

CONTRIBUTORS

Aye M. Soe, CFA
Managing Director
Global Research & Design
aye.soe@spglobal.com

Ryan Poirier, FRM
Senior Analyst
Global Research & Design
ryan.poirier@spglobal.com

Does Past Performance Matter? The Persistence Scorecard

SUMMARY OF RESULTS

- When it comes to the active versus passive debate, one of the key measurements of successful active management lies in the ability of a manager or a strategy to deliver above-average returns consistently over multiple periods. Demonstrating the ability to outperform peers repeatedly is the one way to differentiate a manager's luck from skill.
- According to the S&P Persistence Scorecard, relatively few funds can consistently stay at the top. Out of 563 domestic equity funds that were in the top quartile as of September 2015, only 6.39% managed to stay in the top quartile at the end of September 2017. Furthermore, 6.48% of the large-cap funds, 1.23% of the mid-cap funds, and 6.82% of the small-cap funds remained in the top quartile.
- For the three-year period that ended in September 2017, persistence figures for funds in the top half were closer to the random expectation than that of the top quartile. Over three consecutive 12-month periods, 19.49% of large-cap funds, 18.52% of mid-cap funds, and 23.11% of small-cap funds maintained a top-half ranking.
- An inverse relationship generally exists between the measurement time horizon and the ability of top-performing funds to maintain their status. It is worth noting that no large-cap, mid-cap, or small-cap funds managed to remain in the top quartile at the end of the five-year measurement period. Furthermore, no mid-cap or small-cap funds were able to retain their status as of the end of the fourth period. This figure paints a negative picture regarding long-term persistence in mutual fund returns.
- Similarly, only 4.73% of large-cap funds, 6.47% of mid-cap funds, and 5.49% of small-cap funds maintained top-half performance over five consecutive 12-month periods. Random expectations would suggest a repeat rate of 6.25%.

- The transition matrices are designed to track the performance of top- and bottom-quintile performers over subsequent time periods. The data show a stronger likelihood for the best-performing funds to become the worst-performing funds than vice versa. Of 371 funds that were in the bottom quartile, 14.56% moved to the top quartile over the five-year horizon, while 23.45% of the 371 funds that were in the top quartile moved to the bottom quartile during the same period.
- Our research also suggests that there is consistency in the death rate of bottom-quartile funds. Across all market cap categories and all periods studied, fourth-quartile funds had a much higher rate of being merged or liquidated. The five-year transition matrix shows that 31.34% of large-cap funds, 33.33% of mid-cap funds, and 37.5% of small-cap funds in the fourth quartile disappeared.
- Compared with domestic equity funds, there was a higher level of performance persistence among the top-quartile fixed income funds over the three-year period ending September 2017. Government Short, Government Intermediate, and Emerging Markets funds were the only categories in which the results showed no performance persistence.
- Over the five-year measurement horizon, the results show a lack of persistence among nearly all the top-quartile fixed income categories, with a few exceptions. Funds investing in long-term government bonds, short-term investment-grade bonds, and high yield bonds were the only groups in which a noticeable level of persistence was observed.

ABOUT THE PERSISTENCE SCORECARD

The phrase “past performance is not an indicator of future outcomes” (or some variation thereof) can be found in the fine print of most mutual fund literature. Yet, due to either force of habit or conviction, 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 on a continuous basis, the S&P Persistence Scorecard, released twice per year, tracks the consistency of top performers over yearly consecutive periods and measures performance persistence through transition matrices. 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-year consecutive 12-month periods and two non-overlapping three- and five-year periods.

Key features of the S&P Persistence Scorecard include the following.

- **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. Nevertheless, in their persistence calculations, analysts often limit their sample to funds that continue to exist over the complete time period examined, ranking only the survivors. If that happens, funds that liquidate or merge during a period of study are disregarded, biasing measurements of persistence. Using the University of Chicago's CRSP Survivorship Bias Free Mutual Fund 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. This approach accounts for all initially available funds.
- **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 two non-overlapping, three- and five-year periods. They also track the percentage of funds that have merged or liquidated. In addition, we monitor movements between capitalization levels. This helps us capture, for example, the conversion of some large-cap funds to mid- and small-cap funds.
- **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.

