

## U.S. Persistence Scorecard

### SUMMARY

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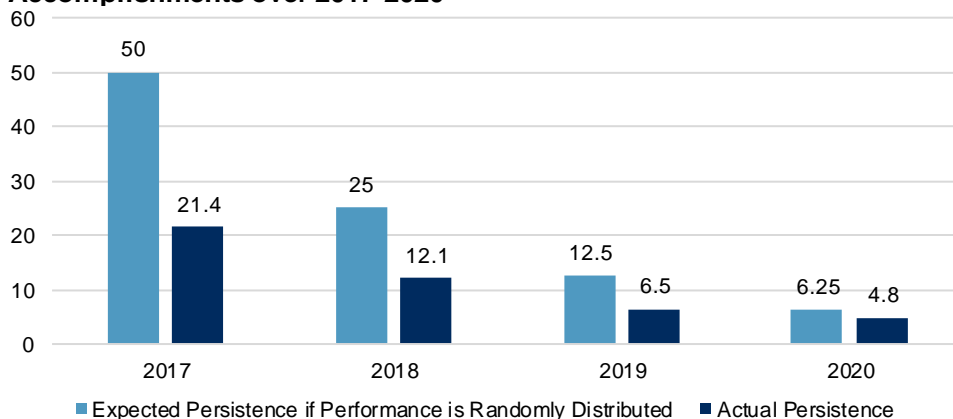
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Can investment results be attributed to skill or luck? Genuine skill is likely to persist, while luck is random and fleeting. Thus, one measure of skill is the consistency of a fund's performance relative to its peers. The Persistence Scorecard measures that consistency and shows that, **regardless of asset class or style focus, active management outperformance is typically short-lived**, with few funds consistently outranking their peers.

Compared to previous years, active fund persistence somewhat improved in 2020. For example, 64.5% of domestic equity funds in the top half of the distribution for 2018 continued in the top half in 2019, and 55.0% repeated that feat in 2020. At first glance, this lends some credence to the idea of persistent outperformance (see Report 1).

However, rewind the clock two years, and **of the top-half funds of 2016, 21.4% repeated that accomplishment in 2017, with just 4.8% ranking in the top half each year through 2020**. This rate is lower than what random chance would predict<sup>1</sup> (see Exhibit 1 and Report 2).

#### Exhibit 1: Top-Half Domestic Funds of 2016 Were Unlikely to Repeat Their Accomplishments over 2017-2020



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

<sup>1</sup> The odds of a top-half fund in one year randomly staying in the top half over the next four years are  $50\% * 50\% * 50\% * 50\% = 6.25\%$ , or 1/16.

This difference in persistence over three- and five-year windows was also visible in top-quartile funds. Of the top-quartile domestic equity funds in 2018, 33.7% managed to stay in the top quartile annually through 2020. In fact, in every equity category, more than 25% of 2018's top-quartile funds stayed in the top quartile annually through 2020. Looking at 2016's top-quartile funds paints a different picture: even in the best-performing category, mid-cap funds, only 1.5% of funds managed to stay in the top quartile annually through 2020 (see Reports 1 and 2).

Some statistically minded readers might note that these numbers are better than what would be expected if fund performance was randomly distributed. For example, the odds that a fund could remain in the top quartile for four consecutive years might be calculated as  $(25\%)^4 = 0.39\%$ , and the 1.5% referenced above is substantially better than that. **While the persistence report does not prove that fund performance is completely random, from a practical or decision-making perspective, it reinforces the notion that choosing between active funds on the basis of previous outperformance is a misguided strategy.** After all, there remains a 98.5% chance that a top-quartile fund will not stay in the top quartile for the next four years.

Lengthening the horizon to consider performance over two consecutive five-year periods, the top-half domestic equity funds in the 2011-2015 period had little luck maintaining their top-half status for the 2016-2020 period. In fact, the chances of a top-half fund changing style or liquidating (39.8%) nearly matched the odds of remaining in the top half (41.0%) (see Report 6).

Unsurprisingly, **the one pattern that did hold across equity funds was the tendency of the poorest funds to close.** Fourth-quartile funds were the most likely to merge or liquidate over the subsequent three- and five-year windows, with 40.6% of the bottom-quartile mid-cap funds from the 2011-2015 period disappearing by 2020. In fact, closing their doors was the most likely outcome in four out of five equity categories for fourth-quartile funds in that period (see Report 5).

Style changes did not appear to be particularly correlated with fund performance. Top, middle, and bottom performers within a category all generally had similar chances of style drift over three- or five-year periods. Multi-cap funds had the highest percentage of style change, with 31% making a change over three years and 42% over five years (see Report 3 and Report 5).

