Economics Bulletin

Volume 36, Issue 1

UK fund returns and sector diversification

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Abstract

We examine the performance of UK equity mutual funds relative to the simple passive alternative of equal sector-weighting. While it has often been reported that only a minority of funds beat the market index, such funds are nonetheless numerous, and many investors have been drawn to active management in the hope that they can spot these funds (Gruber 1996). By contrast, we show that few if any funds outperform equal weighting of industry sectors in the post-1987 period. Our results significantly increase the burden of proof on active equity fund managers wishing to convince investors that they can outperform passive strategies, and introduce an easy to implement passive alternative for would-be investors in such funds.

We are grateful to Bernd Hanke and Garrett Quigley for stimulating discussions and suggestions. All errors are ours.
Citation: Aneel Keswani and David Stolin and Maxim Zagonov, (2016) "UK fund returns and sector diversification", *Economics Bulletin*, Vol. 36 No. 1 pp. 10-21.
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Submitted: January 15, 2016. **Published:** August 11, 2016.

1. Introduction

It has been known at least since Jensen (1968) that actively managed funds have difficulty beating the market index; indeed most active funds fail to do so (French 2008). This raises the puzzle of why investors would be drawn to active funds in the first place. The so-called 'smart money' literature (Gruber 1996, Zheng 1999, Keswani and Stolin 2006) provides a partial answer by documenting that future outperformers attract disproportionate flows of money from investors. In the perpetual tussle between proponents of active and passive investing, this gives credible ammunition to the active side.

However, the market index is not the only alternative available to the passive investor. In fact, passive 'smart beta' indices of varying complexity can be constructed (Lo 2015). Such complexity can give rise to valid concerns about difficulty of implementation, trading costs, and data-mining. We focus on a passive investment that is conceptually straightforward, easy to implement, cheap, and has little scope for data-mining through parameter choice: the equal sector-weights (ES) portfolio. We find that since 1987, when UK sector indices first become available, ES has outperformed every single fund by some performance measures, and the vast majority of funds by any measure. These results are preserved even after adjusting for transaction costs.

The intuition for our finding is that equal-weighting, as a trivial form of fundamental indexing, breaks the link between portfolio weights and market values, reducing the exposure of the portfolio to over-valued assets and increasing its exposure to under-valued ones (Booth and Fama 1982, Hsu 2006, Hanke and Quigley 2014). This results in enhanced portfolio returns. However, while implementing the equal-weighted strategy at the stock level is quite costly, requiring substantial turnover in small and often illiquid securities, doing so at the sector level is much more practical. Indeed, in the US the existence of sector ETFs makes such a strategy very easy to implement. Our results point towards the desirability of introducing sector ETFs for other markets as well.

2. Data and methodology

Our mutual fund dataset includes all active UK equity funds since 1987 whose net monthly returns are available on Morningstar.

Our performance metrics are appraisal ratios, Sharpe ratios, and four-factor alphas. Appraisal ratios are calculated as the intercept in a regression of monthly excess portfolio returns on the excess market return divided by the standard deviation of the residual, while Sharpe ratios are calculated as the average monthly excess return divided by the monthly standard deviation of excess returns.

We obtain risk-adjusted returns (alphas) with the Fama-French-Carhart four-factor model:

$$R_{it} - RF_t = \alpha_i + \beta_i^{MKT} MKT_t + \beta_i^{SMB} SMB_t + \beta_i^{HML} HML_t + \beta_i^{UMD} UMD_t + e_{it}$$

where the Fama-French (1992, 1993) and Carhart (1997) factors are obtained from Gregory, Tharyan and Christidis (2013).

We collect FTSE equity sector indices from Datastream. Our sector portfolios are rebalanced at the start of each calendar year (although our conclusions are invariant to rebalancing in

other months). To estimate transaction-cost (TC) adjusted returns for sector-based strategies, we conservatively assume round-trip trading costs of 150 basis points and our estimated 1987-2013 annual turnover for the ES strategy (generously supplied by Bernd Hanke of GSI LLP) is 12.7%.

