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Do investor types matter? A comparative analysis of separate account characteristics and performance

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Abstract

This study investigates the characteristics and performance of separately managed accounts (SAs), focusing on differences between retail and institutional investor types. It finds that institutional SAs outperform retail and mixed SAs in terms of risk-adjusted returns, primarily driven by distinctively lower fees and a smaller number of managed accounts. However, once characteristics are controlled for, performance differences become insignificant, suggesting no difference in manager skill. Moreover, the analysis shows that characteristics affect the performance of institutional, retail, and mixed SAs differently. These findings highlight the nuanced impact of investor type on SA performance, offering new insights into asset management practices.

KEYWORDS
institutional, performance, retail, separate accounts

JEL CLASSIFICATION
G11, G23

1 | INTRODUCTION

Active investment has enjoyed popularity among investors for decades, as both individuals and institutions have sought to attain returns beyond the scope of a passive investment strategy. Instead of crafting and monitoring portfolios themselves, many investors rely on the services of the asset management industry. The industry offers a range of instruments and products through which investors can invest their money effectively. Although much attention has been devoted to the examination of mutual funds (MFs), the evidence on separate accounts (SAs), representing individual portfolios of assets managed by professional investment firms, is rather sparse. With assets under management reaching approximately $10.7 trillion in 2021 (Cerulli Associates, 2022), compared to $27.0 trillion for MFs (Investment Company Institute, 2022), separately managed accounts have emerged as a very important investment platform. Compared to MFs, SAs often offer additional benefits. These include individual negotiation of management fees, potentially lower administrative fees due to reduced regulation and reporting requirements, portfolio customization, direct ownership of assets rather than holding fund shares, as well as tax gain and loss harvesting. This highlights their prominent role in the asset management industry and underscores the need for their thorough consideration in academic research.

Among the few studies examining SAs, Busse et al. (2010, 2014) suggest that SAs provide positive risk-adjusted gross returns, but like MFs, they do not outperform passive benchmarks from the investors' perspective. However, they may still represent a superior investment alternative when compared to the performance generally achieved by MFs. In fact, this aspect has been the central concern in the existing SA literature. For instance, comparing a sample of SAs and MFs, Elton et al. (2014) find that the annualized difference in risk-adjusted Carhart (1997) alpha is 60 bp. Evans et al. (2020) observe a significant difference in Carhart performance of almost 100 bp based on a nearest neighbor matching. Evans and Fahlenbrach (2012), Chen et al. (2017), and Rohleder et al. (2023) compare SAs and MFs that are offered by the same firm and are managed by the same manager with the same investment objective to control for manager skill and firm-level effects. Their results show a significantly better performance for SAs. Jones et al. (2023) show similar results for category-matched SA-MF-pairs based on Vanguard index fund benchmark alphas (Berk & van Binsbergen, 2015). Evans et al. (2023) compare fundamentally and quantitatively managed SAs finding that the former outperform the latter on average but suffer more strongly from diseconomies of scale.

Building upon these results, the major objective of this study is to examine the extent to which the availability of different SA products tailored to distinctive types of investors—institutional and retail—can be regarded as universally beneficial, as to the best of our knowledge, this has not been addressed in SA literature thus far. We seek to discern whether notable disparities in characteristics and performance are evident across these classifications, shedding light on potential implications for different investor types.

At first glance, offering SAs to retail investors may seem unusual. Due to relatively high minimum investment requirements imposed by SAs, they are typically viewed as platforms available only to institutional investors, with retail access strictly limited to a small group of high-net-worth individuals. While MFs commonly require initial investments of $1000 or less, SAs can impose minimums of up to $100 million. Nonetheless, the growing popularity of SAs, coupled with an improved cost-effectiveness of managing and consolidating smaller accounts due to technological advances in recent years, has enabled asset management firms to significantly reduce their minimum investment requirements, even to as low as $50,000. The result is access to a much larger client base of less wealthy retail investors.

Analyzing a comprehensive sample of 4720 active U.S. domestic equity SAs for the period July 1998 to June 2022, we find that only 21% of the SAs are available exclusively to institutional investors. Instead, 67% of the SAs are open to both institutional and retail investors (henceforth mixed SAs), while 12% of all SAs are even offered exclusively to retail investors. Given a significantly positive risk-adjusted gross performance shown in previous research, private investors who meet the investment requirements of pure retail SAs with $100,000 at the median could thus potentially benefit from the expertise of successful SA managers.[i]

We compare characteristics and performance of SAs with different target investor groups for several reasons. For instance, because fees are negotiated individually and depend on the amount invested, performance might be less attractive from a retail investor's perspective compared to investors who can invest in pure institutional SAs. Furthermore, portfolio managers of retail SAs may be required to manage a larger number of smaller accounts, increasing complexity and marginalizing attention for each individual account, which may in turn reduce risk-adjusted performance. Overall, there might be fundamental differences in characteristics given the different preferences of retail and institutional investors and the potentially different management requirements between the investor types.

Our analysis is divided into three parts. In the first part, we compare SA characteristics between pure retail SAs, pure institutional SAs, and mixed SAs. In the second part, we compare risk-adjusted performance between the three groups both with univariate and multivariate investigation methods. In the third part, we compare the relationship between SA characteristics and performance between the groups.

Starting with the comparison of characteristics, we observe that, on average, asset managers of retail SAs manage a larger number of investor accounts. With respect to minimum investment requirements, mixed SAs, are primarily an option for high-net-worth individuals, as they exhibit an average threshold of approximately $9 million and a median of $5 million. The lower investment levels observed for retail SAs seem to be reflected in the corresponding fees. At an average of 2.14% p.a., they are almost three times as expensive as the 0.75% p.a. documented for institutional SAs, representing a significant disadvantage for retail investors. Additionally, we find that retail SAs are smaller, have fewer holdings, and are less active in terms of annual turnover than institutional SAs.

In the second part, where we analyze risk-adjusted returns ("alpha"), it is noteworthy that all three groups, that is, retail, institutional, and mixed SAs, demonstrate positive and significant gross performance based on the Vanguard benchmark model (Berk & van Binsbergen, 2015, henceforth "Vanguard alpha"). However, with an equal-weighted annualized alpha of 1.76%, institutional SAs exhibit a significantly higher performance than their mixed (1.39%) or pure retail (1.30%) counterparts. When net returns are considered, the relative underperformance of retail SAs is

notably worse, with an equal-weighted Vanguard alpha of –0.86% compared to 1.03% (0.60%) for institutional (mixed) SAs, reflecting the large difference in expense ratios between the groups. Asset-weighted average Vanguard alphas are economically similar but lower in magnitude, indicating diseconomies of scale in SAs on average (e.g., Evans et al., 2023).

Identifying distinctive differences in performance and characteristics between SAs catering to different investor types raises the question of whether the outperformance of institutional SAs is attributable to superior management ability or differences in portfolio characteristics. Therefore, we run panel regressions of alphas against retail and institutional dummies, controlling for SA characteristics, investment style, and time-fixed effects. These regressions show that differences in Vanguard alpha between investor types become statistically insignificant once the performance effects of expenses, number of accounts within a SA, money flow, and turnover are accounted for, and that the differences are not attributable to varying levels of manager talent. With Carhart alphas, retail SAs significantly underperform their institutional and mixed counterparts, also after controlling for characteristics and fixed effects. In addition, the Carhart alpha appears to be more affected by SA characteristics than the Vanguard alpha.