Fixed income funds showed similar results to equities, with rare pockets of one-year persistence and little evidence for consistent annual outperformance over longer periods. **In 9 of the 13 categories considered, no top-quartile funds from 2016 maintained that status annually through 2020** (see Report 8).

Transition matrices showed slightly more evidence of fixed income fund persistence. Over the three-year horizon, in 5 of the 13 categories, 50% or more of top-quartile funds remained in the top-quartile. Similar results existed over the five-year window. However, in many fixed income fund categories, fewer than 20 funds qualified within each quartile, perhaps leading to small sample size effects (see Report 9).

## ABOUT THE PERSISTENCE SCORECARD

The phrase “past performance is no guarantee of future results” (or some variation thereof) can be found in the fine print of most mutual fund literature. Yet many investors and advisors consider past performance and related metrics to be important factors in fund selection. So does past performance really matter?

To answer this question, the semiannual S&P Persistence Scorecard tracks the degree to which historical relative performance is predictive of future relative performance. As in our widely followed SPIVA Scorecards, the University of Chicago’s Center for Research in Security Prices (CRSP) Survivorship Bias Free Mutual Fund Database serves as our underlying data source.

S&P Dow Jones Indices is one of the world’s leading index providers, maintaining a wide variety of investable and benchmark indices to meet an array of investor needs. Our Global Research & Design team is dedicated to conducting unbiased, in-depth analysis on a broad range of topics and issues facing investors in today’s marketplace. This scorecard highlights performance persistence over three and five consecutive 12-month periods and two non-overlapping three- and five-year periods.

Key features of the S&P Persistence Scorecard include:

- **Historical rankings without survivorship bias:** For anyone making an investment decision, all funds available at the time of that decision are part of the initial opportunity set. Ignoring funds that liquidate or merge during a period of study biases measurements of persistence. Using the CRSP database, the S&P Persistence Scorecard ranks all funds available at each point in time and tracks the top-quartile and top-half performers throughout the time period.
- **Clean universe:** The mutual fund universe used in these reports comprises actively managed domestic U.S. equity funds. Index funds, sector funds, and index-based dynamic (bull or bear) funds are excluded from the sample. To avoid double counting multiple share classes, only the share class with the highest previous period return of each fund is used.
- **Transition matrices:** Transition matrices show the movements between quartiles and halves over non-overlapping three- and five-year periods. They also track the percentage of funds that have merged or liquidated. In addition, we monitor movements across capitalization levels. This helps us capture, for example, the conversion of some large-cap funds to mid- and small-cap funds.
  - Starting with the Persistence Scorecard Year-End 2019, the style change calculation includes funds that changed fund categories at any point between the relevant start and end dates. Previously, this calculation only checked if the fund category remained identical at the endpoints.
- **Tracking reports of top performers:** The tracking reports show the percentages of funds that remain in the top-quartile or top-half rankings over consecutive three- and five-year periods.

## REPORTS

### Report 1: Performance Persistence of Domestic Equity Funds over Three Consecutive 12-Month Periods

FUND CATEGORY	FUND COUNT AT START (DECEMBER 2018)	PERCENTAGE REMAINING IN TOP QUARTILE	
		DECEMBER 2019	DECEMBER 2020
<b>TOP QUARTILE</b>			
All Domestic Funds	534	48.50	33.71
All Large-Cap Funds	182	49.45	42.31
All Mid-Cap Funds	66	51.52	30.30
All Small-Cap Funds	133	51.13	40.60
All Multi-Cap Funds	120	45.83	27.50
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2018)	PERCENTAGE REMAINING IN TOP HALF	
		DECEMBER 2019	DECEMBER 2020
<b>TOP HALF</b>			
All Domestic Funds	1,068	64.51	54.96
All Large-Cap Funds	372	63.98	55.65
All Mid-Cap Funds	135	71.11	61.48
All Small-Cap Funds	265	63.40	52.83
All Multi-Cap Funds	232	59.91	51.72

