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# 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. However, performance persistence of domestic equity funds improved compared with the results from March 2018.
- Out of 550 domestic equity funds that were in the top quartile as of September 2016, only 7.09% managed to stay in the top quartile at the end of September 2018 (2.33% as of March 2018). Furthermore, 6.60% (0.93%) of large-cap funds, 3.95% (0%) of mid-cap funds, and 7.69% (3.85%) of small-cap funds remained in the top quartile.
- For the three-year period that ended in September 2018, persistence figures for funds in the top half improved as well. Over three consecutive 12-month periods, 23.64% of large-cap funds, 21.71% of mid-cap funds, and 20% 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 only 0.91% of large cap and no mid-cap or small-cap funds managed to remain in the top quartile at the end of the five-year measurement period. This figure paints a negative picture regarding long-term persistence in mutual fund returns.
- There was an improvement in performance persistence of top-half funds over the five-year horizon; 9.09% of large-cap funds, 11.52% of mid-cap funds, and 5.08% 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-quartile 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 497 funds that were in the bottom quartile, 10.06% moved to the top quartile over the five-year horizon, while 21.13% of the 497 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 31.61% of large-cap funds, 34.67% of mid-cap funds, and 24.55% 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 2018. Government Long and Government Intermediate funds were the only categories in which the results showed no performance persistence.
- Over the five-year 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 and investment-grade bonds, short-term investment-grade bonds, high yield, general municipal debt, and California municipal debt were the only groups in which a noticeable level of persistence was observed. The findings are similar to those from six months prior.

## **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<sup>®</sup> 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 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 2016)	PERCENTAGE REMAINING IN TOP QUARTILE	
		SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP QUARTILE</b>			
All Domestic Funds	550	21.09	7.09
All Large-Cap Funds	212	14.15	6.60
All Mid-Cap Funds	76	23.68	3.95
All Small-Cap Funds	130	32.31	7.69
All Multi-Cap Funds	132	21.21	9.85
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2016)	PERCENTAGE REMAINING IN TOP HALF	
		SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP HALF</b>			
All Domestic Funds	1099	46.31	25.20
All Large-Cap Funds	423	40.19	23.64
All Mid-Cap Funds	152	39.47	21.71
All Small-Cap Funds	260	47.31	20.00
All Multi-Cap Funds	264	42.80	25.38

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. 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 2014)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP QUARTILE</b>					
All Domestic Funds	561	21.03	3.57	1.60	1.43
All Large-Cap Funds	220	21.36	2.27	0.91	0.91
All Mid-Cap Funds	83	15.66	2.41	0.00	0.00
All Small-Cap Funds	128	17.19	3.12	0.78	0.00
All Multi-Cap Funds	130	25.38	6.15	4.62	3.08
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2014)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP HALF</b>					
All Domestic Funds	1120	43.75	20.36	11.25	9.46
All Large-Cap Funds	440	46.82	18.86	10.91	9.09
All Mid-Cap Funds	165	41.21	22.42	13.33	11.52
All Small-Cap Funds	256	43.75	19.53	11.33	5.08
All Multi-Cap Funds	259	46.72	23.94	15.06	11.97

Source: S&P Dow Jones Indices LLC, CRSP. Data as of March 31, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 3: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Quartile)</b>							
<b>ALL DOMESTIC FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2015)</b>	<b>THREE-YEAR PERCENTAGES AT END</b>					
		<b>1ST QUARTILE (%)</b>	<b>2ND QUARTILE (%)</b>	<b>3TH QUARTILE (%)</b>	<b>4TH QUARTILE (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
1st Quartile	522	37.16	22.61	15.52	19.35	5.17	0.19
2nd Quartile	523	20.65	26.00	24.28	16.63	12.05	0.38
3rd Quartile	522	15.33	21.84	25.29	21.84	14.56	1.15
4th Quartile	522	12.45	15.13	20.50	27.78	22.22	1.92
<b>ALL LARGE-CAP FUNDS</b>							
1st Quartile	203	47.78	18.23	10.34	2.96	6.90	13.79
2nd Quartile	202	18.81	26.24	19.80	9.41	12.38	13.37
3rd Quartile	203	6.90	19.21	25.12	28.08	14.78	5.91
4th Quartile	202	1.98	11.88	19.80	35.15	20.79	10.40
<b>ALL MID-CAP FUNDS</b>							
1st Quartile	75	25.33	21.33	10.67	22.67	5.33	14.67
2nd Quartile	75	17.33	18.67	28.00	17.33	9.33	9.33
3rd Quartile	75	16.00	20.00	20.00	14.67	16.00	13.33
4th Quartile	75	13.33	10.67	13.33	16.00	20.00	26.67
<b>ALL SMALL-CAP FUNDS</b>							
1st Quartile	121	24.79	28.10	18.18	23.14	4.96	0.83
2nd Quartile	120	17.50	22.50	28.33	17.50	12.50	1.67
3rd Quartile	121	22.31	18.18	23.97	19.83	10.74	4.96
4th Quartile	120	20.83	16.67	14.17	25.00	20.83	2.50
<b>ALL MULTI-CAP FUNDS</b>							
1st Quartile	124	26.61	19.35	20.16	9.68	4.84	19.35
2nd Quartile	125	20.80	17.60	16.00	14.40	9.60	21.60
3rd Quartile	124	8.87	16.13	14.52	20.97	15.32	24.19
4th Quartile	124	8.87	11.29	14.52	19.35	29.84	16.13

