



Callan
Institute

Research

2019 Investment Management Fee Study

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Executive Summary

Overview and Purpose

Callan's *2019 Investment Management Fee Study* is our eighth examination of institutional investment management fee trends. The purpose of the study is to provide a detailed analysis on fee levels and trends across multiple asset classes and mandate sizes, for both active and passive management. This study focuses on traditional institutional mandates and therefore excludes mutual funds.

The analysis gives insight into what our institutional investor clients are actually paying (negotiated fees) versus the managers' published fee schedules.

New Features

Actual vs. Published Fee Analysis: Added published fees of product subset with actual client mandates; now compares published fees of broad product universe, published fees for products with client mandates, and actual fees for client mandates

Vintage Analysis: Examined actual fees by vintage of hiring date to better measure fee trends over the last 20 years

Industry Concentration Analysis: Examined concentration of AUM and actual fees/revenues by investment firm

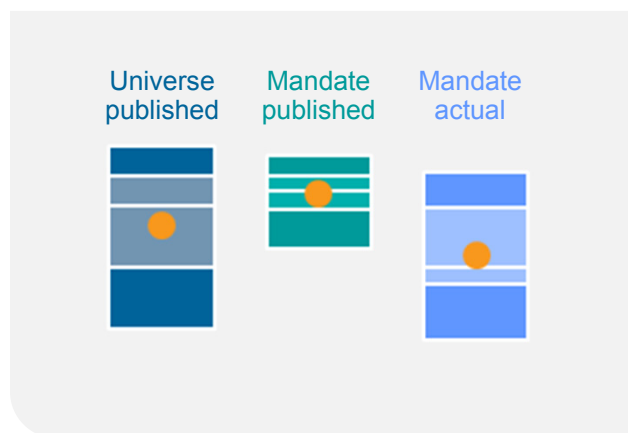
New Asset Classes: U.S. mid cap equity, emerging market debt, multi-asset class (MACs), REITs

New Vehicle: In addition to separate accounts, added collective investment trusts; as noted, mutual funds excluded from the analysis

New Fee Data: In addition to basis points fees, we analyze average mandate sizes and average fees paid in dollars to gain insights into the health of the industry.

Data and Methodology

Data Sources and Types



The detailed data supporting this report was collected and curated using Callan's proprietary investment manager database, actual client fee schedules, and Callan's proprietary client performance reporting database.

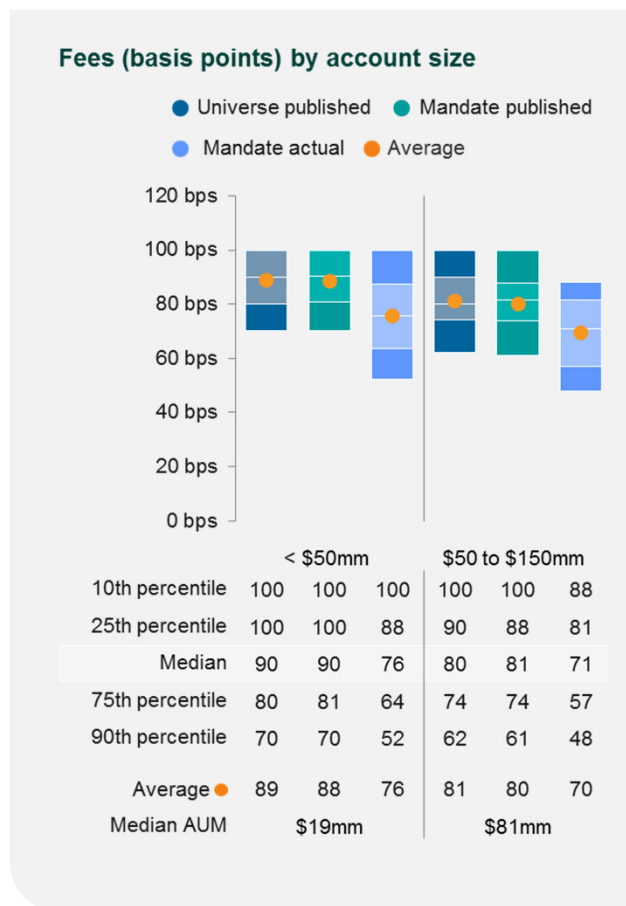
The actual fee dataset for each client mandate was derived from client fee schedules and our client performance reporting database and represents fees paid for 2018. The resulting raw dataset was then reviewed for completeness and accuracy. The final clean dataset was then categorized by parameters such as active/passive, asset class, account size, inception date, and investment manager product. Unique mandate size ranges for analyzing each asset class were determined, balancing practical relevance with sufficient sample sizes. Throughout the study these actual client fees are labeled as "*mandate actual*" data.

All published investment product fees come from Callan's database of investment manager products. By cross-referencing the manager products and mandate sizes in the *actual* fee dataset with the "published" or "standard" fee schedules for those products, we calculated the theoretical published fee (non-negotiated) for those same mandates. These theoretical client fees are labeled as "*mandate published*" data. This more focused view of published fees is new to our study. It represents the starting fee ranges for successfully competitive products as well as potential further negotiated discounts (published actual - mandate actual).

In order to provide a broader view of the competitive fee landscape we also include the range of published fees for all products in the relevant asset class universe (regardless of having any client mandates). This range of published fees is labeled as "*universe published*" and is calculated using the median mandate size for each mandate size range.

Data and Methodology

Actual vs. Published Fee Analysis



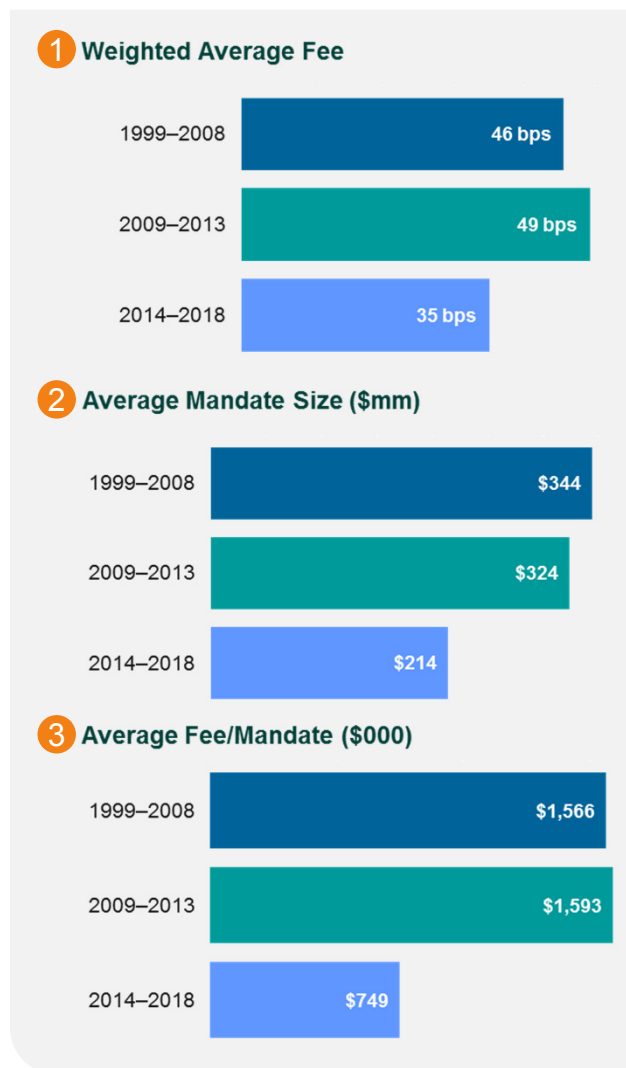
This analysis done on each asset class is meant to show current industry fees from three perspectives: 1) standard “published” fees from the broad universe of all competing products, 2) published fees (pre-negotiation) for only the subset of those products that have Callan client mandates, and 3) actual fees paid (after negotiation) for those client mandates. The goal is to illustrate and compare the fees for the total competitive landscape, the fees for those products successfully winning mandates from Callan clients, and the actual fees those clients ended up paying in 2018.

The analysis groups the mandates by asset size and so illustrates the change in effective fees as mandate size grows. In selecting the size ranges for each asset class, we took into account available sample sizes of client mandates, the usefulness of the breakpoints, and the number of ranges. In asset classes where sample sizes were too small we only report on the total asset class.

For each mandate size range there are three distributions shown: *universe published*, *mandate published*, and *mandate actual* respectively (see chart to left). These three distributions can differ significantly. The reasons for differences between *universe published* and *mandate published* can include: 1) client-specific fee criteria for the search (getting screened out on fees before having the chance to negotiate), 2) hiring tendencies of clients (e.g., choosing lower fee products vs. good performers), 3) differences in actual and published fee database participants, 4) institutional demand and product availability. The reasons for differences between *mandate published* and *mandate actual* can include: 1) negotiation of an actual fee below the published fee schedule as part of hiring process, 2) relationship pricing when a client uses multiple manager products, 3) stale published fee schedules, 4) client tendencies to periodically renegotiate fees on existing mandates.

Data and Methodology

Vintage Fee Analysis



The Vintage Fee Analysis dives deeper into actual client mandate fees to illustrate the changes in the fee environment over the last 20 years. In order to better display these changes in investment management economics, the analysis focuses on not just changes in average actual fees in basis points (% of AUM), but also changes in average mandate sizes and the resulting changes in average dollar fees per client mandate. Looking at fees in both basis points and actual dollars per client gives a clearer picture of how sustained downward pressure on both fee schedules and mandate sizes results in significantly lower dollar fees paid (manager revenue) per client. Showing results in dollars is more illuminating in cases where the average fee in basis points appears stable, but the average mandate size declines materially, resulting in a lower average dollar fee.

The Vintage Fee Analysis looks only at current actual client fees, and groups client mandates into three “vintages” based on the inception date of the mandate: 1) [1999–2008](#) (10 years pre-GFC), 2) [2009–2013](#) (first 5 years post-GFC), and 3) [2014–2018](#) (most recent 5 years). The vintage groups are further broken down into mandate size ranges. For each vintage and mandate size group we calculate: **1** weighted average fee in basis points, **2** average mandate size in dollars, and **3** average fee per mandate (client) in dollars.

Although we use inception vintage groups to differentiate industry fee dynamics over time based on when a mandate fee was negotiated, it is important to note that the **fees being used are the current fees, not necessarily what they were at inception** (original fees not reliably available). Since some clients do periodically renegotiate fees with their managers, it is likely that some of the mandates in the older two vintages (particularly the pre-GFC vintage) had higher fees at inception. This means our analysis probably understates fees in the earlier vintages and therefore also understates the downward change in fees from then to now.

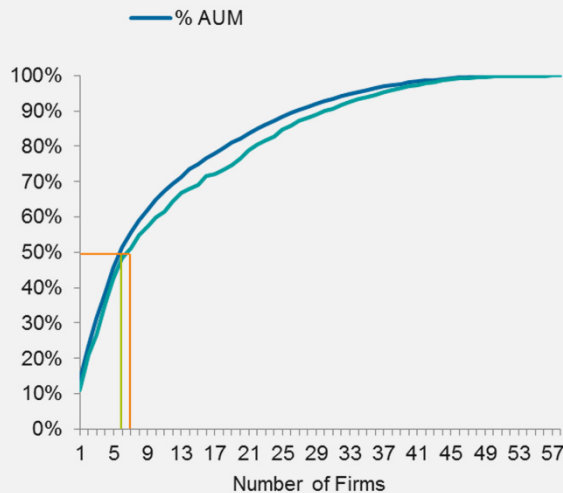
Data and Methodology

Concentration Analysis

\$64.1 billion in assets and **\$257.1 million** in fees

- 224 active mandates with 58 different firms
- 50% of assets managed by **6 firms** (10%)
- 50% of fees made by **7 firms** (12%)
- Active management has 60% AUM market share in this segment (40% AUM passive)
- Active management has 96% fee market share in this segment (4% fees passive)

Concentration by Firm



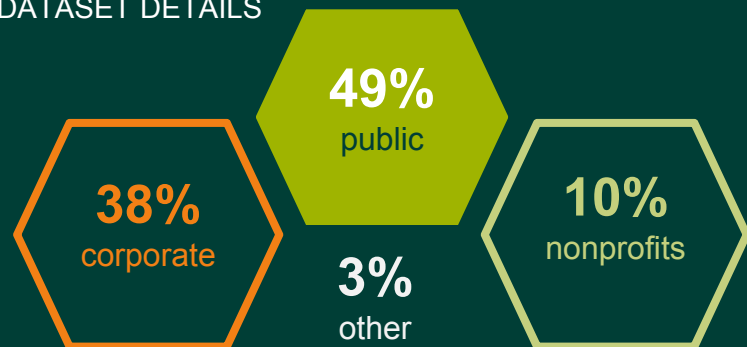
Concentration Analysis is done on the actual client fee dataset both at an industry level (active and passive) as well as asset class by asset class to provide insights into how the competitive pie is being allocated across investment firms by our clients. The results illustrate the number of mandates in each area as well as how many different firms manage those mandates. Concentration of market share in each area with respect to percent of total AUM and percent of total fees is highlighted by showing how many firms control 50% of each. Where relevant we also determine the market share of active vs. passive in an asset class.

We are tracking the investment manager for every client mandate in the fee database, along with the mandate AUM and fee (in basis points and dollars). Therefore we can group mandates by investment management firm and generate useful results on manager market share and concentration across our clients in each asset class and in total.

Key Findings

Callan's 2019 *Investment Management Fee Study* reflects trends on 2018 fees representing over \$500 billion in assets under management and \$1.8 billion in total fees paid. Our fee database includes over 350 investment firms and over 165 institutional investors.

DATASET DETAILS



Popular Vehicles

Separate account	65%
CIT	13%
Commingled	11%

Pricing Power

remained strongest among private real estate and non-U.S. equity

25%

decrease in average mandate size for U.S. large / all cap equity since the GFC

98%

of total fees paid were to active managers

CONCENTRATED

50% of total fees go to <10% of firms

70%

of assets managed actively

Highest Fees

Hedge fund-of-funds	112 bps
Private real estate	85 bps
Non-U.S. / global sm cap	71 bps

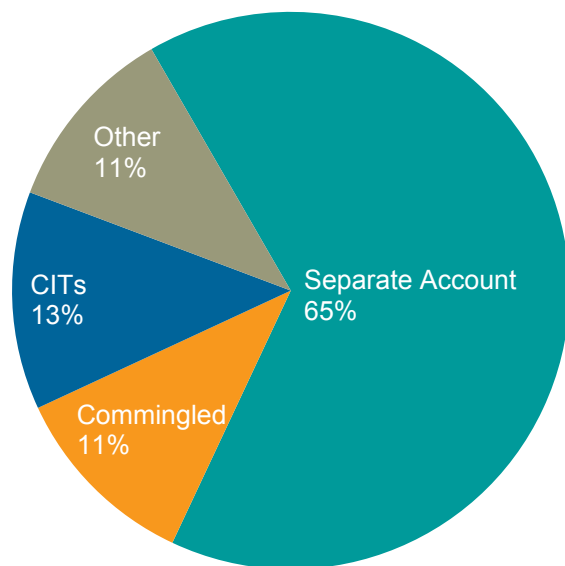
Lowest Fees*

U.S. large / all cap	2 bps
Core fixed income	3 bps
U.S. mid / smid / small / micro cap	4 bps
Non-U.S. / global equity	5 bps

*Passive

Fee Database Profile

Investment Products by Vehicle Type



> **350** distinct investment firms

\$593.1 billion total assets under management

\$1.8 billion total fees paid in 2018

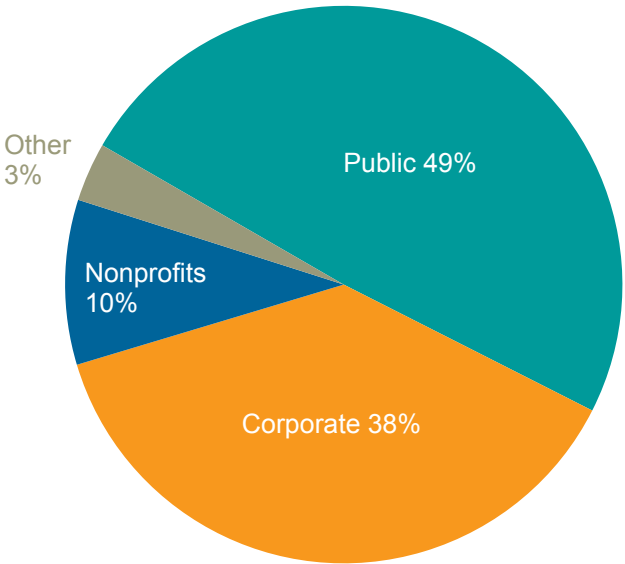
Vehicles	Count	AUM (\$mm)	Average AUM (\$mm)
Separate Account	1,177	\$492,375	\$418
Commingled	200	\$47,665	\$238
CITs	228	\$28,684	\$126
Other	197	\$24,399	\$124
Total	1,802	\$593,123	\$329

Institutional Portfolio Fee Database Statistics

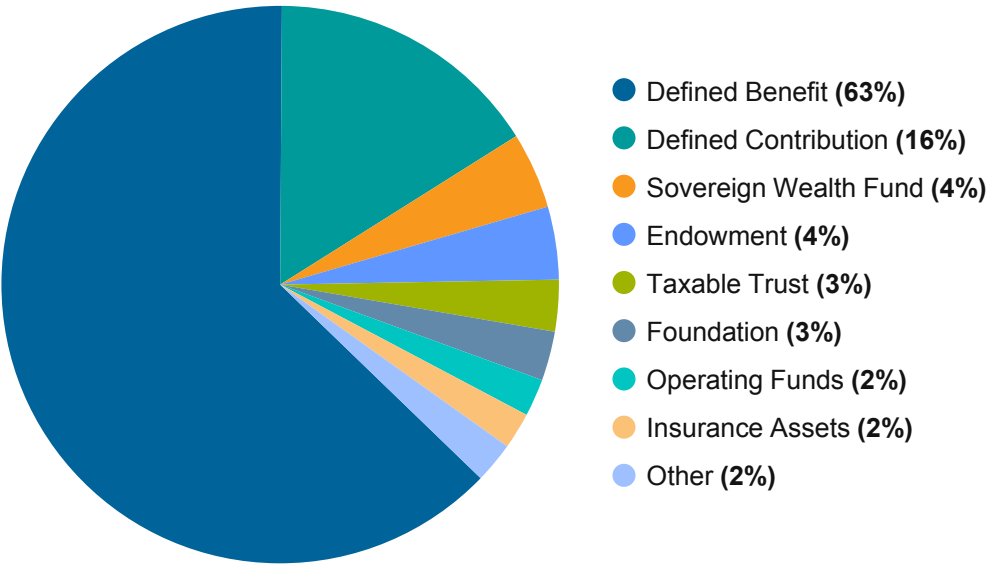
Mandate Type	Portfolios	Total AUM (\$mm)	Average AUM (\$mm)	Total Fees (\$mm)	Weighted Average Fee	Average Portfolio Fee (\$000)
All	1,802	\$593,123	\$329	\$1,762	30 bps	\$978
Active	1,578	\$423,451	\$268	\$1,734	41 bps	\$1,099
Passive	224	\$169,672	\$757	\$28	2 bps	\$126

Fee Database Profile

Institutional Investors by Type



Asset Pools by Type

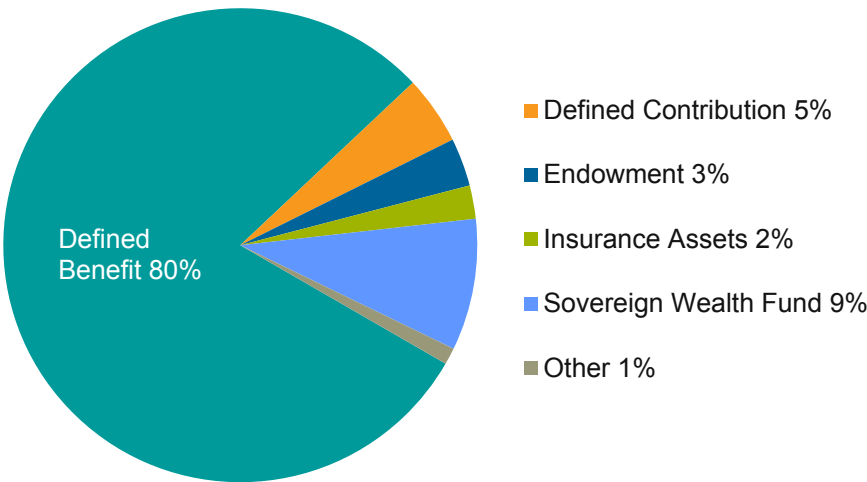


> 165 distinct asset owners

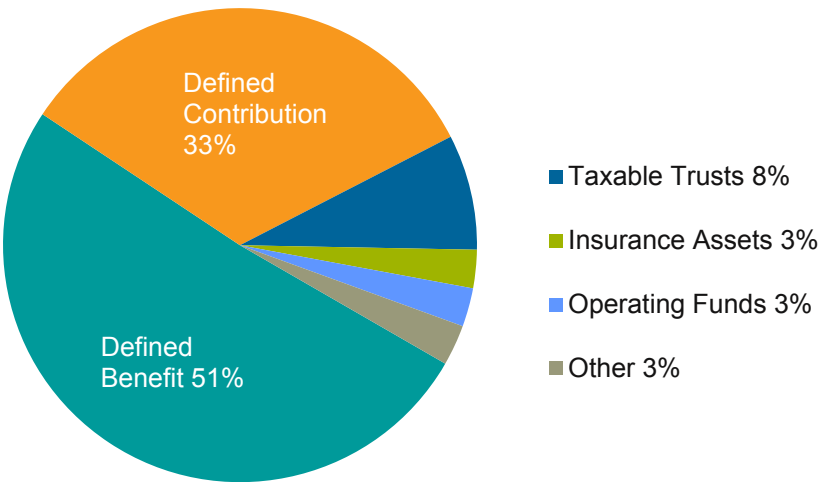
Values may not total 100% due to rounding.

Fee Database Profile Detail

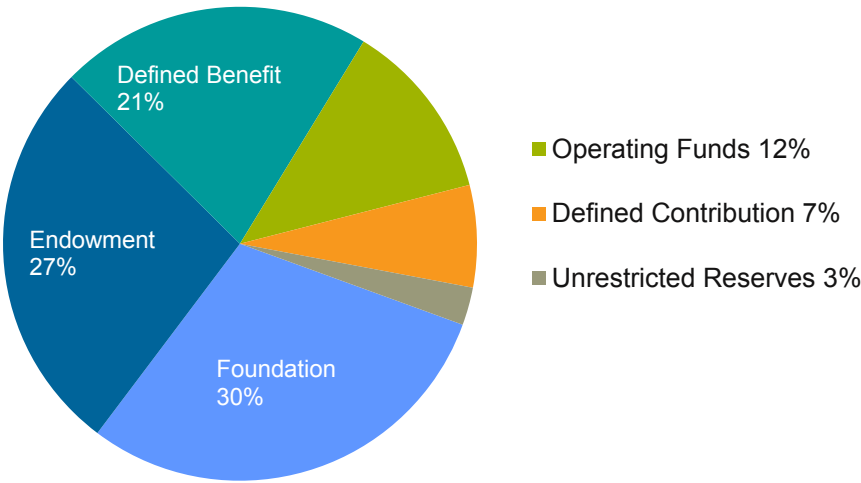
Public Funds – 49% of total



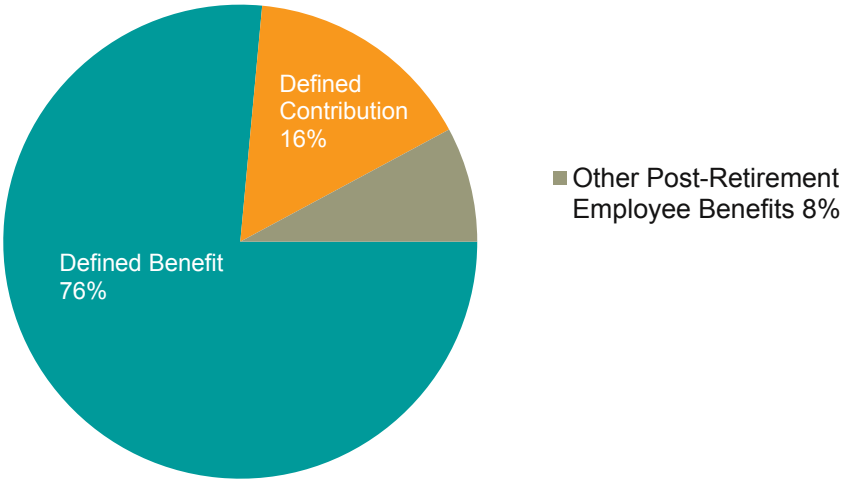
Corporate Funds – 38% of total



Nonprofits – 10% of total



Union and Other – 3% of total



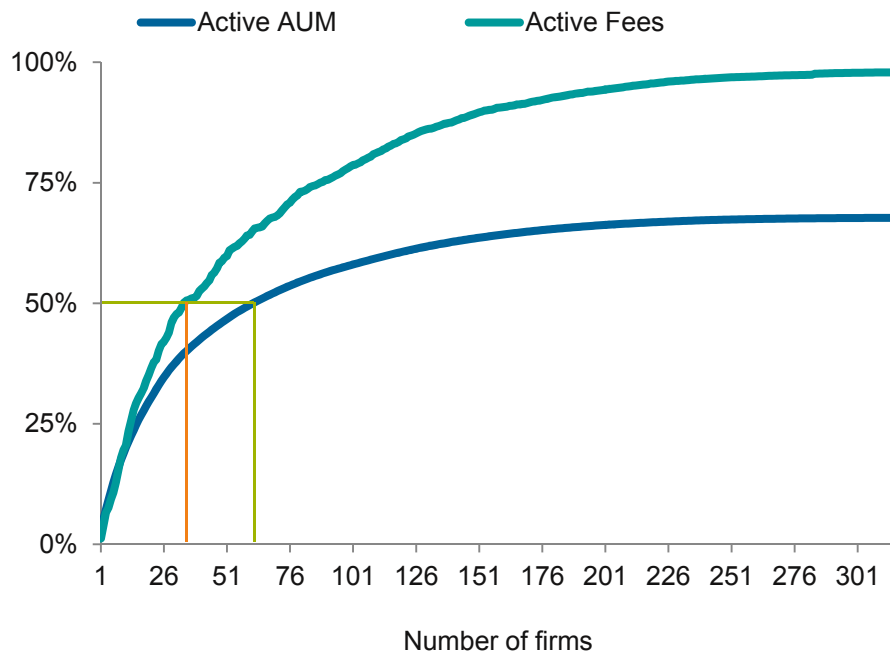
Values may not total 100% due to rounding.

Industry Concentration of AUM and Fees—Active vs. Passive

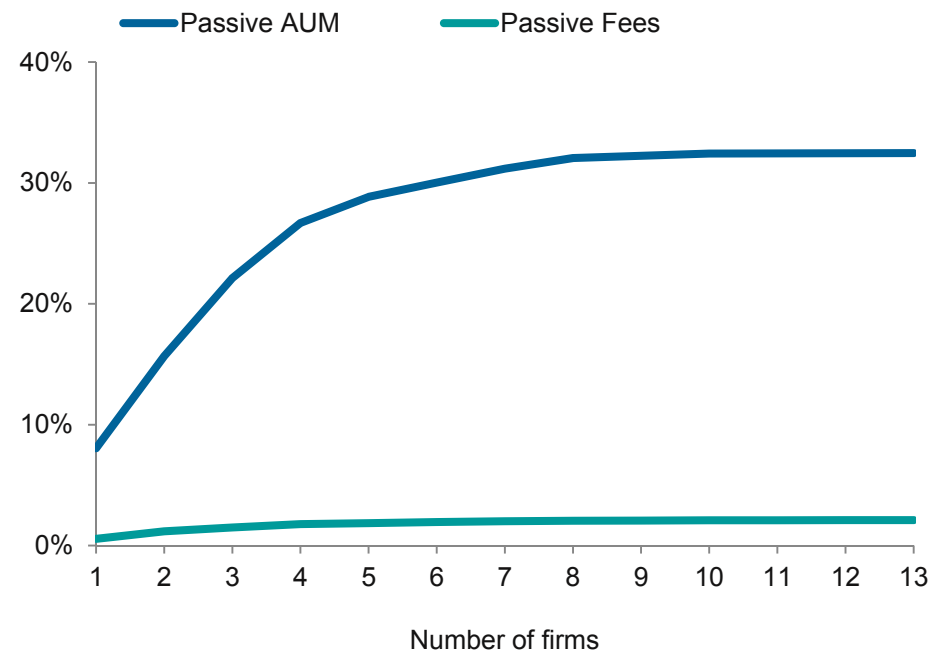
- Active management still represents ~70% of assets and ~98% of fees
- Active pretty concentrated: 34 firms (<10%) get 50% of total fees, 61 firms control 50% of total assets
- Passive represents ~30% of assets and ~2% of fees and is dominated by 4–5 firms

Total Market Share of Active / Passive and Concentration by Firm AUM and Firm Fees

Active Management



Passive Management



For a full explanation of the analysis on this page please refer to page 6.

