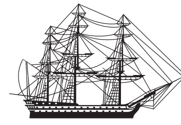

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The mutual fund graveyard: An analysis of dead funds

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Executive summary. This paper studies the performance of mutual funds identified by Morningstar over the 15 years through December 31, 2011, as being closed (meaning, for our purposes, they no longer exist).[1] Among investors, such funds are often thought of as "dead." It's important to account for these funds when evaluating aggregate mutual fund performance, because excluding them can contribute to an upward bias in performance results.

We found that the primary factors leading to fund closure were poor relative performance, a lack of commercial success, or a combination of both. Although the label "dead" conveys an image of a fund literally shutting down, more often than not these closed funds are actually merged into other funds. Further, our analysis shows that:

- Surviving funds generally outperformed funds that were liquidated or merged;

1 Of course, some funds are temporarily closed to new investors and additional cash flow for capacity or other concerns, but such funds are not the focus of this paper.

- A significant majority of liquidated funds underperformed before closure;
- A significant majority of funds that were eventually merged underperformed prior to the merger;
- A fund merger generally led to better relative performance compared with periods before the event, but the merged funds' performance still lagged their unmanaged benchmarks.

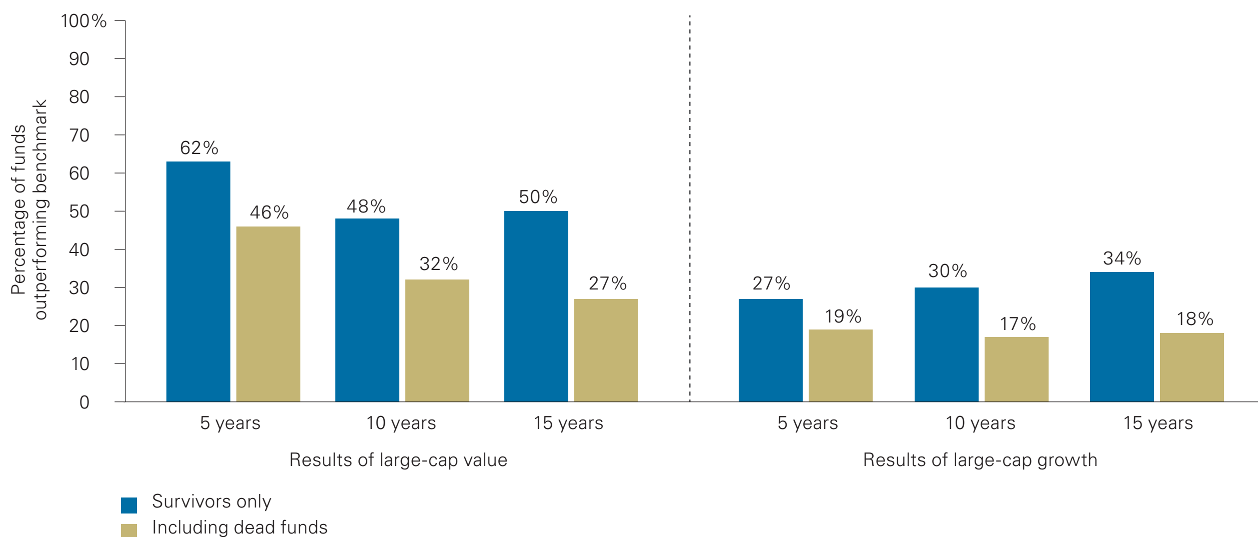
Funds that experience sustained poor performance, a failure to gather assets, or a combination of performance and operational failure are often closed by the provider. As a result, the fund is no longer part of the investment universe. Traditionally, such funds have therefore been eliminated from performance databases such as Morningstar's.[2] This treatment implies that past performance evaluations using fund-category averages are often biased upward.[3] For example, **Figure 1** presents the results of two groups of equity funds—large-capitalization value funds and large-cap growth funds—evaluated relative to a style benchmark. Clearly, not accounting for closed funds can lead to a false perception of the probability of success. For example, for the five years ended December 31, 2011, 62% of surviving large-cap value funds outperformed their style benchmark. However, accounting for those funds that closed reduces that percentage to just 46%, meaning an investor would have stood but a 46% chance of picking a large-cap value fund five years ago that would have survived and outperformed. Therefore, to gain an accurate view of aggregate performance results, it's necessary to account for the probability that investors might have picked a mutual fund that closed and became part of the mutual fund graveyard.