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 4: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Halves)</b>					
<b>ALL DOMESTIC FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2015)</b>	<b>THREE-YEAR PERCENTAGES AT END</b>			
		<b>TOP HALF (%)</b>	<b>BOTTOM HALF (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
Top Half	1045	53.21	37.89	8.61	0.29
Bottom Half	1044	32.38	47.70	18.39	1.53
<b>ALL LARGE-CAP FUNDS</b>					
Top Half	405	55.56	21.23	9.63	13.58
Bottom Half	405	20.00	54.07	17.78	8.15
<b>ALL MID-CAP FUNDS</b>					
Top Half	150	41.33	39.33	7.33	12.00
Bottom Half	150	30.00	32.00	18.00	20.00
<b>ALL SMALL-CAP FUNDS</b>					
Top Half	241	46.47	43.57	8.71	1.24
Bottom Half	241	39.00	41.49	15.77	3.73
<b>ALL MULTI-CAP FUNDS</b>					
Top Half	249	42.17	30.12	7.23	20.48
Bottom Half	248	22.58	34.68	22.58	20.16

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 5: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Quartile)</b>							
<b>ALL DOMESTIC FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2013)</b>	<b>FIVE-YEAR PERCENTAGES AT END</b>					
		<b>1ST QUARTILE (%)</b>	<b>2ND QUARTILE (%)</b>	<b>3TH QUARTILE (%)</b>	<b>4TH QUARTILE (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
1st Quartile	497	27.16	21.73	20.32	21.13	9.46	0.20
2nd Quartile	498	21.69	20.08	21.08	20.08	16.06	1.00
3rd Quartile	497	19.92	21.93	19.72	16.90	18.71	2.82
4th Quartile	497	10.06	15.09	17.71	20.72	27.57	8.85
<b>ALL LARGE-CAP FUNDS</b>							
1st Quartile	194	35.57	19.07	13.40	10.82	13.92	7.22
2nd Quartile	193	17.62	20.73	18.65	16.06	13.47	13.47
3rd Quartile	194	10.31	18.56	19.59	17.01	19.59	14.95
4th Quartile	193	3.11	8.29	15.03	22.80	31.61	19.17
<b>ALL MID-CAP FUNDS</b>							
1st Quartile	75	18.67	21.33	10.67	14.67	8.00	26.67
2nd Quartile	75	12.00	13.33	22.67	21.33	14.67	16.00
3rd Quartile	74	16.22	18.92	12.16	12.16	21.62	18.92
4th Quartile	75	14.67	8.00	14.67	13.33	34.67	14.67
<b>ALL SMALL-CAP FUNDS</b>							
1st Quartile	110	35.45	15.45	15.45	22.73	9.09	1.82
2nd Quartile	110	23.64	22.73	20.00	15.45	14.55	3.64
3rd Quartile	109	11.93	19.27	29.36	20.18	16.51	2.75
4th Quartile	110	10.00	22.73	16.36	21.82	24.55	4.55
<b>ALL MULTI-CAP FUNDS</b>							
1st Quartile	119	19.33	14.29	18.49	13.45	5.04	29.41
2nd Quartile	120	20.00	12.50	17.50	10.83	13.33	25.83
3rd Quartile	119	5.88	16.81	12.61	10.92	17.65	36.13
4th Quartile	119	8.40	9.24	5.04	17.65	26.89	32.77