Asset Class Comparisons

	Total Fees Paid (\$ million)	Average Mandate Size (\$ million)	Average Fee (basis points)	Average Fee (\$ thousand)
Non-U.S. Equity	\$257	\$286	55 bps	\$1,148
Smid / Small / Micro	\$168	\$111	69 bps	\$663
U.S. Large / All Cap	\$167	\$258	40 bps	\$784
Private Real Estate	\$143	\$195	85 bps	\$1,230
Emerging / Frontier	\$103	\$294	67 bps	\$1,635
Global Large Cap	\$81	\$542	46 bps	\$2,243
Non-U.S. / Global SC	\$58	\$189	71 bps	\$1,209
Core Fixed Income	\$55	\$345	18 bps	\$419
Long Duration	\$46	\$437	18 bps	\$675
Core Plus Fixed Income	\$39	\$266	25 bps	\$515
High Yield / Bank Loan	\$36	\$332	39 bps	\$1,231
Hedge Fund-of-funds	\$30	\$80	112 bps	\$778
U.S. Mid Cap	\$29	\$157	58 bps	\$731
Emerging Market Debt	\$17	\$325	45 bps	\$1,502
REIT	\$16	\$138	59 bps	\$632
Global Fixed Income	\$16	\$270	33 bps	\$523
Multi-Asset Class	\$10	\$127	54 bps	\$517
Non-U.S. / GI Equity Passive	\$10	\$1,051	5 bps	\$253
U.S. Large / All Cap Passive	\$10	\$783	2 bps	\$90
Core Fixed Passive	\$7	\$677	3 bps	\$129
Mid / Smid / Sm / Micro Passive	\$1	\$386	4 bps	\$67

Asset Class Coverage

21 Market Segments

Active

U.S. Large Cap and All Cap Equity
U.S. Mid Cap Equity
U.S. Smid, Small, and Micro Cap Equity
Real Estate Investment Trusts
Non-U.S. Large Cap Equity
Global Large Cap Equity
Non-U.S. Small Cap and Global Small Cap Equity
Emerging Market and Frontier Market Equity
Core Fixed Income
Core Plus Fixed Income
High Yield and Bank Loan Fixed Income
Long Duration Fixed Income
Global Fixed Income
Emerging Market Debt

Passive

U.S. Large Cap and All Cap Equity
U.S. Mid, Smid, Small, and Micro Cap Equity
Non-U.S. and Global Large Cap Equity
U.S. Core Fixed Income

Alternatives

Private Real Estate – Core Open-End Funds and Separate Accounts
Multi-Asset Class
Hedge Fund-of-Funds

Active U.S. Equity

Key Findings: Active U.S. Equity

Active U.S. Equity (as a group)

Fee pressures are high across all segments of active U.S. equity as flows out of this area and into both passive and private markets continue. Even where average fees in basis points appear similar to the past, these fees are being offered on significantly smaller mandates, thereby resulting in much smaller dollar fees per mandate.

U.S. Large Cap and All Cap Equity

Active management market share in this segment is now only 39% of assets vs. 61% for passive, but total assets are still large at \$54.9 billion. The weighted average fee is now 40 bps and \$784,000 per mandate. Fee pressures have continued while average mandate sizes have also dropped 25% since the GFC, resulting in a >35% drop in average dollar fee per mandate. For very large mandates, fees can go well below 30 bps, reflecting the growing adoption of lower-fee quantitative-based strategies.

U.S. Mid Cap Equity

Much smaller segment than large cap with only \$6.1 billion but fees are materially higher. Average fee is 58 bps and \$731,000 with an average mandate size of \$157 million. Even for very large mandates, fees rarely dip below 40 bps.

U.S. Smid, Small, and Micro Cap Equity

Active management is still the dominant expression in this segment with a 83% market share vs. 17% passive. Sizable segment with \$28.3 billion in assets. Average fee is at a premium at 69 bps but with smaller average mandate sizes (\$111 million), the dollar fee per mandate (\$663,000) is lower than large cap and mid cap. Fees in basis points have dropped materially for large mandates to the low 50s and even below.

Real Estate Investment Trusts (REITs)

Small segment with only \$3.5 billion in assets. Average fee of 59 bps and \$632,000, but some large mandates may dip below 50 bps.

Actual vs. Published Fees: Active U.S. Large Cap and All Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

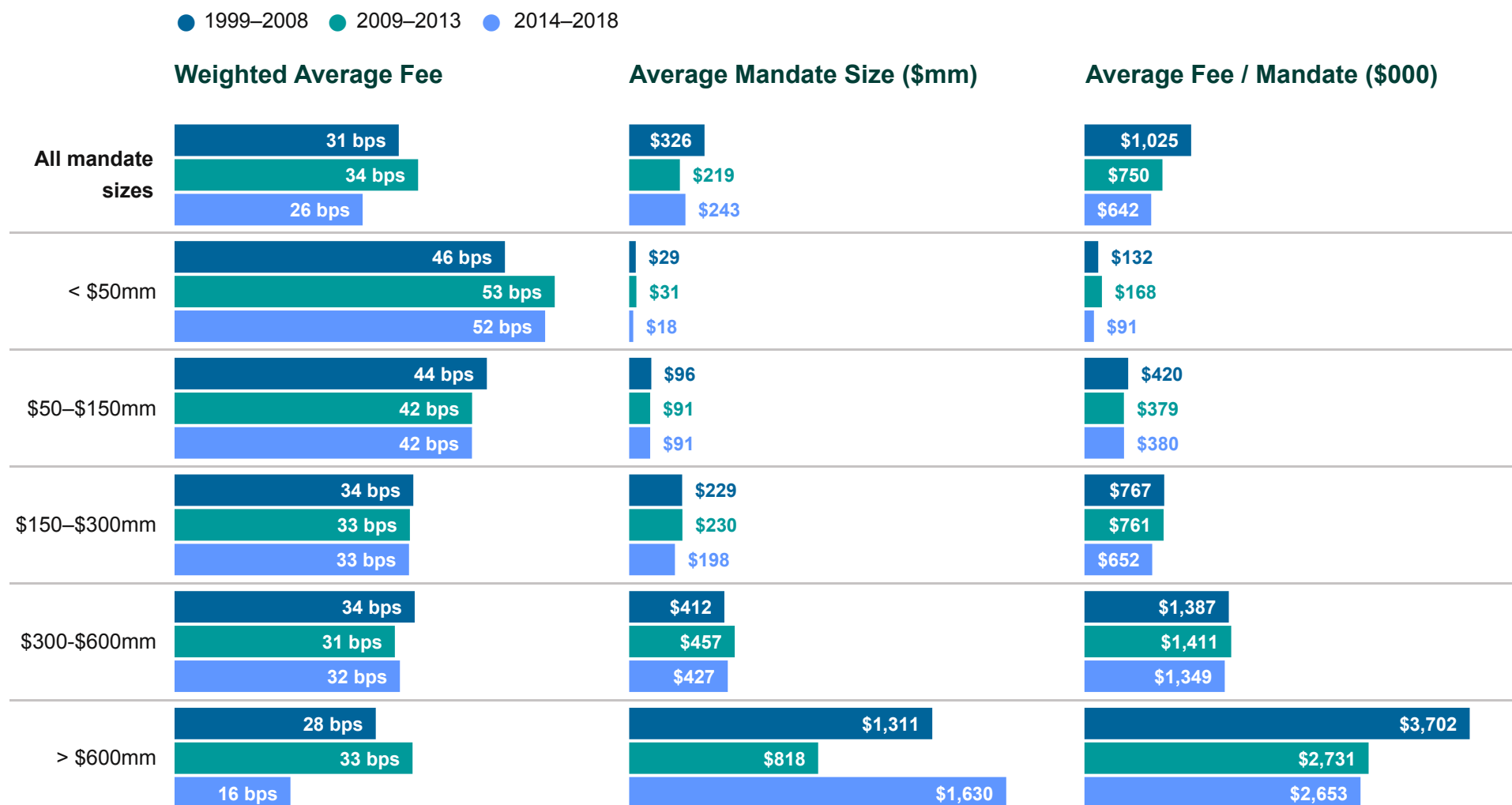
Total AUM (\$mm)	\$54,933
Total count	213
Average AUM (\$mm)	\$258
Median AUM (\$mm)	\$125
Total average fee (bps / \$)	40 / \$783,996
Total median fee (bps / \$)	40 / \$470,040
Total sum fees (\$)	\$166,991,174
Weighted average fee	30 bps



	< \$50mm			\$50 to \$150mm			\$150 to \$300mm			\$300 to \$600mm			\$600mm to \$4.1bn		
10th percentile	80	79	70	71	61	50	63	56	45	61	52	43	61	54	43
25th percentile	70	73	60	58	54	47	52	49	43	51	45	39	50	50	36
Median	60	60	50	51	47	43	45	42	35	42	42	30	41	40	22
75th percentile	55	55	40	45	44	35	40	32	28	36	30	23	32	34	21
90th percentile	44	45	34	39	34	29	33	30	22	29	27	19	26	28	15
Average ●	62	62	51	52	48	42	47	43	34	44	39	31	42	41	28
Median AUM	\$24mm			\$91mm			\$205mm			\$422mm			\$973mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active U.S. Large Cap and All Cap Equity



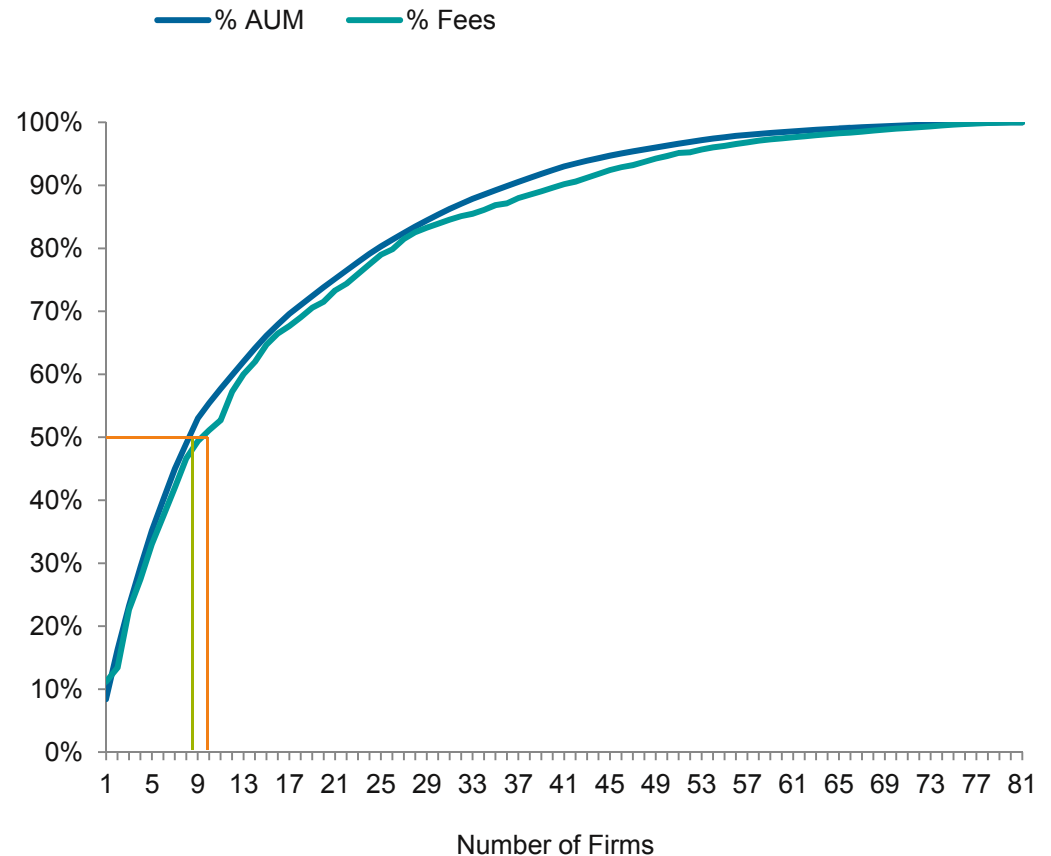
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active U.S. Large Cap and All Cap Equity

\$54.9 billion in assets and **\$167.0** million in fees

- 213 active mandates with 81 different firms
- 50% of assets managed by **9 firms** (11%)
- 50% of fees made by **10 firms** (12%)
- Active management has 39% AUM market share in this segment (61% AUM passive)
- Active management has 94% fee market share in this segment (6% fees passive)

Concentration by Firm



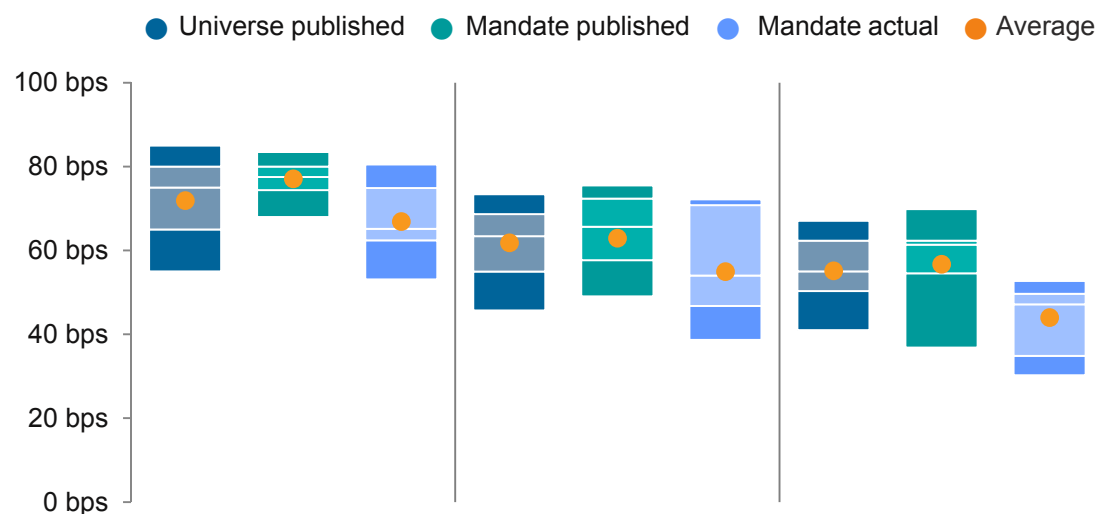
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active U.S. Mid Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

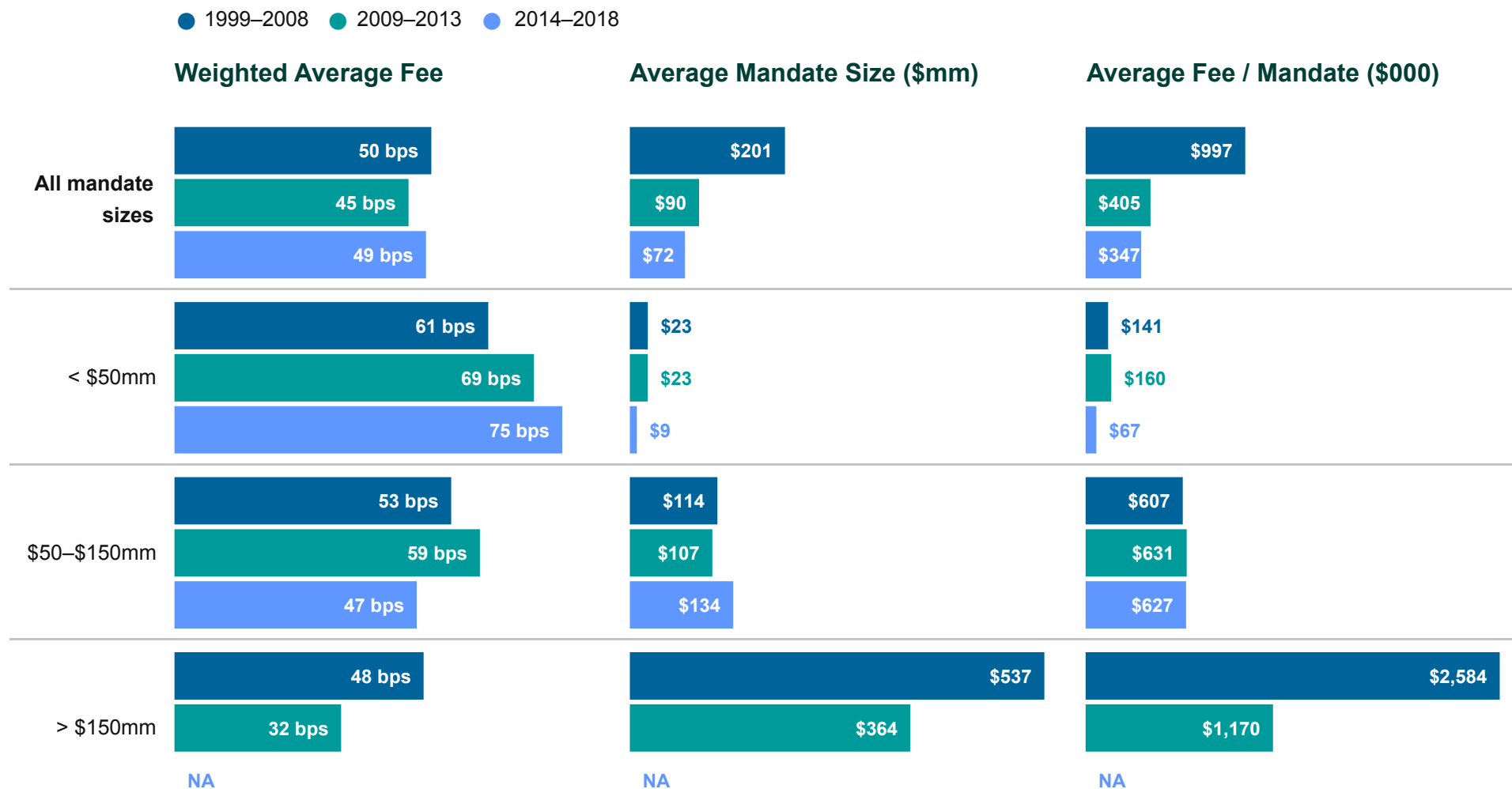
Total AUM (\$mm)	\$6,131
Total count	39
Average AUM (\$mm)	\$157
Median AUM (\$mm)	\$46
Total average fee (bps / \$)	58/ \$730,963
Total median fee (bps / \$)	60/ \$348,500
Total sum fees (\$)	\$28,507,556
Weighted average fee	46 bps



	< \$50mm			\$50 to \$150mm			\$150 to \$712mm		
10th percentile	85	83	81	73	75	72	67	70	53
25th percentile	80	80	75	69	72	71	62	62	50
Median	75	78	65	63	66	54	55	61	47
75th percentile	65	74	62	55	58	47	50	55	35
90th percentile	55	68	53	46	49	39	41	37	30
Average ●	72	77	67	62	63	55	55	57	44
Median AUM	\$25mm			\$112mm			\$487mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active U.S. Mid Cap Equity



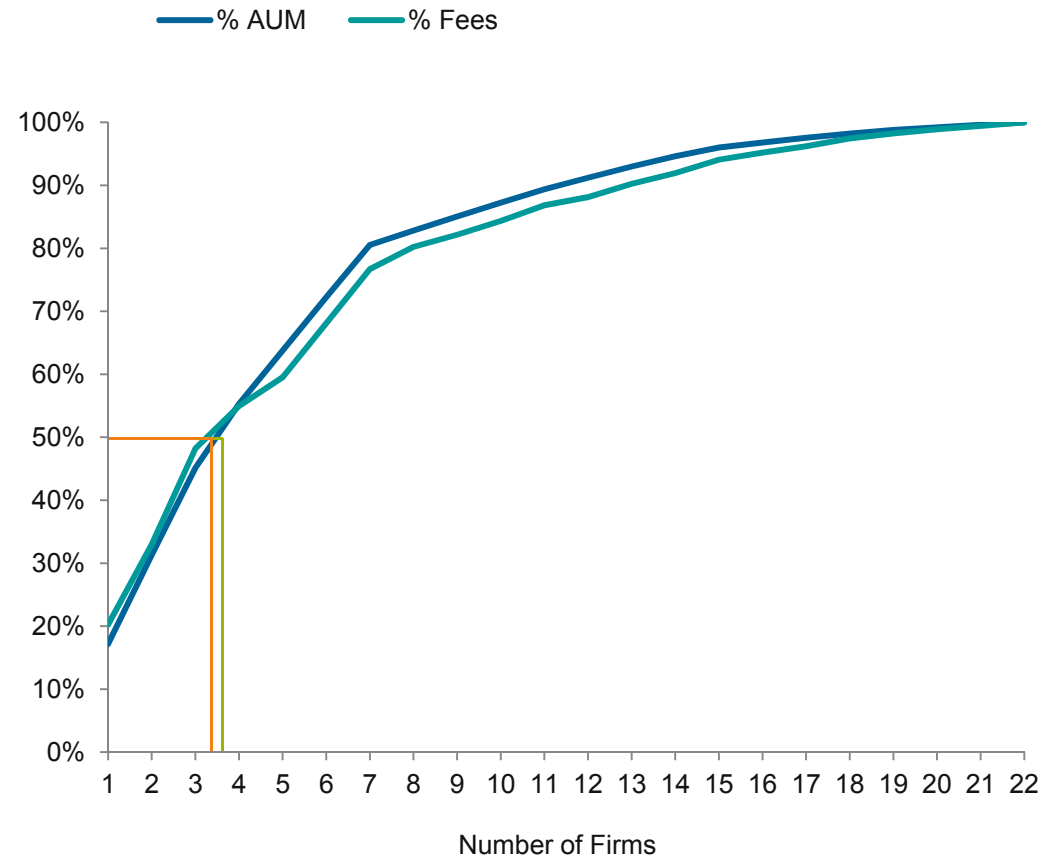
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active U.S. Mid Cap Equity

\$6.1 billion in assets and **\$28.5 million** in fees

- 39 active mandates with 22 different firms
- 50% of assets managed by 4 firms (18%)
- 50% of fees made by 4 firms (18%)

Concentration by Firm

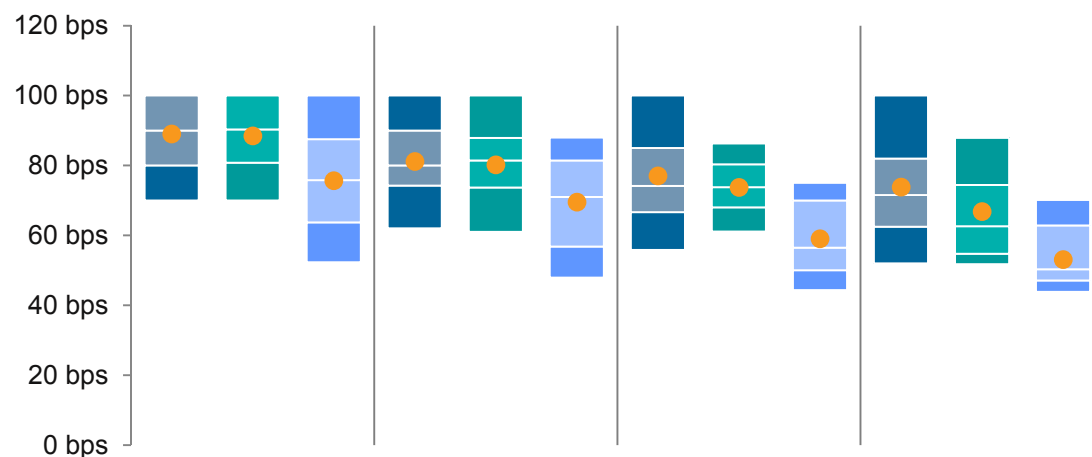


For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active U.S. Smid, Small, and Micro Cap Equity

Fees (basis points) by account size

● Universe published ● Mandate published ● Mandate actual ● Average



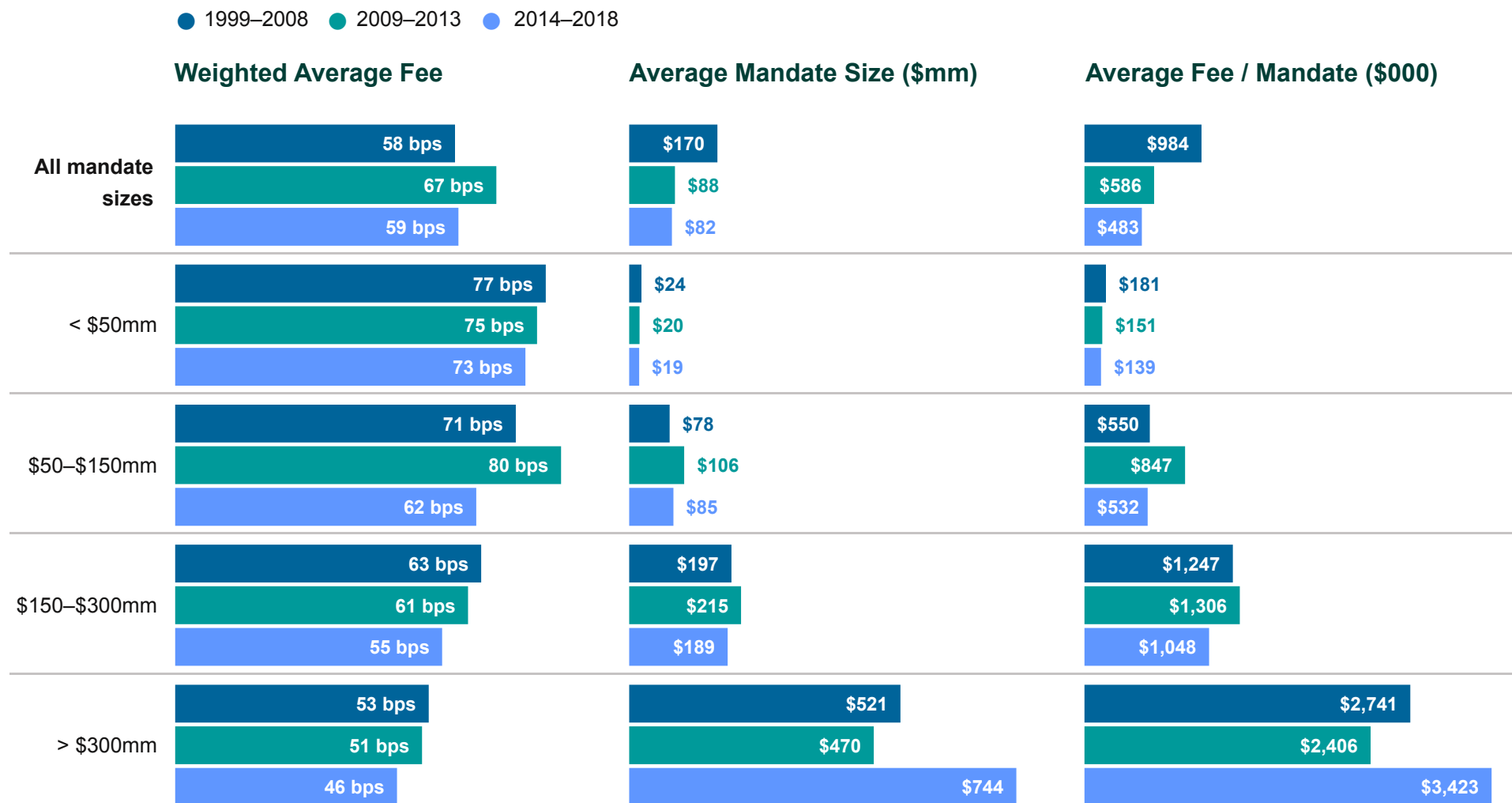
	< \$50mm			\$50 to \$150mm			\$150 to \$300mm			\$300mm to \$1.2bn		
10th percentile	100	100	100	100	100	88	100	86	75	100	88	70
25th percentile	100	100	88	90	88	81	85	80	70	82	74	63
Median	90	90	76	80	81	71	74	74	57	72	63	50
75th percentile	80	81	64	74	74	57	67	68	50	63	55	47
90th percentile	70	70	52	62	61	48	56	61	44	52	52	44
Average ●	89	88	76	81	80	70	77	74	59	74	67	53
Median AUM	\$19mm			\$81mm			\$193mm			\$480mm		

