid-Cap Funds	S&P MidCap 400®	57.14	72.29	86.27	45.08	58.19	75.35
All Small-Cap Funds	S&P SmallCap 600®	61.36	76.49	87.78	48.48	62.75	70.56
All Multi-Cap Funds	S&P Composite 1500	76.08	91.39	91.06	66.95	83.07	79.72
Large-Cap Growth Funds	S&P 500 Growth	76.17	97.92	98.82	64.45	91.69	93.70
Large-Cap Core Funds	S&P 500	88.01	96.32	95.45	76.34	85.53	88.18
Large-Cap Value Funds	S&P 500 Value	76.56	82.11	73.05	54.60	63.86	58.59
Mid-Cap Growth Funds	S&P MidCap 400 Growth	35.42	58.43	90.70	26.39	52.25	86.82
Mid-Cap Core Funds	S&P MidCap 400	79.66	83.66	84.85	63.56	67.32	75.76
Mid-Cap Value Funds	S&P MidCap 400 Value	71.70	72.73	79.79	45.28	42.42	57.45
Small-Cap Growth Funds	S&P SmallCap 600 Growth	33.85	67.84	95.45	26.15	57.29	90.15
Small-Cap Core Funds	S&P SmallCap 600	75.90	88.80	90.43	59.44	70.27	74.47
Small-Cap Value Funds	S&P SmallCap 600 Value	80.00	90.63	72.26	61.74	70.83	40.15
Multi-Cap Growth Funds	S&P Composite 1500 Growth	81.64	97.45	93.28	72.46	87.76	88.14
Multi-Cap Core Funds	S&P Composite 1500	89.88	96.44	90.67	81.71	87.95	76.89
Multi-Cap Value Funds	S&P Composite 1500 Value	86.32	85.48	80.26	72.65	72.58	61.37
Real Estate Funds	S&P United States REIT	45.88	57.78	79.31	20.00	32.22	34.48

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

**Report 2: Percentage of International Equity Funds Underperforming Benchmarks – Risk-Adjusted Returns**

FUND CATEGORY	COMPARISON INDEX	NET OF FEES (%)			GROSS OF FEES (%)		
		5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR
Global Funds	S&P Global 1200	73.75	83.23	85.71	63.75	69.46	71.43
International Funds	S&P 700	75.13	77.78	89.35	64.47	57.64	68.82
International Small-Cap Funds	S&P Developed Ex-U.S. SmallCap	64.56	60.00	92.31	54.43	35.56	69.23
Emerging Markets Funds	S&P/IFCI Composite	76.07	73.68	93.51	56.84	55.64	66.23