In the third and final part, separate panel regressions for each investor type show that gross Vanguard alphas are more strongly affected by the expense ratio for institutional SAs than for retail SAs. For institutional SAs, the gross alpha increases by 1.3 percentage points (pp) if expenses rise by 1 pp. The coefficient on net returns is insignificant, so they recoup the increased costs. The opposite is true for retail SAs. The coefficient on gross alpha is insignificant and that on net alpha is significant at −.8887, so they lose virtually all of the increase in the expense ratio.

Diseconomies of scale at the level of asset management firms are most prevalent in institutional SAs, but not in retail and mixed SAs. The number of individual accounts and money flows have a significant negative impact only on mixed SAs. Turnover has a more negative impact on mixed SAs, while retail SAs are unaffected. Furthermore, cash holdings affect retail and institutional SAs with different signs. Overall, these in-depth analyses thus show not only that characteristics drive performance differences between SAs for different types of investors, but also that characteristics affect performance differently within these SA products, which has not been shown before.

2 | DATA

2.1 | Data source and SA selection criteria

We obtained data for 4720 U.S. domestic equity SAs in the period July 1998 to June 2022 from Morningstar Direct. Specifically, we collected monthly net and gross returns alongside monthly or quarterly SA characteristics. To be included in the sample, we required a minimum of 36 monthly observations for net and gross returns. Furthermore, we followed Elton et al. (2014) and excluded all passive and specialty SAs (e.g., fund of funds). In this dataset, a "Separate Account" represents the aggregate of multiple individual investor accounts with a common overall strategy or style.[ii]

To the best of our knowledge, we are the first to consider SAs as an investment alternative to MFs for (wealthy) retail investors, as SAs are commonly described as an exclusively institutional investment vehicle due to very high minimum investment requirements. We document that, in fact, different types of SAs do exist. Pooling both domestic and international SAs, we find that only 21% (974) of the SAs are offered exclusively to institutional investors, while 67% (3183) are mixed, that is, open to both investor types. The smallest group, with 12% (563) of all SAs, are even offered exclusively to retail investors. This clearly contradicts the general perception that SAs are a purely institutional platform.

Morningstar's data on SAs is free of survivorship bias because it includes both surviving and non-surviving SAs. It should be noted, however, that asset management companies report data on a voluntary basis due to weak reporting requirements. Therefore, there is a risk of self-selection bias, as data from poorly performing SAs may not be reported at all or firms may stop reporting. Elton et al. (2014) examine the severity of this bias in the Morningstar database and conclude that it lacks economic significance. They argue that institutional investors rely heavily on the database for information gathering and SA selection. As a result, asset management companies are forced to weigh the cost of disclosing periods of poor performance against the cost of being excluded from the database. This competitive pressure suggests a relatively low level of bias.

2.2 | Descriptive statistics and comparison of SA characteristics

Table 1 presents pooled monthly descriptive statistics of common SA characteristics. For all SAs in Panel A, the average total assets are about $995 million. The number of accounts, which is the number of different investors within a SA, is around 121 on average. The expense ratio, calculated as the annualized difference between reported gross and net returns, exhibits a mean of 0.98% p.a., which is lower than comparable figures for U.S. domestic equity MFs (e.g., 1.20% p.a., Rohleder et al., 2018). The comparatively low costs can be partly attributed to the high average minimum investment of $9.3 million. The annual turnover equals 59.34%, which is also distinctively lower than that of MFs with around 85% (e.g., Pástor et al., 2017). Over the period from 1998 to 2022, SAs have experienced a substantial annual implied percentage net flow of 7.48%. Following Sirri and Tufano (1998), we calculate annualized monthly implied percentage net flow (hereafter flow) from monthly total assets and monthly returns. The positive average flow attests to the growing importance of SAs over these 25 years.

Panels B and C report statistics separately for institutional and retail SAs. Table 2 reports differences and comparison tests. According to these, institutional SAs are almost twice as large (1270 vs. 699 M$) and have distinctively fewer accounts (61 vs. 330) on average. This might not be unexpected, as the pool of available retail investors is much larger than that of institutional investors, but the average retail investor has considerably less wealth to invest. This is also reflected in the retail SAs' lower average minimum investment (0.74 vs. 16.15 M$). The relatively low investment levels result in a rather unfavorable position in terms of bargaining power, which is reflected in the retail SAs' higher average expense ratio (2.14% p.a. vs. 0.75% p.a.), making them substantially more expensive than the average actively managed U.S. domestic equity MF. Nonetheless, retail SAs received higher percentage inflows (9.84% p.a. vs. 7.15% p.a.). Furthermore, they have fewer holdings (65 stocks vs. 98 stocks), have lower annual turnover (46% vs. 59%), hold more cash (3.5% vs. 2.5%), and are slightly younger (10.6 years vs. 11.47 years).

The results for the large group of mixed SAs in Panel D are mostly between those of pure institutional and retail SAs, which may not be very surprising. However, the average expense ratio is much closer to that of pure institutional investors with 0.85% p.a. The relatively low fee rate is likely driven not only by the institutional clients included in these SAs, but also by the still very high average minimum investment of around $8.76 million, suggesting that mixed SAs are only suitable for high-net-worth retail investors. Moreover, also the number of accounts (106) and the number of holdings (74 stocks) are closer to institutional SAs, while turnover is even higher than in the other two groups with 61.5%. Overall, this suggests that mixed SAs are, on average, largely held by institutional investors, with only a small portion actually held by retail investors.

3 | PERFORMANCE

3.1 | SA performance measurement

To evaluate the performance of SAs, we use excess returns over the risk-free rate as well as risk-adjusted returns according to the Carhart (1997) 4-factor model and the Berk and van Binsbergen (2015) Vanguard index fund model. U.S. research factor returns were obtained from Kenneth R. French's data library.[iii] Vanguard index fund net returns were obtained from Refinitiv.

For the estimation, we rely on monthly returns. To obtain a monthly time series of alphas for each SA, we follow Sharpe (1992) and run rolling time-series regressions (Equation 1 for the Carhart and Equation 3 for the Vanguard model) to calculate out-of-sample alphas ($\alpha_{i,t}^{\text{oos}}$) (Equations 2 and 4) for each SA i in each month t using style betas estimated over the 24-month window ending at t–1.

$$\text{ER}_{i,t} = \alpha_{i,t} + \beta_{i,t}^{M}\text{ER}_{M,t} + \beta_{i,t}^{\text{SMB}}\text{SMB}_t + \beta_{i,t}^{\text{HML}}\text{HML}_t + \beta_{i,t}^{\text{MOM}}\text{MOM}_t + \varepsilon_{i,t} \tag{1}$$

$$\alpha_{i,t}^{\text{oos}} = \text{ER}_{i,t} - \left(\beta_{i,t-1}^{M}\text{ER}_{M,t} + \beta_{i,t-1}^{\text{SMB}}\text{SMB}_t + \beta_{i,t-1}^{\text{HML}}\text{HML}_t + \beta_{i,t-1}^{\text{MOM}}\text{MOM}_t \right) \tag{2}$$

$\text{ER}_{i,t}$ is the monthly excess return of SA i in month t over the 1-month Treasury Bill rate, $\text{ER}_{M,t}$ is the excess return of the U.S. market index, SMB_t (small-minus-big) is the return of the size factor, HML_t (high-minus-low) is the return of the value factor, MOM_t is the return of the momentum factor, and $\varepsilon_{i,t}$ is the error term. $\beta_{i,t}^{M}$, $\beta_{i,t}^{\text{SMB}}$, $\beta_{i,t}^{\text{HML}}$, and $\beta_{i,t}^{\text{MOM}}$ are the style betas of SA i during the 24-month window.