3. Results

Table 1 shows the relative performance of the ten FTSE UK equity sectors for each year from 1987 to 2013.

[Table 1 here]

The table suggests that there is unlikely to be strong sector momentum: while there are seven years when the top-performing sector subsequently remains among the top three sectors, there are nine years when the top-performing sectors migrates to the eighth, ninth, or tenth position.

[Figure 1 here]

Figure 1 shows cumulative average returns for each FTSE sector rank over the calendar year following the ranking year. Although second- and third-ranked sectors have done well over subsequent periods, the poor performance of the top-ranked sector puts into question the advisability of the popular sector-momentum strategy. Further, the eighth, ninth and tenth-ranked sectors have also failed to perform well over the period we consider, indicating that betting on sector-reversal is unlikely to have been worthwhile.

[Table 2 here]

In fact, as the figure shows, the best strategy *ex post* would have been to invest in the previous year's fifth best sector. Our point, of course, is not to data mine sector strategies. Even if we focus only on strategies where each year the portfolio is split among the previous year's *n*th through *m*th best performing sectors where $n \leq m$ (or split among the remaining sectors if $n > m$), this results in 100 distinct strategies, some of which will have performed quite well. Table 2, Panel A shows the results of this estimation. As expected, the best-performing (in hindsight) 5^{th}-ranked sector investment strategy delivers the highest performance, with a 17.44% return. The ES portfolio's 11.61% puts it right in the middle of the pack (51^{st} of 100 portfolios). By contrast, the FTSE All-Share Index's 10.18% return (not reported in a table) is beaten by 82 of the portfolios.

The ES portfolio looks even better on a risk-adjusted basis, as shown in Panel B (Sharpe ratio), C (appraisal ratio) and D (four-factor alpha). Since the ES portfolio is by construction the most widely diversified of all the sector rotation portfolios, its 0.480 Sharpe ratio in Panel B ranks substantially higher than without risk adjustment – 20^{th} of the 100 sector rotation strategies we consider. The market index, on the other hand, with a 0.346 ratio performs worse than 69 of the portfolios. Panel C shows that on the basis of its 0.641 appraisal ratio, ES comes in 7^{th} among the 100 sector rotation portfolios. Lastly, on the basis of four-factor alpha (Panel D), ES is in 45^{th} place with a highly significant positive alpha of 0.020.

If, instead of ranking on the past year's sector returns, we use other ranking periods, or if we rank on some other sector attributes (PE ratio, volatility, dividend yield, and so on), possible

strategies start numbering into the thousands, and concerns about data-mining become even more critical. Instead, we now show that the *ex ante* simplest strategy – the one where equal amounts are allocated to each sector every year regardless of any other considerations – beats not only most sector rotation strategies, but also the overwhelming majority of actual mutual funds.

[Table 3 here]

Our key evidence is presented in Table 3. Panel A shows appraisal ratios, Panel B shows four-factor alphas, while Panel C represents Sharpe ratios. For ease of comparison, we focus on survivor funds. It is well known that survivorship tends to induce an upward bias in returns (Elton, Gruber and Blake, 1996), which means that our results would be even stronger if non-survivor funds were included.

At the end of 2013, there were 304 equity funds that had existed since the beginning of 2009. The highest appraisal ratio attained by these funds over this 60-month period was 1.983 (with the 95th percentile substantially lower at 1.149). Yet even the best performing fund was eclipsed by the simple ES strategy, whose appraisal ratio was 2.959 before costs, and 2.511 after transaction costs. The fact that among the hundreds of mutual funds pursuing a variety of strategies and leveraging investment insights of thousands of research analysts, *not a single one* was able to approach, let alone beat, the performance of the simplest sector-level strategy, is very striking. By contrast, the strategy of investing in the prior year's top three sectors, had it been a fund, would have been in 190th place, i.e. in the third quartile.