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Report 3: Percentage of Fixed Income Funds Underperforming Benchmarks – Risk-Adjusted Returns							
FUND CATEGORY	COMPARISON INDEX	NET OF FEES (%)			GROSS OF FEES (%)		
		5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR
Government Long Funds	Barclays US Government Long	32.08	48.10	59.18	16.98	17.72	8.16
Government Intermediate Funds	Barclays US Government Intermediate	68.18	84.85	83.67	27.27	24.24	26.53
Government Short Funds	Barclays US Government (1-3 Year)	82.14	90.63	97.06	21.43	15.63	26.47
Investment-Grade Long Funds	Barclays US Government/Credit Long	40.66	32.52	60.78	24.18	8.13	10.78
Investment-Grade Intermediate Funds	Barclays US Government/Credit Intermediate	94.92	93.88	95.72	74.11	54.29	65.78
Investment-Grade Short Funds	Barclays US Government/Credit (1-3 Year)	97.75	96.67	100.00	83.15	61.67	78.26
High Yield Funds	Barclays US Corporate High Yield	88.63	90.00	90.84	61.61	62.22	42.75
Mortgage-Backed Securities Funds	Barclays US Aggregate Securitized - MBS	88.68	83.64	97.78	41.51	41.82	51.11
Global Income Funds	Barclays Global Aggregate	73.45	77.78	80.00	55.75	50.00	50.00
Emerging Markets Debt Funds	Barclays Emerging Markets	98.28	100.00	100.00	75.86	100.00	80.00
General Municipal Debt Funds	S&P National AMT-Free Municipal Bond	93.83	87.01	92.47	53.09	31.17	39.78
California Municipal Debt Funds	S&P California AMT-Free Municipal Bond	97.14	97.22	95.24	62.86	52.78	47.62
New York Municipal Debt Funds	S&P New York AMT-Free Municipal Bond	88.46	96.88	100.00	30.77	40.63	45.95
Loan Participation Funds	S&P/LSTA U.S. Leveraged Loan 100	97.92	96.00	91.67	81.25	36.00	25.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Report 4a: Return/Volatility Ratio of Active Mutual Funds and Benchmarks (Net of Fees)										
FUND CATEGORY	BENCHMARK	BENCHMARK			ASSET WEIGHTED			EQUAL WEIGHTED		
		5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR
<b>U.S. EQUITY FUNDS</b>										
All Domestic Funds	S&P Composite 1500	0.96	0.99	0.51	0.92	0.88	0.44	0.76	0.74	0.41
All Large-Cap Funds	S&P 500	1.00	1.03	0.50	0.96	0.94	0.43	0.85	0.84	0.39
All Mid-Cap Funds	S&P MidCap 400	0.64	0.69	0.52	0.79	0.75	0.45	0.73	0.67	0.42
All Small-Cap Funds	S&P SmallCap 600	0.57	0.64	0.51	0.78	0.68	0.47	0.60	0.58	0.43
All Multi-Cap Funds	S&P Composite 1500	0.96	0.99	0.51	0.92	0.86	0.45	0.81	0.77	0.39
Large-Cap Growth Funds	S&P 500 Growth	1.22	1.21	0.56	1.19	1.07	0.42	1.13	0.99	0.39
Large-Cap Core Funds	S&P 500	1.00	1.03	0.50	0.88	0.91	0.44	0.83	0.82	0.37
Large-Cap Value Funds	S&P 500 Value	0.65	0.75	0.38	0.68	0.76	0.44	0.59	0.67	0.41
Mid-Cap Growth Funds	S&P MidCap 400 Growth	0.78	0.78	0.51	0.97	0.84	0.36	0.99	0.80	0.38
Mid-Cap Core Funds	S&P MidCap 400	0.64	0.69	0.52	0.57	0.68	0.57	0.57	0.62	0.44
Mid-Cap Value Funds	S&P MidCap 400 Value	0.48	0.56	0.51	0.50	0.54	0.50	0.42	0.51	0.45
Small-Cap Growth Funds	S&P SmallCap 600 Growth	0.69	0.75	0.54	1.02	0.86	0.40	0.89	0.75	0.39
Small-Cap Core Funds	S&P SmallCap 600	0.57	0.64	0.51	0.57	0.55	0.45	0.47	0.50	0.42
Small-Cap Value Funds	S&P SmallCap 600 Value	0.44	0.52	0.45	0.40	0.44	0.54	0.37	0.41	0.47
Multi-Cap Growth Funds	S&P Composite 1500 Growth	1.19	1.18	0.51	1.12	1.02	0.47	1.05	0.90	0.37
Multi-Cap Core Funds	S&P Composite 1500	0.96	0.99	0.51	0.80	0.79	0.44	0.70	0.73	0.39
Multi-Cap Value Funds	S&P Composite 1500 Value	0.64	0.73	0.44	0.51	0.70	0.46	0.56	0.62	0.41
Real Estate Funds	S&P United States REIT	0.27	0.49	0.44	0.33	0.52	0.45	0.34	0.50	0.44
<b>INTERNATIONAL EQUITY FUNDS</b>										
Global Funds	S&P Global 1200	0.87	0.75	0.43	0.80	0.69	0.43	0.79	0.62	0.35
International Funds	S&P International 700	0.63	0.41	0.33	0.59	0.42	0.32	0.58	0.38	0.26
International Small Cap Funds	S&P Developed Ex-U.S. Small Cap	0.54	0.46	0.46	0.66	0.54	0.43	0.53	0.46	0.40
Emerging Markets Funds	S&P/IFCI Composite	0.73	0.24	0.50	0.79	0.28	0.49	0.67	0.18	0.43