EXHIBITS

Exhibit 1: Performance Persistence of Domestic Equity Funds Over Three Consecutive 12-Month Periods				
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP QUARTILE		
		SEPTEMBER 2016	SEPTEMBER 2017	
TOP QUARTILE				
All Domestic Funds	563	17.94	6.39	
All Large-Cap Funds	216	14.35	6.48	
All Mid-Cap Funds	81	16.05	1.23	
All Small-Cap Funds	132	20.45	6.82	
All Multi-Cap Funds	134	17.16	10.45	
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF		
		SEPTEMBER 2016	SEPTEMBER 2017	
TOP HALF				
All Domestic Funds	1126	45.65	24.42	
All Large-Cap Funds	431	41.53	19.49	
All Mid-Cap Funds	162	40.74	18.52	
All Small-Cap Funds	264	44.32	23.11	
All Multi-Cap Funds	269	43.87	22.3	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 2: Performance Persistence of Domestic Equity Funds Over Five Consecutive 12-Month Periods					
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2013)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2014	SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017
TOP QUARTILE					
All Domestic Funds	576	10.07	1.91	1.04	0.87
All Large-Cap Funds	222	30.63	1.35	0.9	0
All Mid-Cap Funds	85	31.76	5.88	0	0
All Small-Cap Funds	128	24.22	4.69	0	0
All Multi-Cap Funds	141	23.4	4.96	1.42	1.42
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2013)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2014	SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017
TOP HALF					
All Domestic Funds	1151	32.49	12.86	7.21	3.56
All Large-Cap Funds	444	50.9	19.37	9.01	4.73
All Mid-Cap Funds	170	49.41	19.41	9.41	6.47
All Small-Cap Funds	255	46.67	23.92	9.41	5.49
All Multi-Cap Funds	282	46.81	20.57	11.35	7.45

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 3: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Quartile)							
ALL DOMESTIC FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2014)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	516	25.19	18.99	28.88	22.09	4.65	0.19
2nd Quartile	517	24.37	28.82	20.12	14.7	11.8	0.19
3rd Quartile	516	20.93	21.51	20.16	22.67	13.95	0.78
4th Quartile	516	16.47	17.44	17.83	27.33	18.8	2.13
ALL LARGE-CAP FUNDS							
1st Quartile	197	22.84	12.69	24.87	17.77	7.61	14.21
2nd Quartile	197	20.3	31.47	16.24	11.17	13.2	7.61
3rd Quartile	197	20.3	20.3	19.29	18.78	11.68	9.64
4th Quartile	197	14.21	13.2	17.26	29.95	18.27	7.11
ALL MID-CAP FUNDS							
1st Quartile	78	10.26	19.23	21.79	25.64	5.13	17.95
2nd Quartile	78	30.77	23.08	14.1	10.26	8.97	12.82
3rd Quartile	78	23.08	15.38	17.95	16.67	11.54	15.38
4th Quartile	78	6.41	12.82	15.38	17.95	21.79	25.64
ALL SMALL-CAP FUNDS							
1st Quartile	121	21.49	30.58	21.49	20.66	4.96	0.83
2nd Quartile	121	23.14	24.79	26.45	18.18	7.44	0
3rd Quartile	120	20.83	16.67	23.33	21.67	13.33	4.17
4th Quartile	121	21.49	14.88	15.7	26.45	19.83	1.65
ALL MULTI-CAP FUNDS							
1st Quartile	121	19.01	18.18	26.45	20.66	0.83	14.88
2nd Quartile	120	27.5	20	18.33	9.17	12.5	12.5
3rd Quartile	121	14.88	14.88	13.22	14.88	16.53	25.62
4th Quartile	120	7.5	15.83	10.83	24.17	21.67	20