Even more impressively, the ES strategy comes in first place when compared to the 225 funds that survived the full 10-year period from 2004 to 2013 (i.e. including the financial crisis), as well as the 98 funds that survived over the 20-year period from 1994 to 2013 (i.e. including the internet bubble). Only extending the period back to 1988 and insisting on 25-year survivorship dislodges ES from first place to the third – implying that among the 76 lucky members of the late-1980s cohort that were destined to survive over the next quarter-century, only two did better than an investor doing nothing more than regularly rebalancing his or her stock portfolio to equal sector weights.

Ranking funds on four-factor alphas (Panel B) or Sharpe ratios (Panel C) yields results that are only somewhat less damning to proponents of active management. Of the 304 5-year survivors, only 20 or so were able to beat ES after costs. By contrast, over a hundred of these funds beat both the FTSE-All Share market index, and the sector momentum strategy. In fact, even among 10-, 15- and 25-year survivors, and even after adjusting ES returns for transaction costs, fewer than a fifth of the funds outperform the equal-weighted strategy on the basis of four-factor alphas or Sharpe ratios.

[Table 4 here]

It is instructive to peruse the list of best-performing survivor funds and to compare it with the ES strategy. As shown in Table 4, over the 1989-2013 period, after transaction costs ES achieves appraisal ratio of 0.588, Sharpe ratio of 0.469, Treynor ratio of 0.071, and three- and four-factor alphas of 0.019 and 0.018, respectively. Taking the four-factor alpha as an example, only 11 funds are able to beat ES on the basis of this measure. The majority of these funds charge an initial fee of up to 5% of the capital invested, which is enough to eliminate their advantage over ES for typical investment horizons. And even for the remaining funds,

the odds of continuing to outperform ES are slim, given the generally low levels of long-term performance persistence (Brown and Goetzmann, 1995) and decreasing returns to scale eroding the future performance of successful funds (Berk and Green, 2004). While choosing an active mutual fund over the value-weighted index in the face of the evidence requires a measure of conviction, our results show that choosing an active fund over the equal-sector strategy requires a rather more impressive leap of faith.

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Table 1. FTSE sectors performance transition matrix

This table presents the performance transition matrix for the FTSE sectors over the 1987-2013 period. Each year, the sectors are ranked by the past year's return from 1 (winner) to 10 (loser). Data are from Thomson Reuters Datastream.

Year	Oil & gas	Basic mats	Industrials	Consumer gds	Health care	Consumer svs	Telecom	Utilities	Financials	Technology
1987	2	4	10	9	7	6	5	3	8	1
1988	3	7	1	10	5	9	6	8	4	2
1989	3	9	7	4	2	8	6	1	5	10
1990	4	6	10	9	5	7	3	2	8	1
1991	9	7	6	3	1	2	5	4	8	10
1992	8	10	6	2	9	7	3	1	5	4
1993	4	3	6	7	10	5	8	2	1	9
1994	1	7	5	3	4	6	8	2	10	9
1995	4	10	6	7	2	5	9	8	1	3
1996	2	10	9	7	8	4	6	5	3	1
1997	6	9	10	7	4	8	5	1	3	2
1998	8	10	7	9	3	6	1	4	5	2
1999	3	5	4	6	9	7	2	10	8	1
2000	6	4	7	8	1	5	9	2	3	10
2001	2	1	7	4	3	8	9	6	5	10
2002	2	5	8	3	4	7	9	1	6	10
2003	8	3	4	2	9	5	6	10	7	1
2004	4	3	2	5	9	7	8	1	6	10
2005	3	2	1	6	4	9	10	5	7	8
2006	9	2	4	7	10	6	3	1	5	8
2007	3	1	6	4	9	7	2	5	10	8
2008	2	10	6	4	1	8	5	3	9	7
2009	7	1	4	6	8	3	9	10	5	2
2010	9	2	3	5	10	7	4	6	8	1
2011	6	10	7	2	1	8	3	4	9	5
2012	10	7	3	6	9	5	8	4	1	2
2013	9	10	2	7	5	3	1	8	6	4

Table 2: Performance of the Equally-Weighted Sector (ES) portfolio relative to sector rotation portfolios