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 6: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Halves)</b>					
<b>ALL DOMESTIC FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2013)</b>	<b>FIVE-YEAR PERCENTAGES AT END</b>			
		<b>TOP HALF (%)</b>	<b>BOTTOM HALF (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
Top Half	995	45.33	41.31	12.76	0.60
Bottom Half	994	33.50	37.53	23.14	5.84
<b>ALL LARGE-CAP FUNDS</b>					
Top Half	387	46.51	29.46	13.70	10.34
Bottom Half	387	20.16	37.21	25.58	17.05
<b>ALL MID-CAP FUNDS</b>					
Top Half	150	32.67	34.67	11.33	21.33
Bottom Half	149	28.86	26.17	28.19	16.78
<b>ALL SMALL-CAP FUNDS</b>					
Top Half	220	48.64	36.82	11.82	2.73
Bottom Half	219	31.96	43.84	20.55	3.65
<b>ALL MULTI-CAP FUNDS</b>					
Top Half	239	33.05	30.13	9.21	27.62
Bottom Half	238	20.17	23.11	22.27	34.45

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.



<b>Exhibit 7: Performance Persistence of Domestic Fixed Income Funds Over Three Consecutive 12-Month Periods</b>			
<b>MUTUAL FUND CATEGORY</b>	<b>FUND COUNT AT START (SEPTEMBER 2016)</b>	<b>PERCENTAGE REMAINING IN TOP QUARTILE</b>	
		<b>SEPTEMBER 2017</b>	<b>SEPTEMBER 2018</b>
<b>TOP QUARTILE</b>			
Government Long Funds	14	14.29	0.00
Government Intermediate Funds	5	0.00	0.00
Government Short Funds	6	33.33	16.67
Investment-Grade Long Funds	23	52.17	13.04
Investment-Grade Intermediate Funds	50	36.00	14.00
Investment-Grade Short Funds	23	56.52	30.43
High Yield Funds	51	39.22	13.73
Mortgage-Backed Securities Funds	13	46.15	46.15
Global Income Funds	27	29.63	3.70
Emerging Markets Debt Funds	15	26.67	6.67
General Municipal Debt Funds	20	45.00	30.00
California Municipal Debt Funds	9	22.22	22.22
New York Municipal Debt Funds	7	42.86	14.29
<b>MUTUAL FUND CATEGORY</b>	<b>FUND COUNT AT START (SEPTEMBER 2016)</b>	<b>PERCENTAGE REMAINING IN TOP HALF</b>	
		<b>SEPTEMBER 2017</b>	<b>SEPTEMBER 2018</b>
<b>TOP HALF</b>			
Government Long Funds	28	28.57	21.43
Government Intermediate Funds	10	20.00	0.00
Government Short Funds	12	66.67	33.33
Investment-Grade Long Funds	47	72.34	38.30
Investment-Grade Intermediate Funds	100	57.00	30.00
Investment-Grade Short Funds	45	77.78	55.56
High Yield Funds	102	58.82	32.35
Mortgage-Backed Securities Funds	27	59.26	44.44
Global Income Funds	54	46.30	12.96
Emerging Markets Debt Funds	30	63.33	26.67
General Municipal Debt Funds	39	51.28	35.90
California Municipal Debt Funds	18	44.44	27.78
New York Municipal Debt Funds	14	50.00	35.71