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 4: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Halves)						
ALL DOMESTIC FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2014)	THREE-YEAR PERCENTAGES AT END				
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)	
Top Half	1033	48.69	42.88	8.23	0.19	
Bottom Half	1032	38.18	43.99	16.38	1.45	
ALL LARGE-CAP FUNDS						
Top Half	394	43.65	35.03	10.41	10.91	
Bottom Half	394	34.01	42.64	14.97	8.38	
ALL MID-CAP FUNDS						
Top Half	156	41.67	35.9	7.05	15.38	
Bottom Half	156	28.85	33.97	16.67	20.51	
ALL SMALL-CAP FUNDS						
Top Half	242	50	43.39	6.2	0.41	
Bottom Half	241	36.93	43.57	16.6	2.9	
ALL MULTI-CAP FUNDS						
Top Half	241	42.32	37.34	6.64	13.69	
Bottom Half	241	26.56	31.54	19.09	22.82	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 5: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Quartile)							
ALL DOMESTIC FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2012)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	371	25.34	21.56	18.87	23.45	10.24	0.54
2nd Quartile	371	23.45	20.22	20.49	21.29	13.75	0.81
3rd Quartile	370	14.32	21.08	20.54	15.95	23.24	4.86
4th Quartile	371	14.56	14.56	17.79	16.71	31.81	4.58
ALL LARGE-CAP FUNDS							
1st Quartile	134	28.36	16.42	13.43	23.13	8.96	9.7
2nd Quartile	134	20.15	22.39	11.94	15.67	17.16	12.69
3rd Quartile	133	6.02	16.54	19.55	15.79	25.56	16.54
4th Quartile	134	9.7	9.7	19.4	9.7	31.34	20.15
ALL MID-CAP FUNDS							
1st Quartile	54	18.52	16.67	11.11	18.52	11.11	24.07
2nd Quartile	54	11.11	11.11	24.07	12.96	24.07	16.67
3rd Quartile	54	18.52	16.67	7.41	9.26	20.37	27.78
4th Quartile	54	7.41	11.11	12.96	14.81	33.33	20.37
ALL SMALL-CAP FUNDS							
1st Quartile	88	20.45	25	20.45	23.86	10.23	0
2nd Quartile	89	19.1	22.47	24.72	20.22	11.24	2.25
3rd Quartile	88	25	15.91	21.59	20.45	13.64	3.41
4th Quartile	88	15.91	15.91	13.64	14.77	37.5	2.27
ALL MULTI-CAP FUNDS							
1st Quartile	95	21.05	16.84	13.68	17.89	6.32	24.21
2nd Quartile	95	13.68	12.63	15.79	15.79	17.89	24.21
3rd Quartile	94	11.7	12.77	14.89	11.7	17.02	31.91
4th Quartile	95	9.47	13.68	10.53	10.53	32.63	23.16

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 6: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Halves)						
All Domestic Funds	NO. OF FUNDS AT START (SEPTEMBER 2012)	FIVE-YEAR PERCENTAGES AT END				
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)	
Top Half	742	45.28	42.05	11.99	0.67	
Bottom Half	741	32.25	35.49	27.53	4.72	
ALL LARGE-CAP FUNDS						
Top Half	268	43.66	32.09	13.06	11.19	
Bottom Half	267	20.97	32.21	28.46	18.35	
ALL MID-CAP FUNDS						
Top Half	108	28.7	33.33	17.59	20.37	
Bottom Half	108	26.85	22.22	26.85	24.07	
ALL SMALL-CAP FUNDS						
Top Half	177	43.5	44.63	10.73	1.13	
Bottom Half	176	36.36	35.23	25.57	2.84	
ALL MULTI-CAP FUNDS						
Top Half	190	32.11	31.58	12.11	24.21	
Bottom Half	189	23.81	23.81	24.87	27.51	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 7: Performance Persistence of Domestic Fixed Income Funds Over Three Consecutive 12-Month Periods			
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP QUARTILE	
		SEPTEMBER 2016	SEPTEMBER 2017
TOP QUARTILE			
Government Long Funds	14	64.29	7.14
Government Intermediate Funds	6	50	0
Government Short Funds	7	42.86	0
Investment-Grade Long Funds	23	30.43	4.35
Investment-Grade Intermediate Funds	47	27.66	6.38
Investment-Grade Short Funds	22	45.45	27.27
High Yield Funds	51	21.57	3.92
Mortgage-Backed Securities Funds	13	30.77	15.38
Global Income Funds	26	3.85	3.85
Emerging Markets Debt Funds	13	15.38	0
General Municipal Debt Funds	20	60	30
California Municipal Debt Funds	9	44.44	11.11
New York Municipal Debt Funds	7	42.86	14.29
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2015)	PERCENTAGE REMAINING IN TOP HALF	
		SEPTEMBER 2016	SEPTEMBER 2017
TOP HALF			
Government Long Funds	29	79.31	20.69
Government Intermediate Funds	11	72.73	18.18
Government Short Funds	13	53.85	23.08
Investment-Grade Long Funds	46	28.26	10.87
Investment-Grade Intermediate Funds	94	57.45	29.79
Investment-Grade Short Funds	43	58.14	41.86
High Yield Funds	101	45.54	20.79
Mortgage-Backed Securities Funds	25	68	44
Global Income Funds	52	30.77	11.54
Emerging Markets Debt Funds	27	37.04	22.22
General Municipal Debt Funds	39	69.23	35.9
California Municipal Debt Funds	18	72.22	38.89
New York Municipal Debt Funds	14	57.14	28.57