TABLE 1 SA characteristics.

				Percentile				
	N	**Mean**	**SD**	**10**	**25**	**50**	**75**	**90**
Panel A: All SAs								
Total assets (M$)	713,252	994.58	2555.79	3.27	23.72	148.41	725.21	2394.67
Firm assets (B$)	664,550	112.69	272.07	0.32	1.45	7.44	74.04	341.28
# Accounts	651,631	120.83	369.35	1	4	13	55	247
Expense ratio (p.a.)	787,211	0.98	0.73	0.36	0.60	0.80	1.00	2.16
Flow (p.a.)	696,773	7.48	119.89	−72.23	−25.73	−0.78	26.31	83.62
# Holdings	448,344	78.08	72.71	29	39	56	89	140
% Top10 holdings	447,856	31.85	13.14	16.98	22.67	30.11	38.60	48.59
% Cash	448,554	2.87	3.98	0.00	0.22	1.74	3.73	6.61
Turnover ratio (p.a.)	364,682	59.34	49.46	15.00	25.01	45.00	77.92	119.76
Min. investment (M$)	578,241	9.30	15.16	0.10	0.25	3.00	10.00	25.00
Age (years)	808,917	11.33	8.51	2.00	4.75	9.67	16.16	22.85
Panel B: Institutional SAs								
Total assets (M$)	148,141	1270.16	2828.61	5.20	45.37	258.86	1094.00	3387.53
Firm assets (B$)	139,649	144.29	309.43	0.60	2.64	11.33	107.75	487.82
# Accounts	135,750	60.69	254.68	1	2	7	23	86
Expense ratio (p.a.)	161,450	0.75	0.40	0.36	0.52	0.72	0.95	1.08
Flow (p.a.)	146,050	7.15	114.67	−65.06	−22.37	−0.66	20.83	74.44
# Holdings	92,542	97.80	97.62	30	43	66	105	210
% Top10 holdings	92,401	30.30	13.44	14.48	20.77	28.29	38.08	47.98
% Cash	92,610	2.51	3.55	0.00	0.33	1.45	3.30	5.69
Turnover ratio (p.a.)	74,255	59.01	46.71	16.05	26.33	46.37	76.58	117.08
Min. investment (M$)	111,298	16.15	20.66	1.00	3.00	10.00	25.00	50.00
Age (years)	163,889	10.57	8.05	1.75	4.25	8.84	15.09	21.85
Panel C: Retail SAs								
Total assets (M$)	76,783	699.23	2646.77	1.13	8.20	54.19	272.40	1039.64
Firm assets (B$)	79,631	163.68	324.29	0.45	3.19	23.37	170.58	427.90
# Accounts	71,108	330.34	649.42	2	8	46	268	1116
Expense ratio (p.a.)	92,513	2.14	1.06	0.50	0.99	2.96	3.00	3.00
Flow (p.a.)	74,689	9.84	128.27	−74.90	−26.82	−0.35	28.77	91.69
# Holdings	49,224	65.21	52.16	29	38	52	75	103
% Top10 holdings	49,185	32.65	11.95	19.83	24.14	31.20	38.58	47.25
% Cash	49,233	3.47	4.27	0.00	0.90	2.37	4.28	7.45
Turnover ratio (p.a.)	38,948	46.00	40.16	12.82	20.20	34.73	58.49	91.00
Min. investment (M$)	63,707	0.74	3.04	0.05	0.10	0.10	0.25	1.00
Age (years)	96,566	11.47	10.01	1.83	4.42	9.23	15.76	23.02
Panel D: Mixed SAs								
Total assets (M$)	488,328	957.42	2444.16	3.62	24.02	145.70	717.82	2300.00
Firm assets (B$)	445,270	93.66	245.96	0.26	1.12	5.54	50.83	252.05
# Accounts	444,773	105.70	322.95	1	4	14	54	219
Expense ratio (p.a.)	533,248	0.85	0.53	0.36	0.56	0.76	0.97	1.32
Flow (p.a.)	476,034	7.21	120.09	−74.03	−26.64	−0.89	27.56	85.33
# Holdings	306,578	74.19	65.26	28	38	55	87	132

(Continues)

TABLE 1 (Continued)

				Percentile				
	N	**Mean**	**SD**	**10**	**25**	**50**	**75**	**90**
% Top10 holdings	306,270	32.19	13.20	17.36	23.06	30.38	38.74	49.00
% Cash	306,711	2.88	4.05	0.00	0.08	1.70	3.76	6.73
Turnover ratio (p.a.)	251,479	61.50	51.20	15.00	26.00	46.97	80.40	124.78
Min. investment (M$)	403,236	8.76	13.62	0.10	0.50	5.00	10.00	25.00
Age (years)	548,462	11.54	8.34	2.08	4.92	10.00	16.50	23.10

Note: This table shows the number of observations (N), means, standard deviations (SD), and percentiles for characteristics of separate accounts (SAs) on a monthly basis. The sample consists of 4720 active U.S. domestic equity SAs over the period July 1998 to June 2022. Panel A shows descriptive statistics for the full sample; Panel B contains pure institutional SAs; Panel C contains pure retail SAs; and Panel D contains mixed SAs open to both institutional and retail investors. Total assets are the total net assets managed by the SA. Firm assets refer to the total assets managed by the asset management firm. The number of accounts is the number of different investor accounts managed within a SA. The expense ratio is the annualized difference between monthly gross and net returns. Flow is the annualized monthly implied percentage net flow calculated from monthly total assets and monthly returns following Sirri and Tufano (1998). #Holdings are the number of equity holdings held by the SA. Top10 holdings is the percentage of assets invested in the SA's 10 largest portfolio holdings. Cash is the percentage of the SA's assets held in cash. Annual turnover is the lesser of purchases or sales divided by average monthly total assets. Minimum investment is the initial minimum investment in M$ required by the SA. Age is the age of the fund in years since inception.

TABLE 2 SA characteristics differences.

	Institutional vs. retail SAs		Institutional vs. mixed SAs		Retail vs. mixed SAs	
	Diff mean	**SE**	**Diff mean**	**SE**	**Diff mean**	**SE**
Total assets (M$)	570.93***	166.36	312.74***	100.58	−258.19*	147.12
Firm assets (B$)	−19.38	17.39	50.63***	11.78	70.02***	14.42
# Accounts	−269.65***	27.37	−45.01***	9.83	224.64***	26.70
Expense ratio (p.a.)	−1.38***	0.05	−0.09***	0.01	1.29***	0.05
Flow (p.a.)	−2.69**	1.06	−0.06	0.64	2.63***	0.98
# Holdings	32.59***	4.22	23.62***	3.87	−8.97***	2.50
% Top10 holdings	−2.35***	0.73	−1.89***	0.55	0.46	0.60
% Cash	−0.96***	0.21	−0.37***	0.12	0.59***	0.19
Turnover ratio (p.a.)	13.01***	2.37	−2.50	1.90	−15.50***	1.97
Min. investment (M$)	15.41***	0.90	7.39***	0.94	−8.02***	0.37
Age (years)	−0.91*	0.49	−0.97***	0.26	−0.06	0.45

Note: This table shows the means and standard errors (SE) for characteristic comparisons of separate accounts (SAs) on a monthly basis. The sample consists of 4720 active U.S. domestic equity SAs over the period July 1998 to June 2022. Statistics are reported for three comparison groups using the following SA classification: Institutional versus Retail; Institutional versus Mixed; and Retail versus Mixed. Mixed SAs are open to both institutional and retail investors, while institutional or retail SAs cater exclusively to institutional or retail investors. Total assets are the total net assets managed by the SA. Firm assets refer to the total assets managed by the asset management firm. The number of accounts is the number of different investor accounts managed within a SA. The expense ratio is the annualized difference between monthly gross and net returns. Flow is the annualized monthly implied percentage net flow calculated from monthly total assets and monthly returns following Sirri and Tufano (1998). #Holdings are the number of equity holdings held by the SA. Top10 holdings is the percentage of assets invested in the SA's 10 largest portfolio holdings. Cash is the percentage of the SA's assets held in cash. Annual turnover is the lesser of purchases or sales divided by average monthly total assets. Minimum investment is the initial minimum investment in M$ required by the SA. Age is the age of the fund in years since inception. ***, **, and * denote significance of an unpaired two-sample mean comparison test at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered by SA.