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. 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 2014)	PERCENTAGE REMAINING IN TOP QUARTILE			
		SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP QUARTILE</b>					
Government Long Funds	15	60.00	60.00	6.67	6.67
Government Intermediate Funds	5	40.00	40.00	0.00	0.00
Government Short Funds	7	42.86	14.29	0.00	0.00
Investment-Grade Long Funds	22	13.64	9.09	4.55	4.55
Investment-Grade Intermediate Funds	50	24.00	10.00	0.00	0.00
Investment-Grade Short Funds	19	47.37	31.58	21.05	10.53
High Yield Funds	49	14.29	2.04	2.04	2.04
Mortgage-Backed Securities Funds	13	23.08	7.69	0.00	0.00
Global Income Funds	26	50.00	0.00	0.00	0.00
Emerging Markets Debt Funds	11	36.36	0.00	0.00	0.00
General Municipal Debt Funds	20	50.00	40.00	25.00	25.00
California Municipal Debt Funds	9	55.56	44.44	11.11	11.11
New York Municipal Debt Funds	7	42.86	14.29	0.00	0.00
MUTUAL FUND CATEGORY	FUND COUNT AT START (SEPTEMBER 2014)	PERCENTAGE REMAINING IN TOP HALF			
		SEPTEMBER 2015	SEPTEMBER 2016	SEPTEMBER 2017	SEPTEMBER 2018
<b>TOP HALF</b>					
Government Long Funds	29	62.07	51.72	13.79	13.79
Government Intermediate Funds	11	72.73	54.55	9.09	0.00
Government Short Funds	14	57.14	50.00	28.57	7.14
Investment-Grade Long Funds	44	40.91	25.00	15.91	4.55
Investment-Grade Intermediate Funds	99	53.54	44.44	21.21	9.09
Investment-Grade Short Funds	39	56.41	43.59	30.77	20.51
High Yield Funds	97	36.08	22.68	13.40	7.22
Mortgage-Backed Securities Funds	26	65.38	50.00	46.15	38.46
Global Income Funds	52	57.69	15.38	7.69	5.77
Emerging Markets Debt Funds	21	66.67	38.10	19.05	4.76
General Municipal Debt Funds	39	69.23	51.28	33.33	28.21
California Municipal Debt Funds	18	72.22	55.56	22.22	11.11
New York Municipal Debt Funds	14	78.57	57.14	28.57	21.43