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Report 4a: Return/Volatility Ratio of Active Mutual Funds and Benchmarks (Net of Fees) (cont.)										
FUND CATEGORY	BENCHMARK	BENCHMARK			ASSET WEIGHTED			EQUAL WEIGHTED		
		5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR
<b>FIXED INCOME FUNDS</b>										
Government Long Funds	Barclays US Government Long	0.70	0.69	0.63	0.95	0.94	1.03	0.91	0.93	1.05
Government Intermediate Funds	Barclays US Government Intermediate	1.19	1.11	1.30	1.01	1.10	1.42	1.09	0.95	1.27
Government Short Funds	Barclays US Government (1-3 Year)	1.76	1.51	1.91	1.89	1.57	1.90	1.96	1.48	1.86
Investment-Grade Long Funds	Barclays US Government/Credit Long	1.06	0.93	0.80	1.23	1.23	1.09	1.16	1.14	1.09
Investment-Grade Intermediate Funds	Barclays US Government/Credit Intermediate	1.60	1.43	1.49	1.48	1.28	1.26	1.32	1.21	1.17
Investment-Grade Short Funds	Barclays US Government/Credit (1-3 Year)	2.35	2.00	2.22	1.25	1.31	1.40	1.08	1.06	1.08
High Yield Funds	Barclays US Corporate High Yield	1.10	0.96	0.77	0.93	0.83	0.67	0.91	0.80	0.63
Mortgage-Backed Securities Funds	Barclays US Aggregate Securitized - MBS	1.46	1.46	1.70	1.47	1.41	1.64	1.34	1.36	1.56
Global Income Funds	Barclays Global Aggregate	1.02	0.64	0.77	0.86	0.54	0.74	0.91	0.63	0.74
Emerging Markets Debt Funds	Barclays Emerging Markets	0.99	0.91	0.77	0.63	0.48	0.58	0.63	0.33	0.42
General Municipal Debt Funds	S&P National AMT-Free Municipal Bond	0.99	1.19	0.96	0.89	1.17	0.83	0.80	1.04	0.79
California Municipal Debt Funds	S&P California AMT-Free Municipal Bond	0.96	1.28	0.96	0.84	1.17	0.82	0.75	1.10	0.76
New York Municipal Debt Funds	S&P New York AMT-Free Municipal Bond	0.90	1.18	0.99	0.93	1.03	0.68	0.75	0.97	0.76
Loan Participation Funds	S&P/LSTA U.S. Leveraged Loan 100	0.92	0.80	0.57	0.55	0.62	0.47	0.56	0.63	0.48

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.



Report 4b: Return/Volatility Ratio of Active Mutual Funds and Benchmarks (Gross of Fees)										
FUND CATEGORY	BENCHMARK	BENCHMARK			ASSET WEIGHTED			EQUAL WEIGHTED		
		5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR	5-YEAR	10-YEAR	20-YEAR
<b>U.S. EQUITY FUNDS</b>										
All Domestic Funds	S&P Composite 1500	0.96	0.99	0.51	0.96	0.93	0.50	0.96	0.97	0.64
All Large-Cap Funds	S&P 500	1.00	1.03	0.50	1.00	0.99	0.49	1.04	1.07	0.63
All Mid-Cap Funds	S&P MidCap 400	0.64	0.69	0.52	0.83	0.80	0.52	0.92	0.89	0.65
All Small-Cap Funds	S&P SmallCap 600	0.57	0.64	0.51	0.82	0.73	0.53	0.79	0.79	0.65
All Multi-Cap Funds	S&P Composite 1500	0.96	0.99	0.51	0.96	0.91	0.50	1.03	1.01	0.64
Large-Cap Growth Funds	S&P 500 Growth	1.22	1.21	0.56	1.23	1.12	0.49	1.31	1.21	0.64
Large-Cap Core Funds	S&P 500	1.00	1.03	0.50	0.92	0.96	0.50	1.03	1.05	0.60
Large-Cap Value Funds	S&P 500 Value	0.65	0.75	0.38	0.72	0.80	0.49	0.79	0.90	0.65
Mid-Cap Growth Funds	S&P MidCap 400 Growth	0.78	0.78	0.51	1.01	0.89	0.45	1.18	1.01	0.63
Mid-Cap Core Funds	S&P MidCap 400	0.64	0.69	0.52	0.61	0.74	0.62	0.77	0.84	0.67
Mid-Cap Value Funds	S&P MidCap 400 Value	0.48	0.56	0.51	0.53	0.59	0.55	0.57	0.72	0.68
Small-Cap Growth Funds	S&P SmallCap 600 Growth	0.69	0.75	0.54	1.06	0.91	0.47	1.08	0.96	0.62
Small-Cap Core Funds	S&P SmallCap 600	0.57	0.64	0.51	0.61	0.60	0.50	0.65	0.72	0.63
Small-Cap Value Funds	S&P SmallCap 600 Value	0.44	0.52	0.45	0.43	0.48	0.60	0.53	0.61	0.70
Multi-Cap Growth Funds	S&P Composite 1500 Growth	1.19	1.18	0.51	1.17	1.08	0.53	1.29	1.17	0.63
Multi-Cap Core Funds	S&P Composite 1500	0.96	0.99	0.51	0.84	0.84	0.49	0.91	0.96	0.63
Multi-Cap Value Funds	S&P Composite 1500 Value	0.64	0.73	0.44	0.55	0.75	0.51	0.74	0.86	0.65
Real Estate Funds	S&P United States REIT	0.27	0.49	0.44	0.38	0.57	0.47	0.40	0.57	0.47
<b>INTERNATIONAL EQUITY FUNDS</b>										
Global Funds	S&P Global 1200	0.87	0.75	0.43	0.85	0.77	0.50	0.86	0.73	0.46
International Funds	S&P International 700	0.63	0.41	0.33	0.64	0.48	0.38	0.66	0.49	0.36
International Small Cap Funds	S&P Developed Ex-U.S. Small Cap	0.54	0.46	0.46	0.73	0.63	0.51	0.62	0.57	0.51
Emerging Markets Funds	S&P/IFCI Composite	0.73	0.24	0.50	0.86	0.35	0.54	0.76	0.27	0.49