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

### Report 2: Performance Persistence of Domestic Equity Funds over Five Consecutive 12-Month Periods

FUND CATEGORY	FUND COUNT AT START (DECEMBER 2016)	PERCENTAGE REMAINING IN TOP QUARTILE			
		DECEMBER 2017	DECEMBER 2018	DECEMBER 2019	DECEMBER 2020
<b>TOP QUARTILE</b>					
All Domestic Funds	556	3.06	1.08	0.90	0.72
All Large-Cap Funds	203	0.49	0.49	0.49	0.49
All Mid-Cap Funds	68	4.41	1.47	1.47	1.47
All Small-Cap Funds	134	5.22	1.49	0.75	0.75
All Multi-Cap Funds	124	1.61	0.81	0.81	0.00
FUND CATEGORY	FUND COUNT AT START (DECEMBER 2016)	PERCENTAGE REMAINING IN TOP HALF			
		DECEMBER 2017	DECEMBER 2018	DECEMBER 2019	DECEMBER 2020
<b>TOP HALF</b>					
All Domestic Funds	1,110	21.44	12.07	6.49	4.77
All Large-Cap Funds	408	23.04	10.54	5.15	4.17
All Mid-Cap Funds	133	15.04	7.52	4.51	3.01
All Small-Cap Funds	267	23.97	11.99	7.49	3.75
All Multi-Cap Funds	249	27.31	13.65	8.43	6.83

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

Report 3: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (2015-2017)	THREE-YEAR PERCENTAGES AT END (2018-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>ALL DOMESTIC FUNDS</b>							
1st Quartile	512	38.48	21.88	8.98	7.23	7.62	15.82
2nd Quartile	512	12.50	23.44	17.38	14.06	9.77	22.85
3rd Quartile	512	11.33	10.74	19.34	22.85	12.11	23.63
4th Quartile	513	7.60	8.58	17.15	17.35	23.78	25.54
<b>ALL LARGE-CAP FUNDS</b>							
1st Quartile	192	57.29	15.63	5.73	2.60	5.21	13.54
2nd Quartile	192	13.02	30.73	20.83	7.81	8.33	19.27
3rd Quartile	192	4.69	15.63	20.83	26.56	11.46	20.83
4th Quartile	192	3.13	5.21	19.27	26.04	23.44	22.92
<b>ALL MID-CAP FUNDS</b>							
1st Quartile	70	27.14	27.14	11.43	5.71	8.57	20.00
2nd Quartile	69	18.84	15.94	15.94	13.04	10.14	26.09
3rd Quartile	70	20.00	5.71	14.29	18.57	15.71	25.71
4th Quartile	70	4.29	15.71	15.71	12.86	22.86	28.57
<b>ALL SMALL-CAP FUNDS</b>							
1st Quartile	126	30.95	17.46	17.46	12.70	8.73	12.70
2nd Quartile	125	14.40	21.60	21.60	18.40	8.00	16.00
3rd Quartile	125	18.40	12.00	18.40	25.60	13.60	12.00
4th Quartile	126	12.70	10.32	13.49	11.11	29.37	23.02
<b>ALL MULTI-CAP FUNDS</b>							
1st Quartile	125	25.60	19.20	9.60	8.00	11.20	26.40
2nd Quartile	125	9.60	21.60	16.80	11.20	12.80	28.00
3rd Quartile	125	10.40	11.20	17.60	19.20	9.60	32.00
4th Quartile	126	7.14	8.73	12.70	16.67	18.25	36.51

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

Report 4: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Halves)					
HALF	FUND COUNT AT START (2015-2017)	THREE-YEAR PERCENTAGES AT END (2018-2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>ALL DOMESTIC FUNDS</b>					
Top Half	1,024	48.14	23.83	8.69	19.34
Bottom Half	1,025	19.12	38.34	17.95	24.59
<b>ALL LARGE-CAP FUNDS</b>					
Top Half	384	58.33	18.49	6.77	16.41
Bottom Half	384	14.32	46.35	17.45	21.88
<b>ALL MID-CAP FUNDS</b>					
Top Half	139	44.60	23.02	9.35	23.02
Bottom Half	140	22.86	30.71	19.29	27.14
<b>ALL SMALL-CAP FUNDS</b>					
Top Half	251	42.23	35.06	8.37	14.34
Bottom Half	251	26.69	34.26	21.51	17.53
<b>ALL MULTI-CAP FUNDS</b>					
Top Half	250	38.00	22.80	12.00	27.20
Bottom Half	251	18.73	33.07	13.94	34.26