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. 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	FUND COUNT AT START (SEPTEMBER 2015)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	14	42.86	21.43	21.43	7.14	7.14	0.00
2nd Quartile	14	21.43	21.43	35.71	21.43	0.00	0.00
3rd Quartile	13	7.69	30.77	30.77	23.08	7.69	0.00
4th Quartile	14	14.29	14.29	0.00	35.71	35.71	0.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>							
1st Quartile	6	33.33	33.33	16.67	0.00	16.67	0.00
2nd Quartile	5	20.00	20.00	40.00	0.00	0.00	20.00
3rd Quartile	6	16.67	16.67	16.67	33.33	16.67	0.00
4th Quartile	5	0.00	0.00	0.00	40.00	60.00	0.00
<b>GOVERNMENT SHORT FUNDS</b>							
1st Quartile	7	14.29	57.14	28.57	0.00	0.00	0.00
2nd Quartile	6	33.33	33.33	16.67	0.00	0.00	16.67
3rd Quartile	7	28.57	0.00	14.29	28.57	14.29	14.29
4th Quartile	6	0.00	0.00	16.67	50.00	33.33	0.00
<b>INVESTMENT-GRADE LONG FUNDS</b>							
1st Quartile	21	42.86	14.29	19.05	4.76	4.76	14.29
2nd Quartile	21	19.05	38.10	28.57	4.76	9.52	0.00
3rd Quartile	21	19.05	19.05	23.81	33.33	0.00	4.76
4th Quartile	21	4.76	9.52	14.29	38.10	14.29	19.05
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>							
1st Quartile	44	43.18	36.36	4.55	13.64	2.27	0.00
2nd Quartile	44	18.18	18.18	34.09	13.64	11.36	4.55
3rd Quartile	43	16.28	20.93	32.56	18.60	11.63	0.00
4th Quartile	44	11.36	13.64	15.91	43.18	13.64	2.27
<b>INVESTMENT-GRADE SHORT FUNDS</b>							
1st Quartile	18	33.33	38.89	5.56	16.67	5.56	0.00
2nd Quartile	18	38.89	16.67	22.22	11.11	11.11	0.00
3rd Quartile	18	0.00	27.78	38.89	27.78	5.56	0.00
4th Quartile	18	16.67	5.56	16.67	33.33	27.78	0.00
<b>HIGH YIELD FUNDS</b>							
1st Quartile	43	37.21	30.23	16.28	11.63	4.65	0.00
2nd Quartile	44	15.91	34.09	34.09	11.36	4.55	0.00
3rd Quartile	43	20.93	13.95	25.58	30.23	9.30	0.00
4th Quartile	43	13.95	6.98	11.63	32.56	34.88	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. 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	FUND COUNT AT START (SEPTEMBER 2015)	THREE-YEAR PERCENTAGES AT END					
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/LIQUIDATED (%)	STYLE CHANGED (%)
1st Quartile	12	58.33	25.00	8.33	8.33	0.00	0.00
2nd Quartile	12	33.33	50.00	16.67	0.00	0.00	0.00
3rd Quartile	11	0.00	9.09	36.36	36.36	9.09	9.09
4th Quartile	12	0.00	8.33	33.33	50.00	8.33	0.00
<b>GLOBAL INCOME FUNDS</b>							
1st Quartile	23	21.74	17.39	21.74	30.43	4.35	4.35
2nd Quartile	23	17.39	21.74	34.78	8.70	17.39	0.00
3rd Quartile	23	21.74	26.09	13.04	21.74	13.04	4.35
4th Quartile	23	26.09	17.39	17.39	21.74	17.39	0.00
<b>EMERGING MARKETS DEBT FUNDS</b>							
1st Quartile	8	0.00	37.50	25.00	25.00	12.50	0.00
2nd Quartile	7	14.29	28.57	14.29	14.29	28.57	0.00
3rd Quartile	8	37.50	25.00	12.50	0.00	25.00	0.00
4th Quartile	7	28.57	0.00	28.57	42.86	0.00	0.00
<b>GENERAL MUNICIPAL DEBT FUNDS</b>							
1st Quartile	18	55.56	33.33	5.56	0.00	5.56	0.00
2nd Quartile	18	27.78	22.22	33.33	11.11	5.56	0.00
3rd Quartile	18	5.56	16.67	38.89	33.33	0.00	5.56
4th Quartile	18	0.00	16.67	5.56	44.44	22.22	11.11
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>							
1st Quartile	9	44.44	22.22	11.11	11.11	11.11	0.00
2nd Quartile	9	22.22	33.33	33.33	11.11	0.00	0.00
3rd Quartile	8	12.50	25.00	12.50	37.50	12.50	0.00
4th Quartile	9	11.11	11.11	33.33	33.33	0.00	11.11
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>							
1st Quartile	7	42.86	28.57	0.00	14.29	0.00	14.29
2nd Quartile	7	14.29	42.86	28.57	14.29	0.00	0.00
3rd Quartile	6	16.67	16.67	50.00	0.00	16.67	0.00
4th Quartile	7	14.29	14.29	14.29	57.14	0.00	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 10: Three-Year Transition Matrix – Performance Over Two Non-Overlapping Three-Year Periods (Based on Halves)</b>					
<b>GOVERNMENT LONG FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2015)</b>	<b>THREE-YEAR PERCENTAGES AT END</b>			
		<b>TOP HALF (%)</b>	<b>BOTTOM HALF (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
Top Half	28	53.57	42.86	3.57	0.00
Bottom Half	27	33.33	44.44	22.22	0.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>					
Top Half	11	54.55	27.27	9.09	9.09
Bottom Half	11	18.18	45.45	36.36	0.00
<b>GOVERNMENT SHORT FUNDS</b>					
Top Half	13	69.23	23.08	0.00	7.69
Bottom Half	13	15.38	53.85	23.08	7.69
<b>INVESTMENT-GRADE LONG FUNDS</b>					
Top Half	42	57.14	28.57	7.14	7.14
Bottom Half	42	26.19	54.76	7.14	11.90
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>					
Top Half	88	57.95	32.95	6.82	2.27
Bottom Half	87	31.03	55.17	12.64	1.15
<b>INVESTMENT-GRADE SHORT FUNDS</b>					
Top Half	36	63.89	27.78	8.33	0.00
Bottom Half	36	25.00	58.33	16.67	0.00
<b>HIGH YIELD FUNDS</b>					
Top Half	87	58.62	36.78	4.60	0.00
Bottom Half	86	27.91	50.00	22.09	0.00
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>					
Top Half	24	83.33	16.67	0.00	0.00
Bottom Half	23	8.70	78.26	8.70	4.35
<b>GLOBAL INCOME FUNDS</b>					
Top Half	46	39.13	47.83	10.87	2.17
Bottom Half	46	45.65	36.96	15.22	2.17
<b>EMERGING MARKETS DEBT FUNDS</b>					
Top Half	15	40.00	40.00	20.00	0.00
Bottom Half	15	46.67	40.00	13.33	0.00
<b>GENERAL MUNICIPAL DEBT FUNDS</b>					
Top Half	36	69.44	25.00	5.56	0.00
Bottom Half	36	19.44	61.11	11.11	8.33
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>					
Top Half	18	61.11	33.33	5.56	0.00
Bottom Half	17	29.41	58.82	5.88	5.88
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>					
Top Half	14	64.29	28.57	0.00	7.14
Bottom Half	13	30.77	61.54	7.69	0.00