Actual Fees Paid Summary

Total AUM (\$mm)	\$28,294
Total count	254
Average AUM (\$mm)	\$111
Median AUM (\$mm)	\$55
Total average fee (bps / \$)	69 / \$663,028
Total median fee (bps / \$)	70 / \$397,799
Total sum fees (\$)	\$168,409,130
Weighted average fee	60 bps

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active U.S. Smid, Small, and Micro Cap Equity



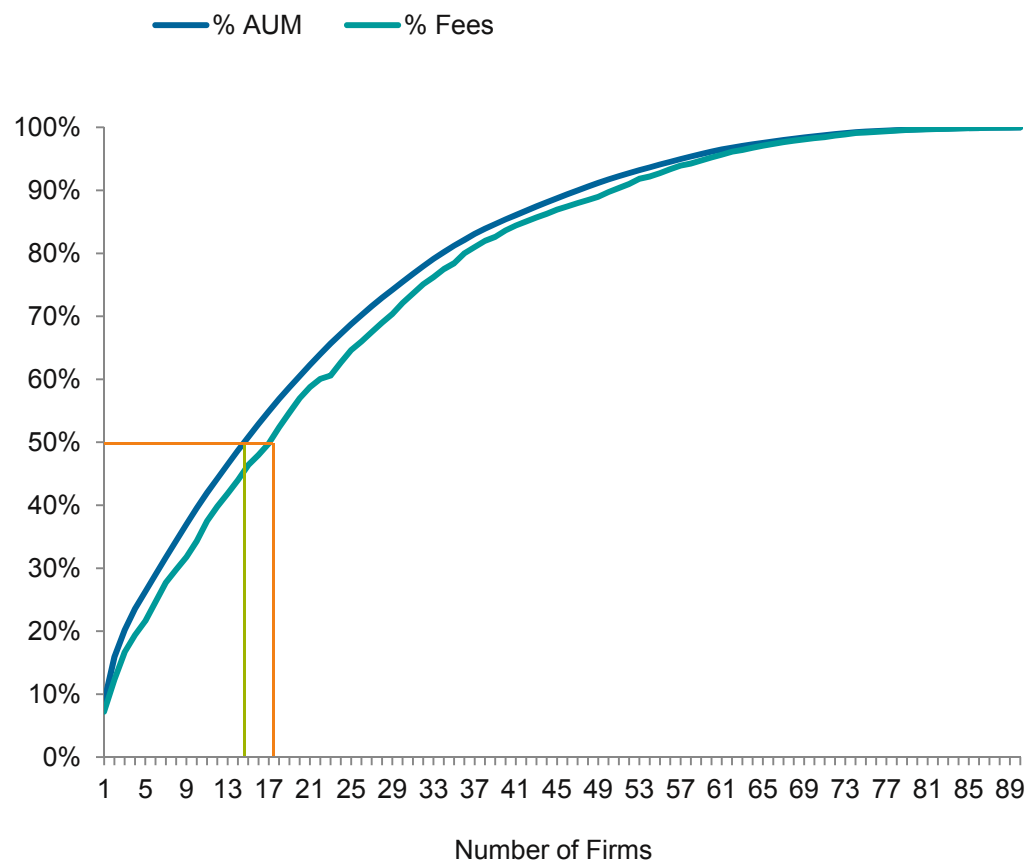
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active U.S. Smid, Small, and Micro Cap Equity

\$28.3 billion in assets and **\$168.4 million** in fees

- 254 active mandates with 90 different firms
- 50% of assets managed by **15 firms** (17%)
- 50% of fees made by **18 firms** (20%)
- Active management has 83% AUM market share in this segment (17% AUM passive)
- Active management has 99% fee market share in this segment (1% fees passive)

Concentration by Firm



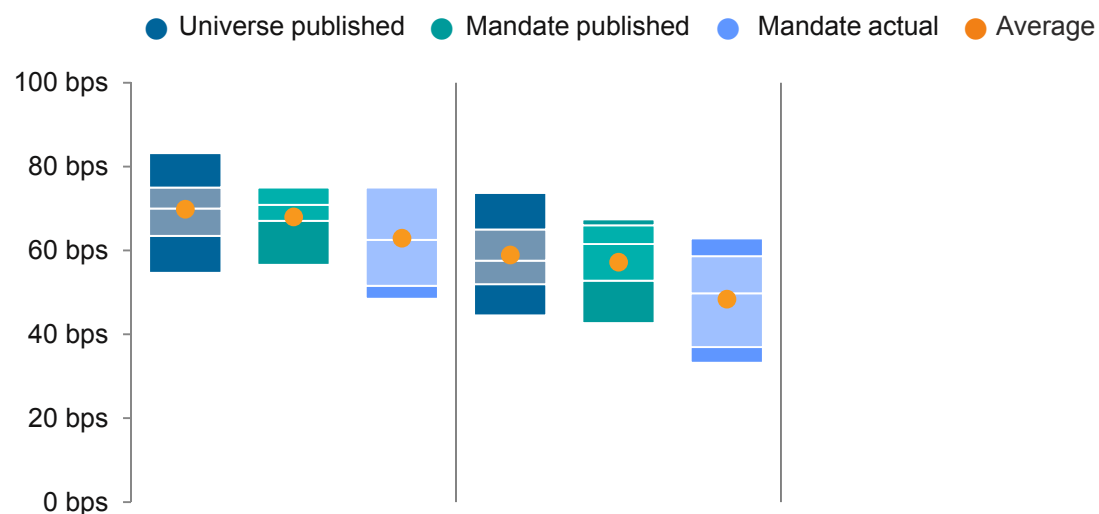
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active Real Estate Investment Trusts

Fees (basis points) by account size

Actual Fees Paid Summary

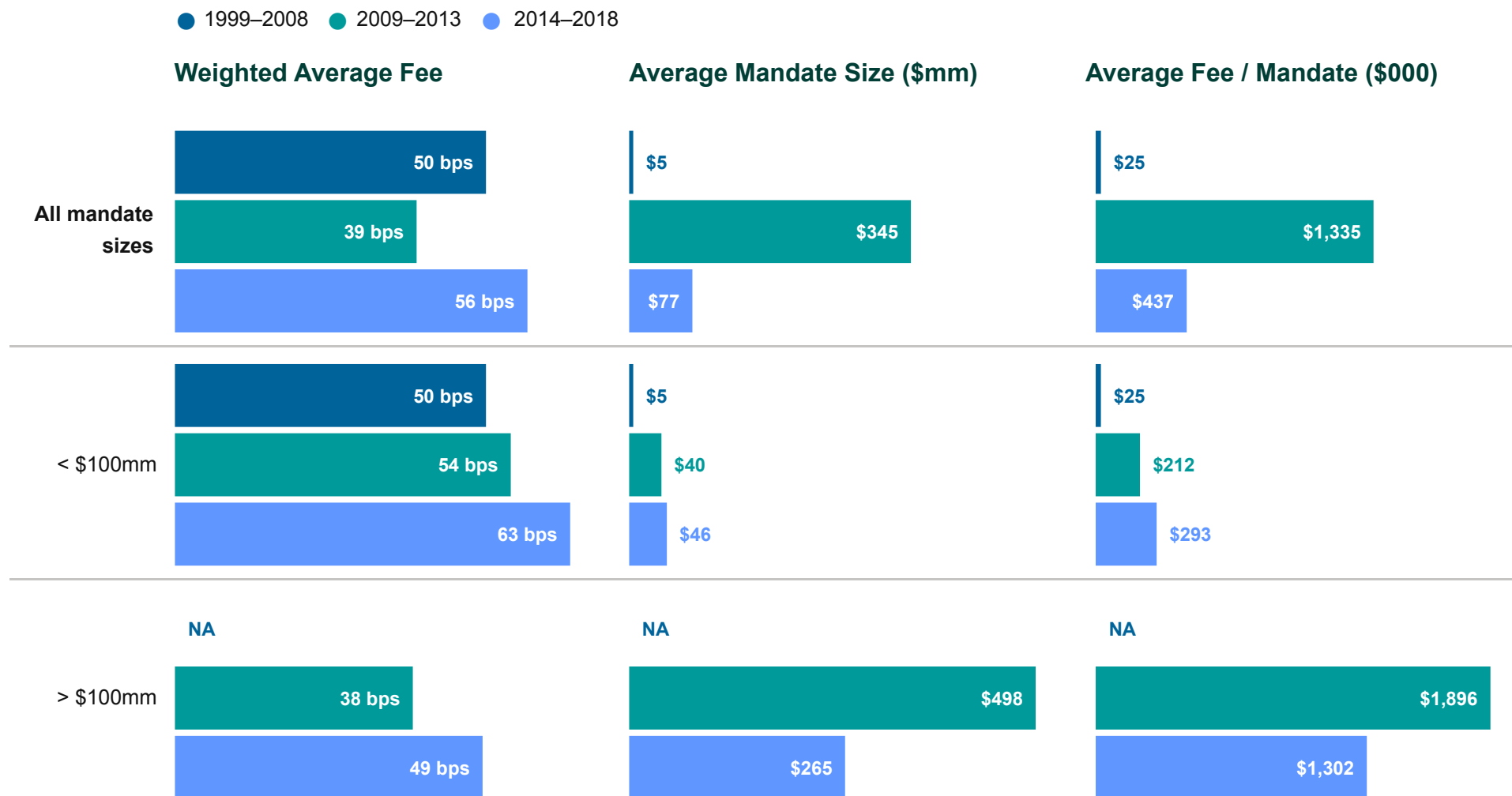
Total AUM (\$mm)	\$3,453
Total count	25
Average AUM (\$mm)	\$138
Median AUM (\$mm)	\$54
Total average fee (bps / \$)	59 / \$631,580
Total median fee (bps / \$)	60 / \$371,756
Total sum fees (\$)	\$15,789,512
Weighted average fee	46 bps



	< \$100mm			\$100mm to \$1bn		
10th percentile	83	75	75	74	67	63
25th percentile	75	75	75	65	66	59
Median	70	71	63	58	62	50
75th percentile	63	67	52	52	53	37
90th percentile	55	57	48	44	43	33
Average ●	70	68	63	59	57	48
Median AUM	\$36mm			\$232mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Real Estate Investment Trusts (REITs)



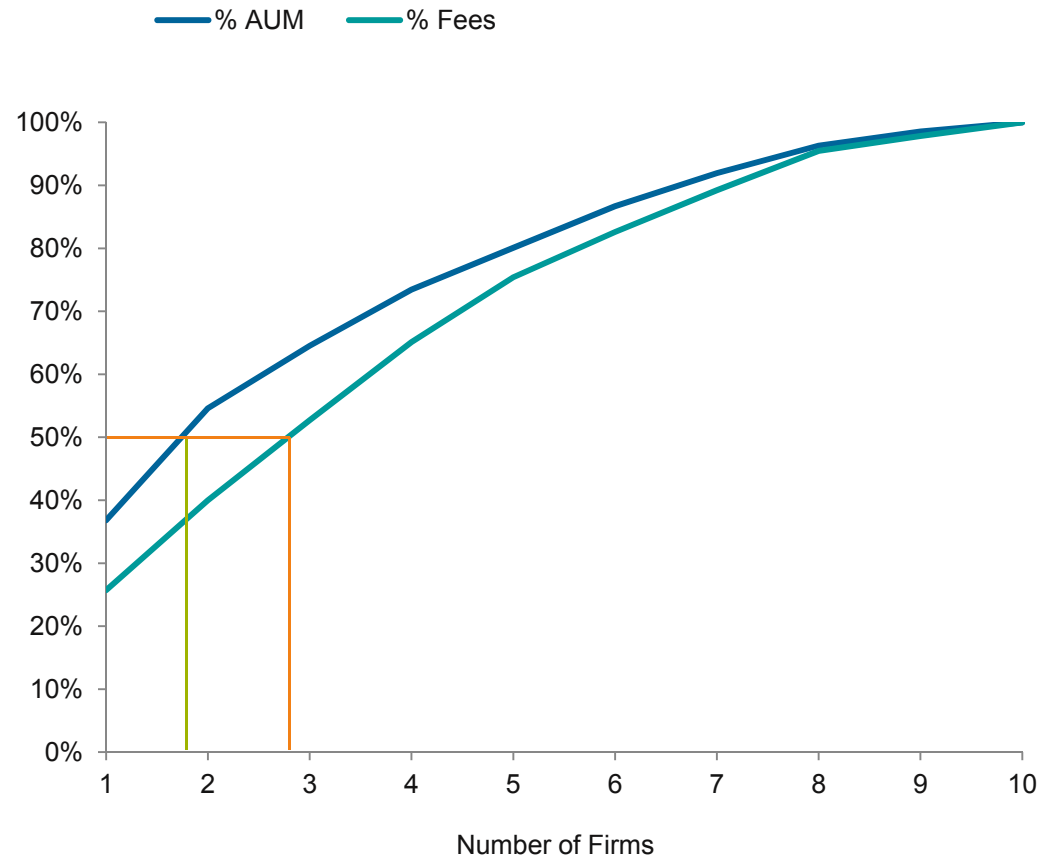
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Real Estate Investment Trusts (REITs)

\$3.5 billion in assets and **\$15.8 million** in fees

- 25 active mandates with 10 different firms
- 50% of assets managed by **2 firms** (20%)
- 50% of fees made by **3 firms** (30%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

Active Non U.S. / Global Equity

Key Findings: Active Non-U.S. and Global Equity

Active Non-U.S. and Global Equity (as a group)

Average fees in basis points have come down recently for most sub-asset classes in this space while the average mandate size has decreased across all sub-asset classes. This has resulted in decreases in average dollar fees per mandate across the board.

Non-U.S. Large Cap Equity

Active management is still the preferred expression here at 60% market share vs. 40% passive. By far the largest total dollar amount of fees collected (>\$257 million) for any asset class, with U.S. mid / small / micro a distant second place. Fees have held up against market pressure better than most segments, probably because of migration from EAFE products to ACWI ex-U.S. products. Smaller average mandate sizes have still resulted in lower dollar fees per mandate.

Global Large Cap Equity

Average mandate size is 189% the size of average mandate for non-U.S. large cap equity counterpart (\$542 million vs. \$286 million). Fees have come down recently and are lower than non-U.S. equity, but the large average mandate sizes make for large dollar fees per mandate.

Non-U.S. Small Cap and Global Small Cap Equity

Fees have come down a little recently as this segment gets more competitive, but there is still a 30% fee premium over non-U.S. large cap (average fee 67 bps vs. 55 bps). Even with smaller average mandates, non-U.S. small cap has higher average dollar fees (\$1.2 million) than non-U.S. large cap.

Emerging Market and Frontier Market Equity

Fees have remained pretty steady and command a >20% premium over non-U.S. large cap (average fee of 67 bps vs. 55 bps). With sizeable average mandates of \$294 million, the average dollar fee per mandate is high at \$1.6 million.

Actual vs. Published Fees: Active Non-U.S. Large Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

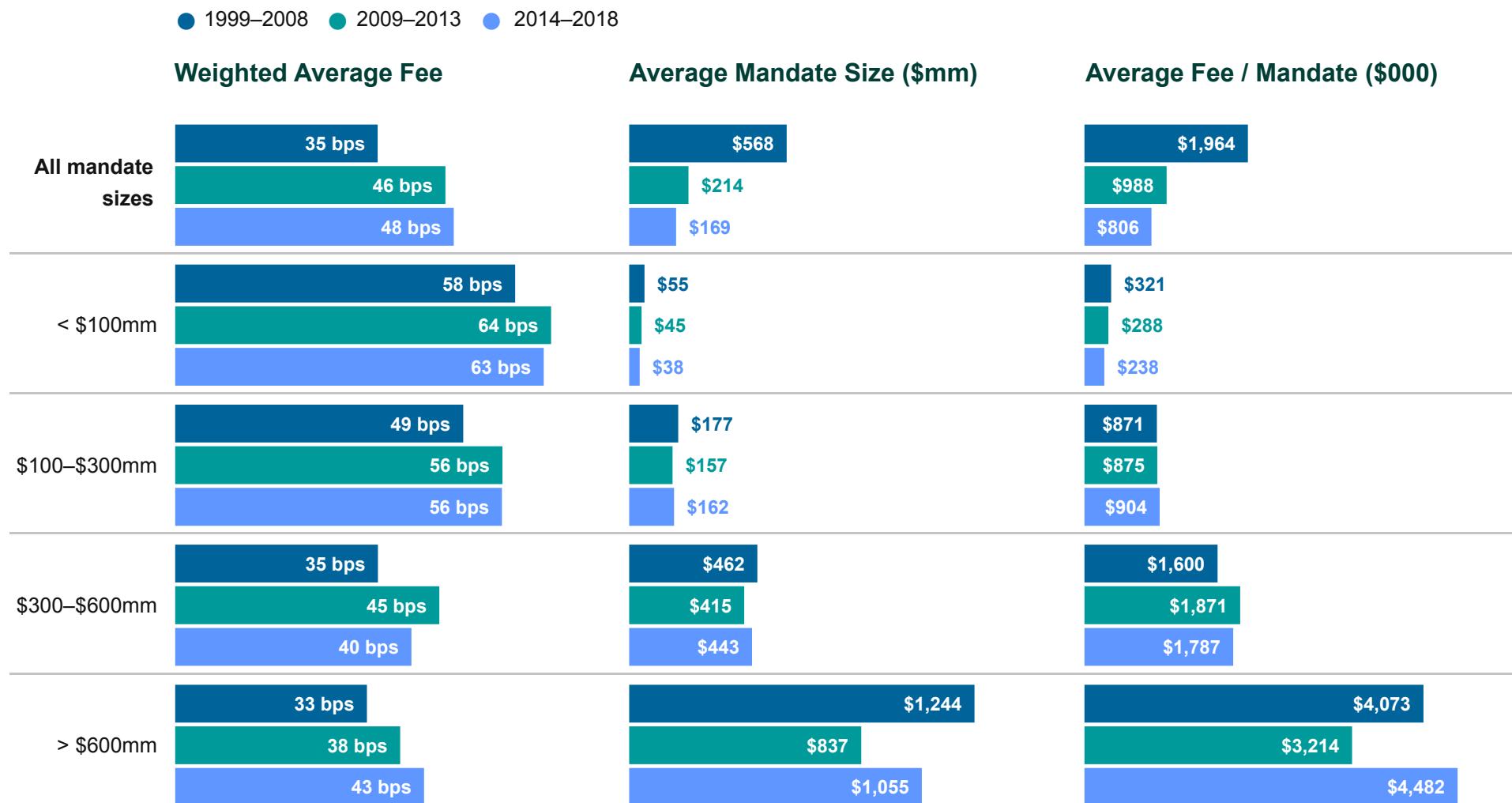
Total AUM (\$mm)	\$64,091
Total count	224
Average AUM (\$mm)	\$286
Median AUM (\$mm)	\$99
Total average fee (bps / \$)	55 / \$1,147,735
Total median fee (bps / \$)	58 / \$573,239
Total sum fees (\$)	\$257,092,569
Weighted average fee	40 bps



	<\$100mm			\$100 to \$300mm			\$300 to \$600mm			\$600mm to \$1bn			\$1bn to \$3.1bn		
10th percentile	81	83	80	71	75	72	66	66	55	66	65	53	65	63	47
25th percentile	75	80	74	67	70	63	61	60	49	59	57	44	57	55	33
Median	71	73	67	60	62	57	54	53	41	52	50	39	51	49	28
75th percentile	65	67	58	53	52	47	46	41	31	44	42	33	42	33	26
90th percentile	56	55	47	48	48	39	42	36	23	38	36	23	36	28	23
Average ●	70	71	65	60	61	56	54	52	40	52	50	39	51	47	31
Median AUM	\$40mm			\$150mm			\$429mm			\$704mm			\$1.8bn		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Non-U.S. Large Cap Equity



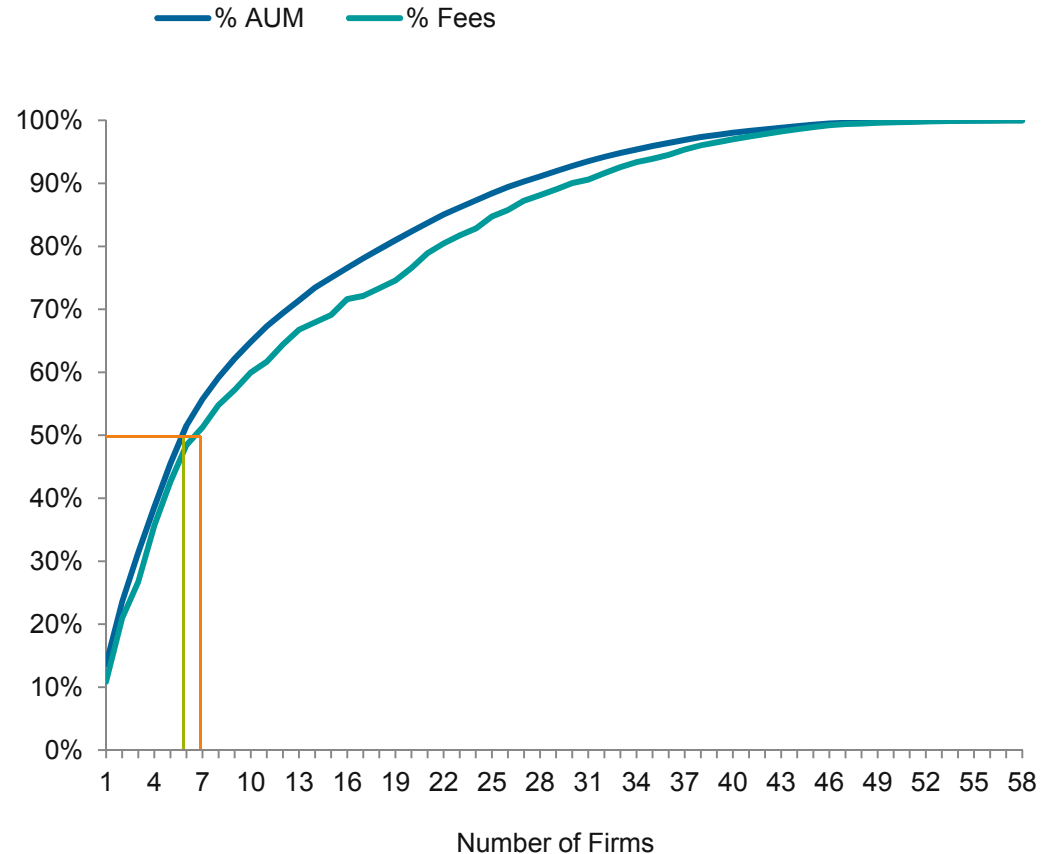
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Non-U.S. Large Cap Equity

\$64.1 billion in assets and **\$257.1** million in fees

- 224 active mandates with 58 different firms
- 50% of assets managed by **6 firms** (10%)
- 50% of fees made by **7 firms** (12%)
- Active management has 60% AUM market share in this segment (40% AUM passive)
- Active management has 96% fee market share in this segment (4% fees passive)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

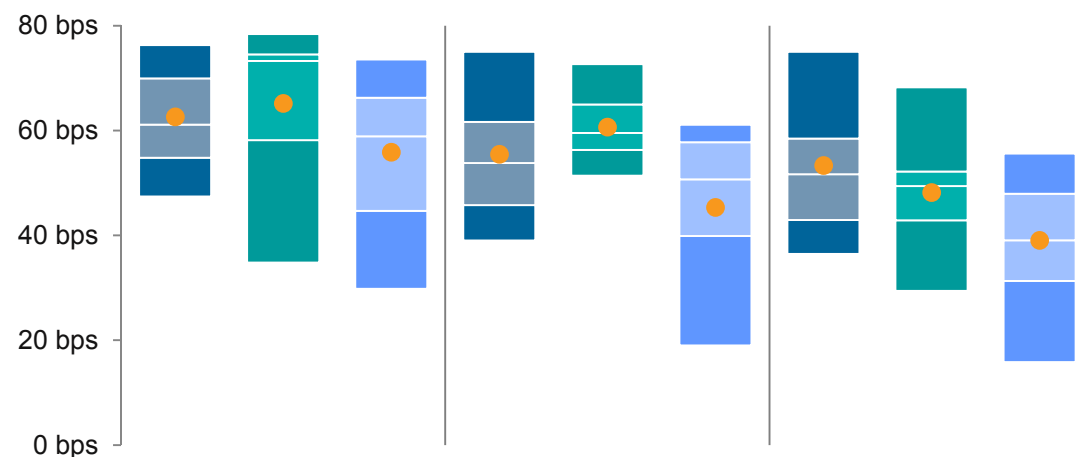
Actual vs. Published Fees: Active Global Large Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$19,527
Total count	36
Average AUM (\$mm)	\$542
Median AUM (\$mm)	\$464
Total average fee (bps / \$)	46 / \$2,242,815
Total median fee (bps / \$)	46 / \$2,328,132
Total sum fees (\$)	\$80,741,343
Weighted average fee	41 bps

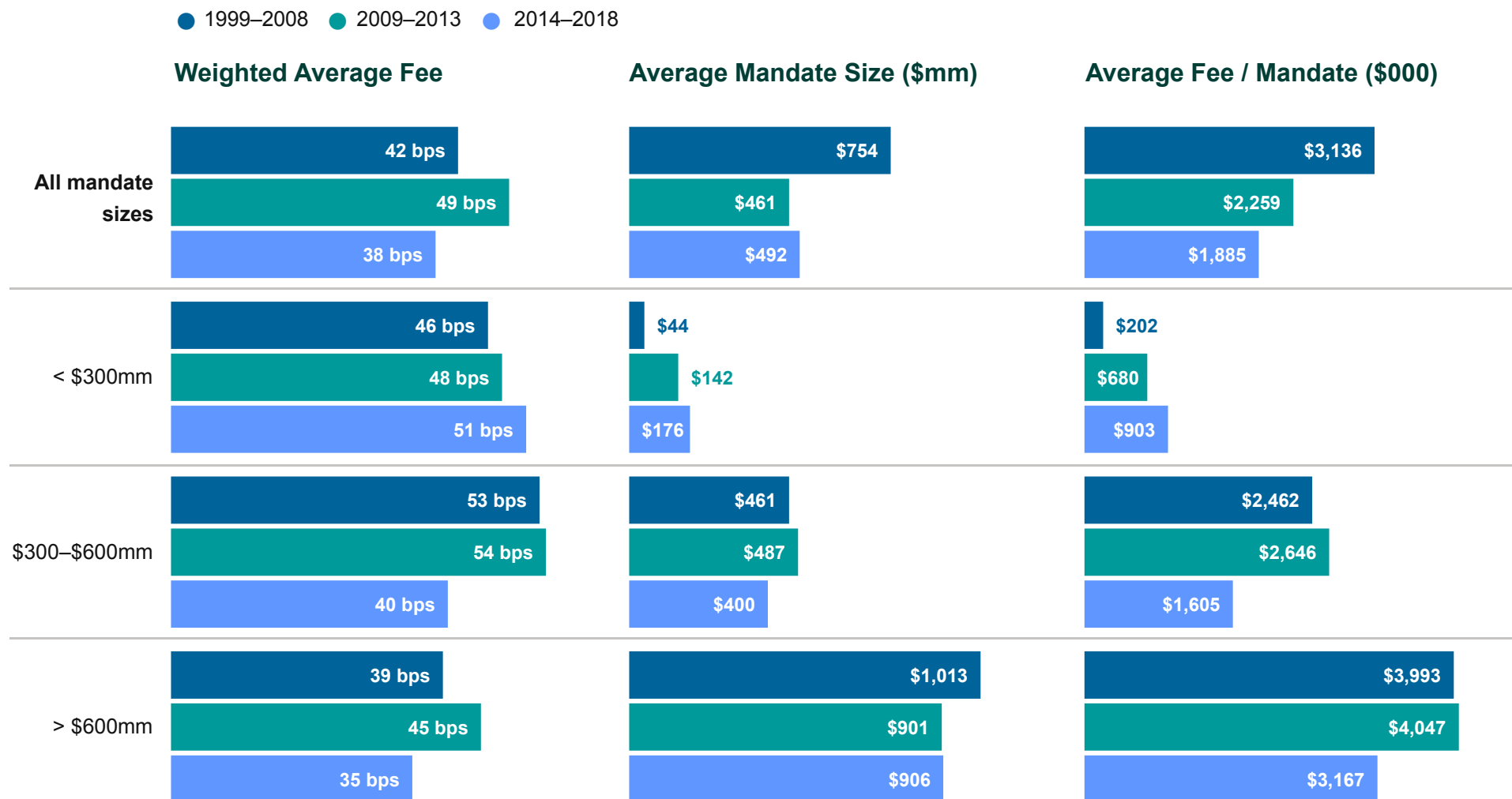
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$300mm			\$300 to \$600mm			\$600mm to \$1.6bn		
10th percentile	76	78	74	75	73	61	75	68	56
25th percentile	70	75	66	62	65	58	58	52	48
Median	61	73	59	54	60	51	52	49	39
75th percentile	55	58	45	46	56	40	43	43	31
90th percentile	47	35	30	39	51	19	36	29	16
Average ●	63	65	56	55	61	45	53	48	39
Median AUM	\$135mm			\$461mm			\$905mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Global Large Cap Equity