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

Report 5: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (2011-2015)	FIVE-YEAR PERCENTAGES AT END (2016-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>ALL DOMESTIC FUNDS</b>							
1st Quartile	491	29.94	19.14	9.16	4.89	9.78	27.09
2nd Quartile	490	15.10	17.76	12.65	11.84	12.86	29.80
3rd Quartile	491	8.96	10.39	14.87	14.87	21.79	29.12
4th Quartile	491	5.91	6.72	12.83	12.83	32.18	29.53
<b>ALL LARGE-CAP FUNDS</b>							
1st Quartile	189	48.15	17.46	6.88	2.65	6.88	17.99
2nd Quartile	188	14.36	23.94	10.64	8.51	14.36	28.19
3rd Quartile	189	6.35	11.64	16.93	16.93	25.40	22.75
4th Quartile	189	2.65	7.41	14.81	19.05	26.98	29.10
<b>ALL MID-CAP FUNDS</b>							
1st Quartile	69	23.19	18.84	10.14	8.70	5.80	33.33
2nd Quartile	68	16.18	13.24	10.29	10.29	16.18	33.82
3rd Quartile	69	11.59	5.80	14.49	10.14	26.09	31.88
4th Quartile	69	7.25	8.70	5.80	5.80	40.58	31.88
<b>ALL SMALL-CAP FUNDS</b>							
1st Quartile	113	26.55	24.78	12.39	11.50	8.85	15.93
2nd Quartile	113	23.01	10.62	21.24	12.39	15.04	17.70
3rd Quartile	113	13.27	17.70	15.04	20.35	10.62	23.01
4th Quartile	113	7.96	5.31	12.39	12.39	38.05	23.89
<b>ALL MULTI-CAP FUNDS</b>							
1st Quartile	120	19.17	12.50	10.83	5.83	12.50	39.17
2nd Quartile	120	9.17	15.00	11.67	9.17	10.83	44.17
3rd Quartile	120	2.50	15.00	8.33	7.50	21.67	45.00
4th Quartile	121	1.65	6.61	12.40	7.44	33.06	38.84

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

<b>Report 6: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Halves)</b>					
<b>HALF</b>	<b>FUND COUNT AT START (2011-2015)</b>	<b>FIVE-YEAR PERCENTAGES AT END (2016-2020)</b>			
		<b>TOP HALF (%)</b>	<b>BOTTOM HALF (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
<b>ALL DOMESTIC FUNDS</b>					
Top Half	981	40.98	19.27	11.31	28.44
Bottom Half	982	15.99	27.70	26.99	29.33
<b>ALL LARGE-CAP FUNDS</b>					
Top Half	377	51.99	14.32	10.61	23.08
Bottom Half	378	14.02	33.86	26.19	25.93
<b>ALL MID-CAP FUNDS</b>					
Top Half	137	35.77	19.71	10.95	33.58
Bottom Half	138	16.67	18.12	33.33	31.88
<b>ALL SMALL-CAP FUNDS</b>					
Top Half	226	42.48	28.76	11.95	16.81
Bottom Half	226	22.12	30.09	24.34	23.45
<b>ALL MULTI-CAP FUNDS</b>					
Top Half	240	27.92	18.75	11.67	41.67
Bottom Half	241	12.86	17.84	27.39	41.91

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



<b>Report 7: Performance Persistence of Domestic Fixed Income Funds over Three Consecutive 12-Month Periods</b>			
<b>FUND CATEGORY</b>	<b>FUND COUNT AT START (DECEMBER 2018)</b>	<b>PERCENTAGE REMAINING IN TOP QUARTILE</b>	
		<b>DECEMBER 2019</b>	<b>DECEMBER 2020</b>
<b>TOP QUARTILE</b>			
Government Long Funds	12	25.00	0.00
Government Intermediate Funds	4	25.00	0.00
Government Short Funds	6	16.67	0.00
Investment-Grade Long Funds	21	0.00	0.00
Investment-Grade Intermediate Funds	48	6.25	2.08
Investment-Grade Short Funds	23	8.70	8.70
High Yield Funds	49	10.20	10.20
Mortgage-Backed Securities Funds	12	33.33	8.33
Global Income Funds	25	8.00	0.00
Emerging Markets Debt Funds	13	0.00	0.00
General Municipal Debt Funds	17	29.41	17.65
California Municipal Debt Funds	8	25.00	12.50
New York Municipal Debt Funds	6	50.00	16.67
<b>FUND CATEGORY</b>	<b>FUND COUNT AT START (DECEMBER 2018)</b>	<b>PERCENTAGE REMAINING IN TOP HALF</b>	
		<b>DECEMBER 2019</b>	<b>DECEMBER 2020</b>
<b>TOP HALF</b>			
Government Long Funds	23	47.83	30.43
Government Intermediate Funds	8	37.50	37.50
Government Short Funds	12	50.00	41.67
Investment-Grade Long Funds	42	4.76	2.38
Investment-Grade Intermediate Funds	95	22.11	16.84
Investment-Grade Short Funds	46	34.78	21.74
High Yield Funds	98	30.61	22.45
Mortgage-Backed Securities Funds	23	56.52	30.43
Global Income Funds	50	44.00	24.00
Emerging Markets Debt Funds	26	38.46	34.62
General Municipal Debt Funds	34	47.06	35.29
California Municipal Debt Funds	16	56.25	37.50
New York Municipal Debt Funds	12	41.67	25.00