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 11: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Quartile)</b>							
<b>GOVERNMENT LONG FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2013)</b>	<b>FIVE-YEAR PERCENTAGES AT END</b>					
		<b>1ST QUARTILE (%)</b>	<b>2ND QUARTILE (%)</b>	<b>3TH QUARTILE (%)</b>	<b>4TH QUARTILE (%)</b>	<b>MERGED/ LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
1st Quartile	13	61.54	15.38	0.00	0.00	15.38	7.69
2nd Quartile	13	15.38	30.77	23.08	30.77	0.00	0.00
3rd Quartile	13	7.69	15.38	30.77	15.38	30.77	0.00
4th Quartile	13	0.00	15.38	30.77	30.77	23.08	0.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>							
1st Quartile	6	33.33	33.33	0.00	0.00	33.33	0.00
2nd Quartile	5	40.00	20.00	20.00	0.00	0.00	20.00
3rd Quartile	6	0.00	16.67	16.67	16.67	50.00	0.00
4th Quartile	5	0.00	0.00	20.00	60.00	20.00	0.00
<b>GOVERNMENT SHORT FUNDS</b>							
1st Quartile	7	42.86	14.29	28.57	0.00	14.29	0.00
2nd Quartile	7	0.00	42.86	14.29	0.00	28.57	14.29
3rd Quartile	7	14.29	0.00	28.57	14.29	28.57	14.29
4th Quartile	7	14.29	0.00	0.00	42.86	28.57	14.29
<b>INVESTMENT-GRADE LONG FUNDS</b>							
1st Quartile	21	38.10	28.57	4.76	0.00	4.76	23.81
2nd Quartile	22	22.73	13.64	36.36	13.64	9.09	4.55
3rd Quartile	21	4.76	14.29	23.81	28.57	14.29	14.29
4th Quartile	21	9.52	14.29	9.52	28.57	14.29	23.81
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>							
1st Quartile	45	26.67	20.00	6.67	8.89	15.56	22.22
2nd Quartile	45	24.44	31.11	28.89	2.22	11.11	2.22
3rd Quartile	45	13.33	20.00	20.00	20.00	20.00	6.67
4th Quartile	45	6.67	0.00	13.33	40.00	13.33	26.67
<b>INVESTMENT-GRADE SHORT FUNDS</b>							
1st Quartile	13	38.46	15.38	15.38	15.38	15.38	0.00
2nd Quartile	13	23.08	46.15	30.77	0.00	0.00	0.00
3rd Quartile	12	8.33	25.00	25.00	41.67	0.00	0.00
4th Quartile	13	15.38	0.00	15.38	30.77	30.77	7.69
<b>HIGH YIELD FUNDS</b>							
1st Quartile	36	27.78	27.78	11.11	19.44	11.11	2.78
2nd Quartile	36	30.56	19.44	22.22	13.89	13.89	0.00
3rd Quartile	36	19.44	22.22	33.33	8.33	16.67	0.00
4th Quartile	36	8.33	13.89	19.44	41.67	13.89	2.78