Notes on risk: All investing is subject to risk, including the possible loss of the money you invest. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the risk of currency fluctuations. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments.

2 Morningstar retains the returns of dead funds, but they must be consciously selected and downloaded separately and are not included in aggregate performance results.

3 See this paper's References for a list of studies that have evaluated the impact of survivorship bias on both mutual fund and hedge fund returns.

Figure 1. In assessing performance, excluding dead funds can inflate perceptions of success



Notes: Fund returns are net of expenses but exclude impact of loads or taxes. All share classes were included to reflect the broadest possible investment universe available to an investor at a given time. Funds identified by Morningstar as closed were assumed to underperform (see analysis later in this paper documenting why this is a safe assumption). Large-cap value funds were represented by Standard & Poor's 500 Value Index from January 1, 1997, through November 30, 2002, and MSCI Prime Market 750 Value Index thereafter. Large-cap growth funds were represented by S&P 500 Growth Index from January 1, 1997, through November 30, 2002, and MSCI Prime Market 750 Growth Index thereafter. All data cover periods through December 31, 2011.

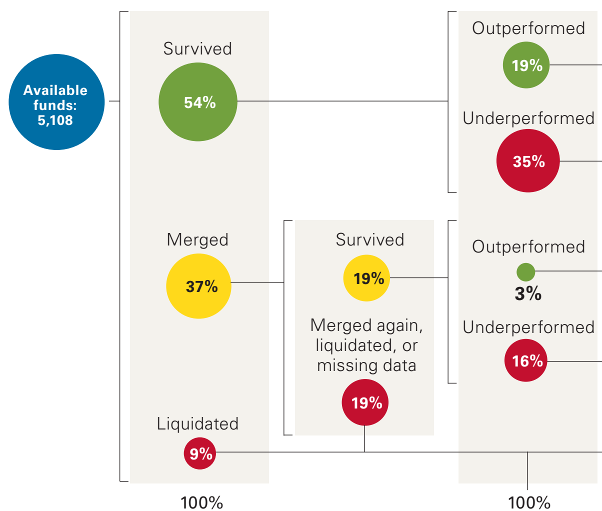
Sources: Vanguard calculations, based on fund returns and classifications provided by Morningstar, Inc.; benchmark returns provided by Thomson Reuters Datastream.

To gauge the performance of closed funds for a range of fund style categories, this paper examines the results of funds identified by Morningstar over the 15 years from January 1, 1997, through December 31, 2011, as being closed.

A fund targeted for closure has two potential outcomes: liquidation or merger. These options, with respect to our fund sample, are shown in **Figure 2**, on page 4. Although 54% of the funds in our sample survived the full 15 years, the rest were either liquidated or merged, in some cases more than once. The figure also indicates, based on this study's analysis, the percentage of funds that resulted in each outcome. Investors had a 22% chance (19% plus 3%) of picking a fund on January 1, 1997, that survived and outperformed or was merged and ended up outperforming, whereas they stood a 79% chance (35% plus 16% plus 19% plus 9%) of picking a fund that underperformed, was liquidated, or had a life cycle too convoluted for us to disentangle.[4]

4 The merged-again, liquidated, or missing-data category includes funds that were either (1) merged into another fund that was not identified; (2) merged into another fund that was not in the database; (3) merged into a fund that was in the database but had missing return data; (4) merged into another fund that was merged again; or (5) merged into another fund that was liquidated.

Figure 2. Identifying the 'quick and the dead': Fund-survival outcomes of our study



Notes: Categories may not add to 100% because of rounding. See Figure 4 for fund-category benchmarks and Figure 5, on page 6, for fund-survival details, including information on merged funds that survived the remainder of the 15-year period. Data cover January 1, 1997, through December 31, 2011.

Sources: Vanguard calculations, using data from Morningstar, Inc., and Thomson Reuters Datastream.