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 8: Performance Persistence of Domestic Fixed Income Funds Over Five Consecutive 12-Month Periods

MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2013)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2014	SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017
TOP QUARTILE					
Government Long Funds	15	20	6.67	6.67	6.67
Government Intermediate Funds	6	0	0	0	0
Government Short Funds	7	14.29	14.29	14.29	0
Investment-Grade Long Funds	24	20.83	4.17	0	0
Investment-Grade Intermediate Funds	51	15.69	3.92	1.96	0
Investment-Grade Short Funds	14	64.29	14.29	14.29	14.29
High Yield Funds	45	44.44	6.67	2.22	2.22
Mortgage-Backed Securities Funds	14	42.86	14.29	0	0
Global Income Funds	26	50	30.77	0	0
Emerging Markets Debt Funds	8	25	12.5	0	0
General Municipal Debt Funds	19	5.26	0	0	0
California Municipal Debt Funds	9	22.22	11.11	11.11	0
New York Municipal Debt Funds	7	0	0	0	0
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2013)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2014	SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017
TOP HALF					
Government Long Funds	29	51.72	24.14	17.24	10.34
Government Intermediate Funds	11	27.27	27.27	9.09	9.09
Government Short Funds	14	57.14	35.71	28.57	14.29
Investment-Grade Long Funds	48	54.17	25	8.33	8.33
Investment-Grade Intermediate Funds	103	31.07	13.59	11.65	7.77
Investment-Grade Short Funds	28	82.14	42.86	28.57	21.43
High Yield Funds	90	67.78	24.44	14.44	10
Mortgage-Backed Securities Funds	29	55.17	48.28	37.93	34.48
Global Income Funds	52	67.31	42.31	9.62	3.85
Emerging Markets Debt Funds	16	56.25	25	12.5	12.5
General Municipal Debt Funds	39	33.33	23.08	20.51	12.82
California Municipal Debt Funds	18	44.44	38.89	27.78	16.67
New York Municipal Debt Funds	14	35.71	28.57	21.43	21.43

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 9: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Quartile)

GOVERNMENT LONG FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2014)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	14	57.14	7.14	21.43	14.29	0	0
2nd Quartile	15	20	33.33	26.67	13.33	6.67	0
3rd Quartile	14	7.14	28.57	42.86	14.29	7.14	0
4th Quartile	14	7.14	14.29	0	42.86	35.71	0
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	5	60	0	0	20	20	0
2nd Quartile	6	33.33	33.33	16.67	16.67	0	0
3rd Quartile	5	0	20	60	20	0	0
4th Quartile	5	0	20	20	20	40	0
GOVERNMENT SHORT FUNDS							
1st Quartile	6	33.33	50	16.67	0	0	0
2nd Quartile	7	28.57	42.86	14.29	0	14.29	0
3rd Quartile	6	16.67	0	33.33	16.67	33.33	0
4th Quartile	6	0	0	16.67	66.67	0	16.67
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	21	52.38	28.57	0	9.52	0	9.52
2nd Quartile	21	23.81	28.57	42.86	0	0	4.76
3rd Quartile	21	14.29	23.81	23.81	28.57	4.76	4.76
4th Quartile	21	0	4.76	23.81	47.62	9.52	14.29
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	45	40	22.22	13.33	8.89	4.44	11.11
2nd Quartile	44	25	25	15.91	13.64	15.91	4.55
3rd Quartile	45	15.56	31.11	28.89	13.33	8.89	2.22
4th Quartile	44	2.27	6.82	25	47.73	9.09	9.09
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	17	47.06	29.41	5.88	11.76	5.88	0
2nd Quartile	18	22.22	33.33	27.78	11.11	5.56	0
3rd Quartile	17	5.88	23.53	47.06	17.65	5.88	0
4th Quartile	17	11.76	0	5.88	47.06	29.41	5.88
HIGH YIELD FUNDS							
1st Quartile	42	26.19	23.81	19.05	21.43	7.14	2.38
2nd Quartile	41	24.39	26.83	29.27	9.76	9.76	0
3rd Quartile	42	30.95	21.43	21.43	14.29	11.9	0
4th Quartile	41	7.32	14.63	19.51	41.46	14.63	2.44