This asset pricing measure has been criticized in the context of portfolio performance measurement because it does not consider transaction costs and minimal management expenses. Therefore, we additionally use the alpha suggested by Berk and van Binsbergen (2015), which employs the net returns of 11 Vanguard index funds as a combined passive benchmark (Equation 3). We use the same selection of $j=1, ..., 11$ indices as listed in Table 1 of their paper (see also Appendix 1: Table A1).

$$\text{ER}_{i,t} = \alpha_{i,t} + \sum_{j=1}^{11} \beta_{i,t}^{j} \text{ER}_{j,t} + \varepsilon_{i,t} \tag{3}$$

$$\alpha_{i,t}^{\text{oos}} = \text{ER}_{i,t} - \sum_{j=1}^{11} \beta_{i,t-1}^j \text{ER}_{j,t} \tag{4}$$

3.2 | Univariate comparison of SA performance

Table 3 provides a comprehensive overview of the average annualized net and gross performance of SAs. The numbers are calculated in a Fama and MacBeth (1973)-like manner by firstly averaging the SAs' out-of-sample alphas cross-sectionally (both equally or asset-weighted) in each period and, secondly, averaging the period averages over the time series. In the case of excess returns, the first-stage cross-sectional averages are based on simple monthly SA returns over the risk-free rate. Standard errors (SE) and test statistics are from second-stage time-series t-tests.

Panel A provides equal-weighted returns. The results for all SAs show that average net risk-adjusted performance is statistically indistinguishable from zero for both the Carhart and Vanguard measures. This indicates that, on average, portfolio managers of SAs are unable to add value for their investors. Gross performance is positive and significant only for the Vanguard alpha (1.45% p.a.), which provides a fairer assessment compared to the academic Carhart benchmark. This difference was therefore to be expected. However, the positive but insignificant Carhart gross performance is somewhat at odds with the findings of Busse et al. (2010), Elton et al. (2014), and Evans et al. (2020), who report significant positive risk-adjusted gross returns for the overall SA universe.

A closer look at the results across various types of SAs reveals notable disparities. While the performance of mixed SAs is rather like that of all SAs, pure retail SAs exhibit an underperformance of −0.86% p.a. in terms of the Vanguard net alpha. In terms of the Carhart alpha, retail SAs perform even worse with −1.73% p.a., which is similar or even worse than the Carhart performance reported previously for U.S. domestic equity MFs (e.g., Carhart, 1997; Cremers & Petajisto, 2009; Edelen et al., 2013; Rohleder et al., 2011). In contrast, institutional SAs, which are characterized by the lowest expense ratio, seem to generate returns that sufficiently cover their costs with a significant net Vanguard alpha of 1.03% p.a. In gross terms, both alphas of institutional SAs are positive and significant, with a Vanguard (Carhart) alpha of 1.76% p.a. (0.87% p.a.).

The asset-weighted results in Panel B are qualitatively similar but lower in magnitude, indicating diseconomies of scale as regularly documented in the literature (e.g., Busse et al., 2010; Evans et al., 2023). Retail SAs underperform by −1.64% p.a. in terms of Vanguard net alpha (−2.58% p.a. in Carhart terms), while institutional SAs outperform by 0.79% p.a. in Vanguard terms. With respect to gross returns, both retail and institutional SAs outperform by 1.09% p.a. and 1.44% p.a., respectively.

The relatively strong performance of institutional SAs is further substantiated by Table 4, where we rigorously test the significance of the differences between the SA groups. Panel A shows the results for equal-weighted first-stage aggregation. In net terms, all differences between all three groups are statistically significant at the 1% level.

In gross terms, institutional SAs perform significantly better than the other groups, while the differences between retail and mixed SAs are statistically insignificant. This is rather surprising, because the comparison of portfolio characteristics in Tables 1 and 2 showed that mixed SAs are closer to institutional SAs on average. Their gross performance, however, is closer to that of retail SAs.

This is different in Panel B of Table 4, showing difference tests for the asset-weighted first-stage aggregation. Here, the net alpha difference between institutional and mixed SAs is very small and only partially significant, consistent with the similarity in portfolio characteristics. The remaining differences (retail vs. mixed) and (institutional vs. retail) remain significant and increase in magnitude. All differences in terms of gross returns become very small and insignificant.

Overall, the equal-weighted results in Tables 3 and 4 show that the SA universe can achieve positive risk-adjusted gross returns in terms of Vanguard alpha. However, only for institutional SAs, this translates into economic value added for investors net of fees. The asset-weighted results indicate that the gross performances of all groups are much closer together once portfolio size and expenses are properly accounted for. Thus, an important question is whether the performance differences are due to differential management skill or due to differences in portfolio characteristics.

3.3 | Comparative panel regressions of SA performance

The relationship between portfolio characteristics and performance is a recurring topic in the MF literature. Our previous findings show that the relationship between performance and expenses may be of particular interest because of the extreme differences in expenses between retail and institutional SAs.[iv] However, being the most expensive SA

TABLE 3 SA performance.

	Net returns (p.a.)		Gross returns (p.a.)	
	Mean	**SE**	**Mean**	**SE**
Panel A: Equal weights				
All SAs				
Excess returns	7.08**	3.26	8.02**	3.26
Carhart alpha	−0.37	0.42	0.57	0.42
Vanguard alpha	0.52	0.37	1.45***	0.37
Institutional SAs				
Excess returns	7.75**	3.28	8.48**	3.28
Carhart alpha	0.14	0.44	0.87**	0.44
Vanguard Alpha	1.03***	0.40	1.76***	0.40
Retail SAs				
Excess returns	5.66*	3.10	7.83**	3.10
Carhart alpha	−1.73***	0.38	0.43	0.38
Vanguard alpha	−0.86**	0.36	1.30***	0.35
Mixed SAs				
Excess returns	7.11**	3.27	7.93**	3.28
Carhart alpha	−0.31	0.42	0.51	0.42
Vanguard alpha	0.60	0.37	1.39***	0.37
Panel B: Asset weights				
All SAs				
Excess Returns	6.52**	3.26	7.33**	3.27
Carhart Alpha	−0.56	0.37	0.28	0.37
Vanguard Alpha	0.44	0.36	1.26***	0.36
Institutional SAs				
Excess Returns	7.41**	3.24	8.06**	3.24
Carhart Alpha	−0.17	0.41	0.48	0.41
Vanguard Alpha	0.79**	0.40	1.44***	0.40
Retail SAs				
Excess Returns	4.16	3.08	6.90**	3.08
Carhart Alpha	−2.58***	0.36	0.16	0.36
Vanguard Alpha	−1.64***	0.40	1.09***	0.40
Mixed SAs				
Excess Returns	6.56**	3.29	7.20**	3.30
Carhart Alpha	−0.43	0.37	0.24	0.37
Vanguard Alpha	0.55	0.37	1.21***	0.37