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. 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	FUND COUNT AT START (SEPTEMBER 2013)	FIVE-YEAR PERCENTAGES AT END						
		1ST QUARTILE (%)	2ND QUARTILE (%)	3TH QUARTILE (%)	4TH QUARTILE (%)	MERGED/ LIQUIDATED (%)	STYLE CHANGED (%)	
1st Quartile	12	41.67	33.33	0.00	8.33	16.67	0.00	
2nd Quartile	12	25.00	16.67	41.67	16.67	0.00	0.00	
3rd Quartile	11	0.00	18.18	9.09	36.36	27.27	9.09	
4th Quartile	12	8.33	8.33	25.00	16.67	25.00	16.67	
<b>GLOBAL INCOME FUNDS</b>								
1st Quartile	15	40.00	20.00	6.67	6.67	20.00	6.67	
2nd Quartile	16	31.25	25.00	25.00	6.25	12.50	0.00	
3rd Quartile	15	6.67	26.67	20.00	26.67	13.33	6.67	
4th Quartile	15	0.00	6.67	26.67	40.00	26.67	0.00	
<b>EMERGING MARKETS DEBT FUNDS</b>								
1st Quartile	4	25.00	50.00	0.00	25.00	0.00	0.00	
2nd Quartile	3	33.33	33.33	33.33	0.00	0.00	0.00	
3rd Quartile	4	25.00	25.00	50.00	0.00	0.00	0.00	
4th Quartile	3	0.00	0.00	0.00	66.67	33.33	0.00	
<b>GENERAL MUNICIPAL DEBT FUNDS</b>								
1st Quartile	17	41.18	35.29	11.76	11.76	0.00	0.00	
2nd Quartile	16	25.00	37.50	12.50	6.25	12.50	6.25	
3rd Quartile	17	5.88	5.88	41.18	29.41	11.76	5.88	
4th Quartile	16	12.50	6.25	18.75	37.50	12.50	12.50	
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>								
1st Quartile	9	44.44	33.33	11.11	0.00	0.00	11.11	
2nd Quartile	8	12.50	37.50	50.00	0.00	0.00	0.00	
3rd Quartile	9	22.22	11.11	11.11	44.44	11.11	0.00	
4th Quartile	8	12.50	12.50	12.50	50.00	12.50	0.00	
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>								
1st Quartile	7	57.14	14.29	28.57	0.00	0.00	0.00	
2nd Quartile	6	33.33	50.00	16.67	0.00	0.00	0.00	
3rd Quartile	7	0.00	0.00	28.57	42.86	14.29	14.29	
4th Quartile	6	0.00	16.67	16.67	33.33	33.33	0.00	

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

<b>Exhibit 12: Five-Year Transition Matrix – Performance Over Two Non-Overlapping Five-Year Periods (Based on Halves)</b>					
<b>GOVERNMENT LONG FUNDS</b>	<b>FUND COUNT AT START (SEPTEMBER 2013)</b>	<b>FIVE-YEAR PERCENTAGES AT END</b>			
		<b>TOP HALF (%)</b>	<b>BOTTOM HALF (%)</b>	<b>MERGED/LIQUIDATED (%)</b>	<b>STYLE CHANGED (%)</b>
Top Half	26	61.54	26.92	7.69	3.85
Bottom Half	26	19.23	53.85	26.92	0.00
<b>GOVERNMENT INTERMEDIATE FUNDS</b>					
Top Half	11	63.64	9.09	18.18	9.09
Bottom Half	11	9.09	54.55	36.36	0.00
<b>GOVERNMENT SHORT FUNDS</b>					
Top Half	14	50.00	21.43	21.43	7.14
Bottom Half	14	14.29	42.86	28.57	14.29
<b>INVESTMENT-GRADE LONG FUNDS</b>					
Top Half	43	51.16	27.91	6.98	13.95
Bottom Half	42	21.43	45.24	14.29	19.05
<b>INVESTMENT-GRADE INTERMEDIATE FUNDS</b>					
Top Half	90	51.11	23.33	13.33	12.22
Bottom Half	90	20.00	46.67	16.67	16.67
<b>INVESTMENT-GRADE SHORT FUNDS</b>					
Top Half	26	61.54	30.77	7.69	0.00
Bottom Half	25	24.00	56.00	16.00	4.00
<b>HIGH YIELD FUNDS</b>					
Top Half	72	52.78	33.33	12.50	1.39
Bottom Half	72	31.94	51.39	15.28	1.39
<b>MORTGAGE-BACKED SECURITIES FUNDS</b>					
Top Half	24	58.33	33.33	8.33	0.00
Bottom Half	23	17.39	43.48	26.09	13.04
<b>GLOBAL INCOME FUNDS</b>					
Top Half	31	58.06	22.58	16.13	3.23
Bottom Half	30	20.00	56.67	20.00	3.33
<b>EMERGING MARKETS DEBT FUNDS</b>					
Top Half	7	71.43	28.57	0.00	0.00
Bottom Half	7	28.57	57.14	14.29	0.00
<b>GENERAL MUNICIPAL DEBT FUNDS</b>					
Top Half	33	69.70	21.21	6.06	3.03
Bottom Half	33	15.15	63.64	12.12	9.09
<b>CALIFORNIA MUNICIPAL DEBT FUNDS</b>					
Top Half	17	64.71	29.41	0.00	5.88
Bottom Half	17	29.41	58.82	11.76	0.00
<b>NEW YORK MUNICIPAL DEBT FUNDS</b>					
Top Half	13	76.92	23.08	0.00	0.00
Bottom Half	13	7.69	61.54	23.08	7.69

Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.



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