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 9: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Quartile) (cont.)							
MORTGAGE-BACKED SECURITIES FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2014)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	13	53.85	38.46	7.69	0	0	0
2nd Quartile	13	23.08	15.38	30.77	23.08	0	7.69
3rd Quartile	13	0	15.38	23.08	30.77	7.69	23.08
4th Quartile	13	7.69	15.38	23.08	30.77	15.38	7.69
GLOBAL INCOME FUNDS							
1st Quartile	20	60	15	0	20	0	5
2nd Quartile	19	31.58	26.32	36.84	5.26	0	0
3rd Quartile	20	0	45	35	5	15	0
4th Quartile	19	0	5.26	15.79	63.16	10.53	5.26
EMERGING MARKETS DEBT FUNDS							
1st Quartile	6	66.67	16.67	16.67	0	0	0
2nd Quartile	6	16.67	50	33.33	0	0	0
3rd Quartile	5	0	0	40	60	0	0
4th Quartile	6	16.67	16.67	16.67	33.33	16.67	0
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	18	50	33.33	11.11	5.56	0	0
2nd Quartile	18	33.33	33.33	16.67	5.56	0	11.11
3rd Quartile	17	5.88	23.53	47.06	17.65	5.88	0
4th Quartile	18	0	5.56	16.67	61.11	5.56	11.11
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	9	55.56	22.22	11.11	11.11	0	0
2nd Quartile	8	12.5	50	12.5	25	0	0
3rd Quartile	9	22.22	22.22	33.33	0	11.11	11.11
4th Quartile	8	0	0	37.5	62.5	0	0
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	7	28.57	42.86	14.29	0	0	14.29
2nd Quartile	7	28.57	14.29	42.86	14.29	0	0
3rd Quartile	6	33.33	16.67	0	33.33	16.67	0
4th Quartile	7	0	28.57	28.57	42.86	0	0

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 10: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Halves)					
GOVERNMENT LONG FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2014)	THREE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	29	58.62	37.93	3.45	0
Bottom Half	28	28.57	50	21.43	0
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	11	63.64	27.27	9.09	0
Bottom Half	10	20	60	20	0
GOVERNMENT SHORT FUNDS					
Top Half	13	76.92	15.38	7.69	0
Bottom Half	12	8.33	66.67	16.67	8.33
INVESTMENT-GRADE LONG FUNDS					
Top Half	42	66.67	26.19	0	7.14
Bottom Half	42	21.43	61.9	7.14	9.52
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	89	56.18	25.84	10.11	7.87
Bottom Half	89	28.09	57.3	8.99	5.62
INVESTMENT-GRADE SHORT FUNDS					
Top Half	35	65.71	28.57	5.71	0
Bottom Half	34	20.59	58.82	17.65	2.94
HIGH YIELD FUNDS					
Top Half	83	50.6	39.76	8.43	1.2
Bottom Half	83	37.35	48.19	13.25	1.2
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	26	65.38	30.77	0	3.85
Bottom Half	26	19.23	53.85	11.54	15.38
GLOBAL INCOME FUNDS					
Top Half	39	66.67	30.77	0	2.56
Bottom Half	39	25.64	58.97	12.82	2.56
EMERGING MARKETS DEBT FUNDS					
Top Half	12	75	25	0	0
Bottom Half	11	18.18	72.73	9.09	0
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	36	75	19.44	0	5.56
Bottom Half	35	17.14	71.43	5.71	5.71
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	17	70.59	29.41	0	0
Bottom Half	17	23.53	64.71	5.88	5.88
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	14	57.14	35.71	0	7.14
Bottom Half	13	38.46	53.85	7.69	0