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Report 4b: Return/Volatility Ratio of Active Mutual Funds and Benchmarks (Gross of Fees) (cont.)										
FUND CATEGORY	BENCHMARK	BENCHMARK			ASSET WEIGHTED			EQUAL WEIGHTED		
		5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR	5-YEAR	10-YEAR	15-YEAR
<b>FIXED INCOME FUNDS</b>										
Government Long Funds	Barclays US Government Long	0.70	0.69	0.63	1.00	1.01	1.11	1.09	1.11	1.23
Government Intermediate Funds	Barclays US Government Intermediate	1.19	1.11	1.30	1.25	1.43	1.77	1.58	1.46	1.74
Government Short Funds	Barclays US Government (1-3 Year)	1.76	1.51	1.91	2.08	1.82	2.13	2.92	2.55	2.65
Investment-Grade Long Funds	Barclays US Government/Credit Long	1.06	0.93	0.80	1.29	1.37	1.23	1.32	1.33	1.27
Investment-Grade Intermediate Funds	Barclays US Government/Credit Intermediate	1.60	1.43	1.49	1.57	1.40	1.37	1.54	1.47	1.42
Investment-Grade Short Funds	Barclays US Government/Credit (1-3 Year)	2.35	2.00	2.22	1.39	1.56	1.59	1.43	1.58	1.53
High Yield Funds	Barclays US Corporate High Yield	1.10	0.96	0.77	1.01	0.93	0.74	1.05	0.95	0.74
Mortgage-Backed Securities Funds	Barclays US Aggregate Securitized - MBS	1.46	1.46	1.70	1.58	1.56	1.80	1.74	1.78	1.97
Global Income Funds	Barclays Global Aggregate	1.02	0.64	0.77	0.98	0.67	0.86	1.06	0.83	0.91
Emerging Markets Debt Funds	Barclays Emerging Markets	0.99	0.91	0.77	0.71	0.59	0.68	0.77	0.48	0.55
General Municipal Debt Funds	S&P National AMT-Free Municipal Bond	0.99	1.19	0.96	1.00	1.30	0.95	1.03	1.30	1.02
California Municipal Debt Funds	S&P California AMT-Free Municipal Bond	0.96	1.28	0.96	0.96	1.31	0.94	0.96	1.33	0.96
New York Municipal Debt Funds	S&P New York AMT-Free Municipal Bond	0.90	1.18	0.99	1.07	1.18	0.81	0.98	1.22	0.98
Loan Participation Funds	S&P/LSTA U.S. Leveraged Loan 100	0.92	0.80	0.57	0.70	0.83	0.62	0.76	0.89	0.67

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

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