A final characteristic of the data is the timing of mergers and liquidations over the 15-year period (see **Figure 3**). Several interesting observations arise. First, liquidations and mergers reached a low point during the bull market of the mid-2000s. Second, mergers have increased in the wake of the global financial crisis (2008–2011). Finally, liquidations reached peaks in the run-up to the technology bubble (1997–1998) as well as in the year following the peak of the global financial crisis (2009).

Evaluating the mutual fund graveyard

Figure 4 provides additional details on the study's 2,364 nonsurviving funds over the 15-year period. We've broken the sample into 16 common fund categories. For each category, we show the relevant statistics such as the percentage that died, the percentage of those that died that underperformed their assigned benchmark before the closure date, and the median dead funds' cumulative excess returns in the periods just before closure. Clearly, a factor leading to closure was underperformance, a factor typical of closed funds regardless of the market environment that prevailed at the time. We also found that dead funds in our sample had negative net cash flows (not shown in Figure 4) in the months leading up to the funds' closings. In other words, investors most likely responded to the underperformance by selling their holdings, furthering the decline of asset bases and increasing the potential for closure.

Analyzing performance of liquidated funds

Mutual funds that are closed and liquidated, involving the sale of all fund assets and the distribution of proceeds to shareholders, represent a worst-case scenario for investors, for several reasons. First, liquidated funds tended to perform worse than funds that were merged. For example, over the 18 months leading up to closure, our analysis indicated that the median liquidated fund underperformed the median merged fund by –1.11% (data not shown in this paper's charts). Although a number of scenarios can cause a firm to shut down a fund and return the assets to shareholders, leading to lower assets under management and less revenue to the firm, certainly one of them is a lack of commercial success brought on by poor relative performance that creates a drag on the firm's bottom line.[5]

Second, when a fund is liquidated, the best possible outcome for investors is that they are forced to sell at a time not of their choosing. A *worst-case* scenario, on the other hand, could mean not only that investors suffer through significant underperformance, but also that embedded gains in the fund result in a taxable distribution and (again, in the worst case) the sale occurs at a premium to the investors' cost basis, meaning investors would need to pay two layers of taxes.

5 It was interesting that not all funds that were liquidated underperformed in the periods immediately preceding liquidation. However, among this study's liquidated funds, we found significantly declining asset bases, meaning that although the funds were performing well for investors, they were not performing well for the fund management company.

Figure 3. History of the fund graveyard: Timing of mergers and liquidations

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Merged	82	116	106	165	189	130	88	82	117	78	126	144	170	116	206	1,915
Liquidated	42	47	33	24	27	28	36	25	21	17	25	31	42	33	18	449
Total	**124**	**163**	**139**	**189**	**216**	**158**	**124**	**107**	**138**	**95**	**151**	**175**	**212**	**149**	**224**	**2,364**

Source: Vanguard calculations, using data from Morningstar, Inc.

Figure 4. Dead funds underperform before date of closure

Category	Number of funds on 1/1/1997	Number of merged funds	Number of liquidated funds	Total dead funds	Percentage dead funds	Percentage underperforming 1/1997 to closing date	6-month prior median cumulative excess return	12-month prior median cumulative excess return	18-month prior median cumulative excess return
International stocks									
Global market	230	95	11	106	46%	88%	–1.34%	–2.44%	–4.07%
Developed markets	438	130	49	179	41	79	–0.94	–3.60	–3.38
Emerging markets	118	36	18	54	46	53	–1.95	–3.27	–4.91
U.S. stocks									
Large blend	566	222	64	286	51	96	–1.37	–3.08	–4.63
Large growth	609	238	45	283	46	93	–1.01	–2.14	–5.03
Large value	473	186	26	212	45	80	–1.58	–3.51	–5.34
Mid-cap blend	120	45	11	56	47	96	–2.44	–4.57	–6.86
Mid-cap growth	340	143	23	166	49	100	–2.51	–5.31	–6.92
Mid-cap value	93	32	16	48	52	95	–3.21	–5.32	–8.18
Small blend	137	45	14	59	43	94	–2.24	–5.48	–10.52
Small growth	291	105	28	133	46	83	–2.67	–5.62	–11.28
Small value	85	19	11	30	35	91	–4.93	–5.27	–7.23
Sector funds	221	68	15	83	38	72	–1.60	–2.45	–5.34
U.S. fixed income									
U.S. government bond	489	223	46	269	55	90	–0.36	–0.60	–0.99
U.S. corporate bond	720	276	65	341	47	96	–0.58	–0.97	–1.75
U.S. high yield	178	52	7	59	33	84	–0.86	–0.85	–3.64
Total	**5,108**	**1,915**	**449**	**2,364**	**46%**	**89%**	**–1.06%**	**–2.02%**	**–3.64%**