Note: This table shows means and corresponding standard errors (SE) for annualized net and gross excess returns as well as risk-adjusted performance measures for separate accounts (SAs). The sample consists of 4720 active U.S. domestic equity SAs over the period July 1998 to June 2022. Statistics are reported for the full sample, for SAs that are offered exclusively to institutional or retail investors, and for mixed SAs that are open to both institutional and retail investors. The means are calculated in a Fama/MacBeth-like manner by first averaging the SAs' excess returns and out-of-sample alphas cross-sectionally in each month and, second, averaging the period averages over the time series. Standard errors are from second-stage time-series t-tests. Panel A calculates means using an equal-weighted first-stage aggregation. Panel B employs an asset-weighted first-stage aggregation using the total assets of the SAs. Excess returns are SA returns subtracted by the U.S. 1-month Treasury bill rate. Risk-adjusted returns are out-of-sample alphas calculated by subtracting the corresponding risk factor returns from the SA's excess returns using previously calculated style betas from t-1. The SA's style betas are factor loadings obtained from 24-month rolling window regressions from t-1 to t-24 using the Carhart (1997) 4-factor and the Berk and van Binsbergen (2015) Vanguard index fund models. ***, **, and * denote significance of a two-sided one-sample t-test with H0 equal to zero at the 1%, 5%, and 10% levels, respectively.

TABLE 4 SA performance differences.

	Institutional vs. retail SAs		Institutional vs. mixed SAs		Retail vs. mixed SAs	
	Diff mean	SE	Diff mean	SE	Diff mean	SE
Panel A: Equal weights						
Net returns (p.a.)						
Excess returns	2.09***	0.34	0.63***	0.16	−1.46***	0.35
Carhart alpha	1.87***	0.19	0.45***	0.11	−1.42***	0.17
Vanguard alpha	1.90***	0.21	0.44***	0.12	−1.46***	0.20
Gross Returns (p.a.)						
Excess returns	0.65*	0.34	0.55***	0.16	−0.10	0.35
Carhart alpha	0.44**	0.19	0.36***	0.11	−0.09	0.17
Vanguard alpha	0.46**	0.21	0.37***	0.12	−0.09	0.20
Panel B: Asset weights						
Net returns (p.a.)						
Excess returns	3.25***	0.42	0.85***	0.28	−2.40***	0.42
Carhart alpha	2.41***	0.30	0.27*	0.15	−2.15***	0.26
Vanguard alpha	2.43***	0.36	0.24	0.19	−2.19***	0.29
Gross returns (p.a.)						
Excess returns	1.15***	0.42	0.86***	0.28	−0.30	0.42
Carhart alpha	0.32	0.30	0.24	0.15	−0.08	0.26
Vanguard alpha	0.35	0.37	0.23	0.19	−0.12	0.29

Note: This table shows mean comparison tests of annualized net and gross excess returns as well as risk-adjusted performance measures for separate accounts (SAs). The sample consists of 4720 active U.S. domestic equity over the period July 1998 to June 2022. Statistics are reported for three comparison groups using the following SA classification: Institutional vs. Retail; Institutional vs. Mixed; Retail vs. Mixed. Mixed SAs are open to both institutional and retail investors, while institutional or retail SAs cater exclusively to institutional or retail investors. The differences in means are calculated in a Fama/MacBeth-like manner by first averaging the SAs' excess returns and out-of-sample alphas cross-sectionally in each month. Secondly, the obtained times series of each SA group are compared by averaging the monthly return differences over the time series. Standard errors (SE) are obtained from t-tests comparing the second-stage time series. Panel A calculates means using an equal-weighted first-stage aggregation. Panel B employs an asset-weighted first-stage aggregation using the total assets of the SAs. Excess returns are SA returns subtracted by the U.S. 1-month Treasury bill rate. Risk-adjusted returns are out-of-sample alphas calculated by subtracting the corresponding risk factor returns from the SA's excess returns using previously calculated style betas from t-1. The SA's style betas are factor loadings obtained from 24-month rolling window regressions from t-1 to t-24 using the Carhart (1997) 4-factor and the Berk and van Binsbergen (2015) Vanguard index fund models. ***, **, and * denote significance of an unpaired two-sample mean comparison test at the 1%, 5%, and 10% levels, respectively.

category with the poorest average performance does not automatically imply that retail SAs do not house managers with superior stock-picking expertise. On the one hand, besides showing positive risk-adjusted gross returns, the most expensive retail SAs might be also capable of generating risk-adjusted returns that overcompensate for their costs over time. On the other hand, they might suffer from even poorer performance compared to their more affordable counterparts. This information is pivotal not only for retail investors, but also for institutional investors considering investments in institutional SAs.

Probably one of the most prominent performance-related characteristics is portfolio size, leading to diseconomies of scale (e.g., for MFs, Berk & Green, 2004; Pollet & Wilson, 2008; Yan, 2008; Pástor et al., 2015; and for SAs, Evans et al., 2023). As noted in Section 3.2, asset weights instead of equal weights result in lower average alphas, reflecting a dependence on SA size. Further characteristics for which we document significant differences in Tables 1 and 2, such as fund flows or trading activity, are also well known to be related to performance.[v]

Consequently, we run panel regressions of net and gross out-of-sample SA Carhart and Vanguard alphas ($\alpha_{i,t}^{\text{oos}}$) on time-invariant dummy variables indicating pure retail and institutional SAs (Retail$_i$, Institutional$_i$), leaving mixed SAs as the baseline group (Equation 5). Thus, the reported coefficients and test statistics represent the differences to mixed SAs. Additional F-tests show the significance of the difference between retail and institutional SAs. We control for all portfolio characteristics described in Table 1 as well as for style[vi] (δ_s) and time-fixed effects (τ_t). Standard errors in parentheses are clustered by SA to account for heteroskedasticity and time-series correlation (e.g., Andrews, 1991).

$$\alpha_{i,t}^{\text{oos}} = \varphi_0 + \varphi_1 \text{Retail}_i + \varphi_2 \text{Institutional}_i + \sum_{m=3}^{M} \varphi_m \text{Control}_{i,t}^m + \delta_s + \tau_t + \eta_{i,t} \quad (5)$$

$\text{Control}_{i,t}^m$ refers to the m-th SA characteristic commonly used as control variable in previous MF and SA performance studies, such as the log total assets to consider the effect of diseconomies of scale, the log total firm assets to control for asset management firm efficiency, the log number of accounts within the SA to capture the complexity of the SA's unique organizational structure and potential client customization effects (e.g., Evans et al., 2020), the annualized flow, the annual turnover ratio to approximate trading activity and transaction costs, the log number of holdings to capture diversification, the share of cash in the SA's portfolio, the age of the SA in years, and the minimum investment requirement in USD millions. Table 5 provides the results.

As the top part of the table shows, there is no significant performance difference between retail, institutional, and mixed SAs in terms of the Vanguard alpha. In terms of the Carhart alpha, only the difference in gross alpha between retail SAs and the other two groups remains significant and negative. Hence, our overall assessment is that the performance differences in Tables 3 and 4 are not decisively driven by differential management skill on average, but rather by differences in SA characteristics.

TABLE 5 Performance regressions.