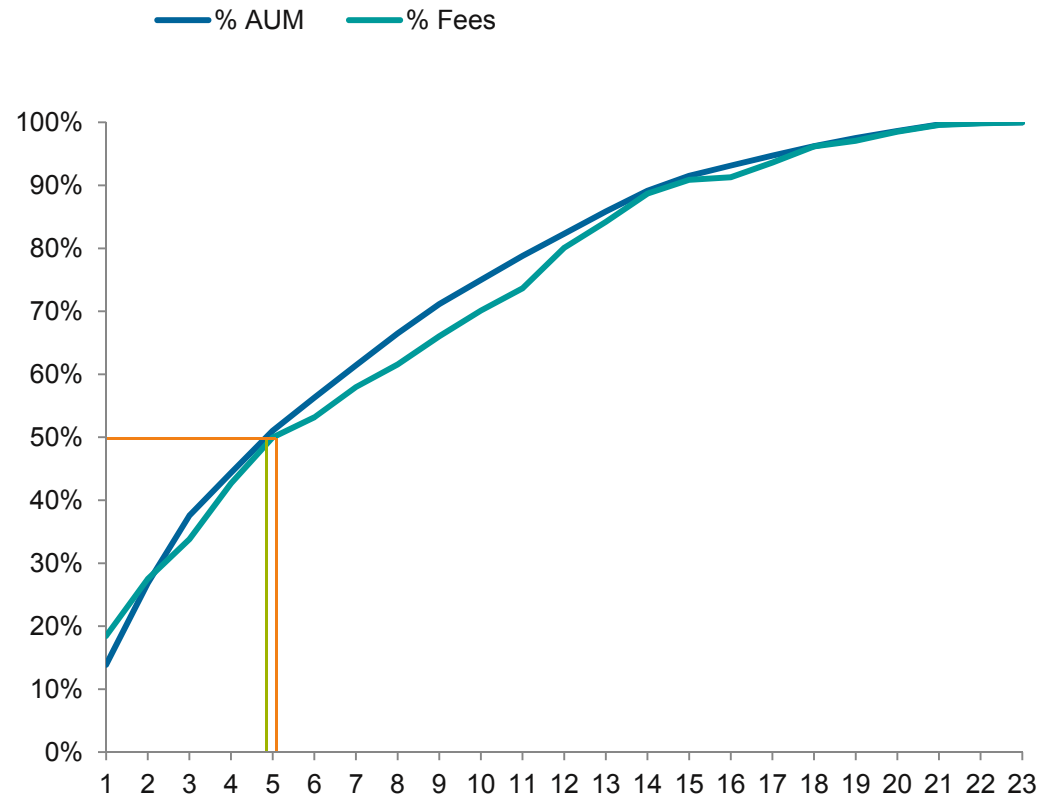
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Global Large Cap Equity

\$19.5 billion in assets and **\$80.7 million** in fees

- 36 active mandates with 23 different firms
- 50% of assets managed by **5 firms** (22%)
- 50% of fees made by **5 firms** (22%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active Non-U.S. Small Cap and Global Small Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

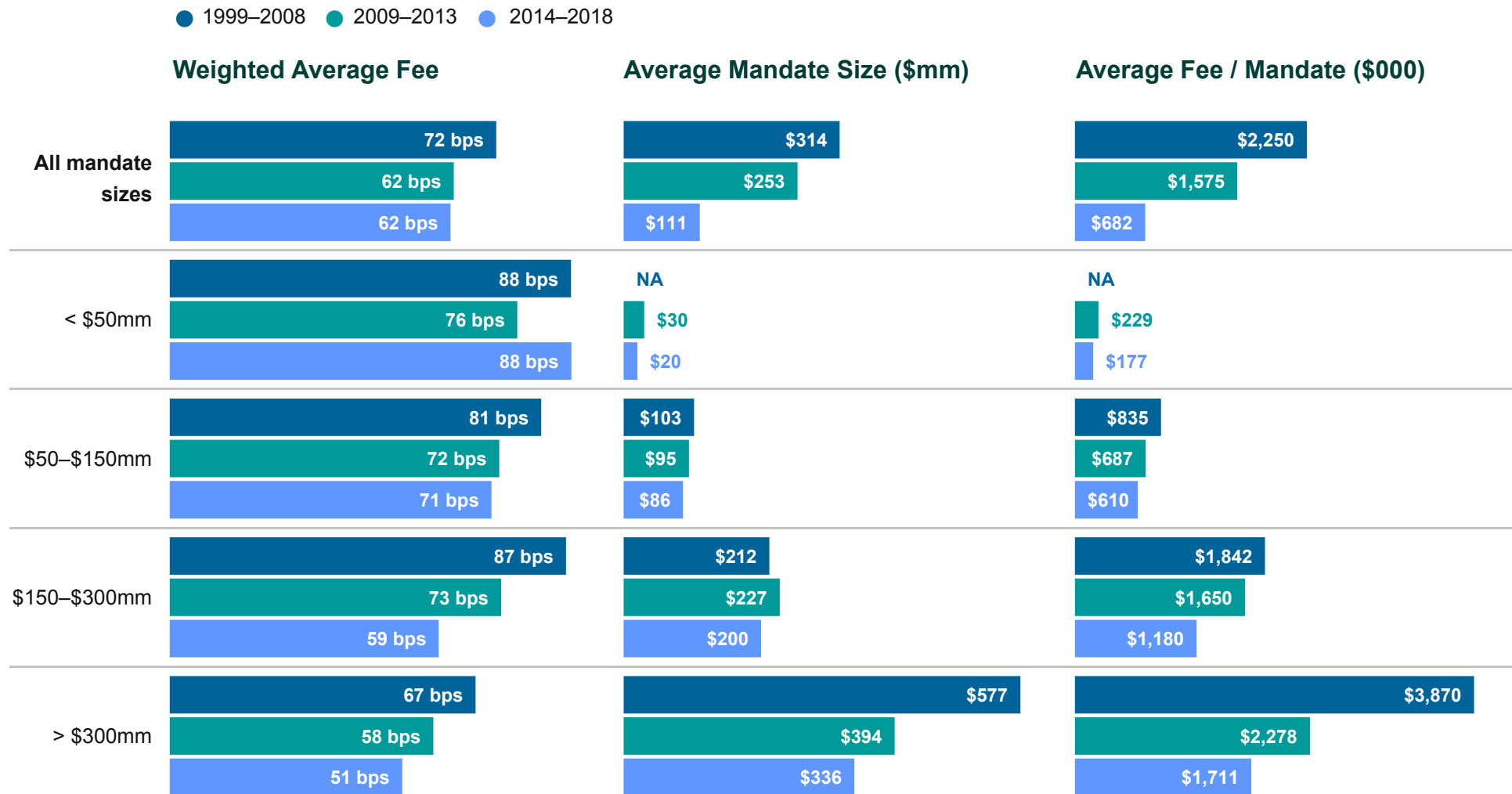
Total AUM (\$mm)	\$9,090
Total count	48
Average AUM (\$mm)	\$189
Median AUM (\$mm)	\$144
Total average fee (bps / \$)	71 / \$1,208,740
Total median fee (bps / \$)	70 / \$1,003,005
Total sum fees (\$)	\$58,019,499
Weighted average fee	64 bps



	< \$50mm			\$50 to \$150mm			\$150 to \$300mm			\$300 to \$662mm		
10th percentile	100	104	104	100	92	86	100	86	83	100	89	75
25th percentile	100	99	96	93	91	84	88	81	71	86	81	69
Median	95	94	90	88	86	80	84	75	64	81	80	66
75th percentile	85	89	79	83	82	67	76	72	59	73	69	52
90th percentile	80	81	64	75	80	61	70	63	56	66	66	30
Average ●	93	93	86	88	85	74	84	76	67	82	77	59
Median AUM	\$23mm			\$95mm			\$200mm			\$363mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Non-U.S. Small Cap and Global Small Cap Equity



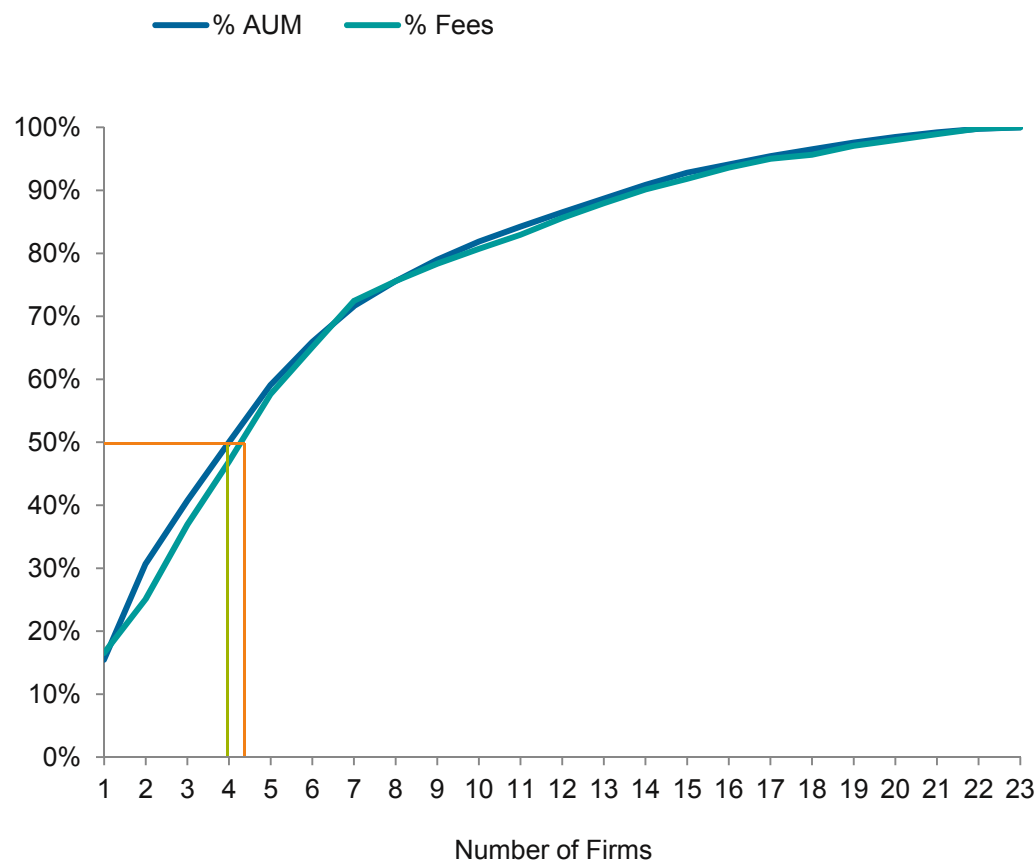
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Non-U.S. Small Cap and Global Small Cap Equity

Concentration by Firm

\$9.1 billion in assets and **\$58.0 million** in fees

- 48 active mandates with 23 different firms
- 50% of assets managed by 4 firms (17%)
- 50% of fees made by 5 firms (22%)



For a full explanation of the analysis on this page please refer to page 6.

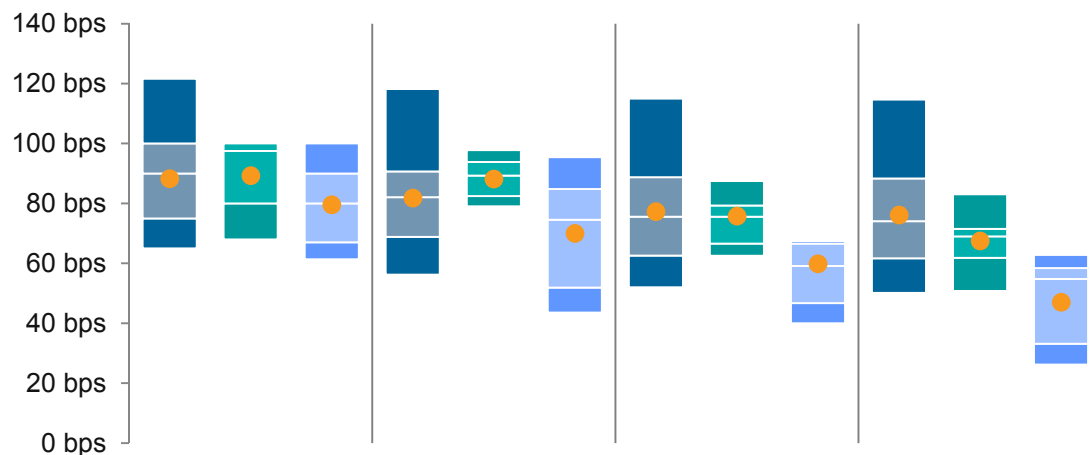
Actual vs. Published Fees: Active Emerging Market and Frontier Market Equity

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$18,206
Total count	62
Average AUM (\$mm)	\$294
Median AUM (\$mm)	\$180
Total average fee (bps / \$)	67 / \$1,635,240
Total median fee (bps / \$)	66 / \$1,260,000
Total sum fees (\$)	\$103,020,102
Weighted average fee	57 bps

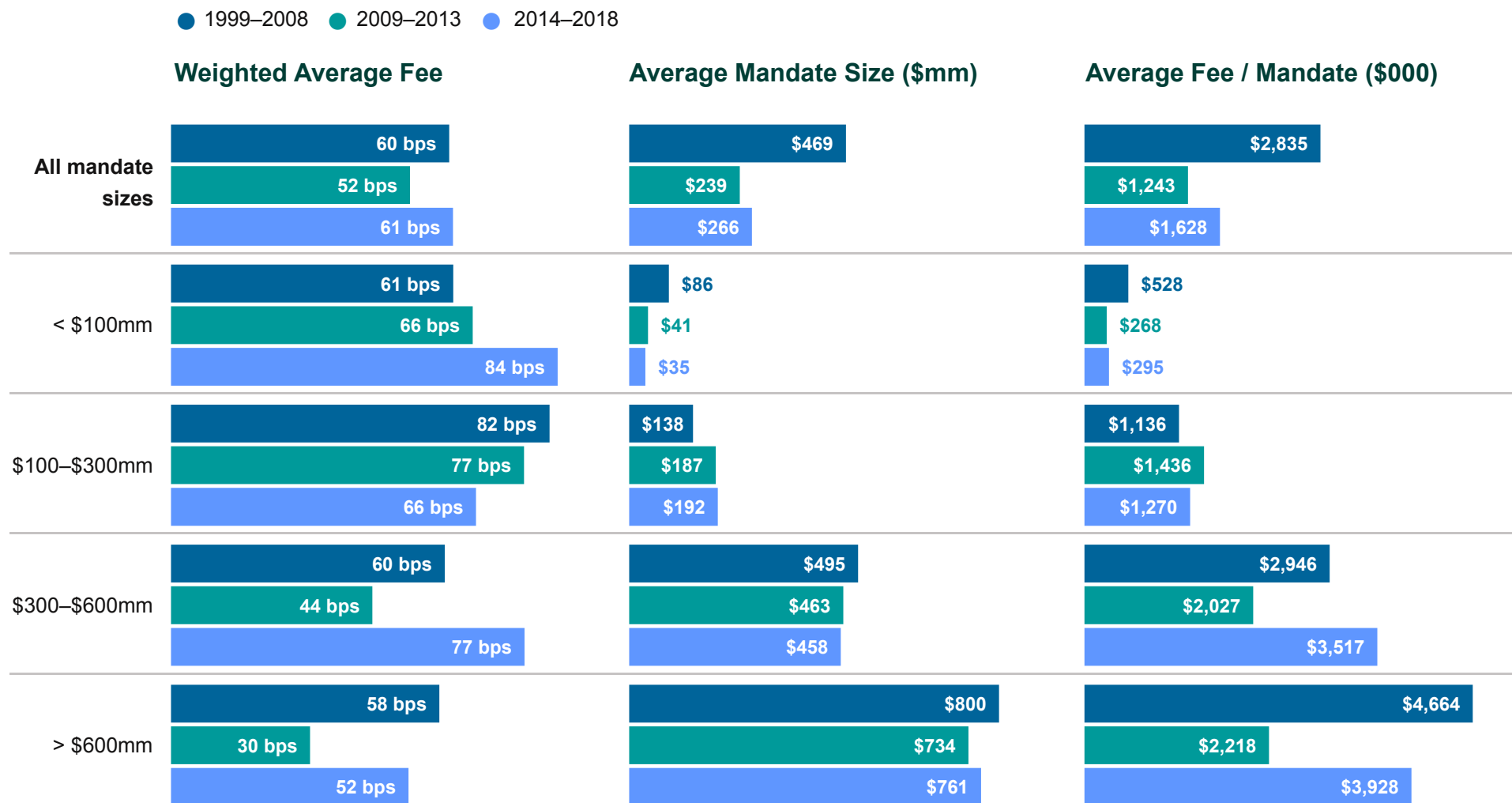
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$100mm			\$100 to \$300mm			\$300 to \$600mm			\$600 to \$946mm		
10th percentile	122	100	100	118	98	95	115	87	67	115	83	63
25th percentile	100	100	90	91	94	85	89	79	67	88	72	58
Median	90	98	80	82	89	75	76	76	59	74	69	55
75th percentile	75	80	67	69	82	52	63	67	47	62	62	33
90th percentile	65	68	61	56	79	44	52	63	40	50	51	26
Average ●	88	89	80	82	88	70	77	76	60	76	67	47
Median AUM	\$32mm			\$177mm			\$514mm			\$773mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Emerging Market and Frontier Market Equity



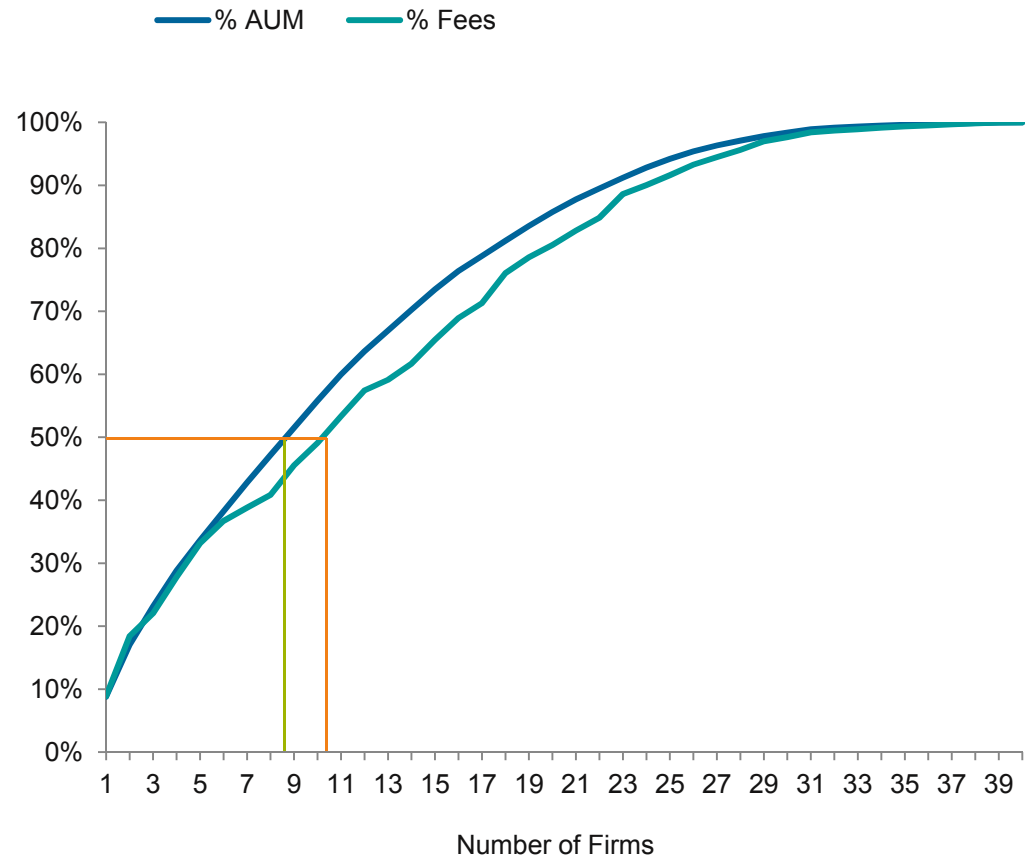
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Emerging Market and Frontier Market Equity

\$18.2 billion in assets and **\$103.0 million** in fees

- 62 active mandates with 40 different firms
- 50% of assets managed by **9 firms** (23%)
- 50% of fees made by **11 firms** (28%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

Active Fixed Income

Key Findings: Active Fixed Income

Active Fixed Income (as a group)

Pricing and mandate sizes continue to slip in most areas of fixed income. Market share is also extremely concentrated in a few firms.

Core Fixed Income

Active management holds a 56% market share relative to 44% passive. Fee levels continue to slowly erode and now average 18 bps (with large mandates in the low teens) and \$419,000 per mandate. Market share is very highly concentrated with more than 50% of the assets managed by 5 firms.

Core Plus Fixed Income

Smaller average mandates than core (\$266 million vs. \$345 million) but mandate sizes and average basis point fees (25 bps) have held up better, resulting in a higher average dollar fee (\$514,000 vs. \$419,000). Core plus pricing commands a 5–7 bps premium over core.

High Yield and Bank Loan Fixed Income

Pricing has softened but this segment still has a 39 bps and \$1.2 million average fee. Pricing does not drop quickly with mandate size.

Long Duration Fixed Income

Pricing is down a little but the largest average mandates (\$437 million), with core-like pricing (18 bps), results in \$675,000 per mandate.

Global Fixed Income

High relative pricing at 33 bps and unattractive markets have caused the average mandate size and dollar fees to drop significantly.

Emerging Market Debt

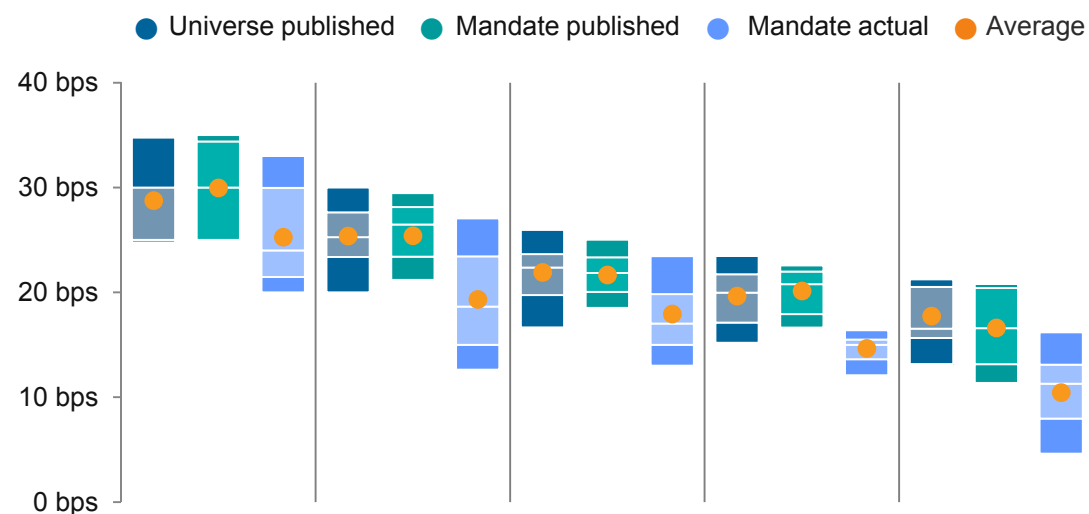
Pricing has softened recently but remains highest at 46 bps and \$1.5 million per mandate. Mandate sizes have also fallen recently.