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

<b>Report 8: Performance Persistence of Domestic Fixed Income Funds over Five Consecutive 12-Month Periods</b>						
<b>FUND CATEGORY</b>	<b>FUND COUNT AT START (DECEMBER 2016)</b>	<b>PERCENTAGE REMAINING IN TOP QUARTILE</b>				
		<b>DECEMBER 2017</b>	<b>DECEMBER 2018</b>	<b>DECEMBER 2019</b>	<b>DECEMBER 2020</b>	
<b>TOP QUARTILE</b>						
Government Long Funds	12	50.00	16.67	8.33	8.33	
Government Intermediate Funds	5	60.00	0.00	0.00	0.00	
Government Short Funds	6	50.00	33.33	0.00	0.00	
Investment-Grade Long Funds	21	66.67	0.00	0.00	0.00	
Investment-Grade Intermediate Funds	50	52.00	2.00	0.00	0.00	
Investment-Grade Short Funds	22	68.18	13.64	0.00	0.00	
High Yield Funds	52	34.62	7.69	5.77	5.77	
Mortgage-Backed Securities Funds	13	53.85	46.15	23.08	7.69	
Global Income Funds	27	22.22	0.00	0.00	0.00	
Emerging Markets Debt Funds	15	26.67	6.67	0.00	0.00	
General Municipal Debt Funds	19	31.58	15.79	10.53	5.26	
California Municipal Debt Funds	9	44.44	22.22	11.11	0.00	
New York Municipal Debt Funds	7	28.57	14.29	0.00	0.00	
<b>FUND CATEGORY</b>	<b>FUND COUNT AT START (DECEMBER 2016)</b>	<b>PERCENTAGE REMAINING IN TOP HALF</b>				
		<b>DECEMBER 2017</b>	<b>DECEMBER 2018</b>	<b>DECEMBER 2019</b>	<b>DECEMBER 2020</b>	
<b>TOP HALF</b>						
Government Long Funds	25	64.00	32.00	28.00	20.00	
Government Intermediate Funds	9	77.78	22.22	22.22	22.22	
Government Short Funds	12	58.33	41.67	16.67	8.33	
Investment-Grade Long Funds	41	87.80	9.76	2.44	0.00	
Investment-Grade Intermediate Funds	100	68.00	17.00	12.00	10.00	
Investment-Grade Short Funds	43	81.40	37.21	13.95	4.65	
High Yield Funds	103	66.99	30.10	21.36	14.56	
Mortgage-Backed Securities Funds	26	69.23	53.85	30.77	19.23	
Global Income Funds	54	44.44	9.26	9.26	3.70	
Emerging Markets Debt Funds	28	53.57	17.86	7.14	7.14	
General Municipal Debt Funds	38	47.37	34.21	23.68	15.79	
California Municipal Debt Funds	17	64.71	35.29	29.41	11.76	
New York Municipal Debt Funds	13	30.77	23.08	15.38	7.69	

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

Report 9: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (2015-2017)	THREE-YEAR PERCENTAGES AT END (2018-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>GOVERNMENT LONG FUNDS</b>							
1st Quartile	13	53.85	7.69	7.69	0.00	7.69	23.08
2nd Quartile	12	16.67	25.00	8.33	8.33	8.33	33.33
3rd Quartile	13	0.00	7.69	30.77	38.46	0.00	23.08
4th Quartile	13	0.00	0.00	15.38	30.77	38.46	15.38
<b>GOVERNMENT INTERMEDIATE FUNDS</b>							
1st Quartile	4	25.00	25.00	25.00	0.00	0.00	25.00
2nd Quartile	4	75.00	25.00	0.00	0.00	0.00	0.00
3rd Quartile	4	0.00	25.00	25.00	50.00	0.00	0.00
4th Quartile	5	0.00	20.00	40.00	40.00	0.00	0.00
<b>GOVERNMENT SHORT FUNDS</b>							
1st Quartile	6	16.67	0.00	33.33	0.00	16.67	33.33
2nd Quartile	6	16.67	66.67	0.00	0.00	16.67	0.00
3rd Quartile	6	16.67	0.00	50.00	16.67	0.00	16.67
4th Quartile	6	16.67	0.00	0.00	50.00	33.33	0.00
<b>INVESTMENT-GRADE LONG FUNDS</b>							
1st Quartile	20	55.00	30.00	5.00	5.00	5.00	0.00
2nd Quartile	20	30.00	30.00	10.00	10.00	15.00	5.00
3rd Quartile	20	5.00	25.00	30.00	30.00	0.00	10.00
4th Quartile	20	0.00	5.00	25.00	30.00	15.00	25.00
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>							
1st Quartile	46	39.13	30.43	13.04	6.52	8.70	2.17
2nd Quartile	45	31.11	31.11	24.44	6.67	4.44	2.22
3rd Quartile	46	15.22	23.91	30.43	17.39	10.87	2.17
4th Quartile	46	0.00	0.00	17.39	52.17	23.91	6.52
<b>INVESTMENT-GRADE SHORT FUNDS</b>							
1st Quartile	22	31.82	27.27	13.64	22.73	4.55	0.00
2nd Quartile	22	27.27	22.73	36.36	4.55	4.55	4.55
3rd Quartile	22	22.73	31.82	18.18	4.55	18.18	4.55
4th Quartile	22	9.09	9.09	18.18	36.36	9.09	18.18
<b>HIGH YIELD FUNDS</b>							
1st Quartile	47	31.91	19.15	14.89	8.51	0.00	25.53
2nd Quartile	47	23.40	23.40	23.40	8.51	8.51	12.77
3rd Quartile	47	19.15	17.02	23.40	10.64	12.77	17.02
4th Quartile	48	6.25	8.33	10.42	25.00	16.67	33.33