	Net returns (p.a.)		Gross returns (p.a.)	
	Carhart	**Vanguard**	**Carhart**	**Vanguard**
Institutional	−0.0202 (0.1283)	−0.0628 (0.1529)	−0.0183 (0.1287)	−0.0569 (0.1531)
Retail	−0.2971 (0.2025)	−0.2600 (0.2078)	−0.4149** (0.2025)	−0.3389 (0.2091)
F-test: Retail vs. Institutional (*p*-value)	.2265	.4193	.0845*	.2536
Expense ratio (p.a.)	−0.5387*** (0.0945)	−0.6020*** (0.0985)	0.5534*** (0.0937)	0.4725*** (0.0993)
Ln Total assets	−0.0128 (0.0263)	0.0073 (0.0300)	−0.0086 (0.0263)	0.0154 (0.0300)
Ln Firm assets	−0.0793*** (0.0254)	−0.0388 (0.0291)	−0.0838*** (0.0254)	−0.0409 (0.0291)
Ln #Accounts	−0.1146*** (0.0312)	−0.1274*** (0.0345)	−0.1153*** (0.0313)	−0.1353*** (0.0345)
% Flow (p.a.)	−0.0046*** (0.0005)	−0.0030*** (0.0006)	−0.0044*** (0.0005)	−0.0029*** (0.0006)
Turnover ratio (p.a.)	−0.0110*** (0.0013)	−0.0088*** (0.0016)	−0.0111*** (0.0013)	−0.0089*** (0.0016)
Ln #Holdings	−0.0215 (0.0981)	−0.0230 (0.1092)	−0.0170 (0.0988)	−0.0199 (0.1094)
% Cash	0.0112 (0.0163)	0.0002 (0.0192)	0.0102 (0.0164)	−0.0014 (0.0192)
Age (years)	−0.0176*** (0.0063)	−0.0020 (0.0074)	−0.0176*** (0.0063)	−0.0016 (0.0074)
Minimum investment (M$)	0.0077* (0.0040)	0.0041 (0.0043)	0.0081* (0.0041)	0.0044 (0.0043)
Intercept	2.9994*** (0.6670)	2.6251*** (0.7636)	2.9335*** (0.6690)	2.4566*** (0.7618)
Style FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Adjusted R²	0.1213	0.0747	0.1216	0.0751
N	154,167	154,167	154,167	154,167

Note: This table shows performance regressions using annualized net and gross out-of-sample Carhart and Vanguard alphas on a monthly basis as dependent variables. The sample consists of 4720 active U.S. domestic equity SAs over the period July 1998 to June 2022. An out-of-sample alpha is calculated by subtracting the corresponding risk factor returns from the SA's excess returns using previously calculated style betas from t-1. The SA's style betas are factor loadings obtained from 24-month rolling window regressions from t-1 to t-24 using the Carhart (1997) 4-factor and the Berk and van Binsbergen (2015) Vanguard index fund models. For the identification of pure retail and pure institutional SAs, the regressions incorporate two separate dummy variables (Institutional and Retail). Mixed SAs that are open to both types of investors form the reference category (Intercept). The *p*-value of a corresponding F-test indicates the significance of the difference between the coefficients of the retail and institutional SA dummies. As explanatory variables, the regressions include several SA characteristics. Ln Total assets is the logarithm of the total net assets managed by the SA. Ln Firm assets refer to the logarithm of the total assets managed by the asset management firm. Ln #Accounts is based on the logarithm of the number of different investor accounts managed within a SA. Flow is the annualized monthly implied percentage net flow calculated from monthly total assets and monthly returns following Sirri and Tufano (1998). Annual Turnover Ratio is the lesser of purchases or sales divided by average monthly total assets. Ln #Holdings is the logarithm of the number of equity holdings held by the SA. Top10 holdings is the percentage of assets invested in the SA's 10 largest portfolio holdings. Cash is the percentage of the SA's assets held in cash. Age is the age of the fund in years since inception. Minimum Investment is the initial minimum investment in M$ required by the SA. All regressions control for style (Morningstar equity style box) and time (month) fixed effects. ***, **, and * denote significance of the estimated parameters at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered by SA and reported in parentheses.

Examining the control variables, the expense ratio shows significant negative coefficients on net alpha. This may be expected as higher expenses directly reduce net alpha. It also means that, on average, higher expenses are not justified by an offsetting increase in the SA managers' stock picking performance. For gross alpha, we would therefore expect insignificant coefficients. However, the coefficients are significantly positive, which may indicate that more expensive SAs do in fact successfully devote more effort to managing their respective portfolios and achieve higher risk-adjusted gross returns. However, given the net return results, the increase in gross performance is not high enough to compensate for the increase in costs, that is, investors do not benefit from this success and thus should select SAs with low expenses.

Contrary to the results comparing equal-weighted and value-weighted average performance in Tables 3 and 4, we do not find a significant negative relationship between log total assets and performance. Instead, the size of the asset management firm and the number of investor accounts within the SA exert a negative influence. However, these characteristics are positively correlated with the size of the SA, as shown in Appendix 2: Table B1, which reports the correlations between SA characteristics. This suggests that diseconomies of scale are primarily driven by the structural challenges of managing many individual investor accounts within a large asset management firm, that is, limited attention, information processing, and hierarchy costs,[vii] and are less driven by liquidity costs (e.g., Pástor et al., 2020) arising within larger portfolios.

All specifications show that money inflows reduce alpha, consistent with the notion that inflows must be processed by the fund management, which may cause a trade-off between liquidity costs and maintaining the management's optimal investment strategy (e.g., Rohleder et al., 2018). Furthermore, higher turnover decreases performance, consistent with the increase in transaction costs from more frequent trading. The number of holdings, that is, the degree of diversification or portfolio concentration, as well as the percentage of portfolio assets held in cash have no influence on alpha.

Finally, older SAs have lower Carhart alphas, while the Vanguard alpha is unrelated to SA age. Likewise, the minimum investment amount is only marginally positively significant for the Carhart alpha, but unrelated to the Vanguard alpha. Thus, overall, the Vanguard alpha is less affected by SA characteristics than the Carhart alpha.

3.4 | Differential effects of SA characteristics on performance

As our analysis in Table 5 shows, SA performance is related to several SA characteristics. In addition, Tables 1 and 2 demonstrate that institutional, retail, and mixed SAs are very different in terms of these characteristics. Further, the challenges of managing institutional vs. retail accounts may be very different. Therefore, it could be reasonable to expect that the alphas of the SA groups will react differently to changes in the various SA characteristics. Therefore, we run the panel regression displayed in Equation (6) separately for institutional, retail, and mixed SAs using net and gross returns as well as the Carhart and Vanguard alphas. Standard errors in parentheses are clustered by SA. The results are reported in Table 6.

$$\alpha_{i,t}^{\text{oos}} = \varphi_0 + \sum_{m=1}^{M} \varphi_m \, \text{Control}_{i,t}^m + \delta_s + \tau_t + \eta_{i,t} \qquad (6)$$

As expected, the relationship between SA characteristics and performance appears to be very different for the three groups. Regarding the expense ratio, the negative coefficient on net returns is much stronger for retail SAs, but negligible for institutional SAs. Thus, selecting less expensive SAs is especially important for retail investors. On the other hand, the positive coefficient for gross returns is particularly high for institutional SAs, but insignificant for retail SAs, which means that institutional SA managers devote special efforts to managing the portfolio, of which the investors, however, do not directly profit.

The negative effect of the number of accounts is significant for institutional and mixed SAs, but insignificant for retail SAs. Remembering from Table 1 that retail SAs have almost five times as many accounts as institutional SAs, this suggests that institutional investors create more complexity through stronger customization demands and individual bargaining. Conversely, pure retail investors may customize their portfolios only marginally, such that a larger number of retail accounts does not seem to add much investment complexity for portfolio managers.