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 11: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Quartile)							
GOVERNMENT LONG FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2012)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	9	55.56	11.11	11.11	11.11	11.11	0
2nd Quartile	8	12.5	12.5	25	25	25	0
3rd Quartile	9	0	44.44	11.11	22.22	11.11	11.11
4th Quartile	8	12.5	12.5	25	25	25	0
GOVERNMENT INTERMEDIATE FUNDS							
1st Quartile	7	42.86	14.29	0	14.29	28.57	0
2nd Quartile	6	16.67	16.67	33.33	16.67	16.67	0
3rd Quartile	7	0	14.29	28.57	0	42.86	14.29
4th Quartile	6	0	33.33	0	33.33	33.33	0
GOVERNMENT SHORT FUNDS							
1st Quartile	7	42.86	14.29	28.57	0	14.29	0
2nd Quartile	8	12.5	25	12.5	12.5	25	12.5
3rd Quartile	7	0	14.29	0	28.57	42.86	14.29
4th Quartile	7	14.29	14.29	14.29	28.57	14.29	14.29
INVESTMENT-GRADE LONG FUNDS							
1st Quartile	15	40	26.67	6.67	6.67	13.33	6.67
2nd Quartile	16	18.75	18.75	6.25	12.5	6.25	37.5
3rd Quartile	15	6.67	13.33	26.67	26.67	6.67	20
4th Quartile	15	6.67	13.33	26.67	26.67	6.67	20
INVESTMENT-GRADE INTERMEDIATE FUNDS							
1st Quartile	39	15.38	17.95	12.82	5.13	12.82	35.9
2nd Quartile	39	20.51	17.95	15.38	2.56	20.51	23.08
3rd Quartile	38	10.53	13.16	18.42	13.16	31.58	13.16
4th Quartile	39	12.82	7.69	12.82	35.9	12.82	17.95
INVESTMENT-GRADE SHORT FUNDS							
1st Quartile	13	38.46	30.77	15.38	7.69	7.69	0
2nd Quartile	14	7.14	28.57	42.86	21.43	0	0
3rd Quartile	13	15.38	23.08	15.38	23.08	23.08	0
4th Quartile	13	23.08	7.69	7.69	30.77	15.38	15.38
HIGH YIELD FUNDS							
1st Quartile	26	38.46	26.92	19.23	3.85	7.69	3.85
2nd Quartile	25	20	16	28	24	12	0
3rd Quartile	26	15.38	15.38	26.92	23.08	15.38	3.85
4th Quartile	25	12	24	12	32	16	4

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 11: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Quartile) (cont.)							
MORTGAGE-BACKED SECURITIES FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2012)	FIVE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGE D (%)
1st Quartile	11	36.36	18.18	27.27	9.09	0	9.09
2nd Quartile	11	0	27.27	18.18	27.27	27.27	0
3rd Quartile	11	18.18	9.09	9.09	27.27	9.09	27.27
4th Quartile	11	27.27	18.18	27.27	9.09	9.09	9.09
GLOBAL INCOME FUNDS							
1st Quartile	10	40	20	20	10	10	0
2nd Quartile	9	11.11	22.22	22.22	33.33	0	11.11
3rd Quartile	10	20	20	20	10	20	10
4th Quartile	9	0	22.22	11.11	22.22	33.33	11.11
EMERGING MARKETS DEBT FUNDS							
1st Quartile	4	50	0	25	0	25	0
2nd Quartile	3	0	66.67	33.33	0	0	0
3rd Quartile	4	25	25	25	25	0	0
4th Quartile	3	0	0	0	66.67	0	33.33
GENERAL MUNICIPAL DEBT FUNDS							
1st Quartile	17	29.41	17.65	29.41	17.65	5.88	0
2nd Quartile	16	25	25	25	18.75	6.25	0
3rd Quartile	17	11.76	23.53	23.53	17.65	17.65	5.88
4th Quartile	16	25	18.75	12.5	31.25	0	12.5
CALIFORNIA MUNICIPAL DEBT FUNDS							
1st Quartile	9	33.33	11.11	22.22	22.22	0	11.11
2nd Quartile	8	0	50	25	25	0	0
3rd Quartile	9	22.22	22.22	22.22	33.33	0	0
4th Quartile	8	37.5	12.5	25	12.5	12.5	0
NEW YORK MUNICIPAL DEBT FUNDS							
1st Quartile	7	28.57	14.29	28.57	28.57	0	0
2nd Quartile	7	14.29	28.57	28.57	14.29	14.29	0
3rd Quartile	6	0	33.33	16.67	33.33	0	16.67
4th Quartile	7	42.86	14.29	14.29	14.29	14.29	0