Notes: Data reflect 15 years through December 31, 2011. All returns shown are cumulative. Based on fund categories, U.S. domestic stocks are represented by the following indexes: Large blend—Standard & Poor's 500 Index, 1/31/1997 through 11/30/2002, and MSCI US Prime Market 750 Index thereafter; Large growth—S&P 500 Growth Index, 1/31/1997 through 11/30/2002, and MSCI US Prime Market 750 Growth Index thereafter; Large value—S&P 500 Value Index, 1/31/1997 through 11/30/2002, and MSCI US Prime Market 750 Value Index thereafter; Medium blend—S&P MidCap 400 Index, 1/31/1997 through 11/30/2002, and MSCI US Mid Cap 450 Index thereafter; Medium growth—S&P MidCap 400 Growth Index, 1/31/1997 through 11/30/2002, and MSCI US Mid Cap 450 Growth Index thereafter; Medium value—S&P MidCap 400 Value Index, 1/31/1997 through 11/30/2002, and MSCI US Mid Cap 450 Value Index thereafter; Small blend—S&P SmallCap 600 Index, 1/31/1997 through 11/30/2002, and MSCI US Small Cap 1750 Index thereafter; Small growth—S&P SmallCap 600 Growth Index, 1/31/1997 through 11/30/2002, and MSCI US Small Cap 1750 Growth Index thereafter. Small value—S&P SmallCap 600 Value Index, 1/31/1997 through 11/30/2002, and MSCI US Small Cap 1750 Value Index thereafter. International and global stocks are represented by the following MSCI indexes: EAFE Index, Emerging Markets Index, and All Country World Index. Sector funds are represented by S&P 500 sector indexes for financials, health care, technology, communications, and utilities; natural resources is represented by S&P North American Natural Resources Sector Index from 1/1/1997 through 11/30/2002, and S&P Global Natural Resources Sector Index thereafter. Fixed income benchmarks are represented by the following Barclays indexes: Short government—U.S. 1–5 Year Government Bond Index; Intermediate government—U.S. Intermediate Government Bond Index; Short corporate—U.S. 1–5 Year Corporate Bond Index; Intermediate corporate—U.S. Intermediate Corporate Bond Index; High yield—U.S. Corporate High Yield Bond Index.

Sources: Vanguard calculations, using data from Morningstar, Inc., and Thomson Reuters Datastream.

Figure 5. Performance of merged funds before and after closing date

Category	Number merged into surviving funds	Percentage underperforming before merger	Percentage underperforming post merger	Percentage underperforming for full period	Median annual excess return before merger	Median annual excess return post merger	Median annual excess return for full period
International stocks							
Global market	58	78%	59%	69%	–1.61%	–1.07%	–1.13%
Developed markets	79	72	65	68	–1.43	–0.50	–1.02
Emerging markets	29	62	72	69	–0.82	–1.74	–0.90
U.S. stocks							
Large blend	122	96	88	99	–2.75	–1.88	–2.23
Large growth	163	88	88	90	–3.00	–2.47	–2.48
Large value	108	77	57	73	–1.90	–0.78	–1.06
Mid-cap blend	24	100	88	100	–5.63	–5.24	–4.83
Mid-cap growth	104	100	72	100	–8.52	–2.20	–5.35
Mid-cap value	16	100	94	100	–3.74	–0.80	–2.67
Small blend	24	96	79	100	–3.06	–1.89	–2.34
Small growth	64	86	69	84	–4.20	–1.30	–2.77
Small value	15	87	73	87	–3.10	–0.13	–1.06
Sector funds	16	44	69	44	0.43	–3.07	0.09
U.S. fixed income							
U.S. government bond	45	98	47	89	–1.04	0.18	–0.62
U.S. corporate bond	75	96	69	99	–1.20	–0.76	–1.30
U.S. high yield	16	88	94	100	–1.42	–1.89	–1.55
Total	**958**	**87%**	**73%**	**87%**	**–2.30%**	**–1.45%**	**–1.97%**

Notes: Data reflect 15 years through December 31, 2011. Same fund-category benchmarks apply here as in notes to Figure 4.