Like the number of accounts, higher turnover more strongly affects the performance of institutional and mixed SAs, which may be due to similar reasons. If more frequent trading is triggered by individual investor demand for customization,

TABLE 6 Separate performance regressions.

	Net returns Carhart (p.a.)			Net returns vanguard (p.a.)			Gross returns Carhart (p.a.)			Gross returns vanguard (p.a.)		
	Institutional	Retail	Mixed	Institutional	Retail	Mixed	Institutional	Retail	Mixed	Institutional	Retail	Mixed
Expense ratio (p.a.)	−0.0055 (0.3922)	−0.7865*** (0.1432)	−0.4201*** (0.1425)	0.2749 (0.5274)	−0.8887*** (0.1387)	−0.5054*** (0.1430)	1.0426** (0.4152)	0.2058 (0.1427)	0.7437*** (0.1405)	1.3262** (0.5316)	0.1099 (0.1392)	0.6209*** (0.1450)
Ln Total assets	0.0348 (0.0551)	−0.0647 (0.0600)	−0.0185 (0.0348)	0.0967 (0.0652)	−0.0425 (0.0641)	−0.0281 (0.0393)	0.0356 (0.0552)	−0.0584 (0.0598)	−0.0118 (0.0348)	0.1025 (0.0653)	−0.0354 (0.0638)	−0.0173 (0.0392)
Ln Firm assets	−0.1624*** (0.0599)	−0.1197* (0.0681)	−0.0583* (0.0325)	−0.1883*** (0.0653)	−0.0747 (0.0769)	0.0067 (0.0374)	−0.1659*** (0.0599)	−0.1247* (0.0679)	−0.0624* (0.0326)	−0.1951*** (0.0651)	−0.0701 (0.0759)	0.0042 (0.0375)
Ln #Accounts	−0.1650* (0.0897)	−0.0101 (0.0667)	−0.1282*** (0.0402)	−0.1602 (0.1056)	0.0436 (0.0698)	−0.1733*** (0.0433)	−0.1644* (0.0900)	−0.0153 (0.0661)	−0.1333*** (0.0403)	−0.1666 (0.1060)	0.0363 (0.0710)	−0.1855*** (0.0434)
% Flow (p.a.)	−0.0017 (0.0013)	−0.0025** (0.0013)	−0.0056*** (0.0007)	−0.0012 (0.0015)	−0.0008 (0.0012)	−0.0037*** (0.0008)	−0.0015 (0.0013)	−0.0025** (0.0013)	−0.0055*** (0.0007)	−0.0011 (0.0015)	−0.0007 (0.0012)	−0.0037*** (0.0008)
Turnover ratio (p.a.)	−0.0126*** (0.0025)	−0.0056 (0.0052)	−0.0113*** (0.0016)	−0.0084*** (0.0030)	0.0008 (0.0074)	−0.0107*** (0.0019)	−0.0123*** (0.0026)	−0.0054 (0.0052)	−0.0115*** (0.0016)	−0.0082*** (0.0030)	0.0006 (0.0074)	−0.0109*** (0.0019)
Ln #Holdings	−0.1014 (0.2072)	−0.2348 (0.2681)	0.0477 (0.1260)	−0.0111 (0.2265)	0.3069 (0.2789)	−0.0998 (0.1406)	−0.1070 (0.2075)	−0.2493 (0.2651)	0.0634 (0.1273)	−0.0362 (0.2244)	0.2777 (0.2775)	−0.0819 (0.1417)
% Cash	−0.0245 (0.0371)	0.0145 (0.0300)	0.0184 (0.0213)	−0.0930* (0.0519)	0.0899*** (0.0229)	0.0026 (0.0251)	−0.0239 (0.0371)	0.0140 (0.0299)	0.0165 (0.0214)	−0.0980* (0.0520)	0.0849*** (0.0232)	0.0020 (0.0253)
Age (years)	−0.0091 (0.0154)	−0.0151 (0.0114)	−0.0193** (0.0085)	−0.0060 (0.0197)	−0.0116 (0.0118)	0.0057 (0.0098)	−0.0083 (0.0154)	−0.0149 (0.0113)	−0.0192** (0.0085)	−0.0040 (0.0198)	−0.0122 (0.0117)	0.0060 (0.0098)
Minimum investment (M$)	0.0064 (0.0075)	0.0346* (0.0192)	0.0068 (0.0051)	−0.0005 (0.0070)	0.0474** (0.0222)	0.0071 (0.0056)	0.0061 (0.0076)	0.0353* (0.0190)	0.0074 (0.0052)	−0.0003 (0.0071)	0.0501** (0.0223)	0.0077 (0.0057)
Intercept	4.1045** (1.7727)	4.8955*** (1.7503)	2.4011*** (0.8100)	4.0155** (1.9449)	1.8705 (1.9978)	2.6498*** (0.9419)	4.1315** (1.7734)	4.9955*** (1.7437)	2.1944*** (0.8111)	4.1100** (1.9302)	1.8058 (1.9767)	2.3562** (0.9416)
Style FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R²	0.1318	0.1082	0.1239	0.1009	0.0648	0.0730	0.1330	0.1066	0.1249	0.1028	0.0636	0.0736
N	31,132	16,987	106,048	31,132	16,987	106,048	31,132	16,987	106,048	31,132	16,987	106,048

Note: This table shows performance regressions using annualized net and gross out-of-sample Carhart and Vanguard alphas on a monthly basis as dependent variables. The sample consists of 4,720 active U.S. domestic equity SAs over the period July 1998 to June 2022. An out-of-sample alpha is calculated by subtracting the corresponding risk factor returns from the SA's excess returns using previously calculated style betas from t-1. The SA's style betas are factor loadings obtained from 24-month rolling window regressions from t-1 to t-24 using the Carhart (1997) 4-factor and the Berk and van Binsbergen (2015) Vanguard index fund models. The regressions divide the SA data into subsamples depending on whether an observation belongs to a pure institutional, pure retail or mixed SA. Mixed SAs are open to both types of investors. As explanatory variables the regressions include several SA characteristics. The Expense Ratio is the annualized difference between monthly gross and net returns. Ln Total Assets is the logarithm of the total net assets managed by the SA. Ln Firm Assets refer to the logarithm of the total assets managed by the asset management firm. Ln #Accounts is based on the logarithm of the number of different investor accounts managed within a SA. Flow is the annualized monthly implied percentage net flow calculated from monthly total assets and monthly returns following Sirri and Tufano (1998). Annual Turnover Ratio is the lesser of purchases or sales divided by average monthly total assets. Ln #Holdings is the logarithm of the number of equity holdings held by the SA. Top10 holdings is the percentage of assets invested in the SA's ten largest portfolio holdings. Cash is the percentage of the SA's assets held in cash. Age is the age of the fund in years since inception. Minimum Investment is the initial minimum investment in M$ required by the SA. All regressions control for style (Morningstar equity style box) and time (month) fixed effects. ***, **, * denote significance of the estimated parameters at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered by SA and reported in parentheses.

this increases management complexity and information processing costs, which in turn reduces performance. Retail SA managers, on the other hand, may trade based on their own optimal portfolio strategy, such that transaction costs are, on average, more likely to be justified by profitable outcomes.

The coefficients of the minimum investment amount are significant and positive only for retail SAs. Thus, the SAs' performance profits from a higher barrier of entry, which may result in fewer and supposedly more sophisticated investors partaking in the SA.