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

Report 9: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Quartile) (cont.)							
QUARTILE	FUND COUNT AT START (2015-2017)	THREE-YEAR PERCENTAGES AT END (2018-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RDTH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>							
1st Quartile	12	41.67	33.33	8.33	8.33	8.33	0.00
2nd Quartile	12	25.00	33.33	8.33	25.00	8.33	0.00
3rd Quartile	12	16.67	16.67	33.33	25.00	8.33	0.00
4th Quartile	12	0.00	0.00	25.00	33.33	33.33	8.33
<b>GLOBAL INCOME FUNDS</b>							
1st Quartile	23	13.04	17.39	17.39	0.00	17.39	34.78
2nd Quartile	22	27.27	40.91	22.73	0.00	9.09	0.00
3rd Quartile	22	40.91	9.09	9.09	31.82	0.00	9.09
4th Quartile	23	4.35	13.04	21.74	43.48	17.39	0.00
<b>EMERGING MARKETS DEBT FUNDS</b>							
1st Quartile	13	7.69	23.08	23.08	38.46	7.69	0.00
2nd Quartile	13	30.77	7.69	30.77	7.69	23.08	0.00
3rd Quartile	13	23.08	30.77	15.38	0.00	23.08	7.69
4th Quartile	13	15.38	15.38	7.69	15.38	38.46	7.69
<b>GENERAL MUNICIPAL DEBT FUNDS</b>							
1st Quartile	18	61.11	22.22	0.00	11.11	5.56	0.00
2nd Quartile	17	23.53	35.29	41.18	0.00	0.00	0.00
3rd Quartile	18	5.56	16.67	38.89	16.67	5.56	16.67
4th Quartile	18	0.00	5.56	0.00	55.56	33.33	5.56
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>							
1st Quartile	8	62.50	25.00	12.50	0.00	0.00	0.00
2nd Quartile	8	25.00	37.50	25.00	0.00	12.50	0.00
3rd Quartile	8	0.00	25.00	37.50	25.00	12.50	0.00
4th Quartile	8	0.00	0.00	12.50	62.50	12.50	12.50
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>							
1st Quartile	6	50.00	16.67	33.33	0.00	0.00	0.00
2nd Quartile	6	33.33	0.00	16.67	33.33	16.67	0.00
3rd Quartile	6	16.67	33.33	0.00	50.00	0.00	0.00
4th Quartile	6	0.00	33.33	33.33	16.67	16.67	0.00