Actual vs. Published Fees: Active Core Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

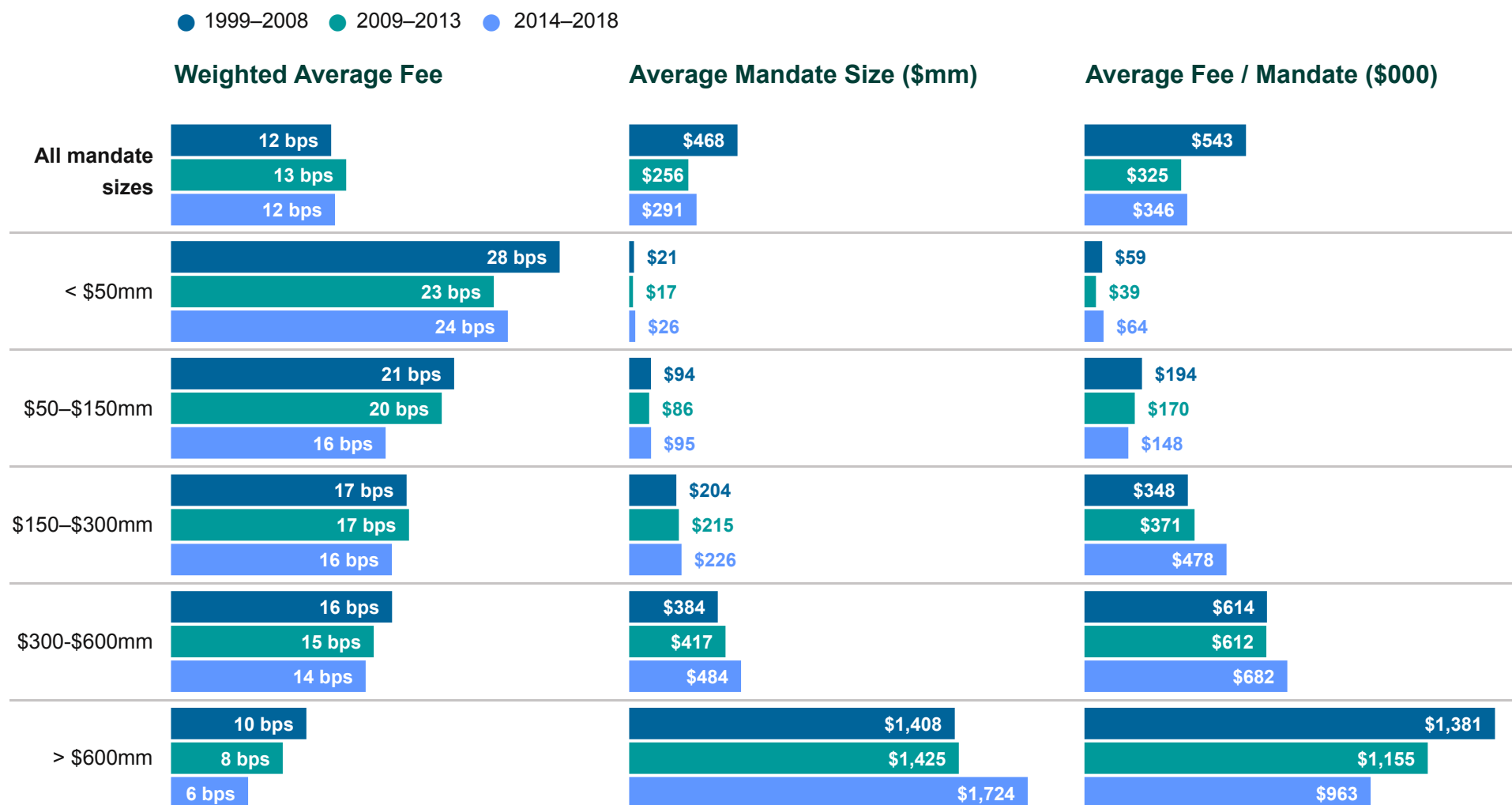
Total AUM (\$mm)	\$45,219
Total count	131
Average AUM (\$mm)	\$345
Median AUM (\$mm)	\$126
Total average fee (bps / \$)	18 / \$419,335
Total median fee (bps / \$)	18 / \$241,536
Total sum fees (\$)	\$54,932,912
Weighted average fee	12 bps



	< \$50mm			\$50 to \$150mm			\$150 to \$300mm			\$300 to \$600mm			\$600mm to \$3bn		
10th percentile	35	35	33	30	29	27	26	25	23	23	23	16	21	21	16
25th percentile	30	34	30	28	28	23	24	23	20	22	22	16	21	20	13
Median	30	30	24	25	26	19	22	22	17	20	21	15	17	17	11
75th percentile	25	25	21	23	23	15	20	20	15	17	18	14	16	13	8
90th percentile	25	25	20	20	21	13	17	19	13	15	17	12	13	11	5
Average ●	29	30	25	25	25	19	22	22	18	20	20	15	18	17	10
Median AUM	\$21mm			\$95mm			\$211mm			\$434mm			\$1208mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Core Fixed Income



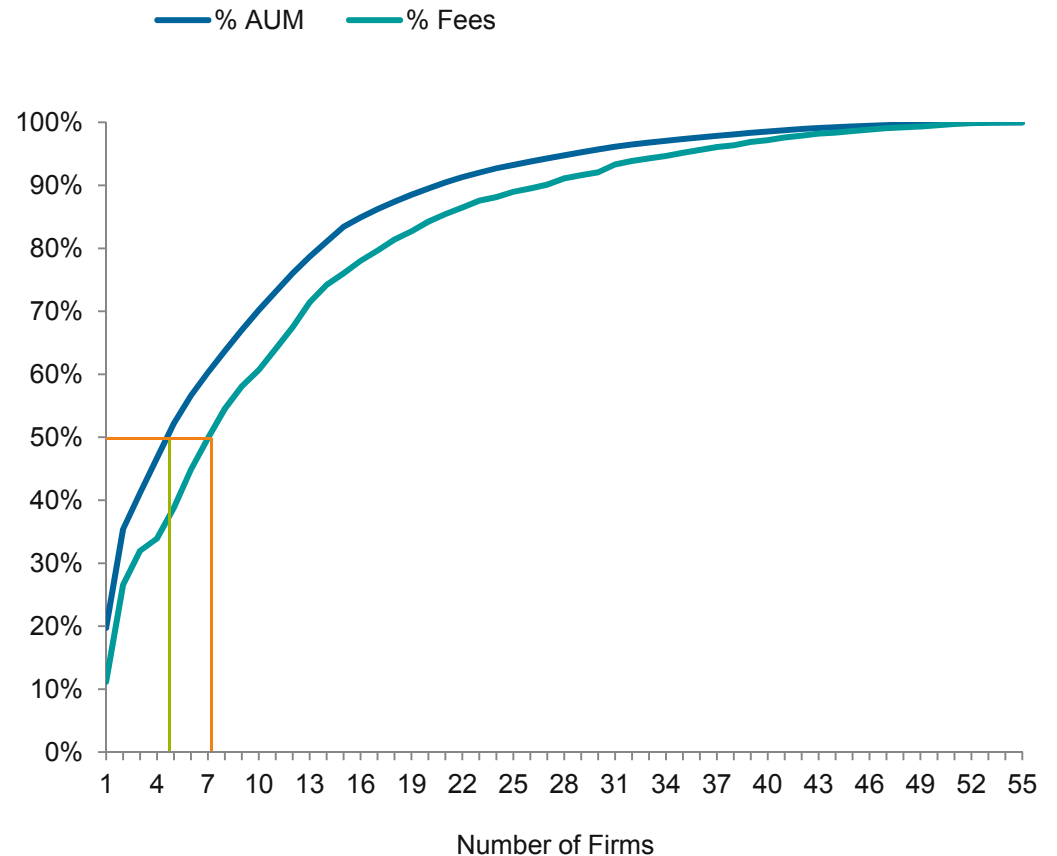
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Core Fixed Income

\$45.2 billion in assets and **\$54.9 million** in fees

- 131 active mandates with 55 different firms
- 50% of assets managed by **5 firms** (9%)
- 50% of fees made by **7 firms** (13%)
- Active management has 56% AUM market share in this Core only (ex Core Plus) segment (44% AUM passive)
- Active management has 89% fee market share in this Core only (ex Core Plus) segment (11% fees passive)

Concentration by Firm



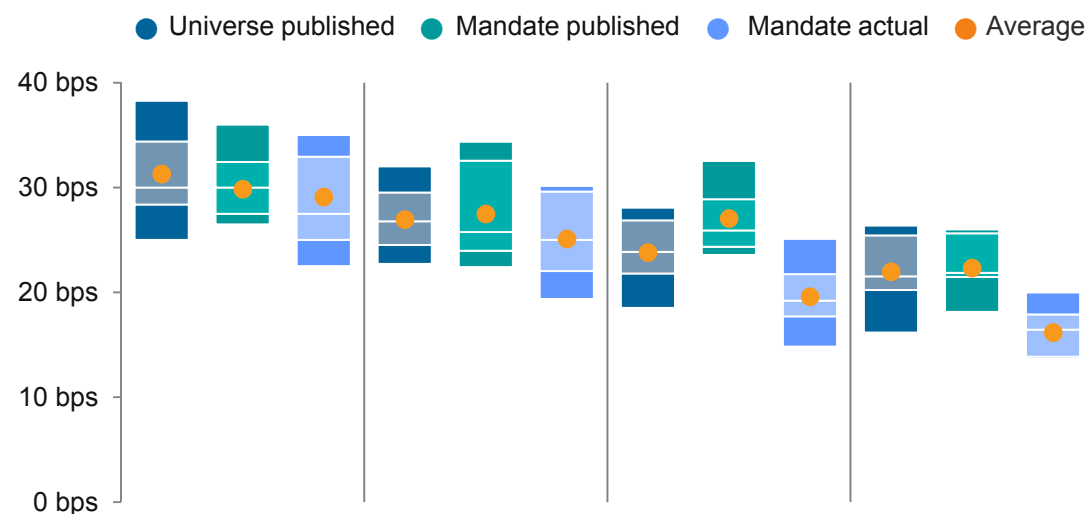
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active Core Plus Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

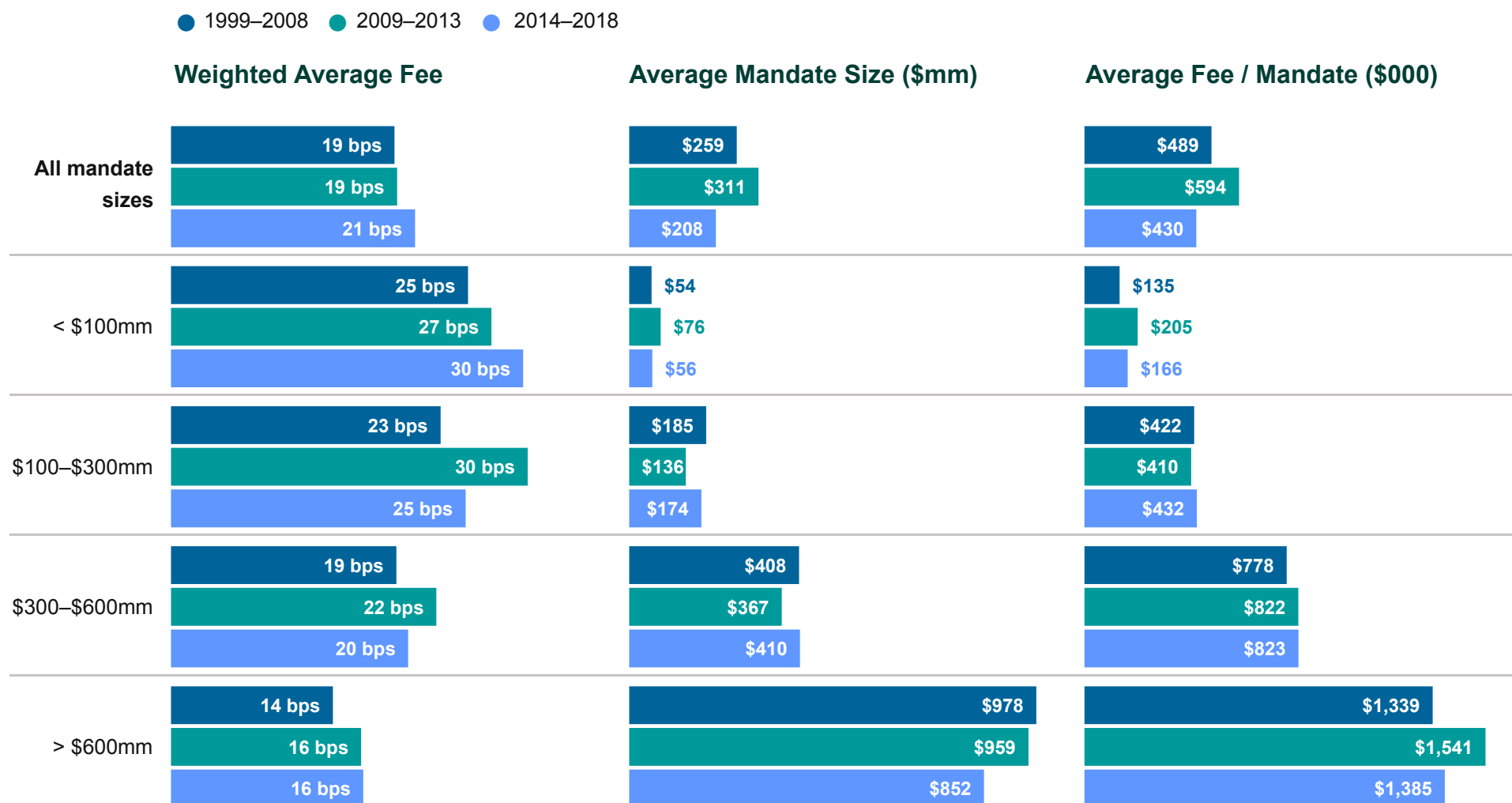
Total AUM (\$mm)	\$20,252
Total count	76
Average AUM (\$mm)	\$266
Median AUM (\$mm)	\$113
Total average fee (bps / \$)	25 / \$514,864
Total median fee (bps / \$)	25 / \$330,864
Total sum fees (\$)	\$39,129,696
Weighted average fee	19 bps



	< \$100mm			\$100 to \$300mm			\$300 to \$600mm			\$600mm to \$1.7bn		
10th percentile	38	36	35	32	34	30	28	33	25	26	26	20
25th percentile	34	32	33	30	33	30	27	29	22	25	26	18
Median	30	30	27	27	26	25	24	26	19	22	22	16
75th percentile	28	28	25	25	24	22	22	24	18	20	21	14
90th percentile	25	26	23	23	22	19	19	24	15	16	18	14
Average ●	31	30	29	27	27	25	24	27	20	22	22	16
Median AUM	\$57mm			\$166mm			\$389mm			\$881mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Core Plus Fixed Income



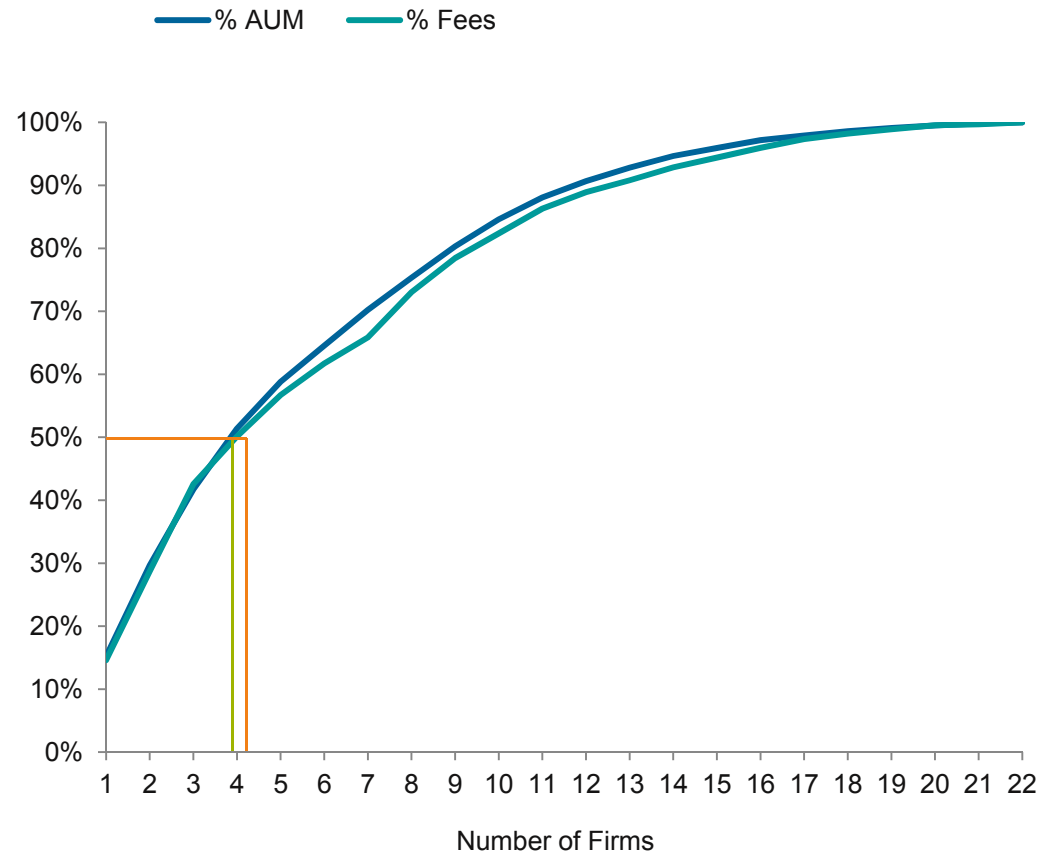
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Core Plus Fixed Income

\$20.3 billion in assets and **\$39.1** million in fees

- 76 active mandates with 22 different firms
- 50% of assets managed by 4 firms (18%)
- 50% of fees made by 4 firms (18%)

Concentration by Firm



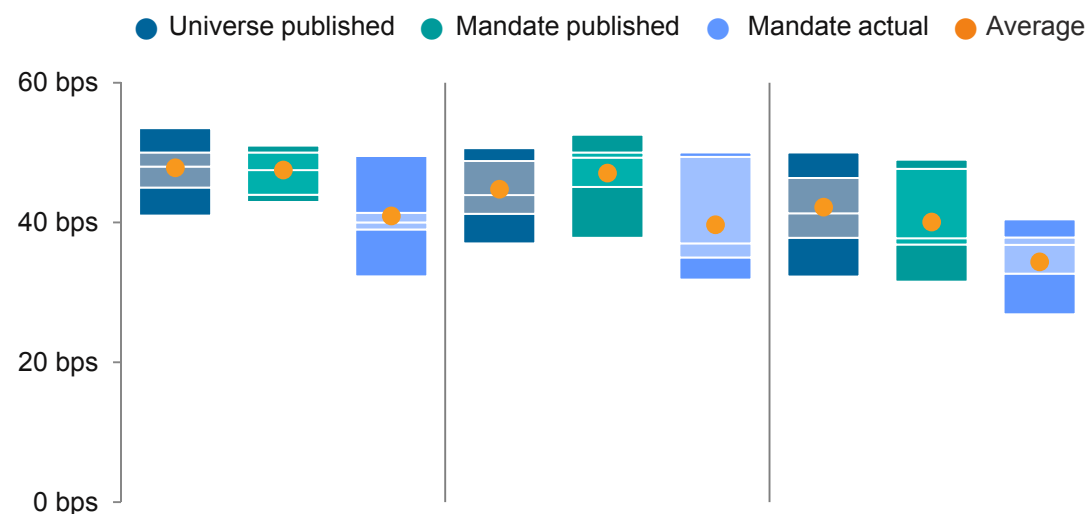
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active High Yield and Bank Loan Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

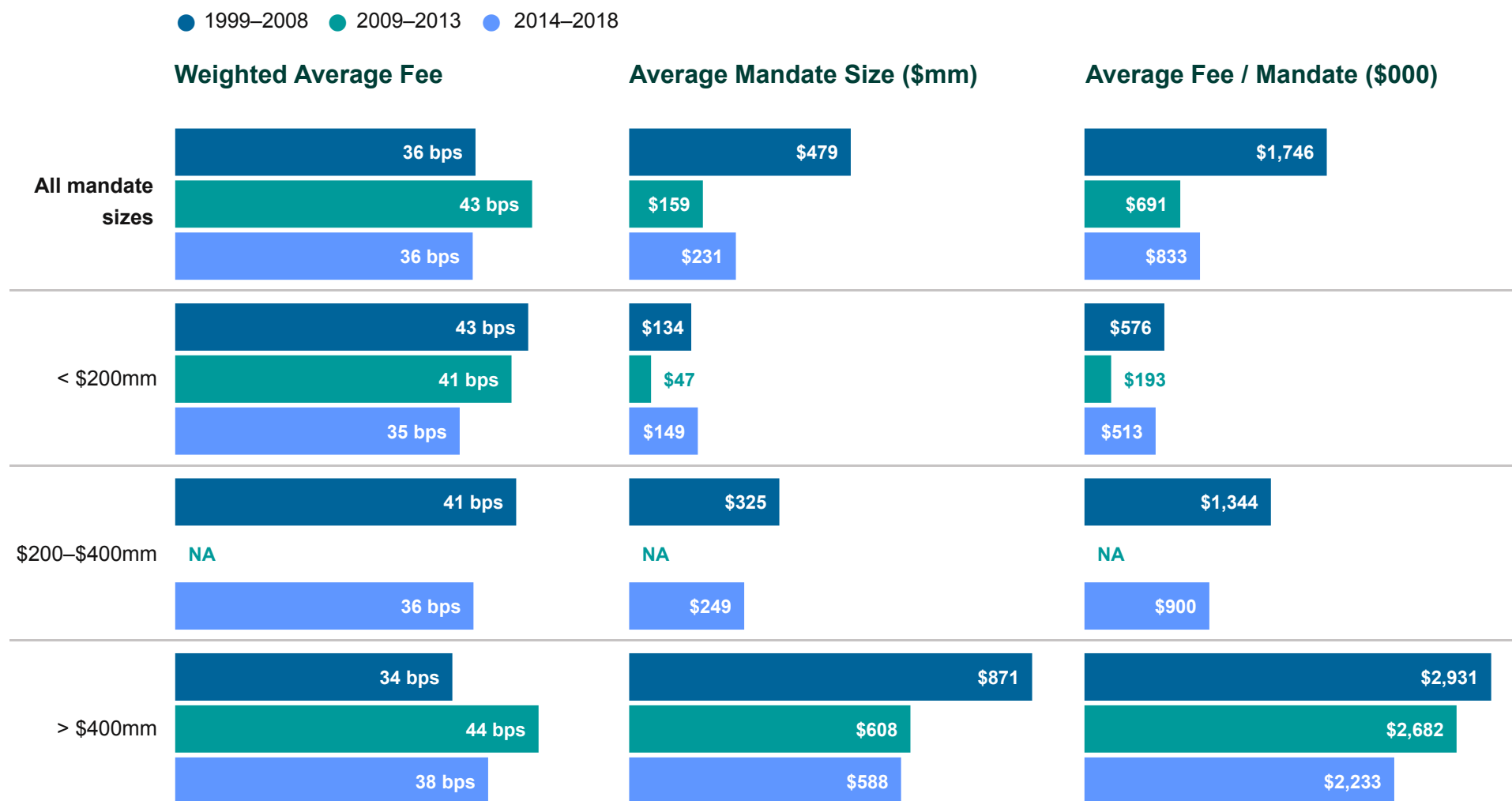
Total AUM (\$mm)	\$9,641
Total count	29
Average AUM (\$mm)	\$332
Median AUM (\$mm)	\$215
Total average fee (bps / \$)	39 / \$1,230,923
Total median fee (bps / \$)	38 / \$757,071
Total sum fees (\$)	\$35,696,773
Weighted average fee	37 bps



	< \$200mm			\$200 to \$400mm			\$400mm to \$1.2bn		
10th percentile	54	51	50	51	53	50	50	49	40
25th percentile	50	50	41	49	50	49	46	48	38
Median	48	48	40	44	49	37	41	38	37
75th percentile	45	44	39	41	45	35	38	37	33
90th percentile	41	43	32	37	38	32	32	32	27
Average ●	48	48	41	45	47	40	42	40	34
Median AUM	\$125mm			\$280mm			\$768mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active High Yield and Bank Loan Fixed Income



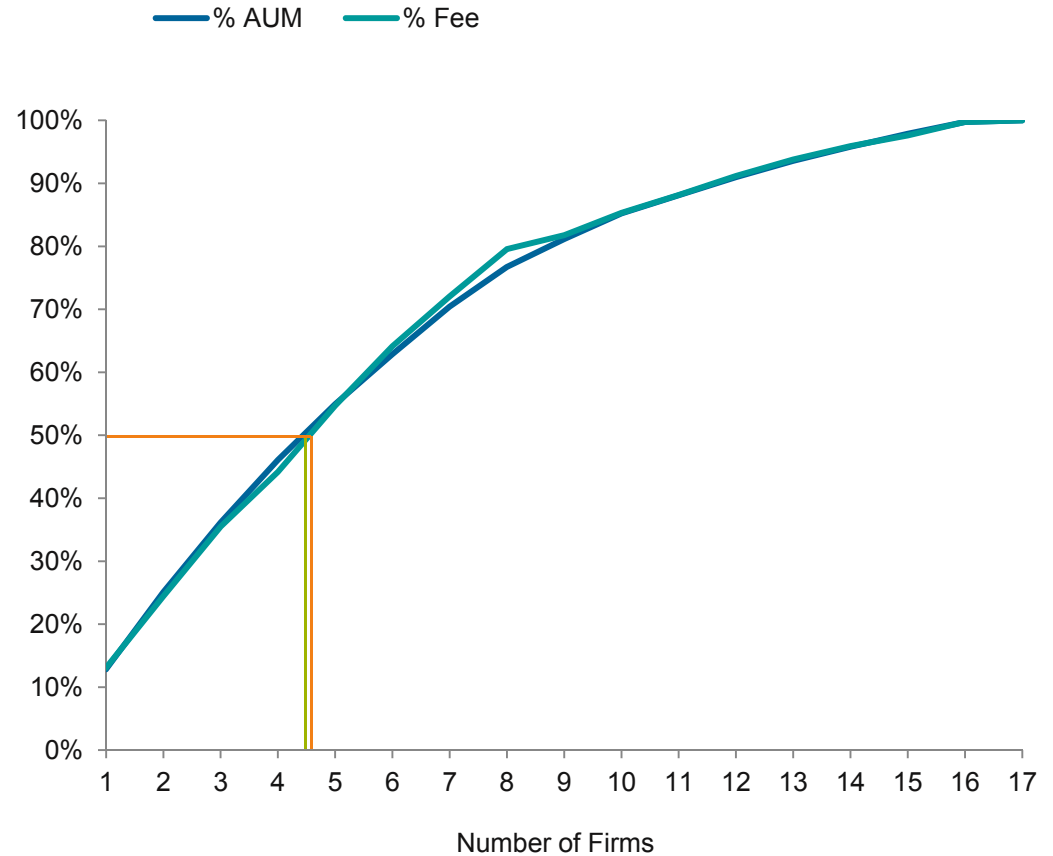
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active High Yield and Bank Loan Fixed Income

\$9.6 billion in assets and **\$35.7 million** in fees

- 29 active mandates with 17 different firms
- 50% of assets managed by **5 firms** (29%)
- 50% of fees made by **5 firms** (29%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

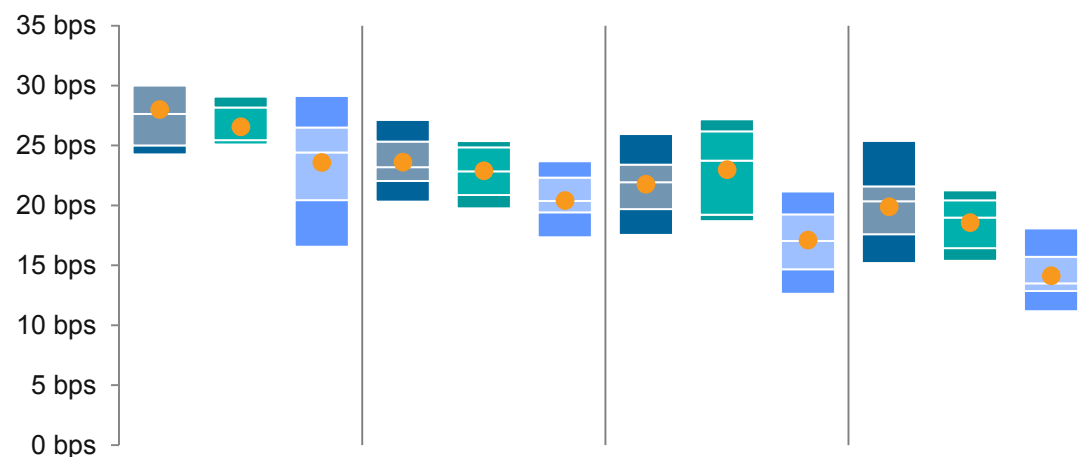
Actual vs. Published Fees: Active Long Duration Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$29,723
Total count	68
Average AUM (\$mm)	\$437
Median AUM (\$mm)	\$350
Total average fee (bps / \$)	18 / \$675,441
Total median fee (bps / \$)	18 / \$652,679
Total sum fees (\$)	\$45,929,981
Weighted average fee	15 bps