Sources: Vanguard calculations, using data from Morningstar, Inc., and Thomson Reuters Datastream.

A final implication of a liquidation is that the investor must now engage in a new manager search. Given previous Vanguard and other industry research indicating the difficulty of selecting a successful active manager (Philips, 2012), this is not a task to be taken lightly.

Analyzing performance of merged funds

As supported by Figures 2 and 4, a relative minority of funds are actually liquidated; more commonly, an underperforming fund is merged into a more enduring fund. The logical question then is whether such an action ultimately succeeds—that is, does the underperforming fund merge into a more successful fund that outperforms, creating a performance boost that leaves the investor better off than had the original fund persisted? To answer that question, we compared the return streams for 958 (50%) of the 1,915 merged funds in our sample with the return streams of the new funds they were merged into that then ultimately finished the 15-year period (representing a best-case scenario for investors in merged funds).[7]

Figure 5 shows the median annualized excess returns for those merged funds before the merger, after the merger, and for the entire 15 years. As expected, fully 87% of merged funds underperformed prior to the merge date, thus leading to the merger itself. More interesting, and perhaps

7 The remaining funds either were merged into funds that were liquidated, were merged again, or had missing data.

surprising, is that 73% of those funds underperformed following the merger. Although in many cases the funds received a performance boost—in that the excess returns were better in the periods after the merger—they were still largely negative (just less so). Finally, after accounting for both pre- and postmerger periods, 87% of funds underperformed for the full 15 years. And in seven fund categories, at least 99% of these merged funds underperformed. For comparison, we also present **Figure 6**, which is the same analysis, but for surviving funds. In each fund category, surviving funds' median returns outperformed those of funds that were merged. Of course, even though in relative terms surviving funds performed better, 64% of them still trailed their benchmarks.

Conclusion

This paper's analysis demonstrates the importance in performance evaluation of accounting for those mutual funds that have closed. Specifically, failure to consider such funds can artificially inflate performance. We have furthermore examined the differences between liquidated funds and funds that are merged into other funds. A key finding of this research is that the act of merging an under-performing fund into a surviving fund did not improve the chances for outperformance. Indeed, merged and liquidated funds both largely underperformed before action was taken, and a majority of merged funds continued to underperform after the merger. The implication for investors is to be on the lookout and avoid those funds that may be at risk of closing (typical symptoms are significant underperformance, dwindling assets, and negative cash flows). And for investors who are analyzing performance results, dead funds should always be taken into account to avoid biased expectations of future performance results.

Figure 6. Performance results of surviving funds

Category	Number of surviving funds	Percentage underperforming	Median annual excess return over 15-year period
International stocks			
Global market	124	35%	0.77%
Developed markets	259	35	0.70
Emerging markets	64	53	–0.10
U.S. stocks			
Large blend	280	65	–0.50
Large growth	326	66	–0.81
Large value	261	50	0.00
Mid-cap blend	64	94	–3.00
Mid-cap growth	174	89	–3.01
Mid-cap value	45	100	–2.46
Small blend	78	58	–0.24
Small growth	158	65	–0.84
Small value	55	56	–0.43
Sector funds	138	30	0.77
U.S. fixed income			
U.S. government bond	220	71	–0.34
U.S. corporate bond	379	85	–0.82
U.S. high yield	119	90	–1.35
Total	2,744	64%	–0.51%

Notes: Data reflect 15 years through December 31, 2011. Same fund-category benchmarks apply here as in notes to Figure 4.

Sources: Vanguard calculations, using data from Morningstar, Inc., and Thomson Reuters Datastream.

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