This table presents information on the performance of the Equally-Weighted Sector (ES) portfolio and other sector rotation portfolios over the 199-2013 period. Data are from ThomsonReuters' Datastream. The cell in the *n*th row of the *m*th column represents the portfolio that, at the start of each calendar year, allocates money equally i) among sectors whose return ranks from *n*th through *m*th inclusive in the previous calendar year if $n \leq m$; ii) among all sectors excluding those whose return ranks from *n*th through *m*th inclusive in the previous calendar year if $1 < m < n < 10$; or iii) between the two sectors whose return ranks *m*th and *n*th in the previous year if $n = 10$ or $m=1$. Accordingly, the ES portfolio is in the cell corresponding to $n = 1$ and $m = 10$. Panel A presents average annualized monthly returns (ES's 11.61% return puts in 51st position among the 100 portfolios), Panel B presents Sharpe ratios (with ES's Sharpe ratio of 0.48 putting it in 22nd position), Panel C presents appraisal ratios (where ES is in 7th position with a ratio of 0.641) and Panel D presents four-factor alphas (where ES's 0.020 alpha is ranked 45th).

Panel A: Absolute return

		m									
		1	2	3	4	5	6	7	8	9	10
n	1	9.24%	12.39%	12.71%	12.27%	13.30%	12.74%	12.02%	11.93%	11.91%	11.61%
	2	12.39%	15.53%	14.45%	13.28%	14.32%	13.44%	12.48%	12.31%	12.24%	11.99%
	3	11.30%	11.04%	13.37%	12.16%	13.92%	12.91%	11.87%	11.77%	11.77%	11.55%
	4	10.09%	11.05%	11.61%	10.94%	14.19%	12.76%	11.49%	11.46%	11.51%	11.29%
	5	13.34%	9.98%	10.78%	11.10%	17.44%	13.67%	11.68%	11.58%	11.62%	11.35%
	6	9.57%	10.00%	10.92%	11.27%	11.23%	9.91%	8.80%	9.63%	10.16%	10.13%
	7	8.46%	10.58%	11.57%	11.87%	11.74%	12.45%	7.69%	9.50%	10.25%	10.19%
	8	10.27%	10.33%	11.63%	11.98%	11.81%	12.61%	12.27%	11.30%	11.53%	11.02%
	9	10.50%	9.62%	11.59%	12.04%	11.82%	12.75%	12.35%	11.77%	11.76%	10.88%
	10	9.62%	12.77%	11.69%	10.48%	13.72%	9.96%	8.85%	10.66%	10.88%	10.01%

Panel B: Sharpe ratio

		m									
		1	2	3	4	5	6	7	8	9	10
n	1	0.191	0.369	0.447	0.468	0.556	0.527	0.471	0.468	0.469	0.480
	2	0.369	0.438	0.515	0.526	0.620	0.576	0.500	0.491	0.487	0.456
	3	0.367	0.391	0.429	0.453	0.592	0.543	0.460	0.453	0.452	0.421
	4	0.311	0.377	0.418	0.355	0.600	0.529	0.428	0.427	0.428	0.396
	5	0.499	0.301	0.356	0.386	0.699	0.554	0.416	0.415	0.416	0.380
	6	0.258	0.291	0.355	0.388	0.402	0.273	0.218	0.278	0.311	0.294
	7	0.187	0.323	0.395	0.429	0.441	0.496	0.128	0.249	0.296	0.279
	8	0.301	0.294	0.385	0.428	0.443	0.506	0.489	0.320	0.354	0.311
	9	0.315	0.239	0.362	0.420	0.439	0.512	0.493	0.446	0.312	0.270
	10	0.239	0.383	0.346	0.301	0.446	0.258	0.179	0.278	0.270	0.191