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

Report 10: Three-Year Transition Matrix – Performance over Two Non-Overlapping Three-Year Periods (Based on Halves)						
HALF	FUND COUNT AT START (2015-2017)	THREE-YEAR PERCENTAGES AT END (2018-2020)				
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)	
<b>GOVERNMENT LONG FUNDS</b>						
Top Half	25	52.00	12.00	8.00	28.00	
Bottom Half	26	3.85	57.69	19.23	19.23	
<b>GOVERNMENT INTERMEDIATE FUNDS</b>						
Top Half	8	75.00	12.50	0.00	12.50	
Bottom Half	9	22.22	77.78	0.00	0.00	
<b>GOVERNMENT SHORT FUNDS</b>						
Top Half	12	50.00	16.67	16.67	16.67	
Bottom Half	12	16.67	58.33	16.67	8.33	
<b>INVESTMENT-GRADE LONG FUNDS</b>						
Top Half	40	72.50	15.00	10.00	2.50	
Bottom Half	40	17.50	57.50	7.50	17.50	
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>						
Top Half	91	65.93	25.27	6.59	2.20	
Bottom Half	92	19.57	58.70	17.39	4.35	
<b>INVESTMENT-GRADE SHORT FUNDS</b>						
Top Half	44	54.55	38.64	4.55	2.27	
Bottom Half	44	36.36	38.64	13.64	11.36	
<b>HIGH YIELD FUNDS</b>						
Top Half	94	48.94	27.66	4.26	19.15	
Bottom Half	95	25.26	34.74	14.74	25.26	
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>						
Top Half	24	66.67	25.00	8.33	0.00	
Bottom Half	24	16.67	58.33	20.83	4.17	
<b>GLOBAL INCOME FUNDS</b>						
Top Half	45	48.89	20.00	13.33	17.78	
Bottom Half	45	33.33	53.33	8.89	4.44	
<b>EMERGING MARKETS DEBT FUNDS</b>						
Top Half	26	34.62	50.00	15.38	0.00	
Bottom Half	26	42.31	19.23	30.77	7.69	
<b>GENERAL MUNICIPAL DEBT FUNDS</b>						
Top Half	35	71.43	25.71	2.86	0.00	
Bottom Half	36	13.89	55.56	19.44	11.11	
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>						
Top Half	16	75.00	18.75	6.25	0.00	
Bottom Half	16	12.50	68.75	12.50	6.25	
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>						
Top Half	12	50.00	41.67	8.33	0.00	
Bottom Half	12	41.67	50.00	8.33	0.00	

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

Report 11: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile)							
QUARTILE	FUND COUNT AT START (2011-2015)	FIVE-YEAR PERCENTAGES AT END (2016-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>GOVERNMENT LONG FUNDS</b>							
1st Quartile	13	53.85	15.38	0.00	0.00	15.38	15.38
2nd Quartile	12	0.00	33.33	25.00	8.33	0.00	33.33
3rd Quartile	12	0.00	8.33	25.00	8.33	16.67	41.67
4th Quartile	13	0.00	0.00	0.00	61.54	38.46	0.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>							
1st Quartile	5	60.00	0.00	20.00	0.00	0.00	20.00
2nd Quartile	5	20.00	40.00	0.00	0.00	40.00	0.00
3rd Quartile	5	0.00	40.00	20.00	20.00	20.00	0.00
4th Quartile	6	0.00	0.00	33.33	50.00	16.67	0.00
<b>GOVERNMENT SHORT FUNDS</b>							
1st Quartile	6	33.33	16.67	16.67	0.00	33.33	0.00
2nd Quartile	6	16.67	16.67	16.67	0.00	16.67	33.33
3rd Quartile	6	0.00	16.67	50.00	16.67	16.67	0.00
4th Quartile	7	0.00	14.29	0.00	42.86	28.57	14.29
<b>INVESTMENT-GRADE LONG FUNDS</b>							
1st Quartile	20	60.00	25.00	0.00	0.00	5.00	10.00
2nd Quartile	19	21.05	31.58	26.32	5.26	10.53	5.26
3rd Quartile	20	5.00	10.00	20.00	30.00	10.00	25.00
4th Quartile	20	5.00	15.00	15.00	30.00	20.00	15.00
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>							
1st Quartile	40	45.00	32.50	12.50	5.00	5.00	0.00
2nd Quartile	40	30.00	25.00	22.50	2.50	17.50	2.50
3rd Quartile	40	7.50	22.50	37.50	10.00	17.50	5.00
4th Quartile	41	2.44	2.44	9.76	63.41	19.51	2.44
<b>INVESTMENT-GRADE SHORT FUNDS</b>							
1st Quartile	17	47.06	11.76	11.76	11.76	17.65	0.00
2nd Quartile	16	18.75	25.00	43.75	0.00	12.50	0.00
3rd Quartile	17	17.65	35.29	17.65	23.53	5.88	0.00
4th Quartile	17	5.88	11.76	11.76	35.29	17.65	17.65
<b>HIGH YIELD FUNDS</b>							
1st Quartile	39	17.95	25.64	15.38	20.51	5.13	15.38
2nd Quartile	38	18.42	18.42	26.32	21.05	5.26	10.53
3rd Quartile	38	21.05	10.53	28.95	7.89	18.42	13.16
4th Quartile	39	17.95	10.26	7.69	15.38	28.21	20.51