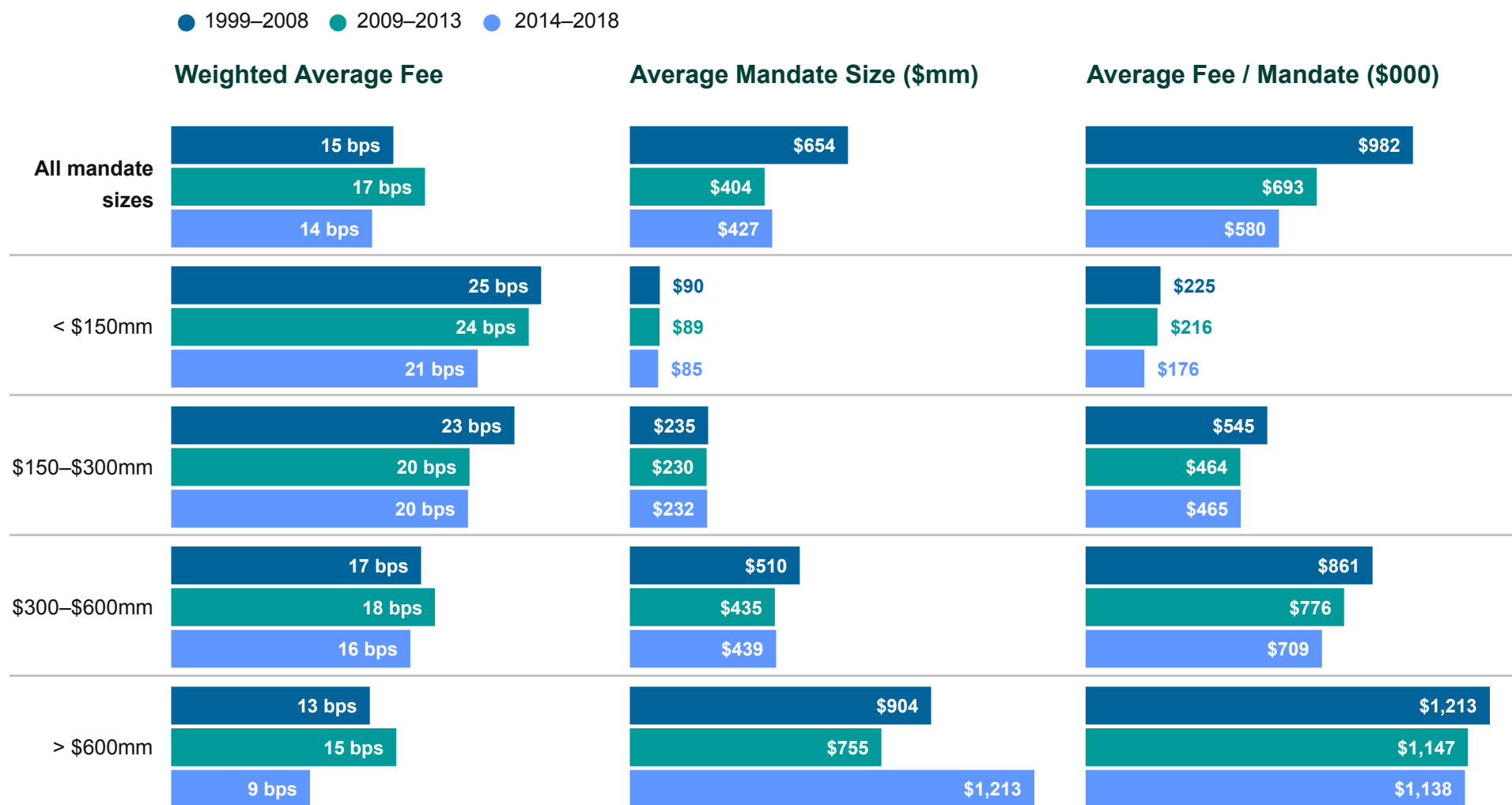
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$150mm			\$150 to \$300mm			\$300 to \$600mm			\$600mm to \$2.4bn		
10th percentile	30	29	29	27	25	24	26	27	21	25	21	18
25th percentile	30	28	27	25	25	22	23	26	19	22	20	16
Median	28	25	24	23	23	20	22	24	17	20	19	13
75th percentile	25	25	20	22	21	19	20	19	15	18	16	13
90th percentile	24	25	17	20	20	17	18	19	13	15	15	11
Average ●	28	27	24	24	23	20	22	23	17	20	19	14
Median AUM	\$95mm			\$235mm			\$389mm			\$758mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Long Duration Fixed Income



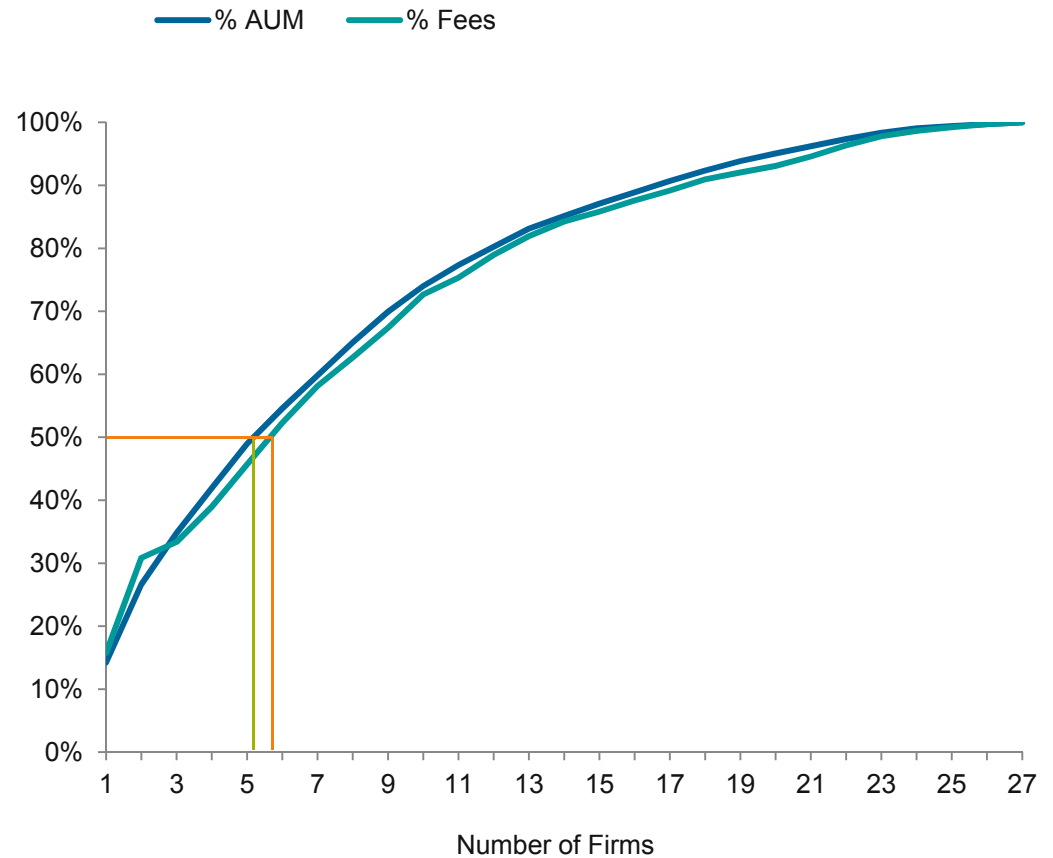
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Long Duration Fixed Income

\$29.7 billion in assets and **\$45.9** million in fees

- 68 active mandates with 27 different firms
- 50% of assets managed by **6 firms** (22%)
- 50% of fees made by **6 firms** (22%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

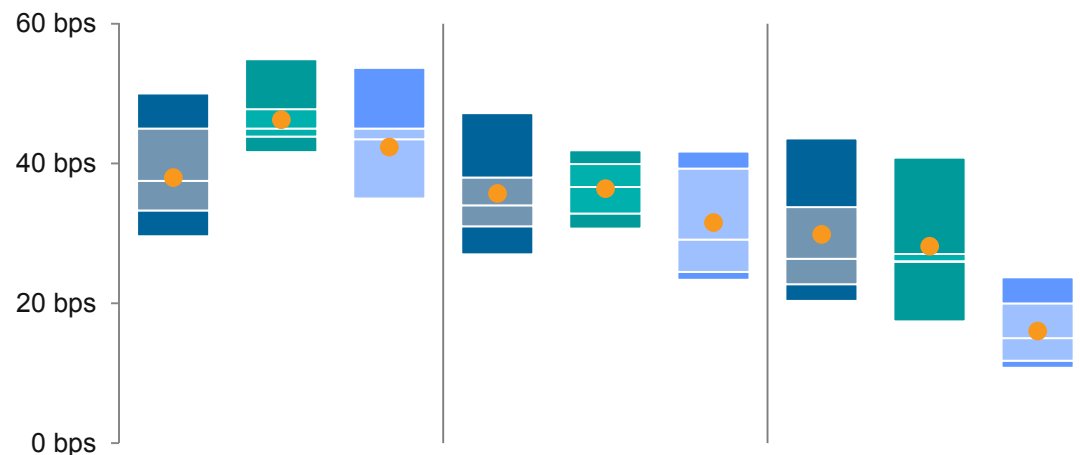
Actual vs. Published Fees: Active Global Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$8,090
Total count	30
Average AUM (\$mm)	\$270
Median AUM (\$mm)	\$104
Total average fee (bps / \$)	33 / \$523,489
Total median fee (bps / \$)	35 / \$344,494
Total sum fees (\$)	\$15,704,683
Weighted average fee	19 bps

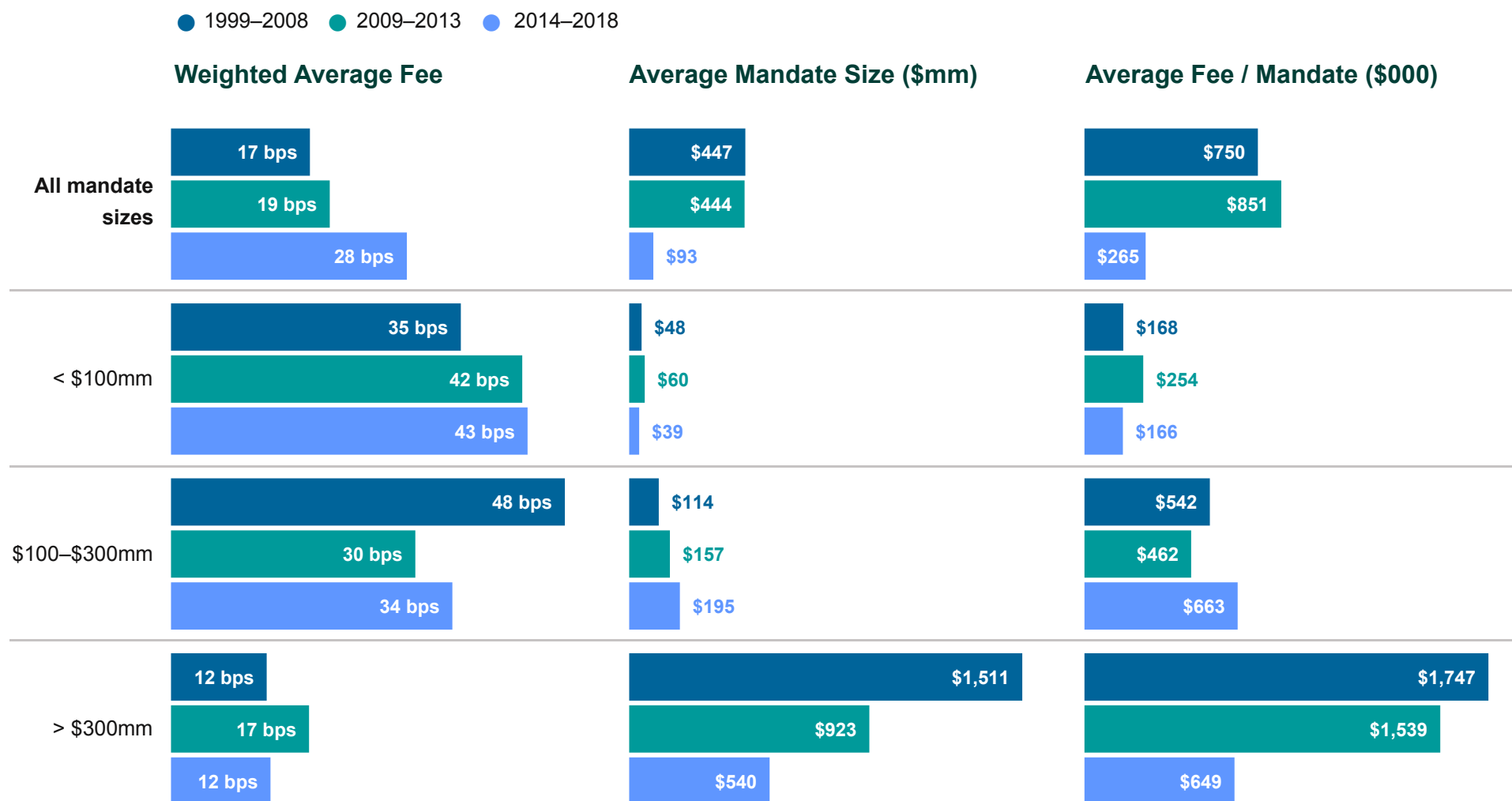
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$100mm			\$100 to \$300mm			\$300mm to \$1.5bn		
10th percentile	50	55	54	47	42	42	44	41	24
25th percentile	45	48	45	38	40	39	34	27	20
Median	38	45	43	34	37	29	26	26	15
75th percentile	33	44	35	31	33	24	23	26	12
90th percentile	30	42	35	27	31	23	20	17	11
Average ●	38	46	42	36	36	32	30	28	16
Median AUM	\$35mm			\$125mm			\$733mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Global Fixed Income



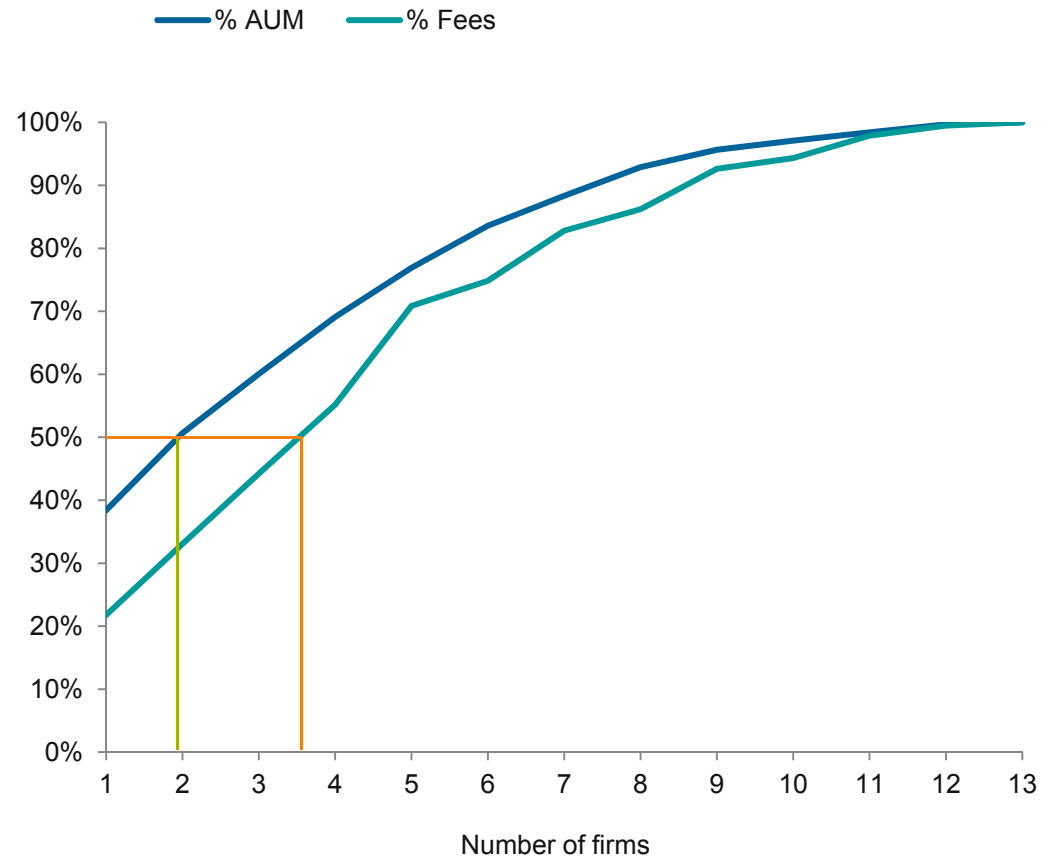
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Global Fixed Income

\$8.1 billion in assets and **\$15.7 million** in fees

- 30 active mandates with 13 different firms
- 50% of assets managed by **2 firms** (15%)
- 50% of fees made by **4 firms** (31%)

Concentration by Firm



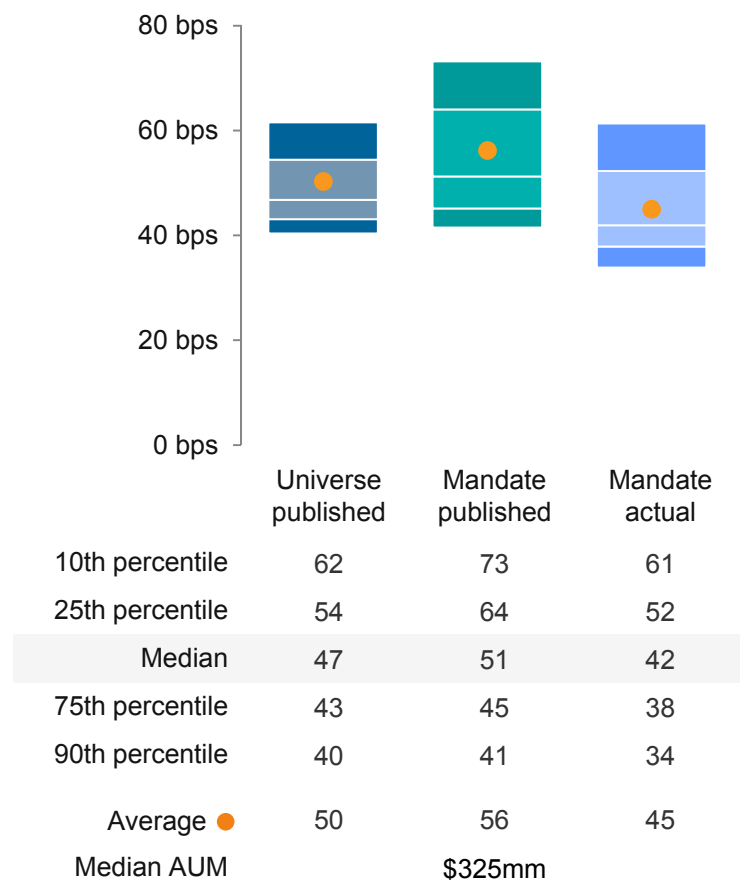
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active Emerging Market Debt

Fees (basis points) for account sizes \$164mm – \$575mm

Actual Fees Paid Summary

Total AUM (\$mm)	\$3,570
Total count	11
Average AUM (\$mm)	\$325
Median AUM (\$mm)	\$325
Total average fee (bps / \$)	45 / \$1,501,759
Total median fee (bps / \$)	42 / \$1,362,400
Total sum fees (\$)	\$16,519,350
Weighted average fee	46 bps



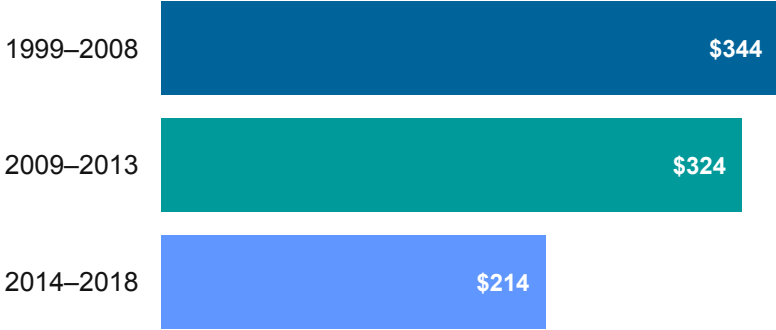
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Emerging Market Debt

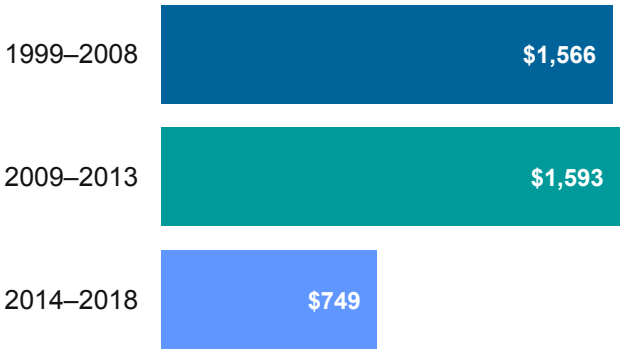
Weighted Average Fee



Average Mandate Size (\$mm)



Average Fee/Mandate (\$000)



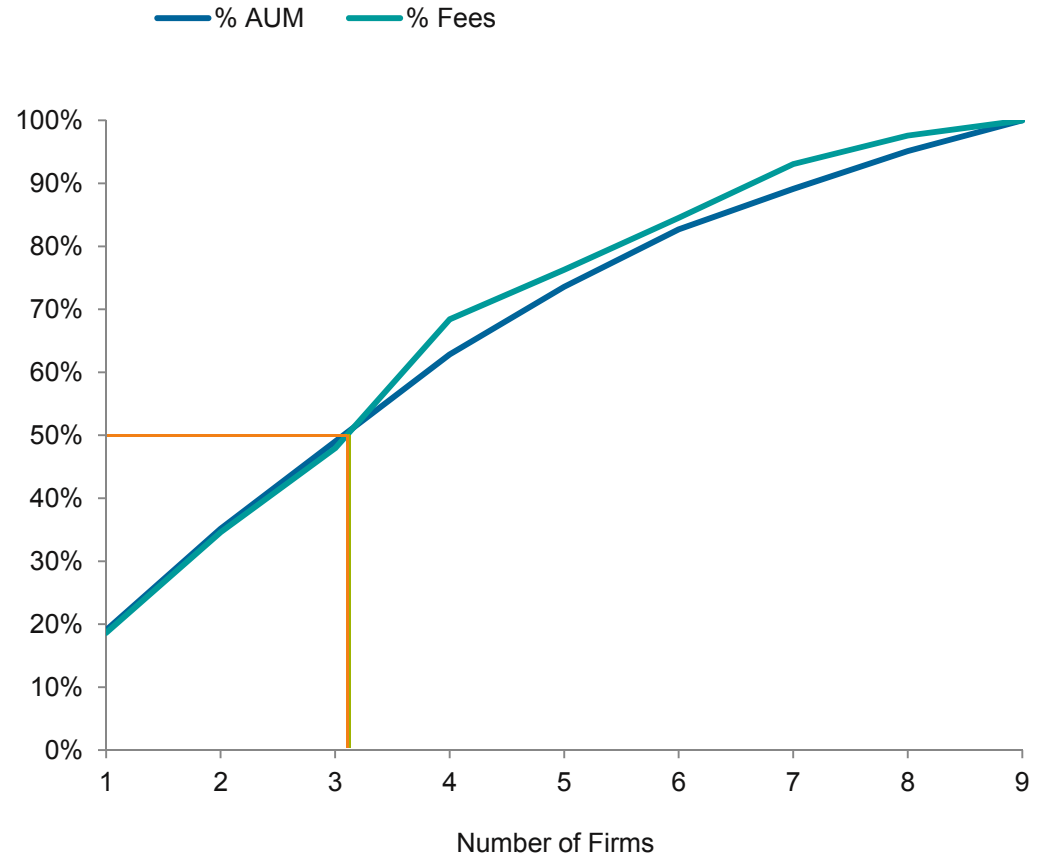
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Emerging Market Debt

\$3.6 billion in assets and **\$16.5 million** in fees

- 11 active mandates with 9 different firms
- 50% of assets managed by 4 firms (44%)
- 50% of fees made by 4 firms (44%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

Passive

Key Findings: Passive

Passive (as a group)

Fees continue to grind downwards and are now shown to 1/10th of a basis point. Market share is dominated by 4 to 5 players and pricing can be dependent on securities lending. Average mandate sizes and dollar fees are also dropping as smaller funds are using passive. Passive management in aggregate controls about 30% of institutional market assets and 2% of the total management fees.

Passive U.S. Large Cap and All Cap Equity

Average fees are now 2.3 bps and \$90,000 with an average mandate size of \$783 million. For mandates >\$1 billion, the fees can dip below 1 bps. Passive management in this segment controls about 61% of institutional assets and 6% of the total management fees.

Passive U.S. Mid, Smid, Small, and Micro Cap Equity

Average fees are now 3.7 bps and \$48,000 with an average mandate size of \$276 million. For mandates >\$1 billion, the fees can dip below 2 bps. Passive management in this segment controls about 17% of institutional assets and 1% of the total management fees.

Passive Non-U.S. and Global Large Cap Equity

Average fees are now 5.2 bps and \$253,000 with an average mandate size of \$1 billion. For mandates >\$1 billion, the fees can dip below 1.5 bps. Passive management in this segment controls about 40% of institutional assets and 4% of the total management fees.

Passive U.S. Core Fixed Income

Average fees are now 3.4 bps and \$129,000 with an average mandate size of \$677 million. For mandates >\$1 billion, the fees can dip below 1.8 bps. Passive management in this segment (excluding core plus) controls about 44% of institutional assets and 11% of the total management fees. If core plus is included in the mix then passive management controls about 35% of assets and 7% of management fees.