Panel C: Appraisal ratio

		m									
		1	2	3	4	5	6	7	8	9	10
n	1	-0.038	0.173	0.285	0.338	0.581	0.544	0.434	0.474	0.585	0.641
	2	0.173	0.287	0.391	0.438	0.693	0.653	0.507	0.531	0.598	0.480
	3	0.146	0.213	0.260	0.294	0.584	0.539	0.377	0.385	0.414	0.303
	4	0.065	0.158	0.321	0.163	0.553	0.472	0.276	0.292	0.315	0.208
	5	0.380	-0.081	0.085	0.201	0.681	0.515	0.248	0.257	0.271	0.160
	6	-0.021	-0.092	0.084	0.204	0.275	0.017	-0.178	-0.093	-0.023	-0.056
	7	-0.193	0.013	0.201	0.336	0.425	0.707	-0.261	-0.127	-0.034	-0.063
	8	0.021	-0.028	0.169	0.306	0.390	0.676	0.648	0.084	0.118	0.033
	9	0.037	-0.098	0.126	0.256	0.325	0.584	0.551	0.411	0.088	-0.002
	10	-0.098	0.175	0.103	0.030	0.284	-0.055	-0.187	-0.013	-0.002	-0.074

Panel D: Four-factor alpha

		M									
		1	2	3	4	5	6	7	8	9	10
n	1	-0.077**	-0.038*	-0.018	-0.011	0.007	0.005	0.001	0.005	0.012*	0.020***
	2	-0.038*	0.002	0.012	0.011	0.028**	0.021*	0.014	0.016*	0.023***	0.029***
	3	-0.027	0.020***	0.022	0.015	0.036**	0.026**	0.016	0.019*	0.026***	0.032***
	4	-0.034*	0.022***	0.019**	0.009	0.043**	0.028*	0.015	0.018*	0.027***	0.034***
	5	0.000	0.012	0.011	0.012	0.078***	0.037**	0.017	0.021*	0.031***	0.038***
	6	-0.040*	0.016	0.013	0.015*	0.014**	-0.004	-0.013	0.002	0.019*	0.030***
	7	-0.050***	0.025**	0.021*	0.021**	0.019**	0.026***	-0.023	0.004	0.027**	0.039***
	8	-0.023	0.023	0.018	0.019*	0.017**	0.026***	0.022***	0.031	0.052***	0.059***
	9	-0.002	-0.001	0.000	0.005	0.006	0.018**	0.015*	0.010	0.072***	0.073***
	10	-0.001	0.038	0.048**	0.042**	0.076***	0.035*	0.026	0.053***	0.073***	0.074**

Table 3. Equal-Weighted Sector and Sector Momentum portfolios performance relative to equity mutual funds

This table presents information on the appraisal ratios, four-factor alphas and Sharpe ratios of the Equally-Weighted Sector (ES) and Sector Momentum portfolios relative to the universe of surviving actively managed U.K. equity mutual funds from the Morningstar database, by sub-period. ES (TC) denotes the Equally-Weighted Sector portfolio adjusted for transaction costs. The appraisal ratio is calculated as the intercept in a regression of monthly excess returns divided by the standard deviation of the residual. The explanatory variable in the regression of portfolio returns is the monthly excess return on the FTSE All Share value-weighted market portfolio. The Sharpe ratio is defined as the average monthly excess return divided by the monthly standard deviation of excess returns. The table shows annualized appraisal and Sharpe ratios.

Panel A: Appraisal ratio

	Period	Distribution of appraisal ratios				Appraisal ratio (relative rank)		
		Count	Med	95th %ile	Max	ES (TC)	ES	3-S MOM
Funds with at least 5-year history	2009-2013	304	0.313	1.149	1.983	2.511 (1)	2.959 (1)	0.082 (190)
Funds with at least 10-year history	2004-2013	225	0.042	0.723	1.060	1.499 (1)	1.597 (1)	0.292 (61)
Funds with at least 20-year history	1994-2013	98	0.136	0.575	0.693	0.715 (1)	0.753 (1)	0.395 (20)
Funds with at least 25-year history	1988-2013	76	0.011	0.475	0.710	0.588 (3)	0.641 (3)	0.312 (16)