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

Report 11: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Quartile) (cont.)							
QUARTILE	FUND COUNT AT START (2011-2015)	FIVE-YEAR PERCENTAGES AT END (2016-2020)					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3RD QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>							
1st Quartile	11	45.45	36.36	9.09	0.00	9.09	0.00
2nd Quartile	11	18.18	18.18	36.36	18.18	9.09	0.00
3rd Quartile	11	0.00	9.09	18.18	36.36	18.18	18.18
4th Quartile	11	9.09	18.18	18.18	27.27	27.27	0.00
<b>GLOBAL INCOME FUNDS</b>							
1st Quartile	17	11.76	11.76	29.41	11.76	5.88	29.41
2nd Quartile	17	29.41	11.76	11.76	29.41	17.65	0.00
3rd Quartile	17	17.65	29.41	11.76	17.65	17.65	5.88
4th Quartile	17	5.88	17.65	17.65	17.65	17.65	23.53
<b>EMERGING MARKETS DEBT FUNDS</b>							
1st Quartile	4	25.00	0.00	25.00	25.00	25.00	0.00
2nd Quartile	4	0.00	25.00	50.00	25.00	0.00	0.00
3rd Quartile	4	25.00	50.00	0.00	25.00	0.00	0.00
4th Quartile	5	40.00	0.00	20.00	20.00	20.00	0.00
<b>GENERAL MUNICIPAL DEBT FUNDS</b>							
1st Quartile	17	47.06	35.29	11.76	0.00	5.88	0.00
2nd Quartile	16	25.00	31.25	18.75	12.50	12.50	0.00
3rd Quartile	17	5.88	11.76	41.18	11.76	17.65	11.76
4th Quartile	17	5.88	0.00	5.88	52.94	23.53	11.76
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>							
1st Quartile	9	44.44	22.22	22.22	0.00	11.11	0.00
2nd Quartile	8	37.50	25.00	0.00	12.50	12.50	12.50
3rd Quartile	8	0.00	37.50	50.00	12.50	0.00	0.00
4th Quartile	9	0.00	0.00	11.11	44.44	33.33	11.11
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>							
1st Quartile	7	57.14	14.29	0.00	0.00	14.29	14.29
2nd Quartile	6	33.33	16.67	50.00	0.00	0.00	0.00
3rd Quartile	6	0.00	33.33	16.67	33.33	16.67	0.00
4th Quartile	7	0.00	14.29	28.57	42.86	14.29	0.00

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

Report 12: Five-Year Transition Matrix – Performance over Two Non-Overlapping Five-Year Periods (Based on Halves)					
HALF	FUND COUNT AT START (2011-2015)	FIVE-YEAR PERCENTAGES AT END (2016-2020)			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
<b>GOVERNMENT LONG FUNDS</b>					
Top Half	25	52.00	16.00	8.00	24.00
Bottom Half	25	4.00	48.00	28.00	20.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>					
Top Half	10	60.00	10.00	20.00	10.00
Bottom Half	11	18.18	63.64	18.18	0.00
<b>GOVERNMENT SHORT FUNDS</b>					
Top Half	12	41.67	16.67	25.00	16.67
Bottom Half	13	15.38	53.85	23.08	7.69
<b>INVESTMENT-GRADE LONG FUNDS</b>					
Top Half	39	69.23	15.38	7.69	7.69
Bottom Half	40	17.50	47.50	15.00	20.00
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>					
Top Half	80	66.25	21.25	11.25	1.25
Bottom Half	81	17.28	60.49	18.52	3.70
<b>INVESTMENT-GRADE SHORT FUNDS</b>					
Top Half	33	51.52	33.33	15.15	0.00
Bottom Half	34	35.29	44.12	11.76	8.82
<b>HIGH YIELD FUNDS</b>					
Top Half	77	40.26	41.56	5.19	12.99
Bottom Half	77	29.87	29.87	23.38	16.88
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>					
Top Half	22	59.09	31.82	9.09	0.00
Bottom Half	22	18.18	50.00	22.73	9.09
<b>GLOBAL INCOME FUNDS</b>					
Top Half	34	32.35	41.18	11.76	14.71
Bottom Half	34	35.29	32.35	17.65	14.71
<b>EMERGING MARKETS DEBT FUNDS</b>					
Top Half	8	25.00	62.50	12.50	0.00
Bottom Half	9	55.56	33.33	11.11	0.00
<b>GENERAL MUNICIPAL DEBT FUNDS</b>					
Top Half	33	69.70	21.21	9.09	0.00
Bottom Half	34	11.76	55.88	20.59	11.76
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>					
Top Half	17	64.71	17.65	11.76	5.88
Bottom Half	17	17.65	58.82	17.65	5.88
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>					
Top Half	13	61.54	23.08	7.69	7.69
Bottom Half	13	23.08	61.54	15.38	0.00

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



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