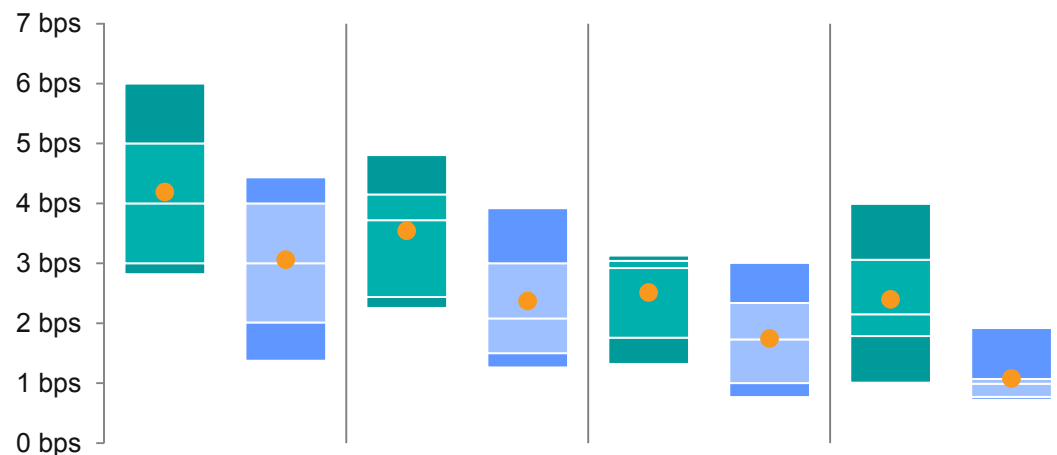
Actual vs. Published Fees: Passive U.S. Large Cap and All Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$84,544
Total count	108
Average AUM (\$mm)	\$783
Median AUM (\$mm)	\$124
Total average fee (bps / \$)	2.3 / \$90,216
Total median fee (bps / \$)	2.0 / \$31,680
Total sum fees (\$)	\$9,923,790
Weighted average fee	1.2 bps

● Mandate published ● Mandate actual ● Average



	< \$100mm		\$100 to \$300mm		\$300mm to \$1bn		\$1bn to \$11bn	
10th percentile	6.0	4.4	4.8	3.9	3.1	3.0	4.0	1.9
25th percentile	5.0	4.0	4.2	3.0	3.0	2.3	3.1	1.1
Median	4.0	3.0	3.7	2.1	2.9	1.7	2.2	1.0
75th percentile	3.0	2.0	2.4	1.5	1.8	1.0	1.8	0.8
90th percentile	2.8	1.4	2.3	1.3	1.3	0.8	1.0	0.7
Average ●	4.2	3.1	3.5	2.4	2.5	1.7	2.4	1.1
Median AUM	\$53mm		\$164mm		\$533mm		\$2.3 bn	

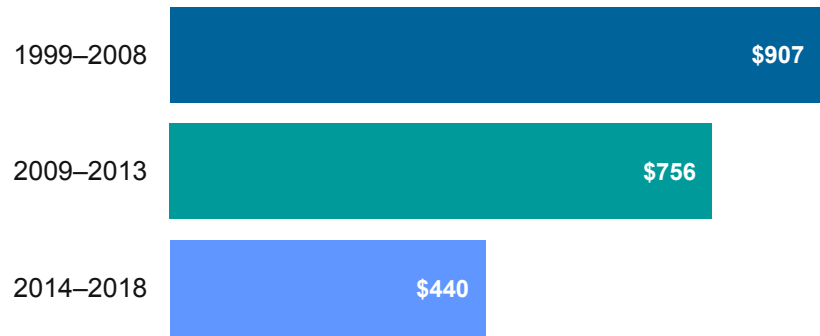
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Passive U.S. Large Cap and All Cap Equity

Weighted Average Fee



Average Mandate Size (\$mm)



Average Fee/Mandate (\$000)



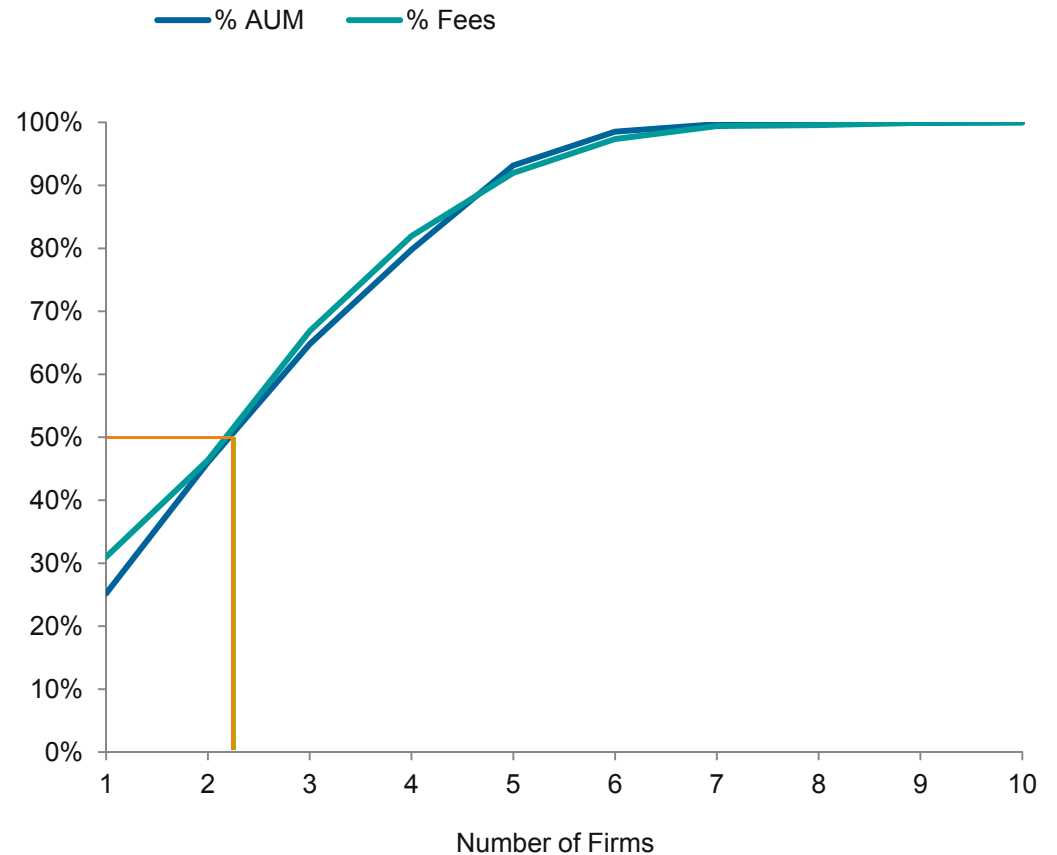
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Passive U.S. Large Cap and All Cap Equity

\$84.5 billion in assets and **\$9.9 million** in fees

- 108 passive mandates with 10 different firms
- 50% of assets managed by **3 firms** (30%)
- 50% of fees made by **3 firms** (30%)
- Passive management has 61% AUM market share in this segment (39% AUM active)
- Passive management has 6% fee market share in this segment (94% fees active)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

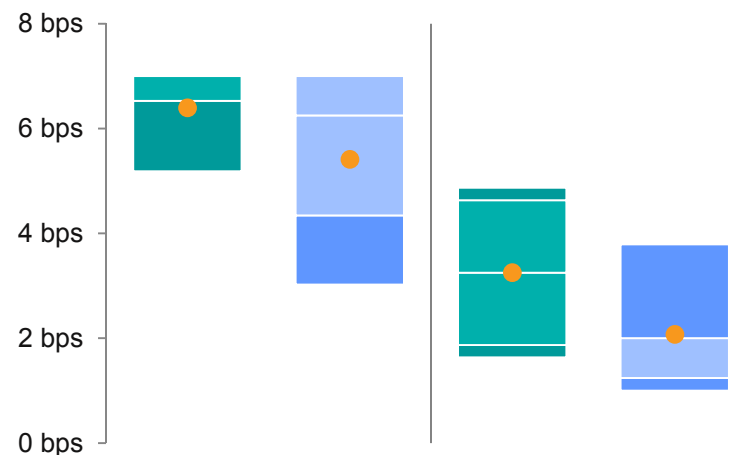
Actual vs. Published Fees: Passive U.S. Smid, Small, and Micro Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$5,792
Total count	21
Average AUM (\$mm)	\$276
Median AUM (\$mm)	\$100
Total average fee (bps / \$)	3.7 / \$48,111
Total median fee (bps / \$)	3.3 / \$29,600
Total sum fees (\$)	\$1,010,327
Weighted average fee	1.7 bps

● Mandate published ● Mandate actual ● Average



	< \$100mm		\$100mm to \$1.9bn	
10th percentile	7.0	7.0	4.9	3.8
25th percentile	7.0	7.0	4.6	2.0
Median	7.0	6.3	3.3	2.0
75th percentile	6.5	4.3	1.9	1.2
90th percentile	5.2	3.0	1.6	1.0
Average ●	6.4	5.4	3.3	2.1
	\$20mm		\$287mm	

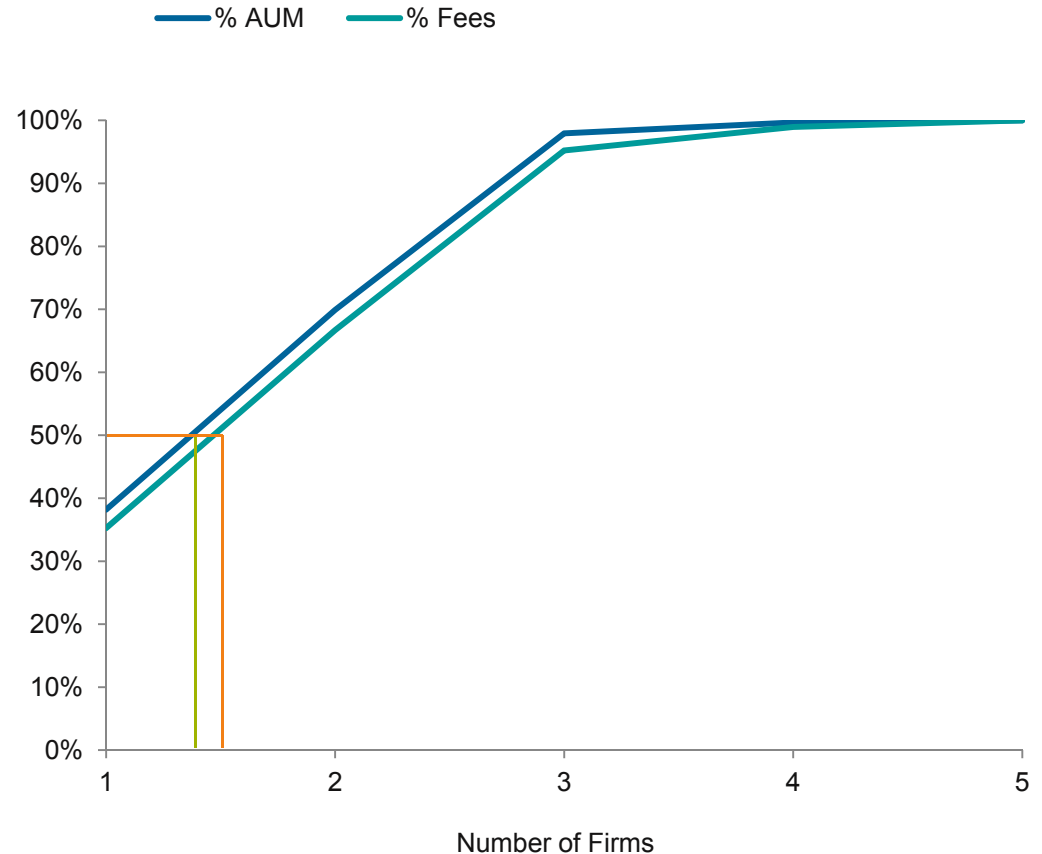
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Concentration Analysis: Passive U.S. Smid, Small, and Micro Cap Equity

\$5.8 billion in assets and **\$1 million** in fees

- 21 passive mandates with 5 different firms
- 50% of assets managed by **2 firms** (40%)
- 50% of fees made by **2 firms** (40%)
- Passive management has 17% AUM market share in this segment (83% AUM active)
- Passive management has 1% fee market share in this segment (99% fees active)

Concentration by Firm



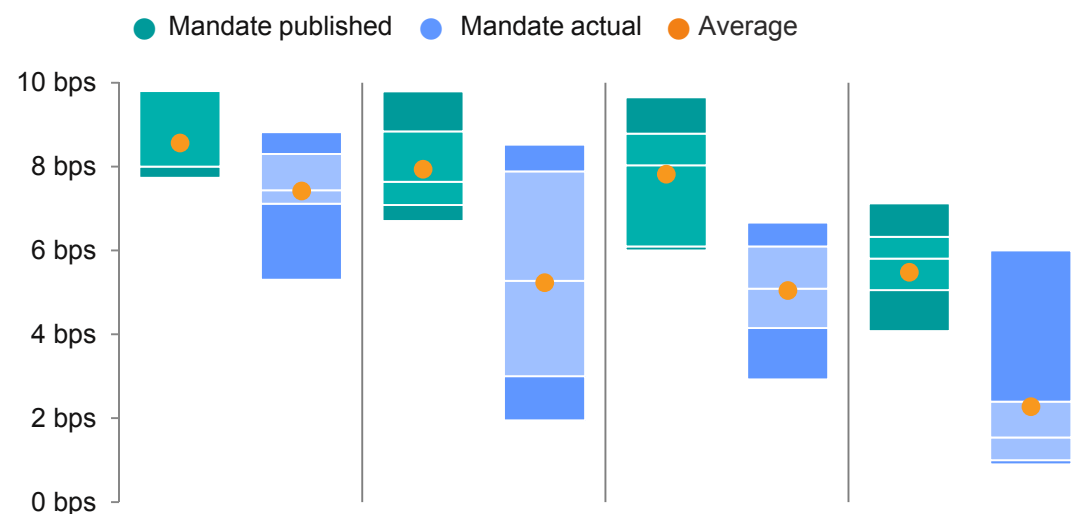
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Passive Non-U.S. and Global Large Cap Equity

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$44,142
Total count	42
Average AUM (\$mm)	\$1,051
Median AUM (\$mm)	\$183
Total average fee (bps / \$)	5.2 / \$253,021
Total median fee (bps / \$)	6.0 / \$119,869
Total sum fees (\$)	\$10,626,893
Weighted average fee	2.4 bps

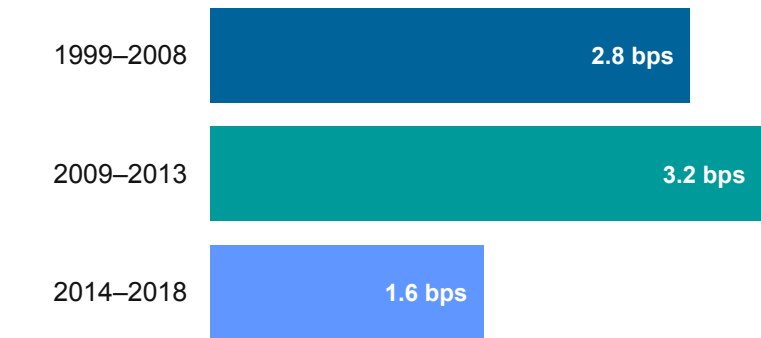


	< \$100mm		\$100 to \$300mm		\$300mm to \$1bn		\$1bn to \$8bn	
10th percentile	9.8	8.8	9.8	8.5	9.7	6.7	7.1	6.0
25th percentile	9.8	8.3	8.8	7.9	8.8	6.1	6.3	2.4
Median	8.0	7.4	7.6	5.3	8.0	5.1	5.8	1.5
75th percentile	8.0	7.1	7.1	3.0	6.1	4.2	5.1	1.0
90th percentile	7.7	5.3	6.7	2.0	6.0	2.9	4.1	0.9
Average ●	8.6	7.4	7.9	5.2	7.8	5.0	5.5	2.3
Median AUM	\$20mm		\$173mm		\$738mm		\$2.6bn	

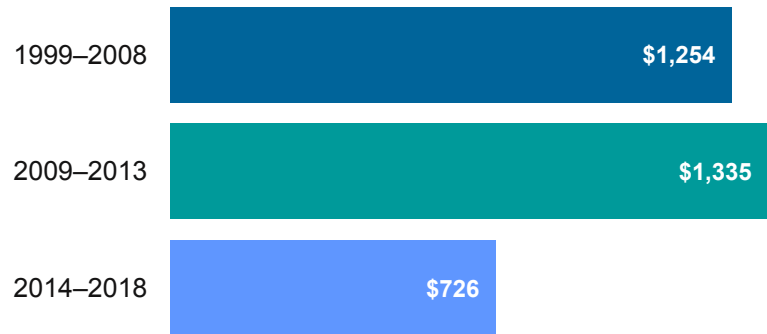
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Passive Non-U.S. and Global Large Cap Equity

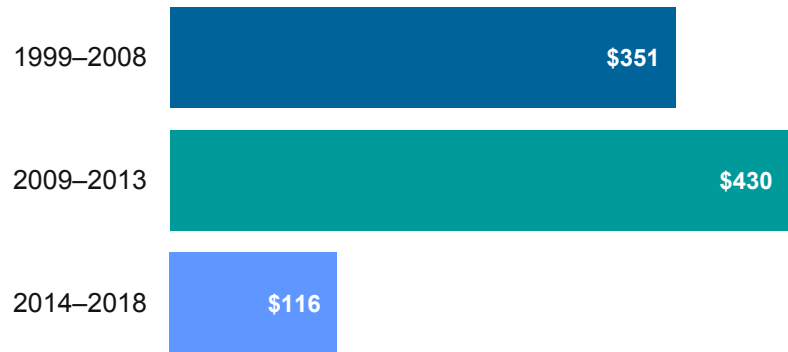
Weighted Average Fee



Average Mandate Size (\$mm)



Average Fee/Mandate (\$000)



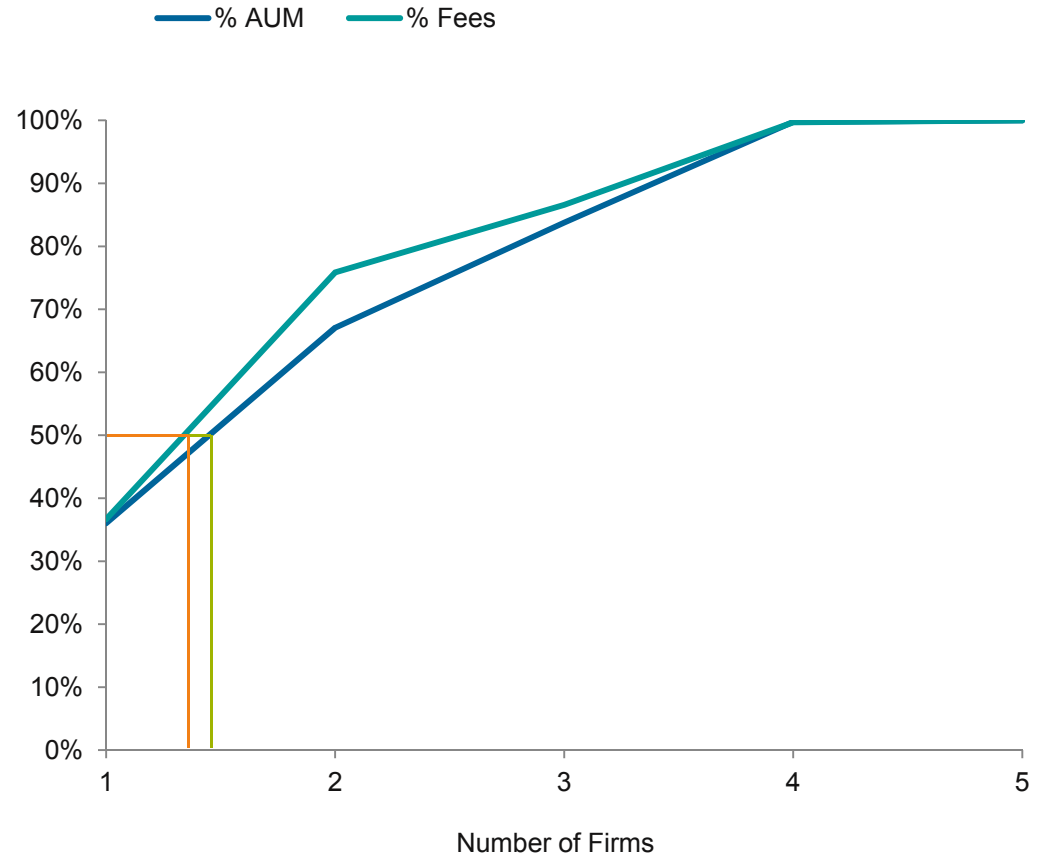
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Passive Non-U.S. and Global Large Cap Equity

\$44.1 billion in assets and **\$10.6** million in fees

- 42 passive mandates with 5 different firms
- 50% of assets managed by 2 firms (40%)
- 50% of fees made by 2 firms (40%)
- Passive management has 40% AUM market share in this segment (60% AUM active)
- Passive management has 4% fee market share in this segment (96% fees active)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

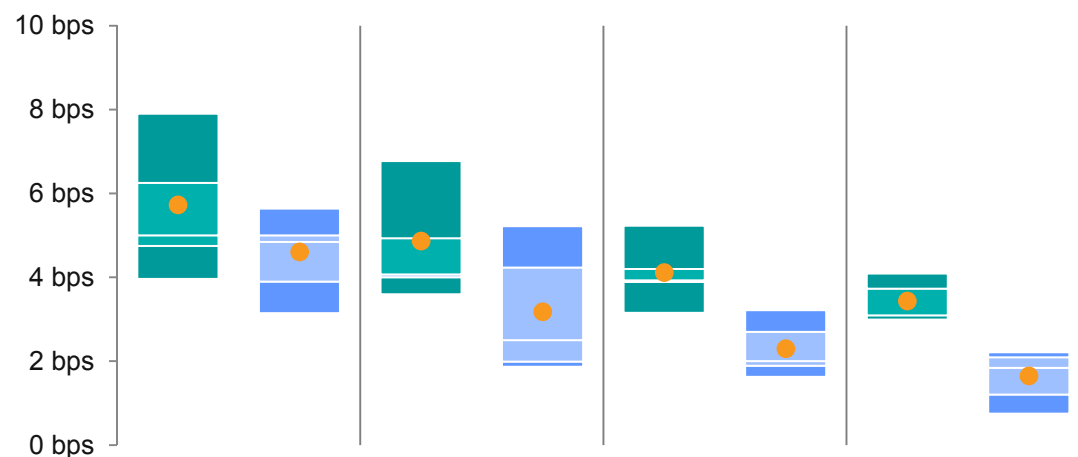
Actual vs. Published Fees: Passive U.S. Core Market Fixed Income

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$35,196
Total count	52
Average AUM (\$mm)	\$677
Median AUM (\$mm)	\$126
Total average fee (bps / \$)	3.4 / \$128,983
Total median fee (bps / \$)	3.1 / \$29,442
Total sum fees (\$)	\$6,707,132
Weighted average fee	1.9 bps

● Mandate published ● Mandate actual ● Average



	< \$100mm		\$100 to \$300mm		\$300mm to \$1bn		\$1bn to \$6bn	
10th percentile	7.9	5.6	6.8	5.2	5.2	3.2	4.1	2.2
25th percentile	6.3	5.0	4.9	4.2	4.2	2.7	3.7	2.1
Median	5.0	4.8	4.1	2.5	3.9	2.0	3.1	1.8
75th percentile	4.8	3.9	4.0	2.0	3.9	1.9	3.1	1.2
90th percentile	4.0	3.1	3.6	1.9	3.2	1.6	3.0	0.8
Average ●	5.7	4.6	4.9	3.2	4.1	2.3	3.4	1.6
Median AUM	\$26mm		\$162mm		\$585mm		\$1.6bn	

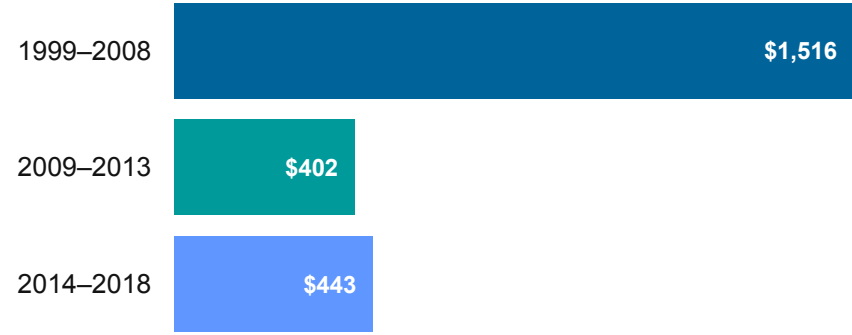
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Passive U.S. Core Market Fixed Income

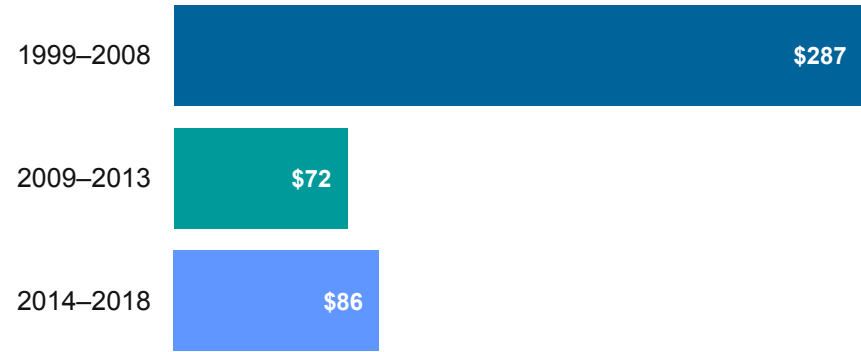
Weighted Average Fee



Average Mandate Size (\$mm)



Average Fee/Mandate (\$000)



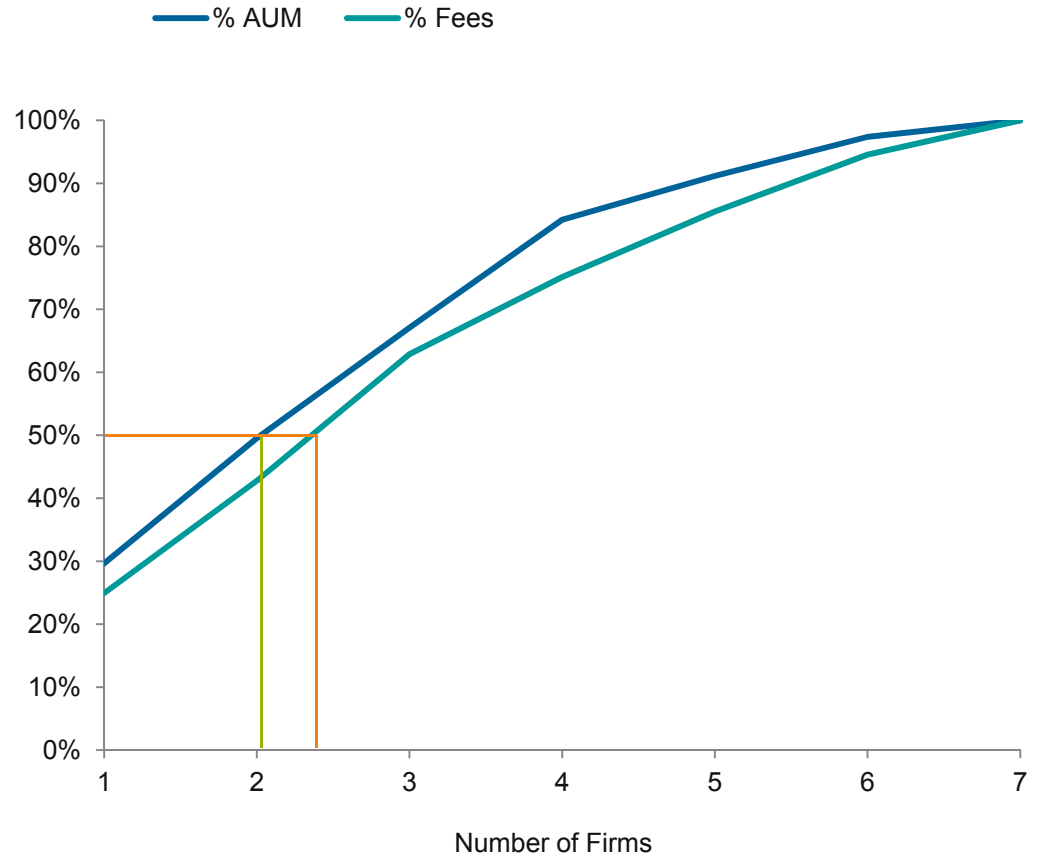
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Passive U.S. Core Fixed Income

\$35.2 billion in assets and **\$6.7 million** in fees

- 52 active mandates with 7 different firms
- 50% of assets managed by **2 firms** (29%)
- 50% of fees made by **3 firms** (43%)
- Passive management has 35% AUM market share in this segment (65% AUM active Core and Core Plus)
- Passive management has 7% fee market share in this segment (93% fees active Core and Core Plus)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

Alternatives

Key Findings: Alternatives

Alternatives (as a group)

Ever since the GFC, institutional money has moved from traditional active public markets asset classes to passive as well towards mostly private market asset classes and some non-traditional public market areas. Pricing for many (but not all) of these areas has remained strong.

Private Real Estate – Core Open-End Funds and Separate Accounts

Pricing has only marginally come down in core private real estate and there is still a hefty premium over public market asset class pricing. The current average fee is 85 bps and \$1.2 million per mandate on an average mandate size of \$195 million. Negotiated discounts below standard pricing do not appear likely until mandate sizes approach \$500 million and most likely involve separate accounts. The core open-end real estate space is dominated by a handful of firms.

Multi-Asset Class

The liquid multi-asset class space is newer and mostly a post-GFC creation. In this small sample size the average mandate size is \$127 million with average fees of 54 bps and \$517,000 per mandate. In the last 5 years average mandate sizes have grown considerably, causing fees in basis points to go down and fees in dollars to go up significantly.

Hedge Fund-of-Funds

The hedge fund-of-fund business has been under significant pressure in recent years both in terms of fees and flows. Pricing has come down materially in the last 5 years, especially for institutional-sized mandates (>\$50 million now at 75 bps). The current average fee for survivors with client mandates (many have not survived) is 112 bps and \$778,000 per mandate. The average mandate size is \$80 million, with a median of only \$26 million reflecting the dominance of a couple of large mandates in the results. The median fees are 109 bps and \$321,000 per mandate.