Panel B: Four-factor alpha

	Period	Distribution of four-factor alphas				Four-factor alpha (relative rank)		
		Count	Med	95th %ile	Max	ES (TC)	ES	3-S MOM
Funds with at least 5-year history	2009-2013	304	-0.007	0.046	0.130	0.038 (20)	0.046 (16)	-0.003 (126)
Funds with at least 10-year history	2004-2013	225	-0.006	0.032	0.056	0.027 (20)	0.029 (18)	-0.002 (95)
Funds with at least 20-year history	1994-2013	98	0.000	0.037	0.048	0.023 (16)	0.024 (16)	-0.000 (53)
Funds with at least 25-year history	1988-2013	76	-0.004	0.032	0.047	0.017 (13)	0.020 (12)	-0.001 (33)

Panel C: Sharpe ratio

	Period	Distribution of Sharpe ratios				Sharpe ratio (relative rank)			
		Count	Med	95th %ile	Max	ES (TC)	ES	3-S MOM	FTSE All
Funds with at least 5-year history	2009-2013	304	1.012	1.421	2.033	1.329 (21)	1.369 (20)	0.870 (253)	0.974 (174)
Funds with at least 10-year history	2004-2013	225	0.479	0.713	0.883	0.763 (9)	0.769 (9)	0.574 (57)	0.496 (104)
Funds with at least 20-year history	1994-2013	98	0.333	0.559	0.638	0.474 (17)	0.482 (15)	0.486 (14)	0.306 (59)
Funds with at least 25-year history	1988-2013	76	0.330	0.535	0.665	0.469 (11)	0.480 (10)	0.463 (13)	0.346 (33)

Table 4. Equally-Weighted Sector and Sector Momentum portfolios performance relative to top 30 mutual funds

This table presents summary statistics on excess returns, appraisal, Sharpe, and Treynor ratios of the EW Sector and Sector Momentum portfolios relative to the top 30 actively managed U.K. equity mutual funds from the Morning Star database with at least 25 year history (1989-2013). EW Sector (TC) denotes the EW Sector portfolio adjusted for transaction costs. The appraisal ratio is calculated as the intercept in a regression of monthly excess returns divided by the standard deviation of the residual. The explanatory variable in the regression of portfolio returns is the monthly excess return on the FTSE All Share value-weighted market portfolio. The Sharpe ratio is defined as the average monthly excess return divided by the monthly standard deviation of excess returns. The Treynor ratio is defined as the average monthly excess return divided by the slope (beta) of a regression of the portfolio monthly excess returns on the monthly excess return on the FTSE All Share value-weighted market portfolio. The table shows annualized excess returns, appraisal, Sharpe, and Treynor ratios. Top 30 funds are selected based on the average annual excess return over the period 1989-2013. *Max initial charge* and *Annual mgmt charge* are from Morningstar. ***, **, and * represent significance at the 1%, 5%, and 10% levels respectively.