Finally, while the coefficient on cash holdings was insignificant in Table 5, the coefficients here are positive for retail SAs and negative for institutional SAs in case of the Vanguard alpha. This differential effect may indicate that the liquidity requirements of retail SAs are higher because retail investor flows are less predictable. Thus, keeping cash reserves buffers the negative effects from flows shown for retail investors in terms of Carhart alpha. On the other hand, institutional flows seem to be rather predictable, as indicated by the insignificant coefficients for institutional SAs. Thus, maintaining high cash reserves diminishes alpha at institutional SAs due to the opportunity costs of being underinvested in risky assets.

Overall, this new in-depth investigation of the differential effects of SA variables on SA performance suggests that SA investors need to consider different effects from SA characteristics in their investment decisions. Moreover, the Vanguard alpha is generally less affected by these characteristics than the Carhart alpha.

4 | CONCLUSION

This study significantly advances the understanding of the SA investment landscape, particularly in distinguishing the characteristics and performance of SAs tailored to different investor types—institutional and retail. The findings indicate that while pure institutional SAs deliver superior risk-adjusted returns, the performance of pure retail and mixed SAs is markedly lower, especially after accounting for expenses. In fact, in net terms, institutional SAs are the only group capable of generating significant positive Vanguard alphas on average, whereas retail SAs show pronounced underperformance. This disparity raises important considerations for both investors and asset managers and underscores the importance of investor type in SA performance, suggesting that institutional investors benefit from lower expense ratios and more favorable portfolio characteristics, such as a smaller number of accounts managed per manager.

The implications for practice are clear. For retail investors, the higher fees and lower performance of retail SAs suggest that these accounts may not be the most cost-effective investment vehicle, particularly compared to mutual funds or other investment options with lower expense ratios such as exchange-traded funds. Retail investors should carefully consider whether the benefits of SAs, such as customized investment strategies and potential tax advantages, justify the higher costs and potential underperformance.

For asset managers, the results highlight the need to tailor their strategies to the specific characteristics and needs of their investor base. Managers of retail SAs must be aware of the challenges posed by higher account numbers and lower investment amounts, which may necessitate different management approaches or fee structures to maintain competitive performance relative to other viable investment alternatives. Moreover, the presence of mixed SAs, which combine retail and institutional investors, presents both an opportunity and a challenge—these accounts must balance the needs and expectations of a diverse investor base to optimize performance.

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Endnotes

[i] It is important to note that the minimum investment requirements for retail SAs are still relatively high, as they are more likely to be affordable to wealthier, high net-worth individuals than to lower-income households. However, we have based our classification of investor types on Morningstar's description of SA product types, which distinguishes between institutional, retail, and both.

[ii] SAs have a unique organizational structure where each SA investor owns an individual account in which they directly hold their respective assets. This structure enables investors to restrict or customize their portfolio by setting style or risk preferences. This results in greater management

complexity compared to MFs. All accounts that follow a common overall strategy are managed in conjunction with the other investors' accounts. Thus, reported SA characteristics are aggregate observations, for example, the weighted average of the realized returns of the accounts within a SA or the sum of total assets. Individual investor accounts are not reported.

[iii] https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

[iv] For MFs, the relationship between performance and expenses has been discussed by, for example, Ippolito (1989), Carhart (1997), Wermers (2000), Gil-Bazo and Ruiz-Verdú (2009), and Vidal et al. (2015).

[v] For instance, for fund flows, refer to Sirri and Tufano (1998), Edelen (1999), Alexander et al. (2007), and Fulkerson and Riley (2017). For activity, see Carhart (1997), Cremers and Petajisto (2009), Edelen et al. (2013), Pástor et al. (2017), and Champagne et al. (2018).

[vi] For style classification, we use Morningstar's equity style box, which has nine categories (e.g., value-large).

[vii] E.g., Indro et al. (1999), Chen et al. (2004), Kacperczyk et al. (2016), Gupta-Mukherjee and Pareek (2020), Evans et al. (2023), and Evans et al. (2024).

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APPENDIX 1

TABLE A1 Benchmark Vanguard index funds.

Fund name	Ticker	Asset class	Inception date
S&P 500 Index	VFINX	Large-Cap Blend	08/31/1976
Extended Market Index	VEXMX	Mid-Cap Blend	12/21/1987
Small-Cap Index	NAESX	Small-Cap Blend	01/01/1990[a]
European Stock Index	VEURX	International	06/18/1990
Pacific Stock Index	VPACX	International	06/18/1990
Value Index	VVIAX	Large-Cap Value	11/02/1992
Balanced Index	VBINX	Balanced	11/02/1992
Emerging Markets Stock Index	VEIEX	International	05/04/1994
Mid-Cap Index	VIMSX	Mid-Cap Blend	05/21/1998
Small-Cap Growth Index	VISGX	Small-Cap Growth	05/21/1998
Small-Cap Value Index	VISVX	Small-Cap Value	05/21/1998

Note: This table lists the set of Vanguard index funds used to calculate the Vanguard benchmark. The listed ticker is for the investor class shares which we use until Vanguard introduces the Admiral class for the fund, and thereafter we use the return on the Admiral class shares (Admiral class shares have lower fees but require a higher minimum investment).

[a]NAESX was introduced earlier but was originally not an index. It was converted into an index in late 1989, so the date in the table reflects the first date we included the fund in the benchmark set.

APPENDIX 2

TABLE B1 Correlation matrix of explanatory variables.

	Expense ratio	Ln Total assets	Ln Firm assets	Ln #Accounts	% flow	Turnover ratio	Ln #Holdings	% Top10 holdings	% cash	Age	Minimum investment
Expense ratio	100.00										
Ln Total assets	−21.76	100.00									
Ln Firm assets	8.74	38.27	100.00								
Ln #Accounts	15.12	29.16	−8.62	100.00							
% Flow	1.47	−1.69	−2.07	1.54	100.00						
Turnover ratio	−5.63	−9.75	−4.60	−25.61	−1.00	100.00					
Ln #Holdings	−13.15	12.45	30.79	−28.64	−1.11	17.89	100.00				
% Top10 holdings	8.29	−5.55	−19.89	23.24	0.57	−16.04	−77.69	100.00			
% Cash	9.76	−3.23	−11.26	16.90	−0.03	−13.54	−31.22	24.11	100.00		
Age	3.25	31.19	17.50	26.26	−7.60	−18.84	−5.73	4.69	6.38	100.00	
Minimum investment	−21.77	33.81	44.37	−22.92	−2.36	7.17	30.76	−16.57	−12.57	8.90	100.00

Note: This table shows the pairwise correlation coefficients between SA characteristics based on the observations used in the panel regressions. The sample consists of 4720 active U.S. domestic equity SAs over the period July 1998 to June 2022. The Expense Ratio is the annualized difference between monthly gross and net returns. Ln Total assets is the logarithm of the total net assets managed by the SA. Ln Firm assets refer to the logarithm of the total assets managed by the asset management firm. Ln #Accounts is based on the logarithm of the number of different investor accounts managed within a SA. Flow is the annualized monthly implied percentage net flow calculated from monthly total assets and monthly returns following Sirri and Tufano (1998). Annual turnover ratio is the lesser of purchases or sales divided by average monthly total assets. Ln #Holdings is the logarithm of the number of equity holdings held by the SA. Top10 holdings is the percentage of assets invested in the SA's 10 largest portfolio holdings. Cash is the percentage of the SA's assets held in cash. Age is the age of the fund in years since inception. Minimum Investment is the initial minimum investment in M$ required by the SA. All correlations above |0.1| are statistically significant at the 10% level or higher.