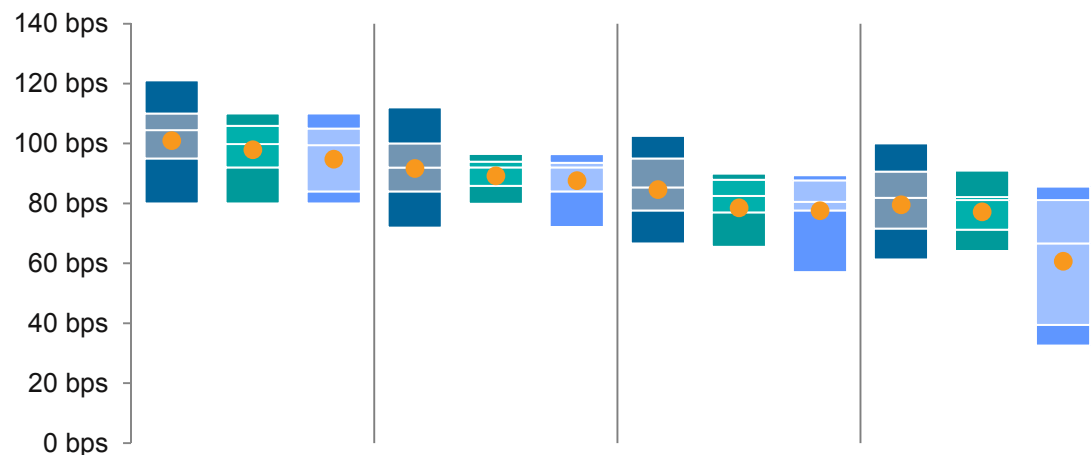
Actual vs. Published Fees: Private Real Estate – Core Open-Ended and Separate Accounts

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$22,610
Total count	116
Average AUM (\$mm)	\$195
Median AUM (\$mm)	\$72
Total average fee (bps / \$)	85 / \$1,230,316
Total median fee (bps / \$)	88 / \$651,107
Total sum fees (\$)	\$142,716,659
Weighted average fee	63 bps

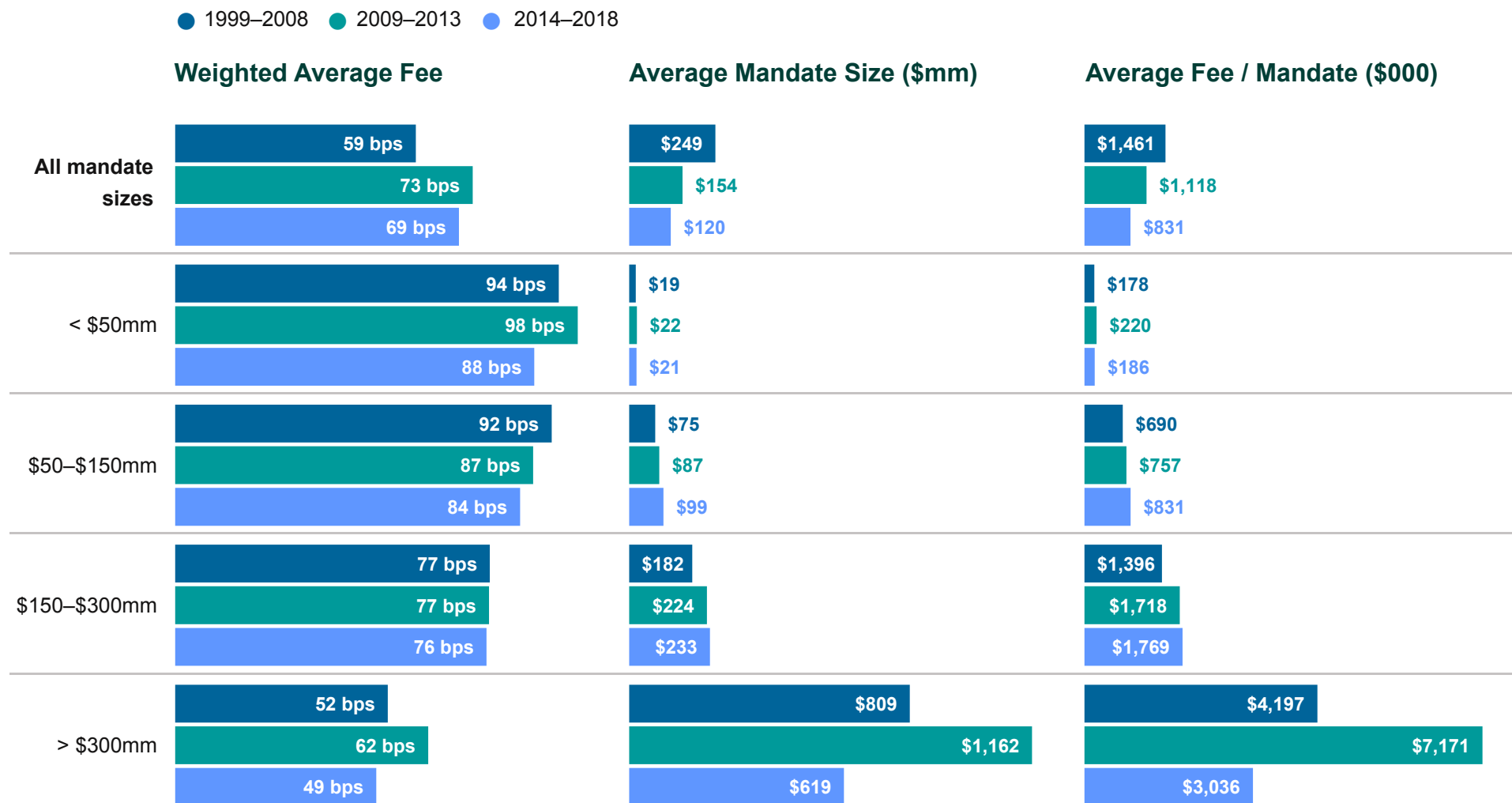
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$50mm			\$50 to \$150mm			\$150 to \$300mm			\$300mm to \$2.1bn		
10th percentile	121	110	110	112	97	96	103	90	89	100	91	86
25th percentile	110	106	105	100	94	94	95	88	88	91	82	81
Median	104	100	99	92	92	92	85	82	81	82	81	67
75th percentile	95	92	84	84	86	84	78	77	78	72	71	39
90th percentile	80	80	80	72	80	72	67	66	57	61	64	33
Average ●	101	98	95	92	89	88	85	79	78	80	77	61
Median AUM	\$19mm			\$90mm			\$216mm			\$624mm		

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Private Real Estate – Core Open-Ended and Separate Accounts



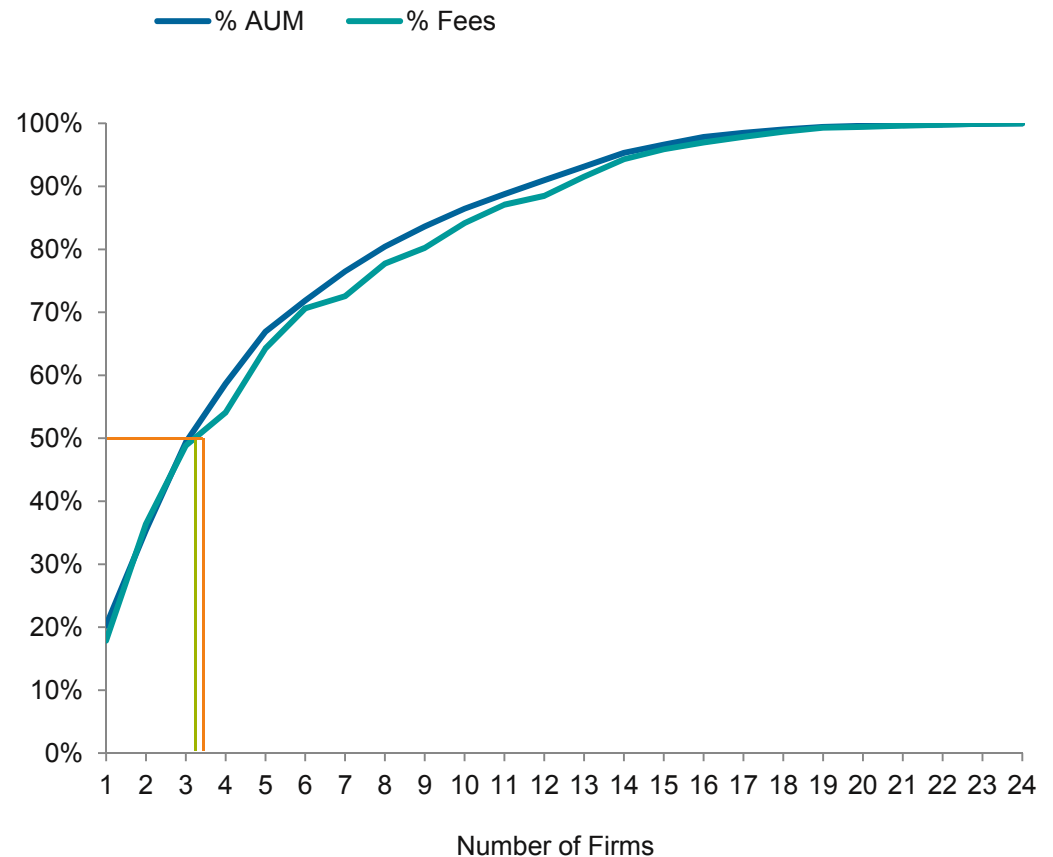
For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Private Real Estate – Core Open-End Funds and Separate Accounts

\$22.6 billion in assets and **\$142.7** million in fees

- 116 active mandates with 24 different firms
- 50% of assets managed by 4 firms (17%)
- 50% of fees made by 4 firms (17%)

Concentration by Firm



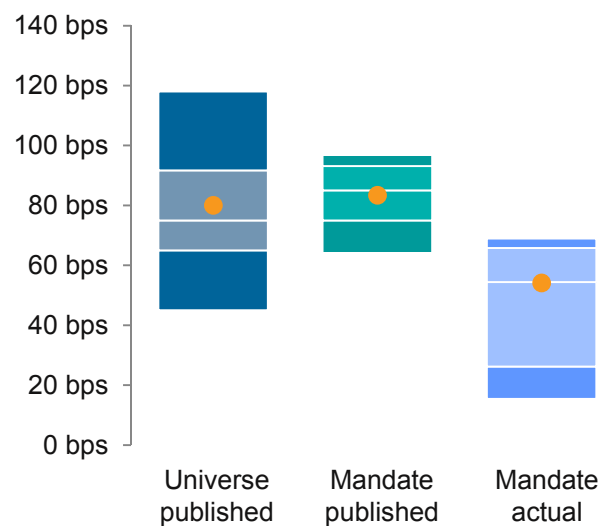
For a full explanation of the analysis on this page please refer to page 6.

Actual vs. Published Fees: Active Multi-Asset Class

Fees (basis points) for account sizes \$2mm to \$635mm

Actual Fees Paid Summary

Total AUM (\$mm)	\$2,544
Total count	20
Average AUM (\$mm)	\$127
Median AUM (\$mm)	\$30
Total average fee (bps / \$)	54 / \$516,914
Total median fee (bps / \$)	47 / \$228,482
Total sum fees (\$)	\$10,338,286
Weighted average fee	41 bps

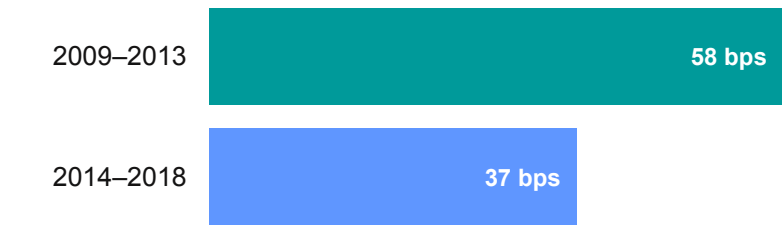


	Universe published	Mandate published	Mandate actual
10th percentile	118	97	69
25th percentile	92	93	66
Median	75	85	54
75th percentile	65	75	26
90th percentile	45	64	15
Average ●	80	83	54
Median AUM		\$30mm	

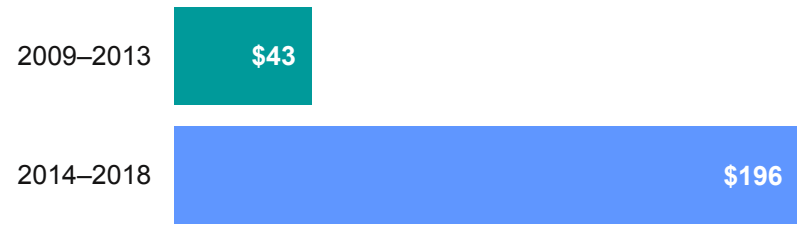
For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Active Multi-Asset Class

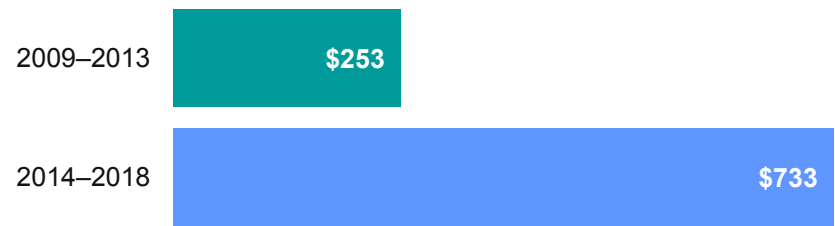
Weighted Average Fee*



Average Mandate Size (\$mm)



Average Fee/Mandate (\$000)



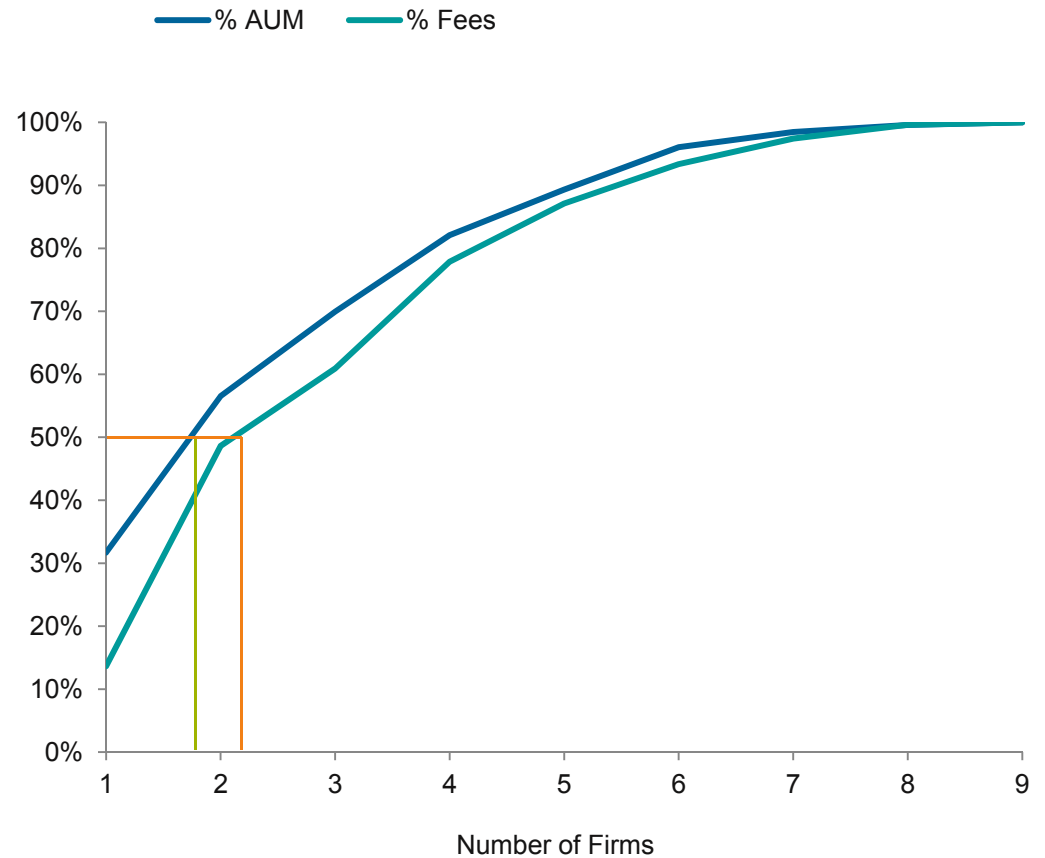
*No data available prior to 2009. For a full explanation of the analysis on this page please refer to page 5.

Concentration Analysis: Active Multi-Asset Class

\$2.5 billion in assets and **\$10.3 million** in fees

- 20 active mandates with 9 different firms
- 50% of assets managed by **2 firms** (22%)
- 50% of fees made by **3 firms** (33%)

Concentration by Firm



For a full explanation of the analysis on this page please refer to page 6.

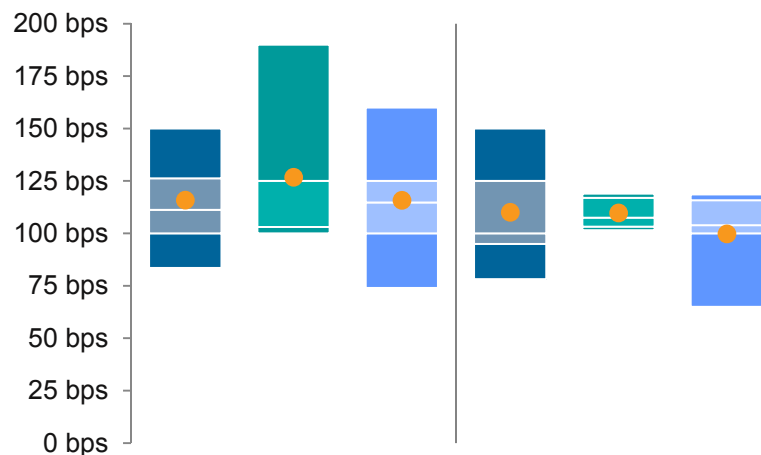
Actual vs. Published Fees: Hedge Fund-of-Funds

Fees (basis points) by account size

Actual Fees Paid Summary

Total AUM (\$mm)	\$3,029
Total count	38
Average AUM (\$mm)	\$80
Median AUM (\$mm)	\$26
Total average fee (bps / \$)	112 / \$778,342
Total median fee (bps / \$)	109 / \$321,250
Total sum fees (\$)	\$29,576,987
Weighted average fee	98 bps

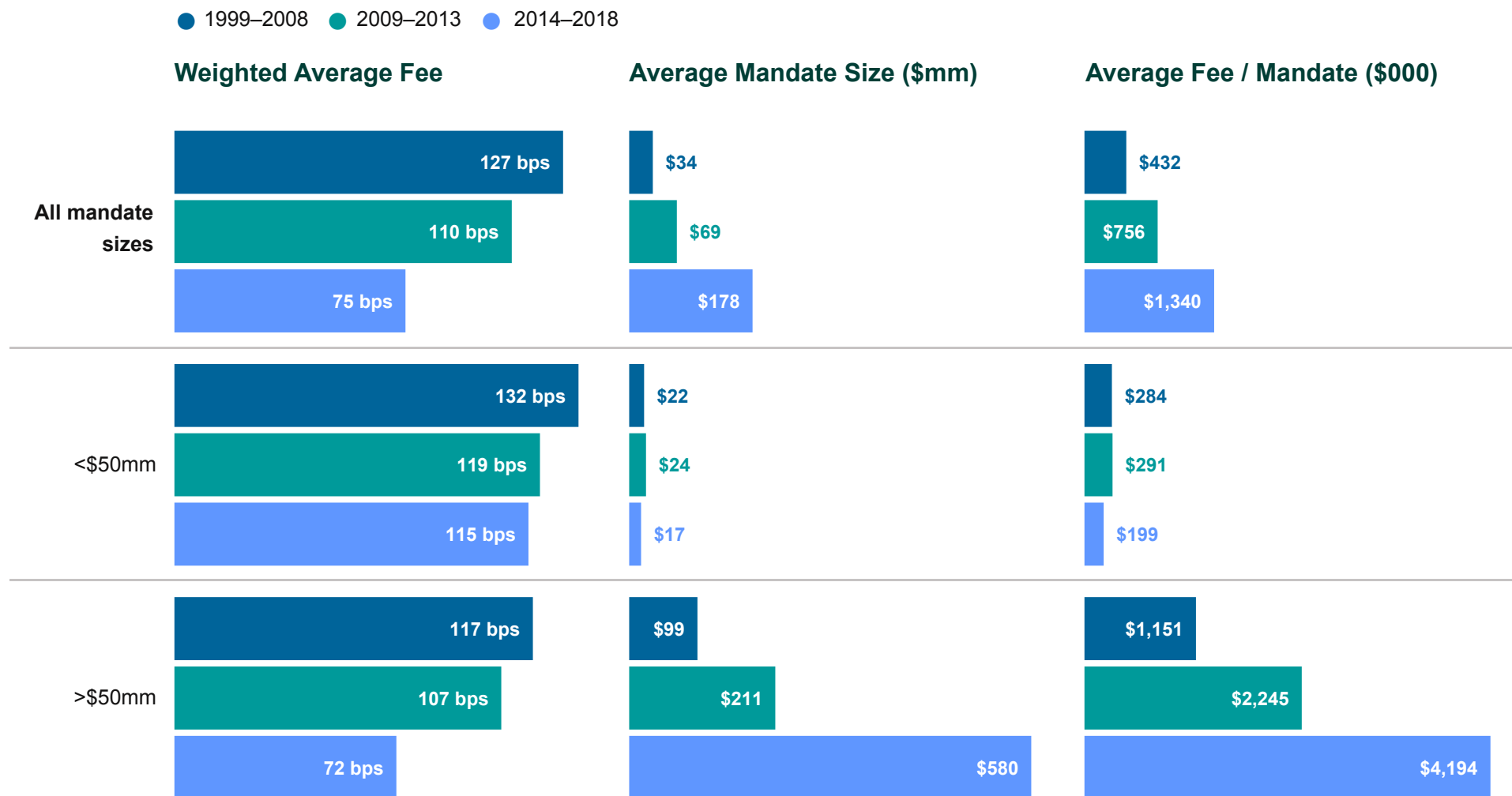
● Universe published ● Mandate published ● Mandate actual ● Average



	< \$50mm			\$50 to \$915mm		
10th percentile	150	190	160	150	119	119
25th percentile	126	125	125	125	117	116
Median	111	125	115	100	108	104
75th percentile	100	103	100	95	103	100
90th percentile	84	100	74	78	102	65
Average ●	116	127	116	110	110	100
Median AUM		\$20mm			\$182mm	

For a full explanation of the analysis on this page please refer to pages 3 and 4.

Vintage Fee Analysis: Hedge Fund-of-Funds



For a full explanation of the analysis on this page please refer to page 5.

Appendix

2019 Published Fees for Additional Asset Classes

	Large Cap Core						Large Cap Growth						Large Cap Value					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	75	70	65	60	59	55	78	76	73	68	65	58	80	75	68	62	60	55
25th Percentile	65	64	58	53	52	47	75	67	63	57	56	52	75	66	60	55	54	50
Median	55	55	50	47	45	41	65	64	58	53	52	46	65	60	55	51	49	43
75th Percentile	45	44	44	41	40	36	60	55	52	50	48	42	55	52	48	44	42	38
90th Percentile	39	35	35	33	33	31	50	50	49	45	43	35	45	45	40	37	34	29
Average	55	55	50	47	45	41	65	64	58	53	52	46	65	60	55	51	49	43
Member Count	58	58	58	58	58	58	74	74	74	74	74	74	69	69	69	69	69	69

	Mid Cap Core						Mid Cap Growth						Mid Cap Value					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	90	86	81	77	74	70	93	90	85	81	80	75	89	85	80	76	75	71
25th Percentile	85	80	75	70	70	63	85	80	79	75	75	68	80	80	75	72	70	66
Median	70	70	66	65	63	57	80	76	74	69	67	63	75	75	70	66	65	60
75th Percentile	60	60	55	53	53	50	70	70	67	63	61	56	73	69	62	58	55	53
90th Percentile	50	43	39	38	37	33	60	55	54	52	50	45	60	56	53	49	47	43
Average	70	70	66	65	63	57	80	76	74	69	67	63	75	75	70	66	65	60
Member Count	31	31	31	31	31	31	49	49	49	49	49	49	42	42	42	42	42	42

	Small Cap Core						Small Cap Growth						Small Cap Value					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	100	100	95	92	91	88	100	100	100	100	100	100	100	100	100	100	100	100
25th Percentile	100	90	87	82	80	78	100	100	98	93	93	85	100	100	93	89	87	83
Median	85	85	80	78	77	71	95	90	85	82	80	76	90	90	86	82	80	75
75th Percentile	75	75	75	71	68	64	85	85	80	76	73	68	80	80	80	75	73	69
90th Percentile	60	60	58	56	55	51	80	76	74	70	68	62	75	75	75	70	68	61
Average	85	85	80	78	77	71	95	90	85	82	80	76	90	90	86	82	80	75
Member Count	82	82	82	82	82	82	73	73	73	73	73	73	61	61	61	61	61	61

2019 Published Fees for Additional Asset Classes (continued)

	Unconstrained						Extended Maturity						Government/Credit					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	73	73	73	72	71	68	35	35	30	30	30	28	44	42	37	34	32	28
25th Percentile	60	60	60	60	60	55	30	30	30	30	30	26	35	35	31	30	29	25
Median	50	50	50	50	50	45	30	30	30	28	28	24	30	30	29	26	25	23
75th Percentile	40	40	40	40	40	38	26	26	26	26	25	22	25	25	25	25	24	20
90th Percentile	35	35	35	33	33	29	24	24	23	22	22	19	24	24	23	22	22	18
Average	50	50	50	50	50	45	30	30	30	28	28	24	30	30	29	26	25	23
Member Count	34	34	34	34	34	34	25	25	25	25	25	25	15	15	15	15	15	15

	Intermediate Fixed Income						TIPS						Short Fixed Income					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	37	35	33	32	30	27	114	114	114	114	114	114	28	27	25	25	25	24
25th Percentile	35	32	30	29	28	25	80	80	80	80	80	80	25	25	25	23	22	20
Median	30	30	28	25	25	22	45	45	45	45	45	45	22	22	22	20	20	18
75th Percentile	25	25	25	23	23	19	15	15	15	15	15	13	18	18	17	17	16	15
90th Percentile	25	23	22	20	19	17	8	8	8	7	7	6	15	15	15	14	14	12
Average	30	30	28	25	25	22	45	45	45	45	45	45	22	22	22	20	20	18
Member Count	50	50	50	50	50	50	31	31	31	31	31	31	74	74	74	74	74	74

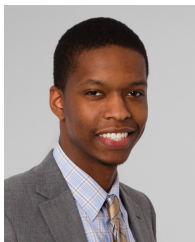
	Municipal Bond						Active Cash						Non U.S. Fixed Income					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	50	50	50	50	50	50	23	20	20	20	20	20	50	50	50	49	49	45
25th Percentile	40	37	34	32	30	30	20	20	20	19	18	16	45	45	45	45	43	39
Median	30	30	29	27	25	23	18	17	15	15	15	14	43	43	43	40	39	34
75th Percentile	25	25	25	25	24	21	15	15	15	15	15	13	35	35	35	35	35	33
90th Percentile	25	25	22	21	20	18	14	14	14	13	12	11	35	35	35	34	33	30
Average	30	30	29	27	25	23	18	17	15	15	15	14	43	43	43	40	39	34
Member Count	108	108	108	108	108	108	14	14	14	14	14	14	15	15	15	15	15	15

2019 Published Fees for Additional Asset Classes (continued)

	Non-U.S. Developed Core Equity						Non-U.S. Developed Growth Equity						Non-U.S. Developed Value Equity					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	83	83	78	75	75	71	87	84	83	80	77	69	98	97	85	83	83	81
25th Percentile	75	75	75	72	70	65	80	76	75	72	70	63	78	78	76	73	69	64
Median	75	75	70	64	63	57	75	75	70	65	63	57	70	70	70	65	65	58
75th Percentile	65	65	60	58	57	49	64	64	62	56	54	48	62	62	61	58	57	51
90th Percentile	55	55	55	53	51	43	55	55	55	53	52	45	49	49	49	49	49	47
Average	75	75	70	64	63	57	75	75	70	65	63	57	70	70	70	65	65	58
Member Count	34	34	34	34	34	34	26	26	26	26	26	26	21	21	21	21	21	21

	Global Developed Core Equity						Global Developed Growth Equity						Global Developed Value Equity					
	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm	\$10mm	\$25mm	\$50mm	\$75mm	\$100mm	\$200mm
10th Percentile	90	83	82	80	80	74	89	89	85	81	79	77	108	108	100	94	91	87
25th Percentile	80	75	75	70	70	64	80	80	75	75	73	68	76	76	75	71	71	67
Median	65	65	65	60	60	54	75	75	73	67	65	60	70	70	70	65	63	56
75th Percentile	60	55	55	55	53	45	70	70	63	58	58	53	65	65	62	57	55	49
90th Percentile	47	46	42	41	41	38	56	56	56	55	53	49	54	54	54	54	52	43
Average	65	65	65	60	60	54	75	75	73	67	65	60	70	70	70	65	63	56
Member Count	43	43	43	43	43	43	31	31	31	31	31	31	26	26	26	26	26	26

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Butch joined the programming group of Callan in 1989 and was instrumental in developing sophisticated performance analytics, as well as solutions to data processing and management problems. In 1993, he became the manager of the database group, coordinating the design and implementation of performance measurement operations and overseeing the development and maintenance of Callan's databases. Butch was made director of operations in 2000 to manage and develop all Callan's performance monitoring systems and personnel. In 2007, Butch became the director of investment research and operations with responsibilities expanded to include oversight of Callan's Global Manager Research activities.



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Disclosure

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