Portfolio (fund ISIN)	Manager	Max initial charge	Annual mgmt charge	Average excess return	Appraisal ratio	Sharpe ratio	Treynor ratio	Fama-French alpha	4-factor alpha
EW Sector	Passive strategy	-	-	0.071	0.641	0.480	0.073	0.021***	0.020***
EW Sector (TC)	Passive strategy	-	-	0.069	0.588	0.469	0.071	0.019***	0.018***
3-Sector Momentum	Semi-passive strategy	-	-	0.081	0.312	0.463	0.085	0.037*	-0.015
GB0033054015	Invesco Fund Managers Ltd	5.00%	1.67%	0.092	0.710	0.665	0.115	0.049***	0.047***
GB0004456892	Aviva Investors UK Fund Services Ltd	n/a	1.50%	0.091	0.648	0.579	0.093	0.042***	0.045***
GB0003875100	Fidelity (FIL Investment SVCS (UK))	n/a	1.50%	0.086	0.413	0.523	0.095	0.032***	0.031**
GB0006795529	Artemis Fund Managers Ltd	5.00%	1.50%	0.086	0.345	0.484	0.090	0.037**	0.017
GB0033053827	Invesco Fund Managers Ltd	5.00%	1.66%	0.085	0.548	0.573	0.097	0.038***	0.035**
GB0004791389	Jupiter Unit Trust Managers Ltd	5.00%	1.50%	0.082	0.587	0.589	0.099	0.037***	0.035***
GB0004792130	Jupiter Unit Trust Managers Ltd	5.00%	1.50%	0.075	0.349	0.462	0.076	0.021*	0.023*
GB0007648909	Schroder Unit Trusts Ltd	n/a	1.50%	0.074	0.402	0.483	0.079	0.022*	0.028**
GB0033031153	Invesco Fund Managers Ltd	5.00%	1.66%	0.073	0.303	0.450	0.074	0.017	0.023*
GB0003884508	Premier Portfolio Managers Ltd	4.00%	1.50%	0.073	0.444	0.499	0.081	0.024**	0.025**
GB0032212283	Cavendish Asset Management	5.00%	1.50%	0.073	0.193	0.382	0.079	0.017	0.021
GB0031078784	Investec Fund Managers Ltd	4.50%	1.50%	0.068	0.332	0.448	0.072	0.017	0.026**
GB0006779218	BNY Mellon Asset Management Ltd	n/a	1.50%	0.068	0.348	0.464	0.074	0.018	0.018
GB0001229045	Rathbone Unit Trust Management Ltd	2.50%	1.50%	0.068	0.341	0.470	0.080	0.021	0.013
GB0001448900	Threadneedle Investment Services Ltd	3.75%	1.50%	0.067	0.451	0.467	0.072	0.018**	0.013
GB0006779549	BNY Mellon Asset Management Ltd	n/a	1.50%	0.066	0.448	0.493	0.079	0.022**	0.017
GB0033053488	Invesco Fund Managers Ltd	5.00%	1.67%	0.065	0.289	0.437	0.072	0.015	0.014
GB0033054452	Invesco Fund Managers Ltd	5.00%	1.17%	0.063	0.321	0.444	0.071	0.016	0.017
GB0005805022	BlackRock Fund Managers Ltd	5.00%	1.50%	0.063	0.159	0.379	0.065	0.008	0.002
GB00B0XWN70	Aberdeen Asset Management PLC	n/a	1.50%	0.062	0.254	0.411	0.064	0.009	0.015
GB0007648677	Schroder Unit Trusts Ltd	n/a	1.50%	0.061	0.205	0.387	0.059	0.006	0.009
GB0005803530	BlackRock Fund Managers Ltd	5.00%	0.50%	0.058	0.183	0.384	0.059	0.006	0.004
GB0001439610	Threadneedle Investment Services Ltd	n/a	1.00%	0.057	0.149	0.374	0.057	0.006	-0.001

GB0004330717	Standard Life Investments	4.00%	1.50%	0.056	0.067	0.346	0.056	0.003	-0.005
GB0031289217	M&G Group	4.00%	1.50%	0.056	0.065	0.332	0.055	0.001	-0.002
GB0001647246	Threadneedle Investment Services Ltd	n/a	1.00%	0.056	0.183	0.380	0.058	0.007	0.001
GB00B63H3D38	Royal London Asset Management Ltd	4.00%	1.25%	0.055	0.067	0.342	0.054	0.003	0.000
GB00B67N8655	Royal London Asset Management Ltd	4.00%	1.25%	0.055	0.158	0.378	0.059	0.005	0.003
GB0031383952	Allianz Global Investors GmbH	4.00%	1.25%	0.054	0.079	0.353	0.055	0.003	-0.009
GB0008178799	Smith&Williamson Fund	5.00%	1.50%	0.053	0.208	0.407	0.069	0.010	0.008

Figure 1. Cumulative average returns by prior-year sector ranking, 1987-2013

This figure plots 1-year cumulative average monthly returns from the sector-rotation strategy based on prior-year sector ranking. Each line shows the cumulative average return from investing in the previous year's best performer (Rank 1) through to investing in the worst performer (Rank 10). Source: Authors' calculations based on data from Thomson Reuters Datastream.