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 12: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Halves)					
GOVERNMENT LONG FUNDS	NO. OF FUNDS AT START (SEPTEMBER 2012)	FIVE-YEAR PERCENTAGES AT END			
		TOP HALF (%)	BOTTOM HALF (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)
Top Half	17	47.06	35.29	17.65	0
Bottom Half	17	35.29	41.18	17.65	5.88
GOVERNMENT INTERMEDIATE FUNDS					
Top Half	13	46.15	30.77	23.08	0
Bottom Half	13	23.08	30.77	38.46	7.69
GOVERNMENT SHORT FUNDS					
Top Half	15	46.67	26.67	20	6.67
Bottom Half	14	21.43	35.71	28.57	14.29
INVESTMENT-GRADE LONG FUNDS					
Top Half	31	51.61	16.13	9.68	22.58
Bottom Half	30	20	53.33	6.67	20
INVESTMENT-GRADE INTERMEDIATE FUNDS					
Top Half	78	35.9	17.95	16.67	29.49
Bottom Half	77	22.08	40.26	22.08	15.58
INVESTMENT-GRADE SHORT FUNDS					
Top Half	27	51.85	44.44	3.7	0
Bottom Half	26	34.62	38.46	19.23	7.69
HIGH YIELD FUNDS					
Top Half	51	50.98	37.25	9.8	1.96
Bottom Half	51	33.33	47.06	15.69	3.92
MORTGAGE-BACKED SECURITIES FUNDS					
Top Half	22	40.91	40.91	13.64	4.55
Bottom Half	22	36.36	36.36	9.09	18.18
GLOBAL INCOME FUNDS					
Top Half	19	47.37	42.11	5.26	5.26
Bottom Half	19	31.58	31.58	26.32	10.53
EMERGING MARKETS DEBT FUNDS					
Top Half	7	57.14	28.57	14.29	0
Bottom Half	7	28.57	57.14	0	14.29
GENERAL MUNICIPAL DEBT FUNDS					
Top Half	33	48.48	45.45	6.06	0
Bottom Half	33	39.39	42.42	9.09	9.09
CALIFORNIA MUNICIPAL DEBT FUNDS					
Top Half	17	47.06	47.06	0	5.88
Bottom Half	17	47.06	47.06	5.88	0
NEW YORK MUNICIPAL DEBT FUNDS					
Top Half	14	42.86	50	7.14	0
Bottom Half	13	46.15	38.46	7.69	7.69

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2017. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

GENERAL DISCLAIMER

Copyright © 2018 by S&P Dow Jones Indices LLC, a part of S&P Global. All rights reserved. Standard & Poor's®, S&P 500® and S&P® are registered trademarks of Standard & Poor's Financial Services LLC ("S&P"), a subsidiary of S&P Global. Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"). Trademarks have been licensed to S&P Dow Jones Indices LLC. Redistribution, reproduction and/or photocopying in whole or in part are prohibited without written permission. This document does not constitute an offer of services in jurisdictions where S&P Dow Jones Indices LLC, Dow Jones, S&P or their respective affiliates (collectively "S&P Dow Jones Indices") do not have the necessary licenses. All information provided by S&P Dow Jones Indices is impersonal and not tailored to the needs of any person, entity or group of persons. S&P Dow Jones Indices receives compensation in connection with licensing its indices to third parties. Past performance of an index is not a guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index is available through investable instruments based on that index. S&P Dow Jones Indices does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. S&P Dow Jones Indices makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC is not an investment advisor, and S&P Dow Jones Indices makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document. Prospective investors are advised to make an investment in any such fund or other vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or other vehicle. Inclusion of a security within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, nor is it considered to be investment advice.

These materials have been prepared solely for informational purposes based upon information generally available to the public and from sources believed to be reliable. No content contained in these materials (including index data, ratings, credit-related analyses and data, research, valuations, model, software or other application or output therefrom) or any part thereof (Content) may be modified, reverse-engineered, reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of S&P Dow Jones Indices. The Content shall not be used for any unlawful or unauthorized purposes. S&P Dow Jones Indices and its third-party data providers and licensors (collectively "S&P Dow Jones Indices Parties") do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Dow Jones Indices Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON AN "AS IS" BASIS. S&P DOW JONES INDICES PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Dow Jones Indices Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.

S&P Dow Jones Indices keeps certain activities of its business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain business units of S&P Dow Jones Indices may have information that is not available to other business units. S&P Dow Jones Indices has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

In addition, S&P Dow Jones Indices provides a wide range of services to, or relating to, many organizations, including issuers of securities, investment advisers, broker-dealers, investment banks, other financial institutions and financial intermediaries, and accordingly may receive fees or other economic benefits from those organizations, including organizations whose securities or services they may recommend, rate, include in model portfolios, evaluate or otherwise address.