

Potential Maximum Value of Active Exposure to the Target Factors of the MSCI Diversified Multiple-Factor (“DMF”) Index Methodology

SUPPORTING MATERIAL FOR SURVEY

February 2022

This survey may or may not lead to the implementation of any or all of the proposed changes in the highlighted or any other MSCI indexes. Survey feedback will remain confidential. MSCI may publicly disclose feedback if specifically requested by specific market participants. In that case, the relevant feedback would be published together with the final result of the survey.

Introduction

- MSCI announced on August 31, 2021, the conclusions from its [consultation](#) on a proposal to apply a set of methodology enhancements to the MSCI Diversified Multiple-Factor ("DMF") Index Methodology and other applicable index methodologies*.
- One of the conclusions was to restrict the index active exposure to target factors to lie within a minimum and a maximum value.
 - The minimum value will be set to 0.1 in magnitude.
 - **To confirm the maximum value, MSCI announced it would launch a brief follow-up survey to seek client feedback on alternative values.**
- To support the [survey](#) questions, the analysis in this deck shows index simulation results with different maximum values of the active exposure to the target factor.
- The decisions resulting from this survey will be reflected starting from the May 2022 Semi-Annual Index Review.



* Other applicable index methodologies are: MSCI Diversified Multiple 3-Factor Indexes, MSCI Diversified Multiple 5-Factor Indexes, MSCI Diversified Multiple-Factor Low Volatility Indexes, MSCI Diversified Multiple-Factor R-Series Indexes, MSCI Factor ESG Target Series Indexes

Executive Summary

- The variants studied in this analysis incorporate the proposed enhancements announced on August 31, 2021, with alternative “maximum value of active exposures” #

	Case 1	Case 2	Case 3	Case 4
Maximum value of active exposure	0.75	0.6	0.5	0.4

- It was broadly observed that
 - Size factor exposure was the most impacted among the target factor exposures
 - Tighter constraint on active exposures, especially Case 4, exhibited very concentrated active exposure to Size factor and more tilt towards the Large Cap stocks
 - All variants, except Case 4, showed reduction in stock-specific component of contribution to performance with reference to current MSCI DMF
 - Case 4 also exhibited divergence in long term historical performance relative to other cases
- Proposal** : With the aim to achieve a balance between over-exposure v/s concentration in single factors and reduce stock-specific risk, we propose the cap value to be **0.6** (Case 2). The original consultation proposal had simulated the configuration with this value set to 0.75 (Case 1).



Methodology details on the next page; the limit is applied to the absolute value of the factor exposure

Methodology Summary

Variant	Case 1 (0.75)	Case 2 (0.6) Proposal	Case 3 (0.5)	Case 4 (0.4)
Adjustments	<ul style="list-style-type: none"> Recent Model Data Parent Relative Size and Momentum Normalized Data 			
Non-target factors	+/-0.1			
Target Factors (Magnitude Constraints)#	Target Factor Lower bound: 0.1			
	Target Factor Upper bound: 0.75	Target Factor Upper bound: 0.6	Target Factor Upper bound: 0.5	Target Factor Upper bound: 0.4
Asset Weight Constraints	<ul style="list-style-type: none"> Large Caps : (b ± 2%, b * 10) Mid Caps : (b ± 1%, b * 5) 			
Rebalance##	Quarterly rebalancing, 10% one-way per rebalancing			

Case 1 corresponds to Case 8 of the [Consultation on Potential Adjustments to the MSCI Diversified Multiple-Factor Index Methodology deck](#)



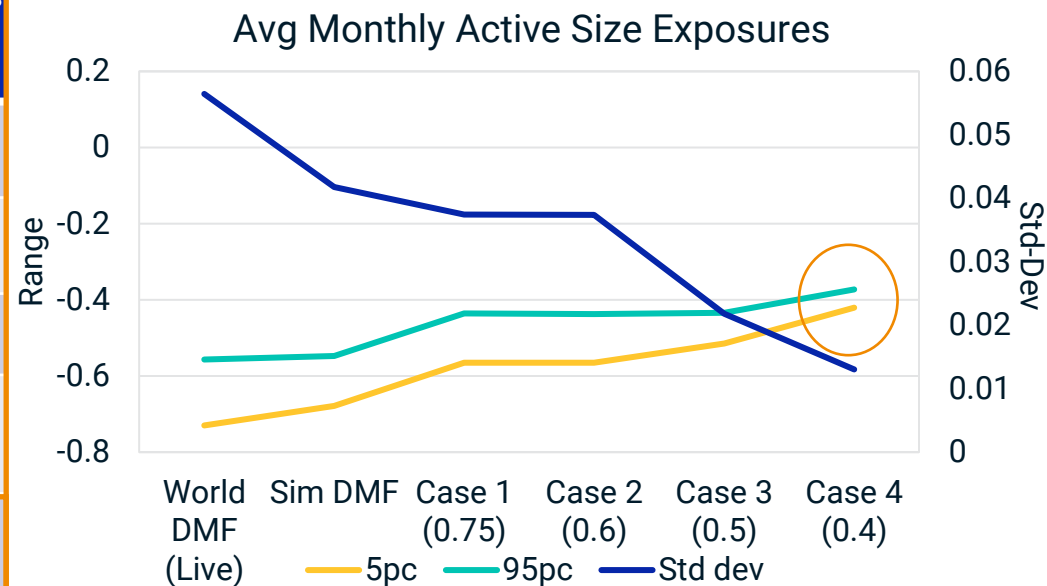
#Factor exposures of Size, Leverage and Earn. Var are limited to fall between -0.75/-0.6/-0.5/-0.4 and -0.1

In case of infeasible optimization, turnover is relaxed from 12% to 20% (for simulation purpose only).

Information Classification: GENERAL

Tighter control led to concentrated exposure to Size

Case	Simulated Index Name	Active Factor Exp (w.r.t MSCI World)				Perf Attribution (w.r.t MSCI World)*		
		Value	Size	Momentum	Quality	Asset selection	Industries	Styles
	MSCI World Index	--	--	--	--	--	--	--
	MSCI World DMF (Live) Index	0.29	-0.64	0.13	0.19	-3.28%	0.79%	1.25%
	World Simulated DMF	0.32	-0.62	0.15	0.27	-2.64%	0.88%	1.62%
1	Case 1 (0.75)	0.24	-0.51	0.19	0.25	-1.91%	0.56%	1.79%
2	Case 2 (0.6)	0.24	-0.51	0.19	0.25	-1.89%	0.57%	1.79%
3	Case 3 (0.5)	0.25	-0.48	0.19	0.25	-1.90%	0.61%	1.75%
4	Case 4 (0.4)	0.29	-0.40	0.20	0.26	-2.39%	0.82%	1.74%



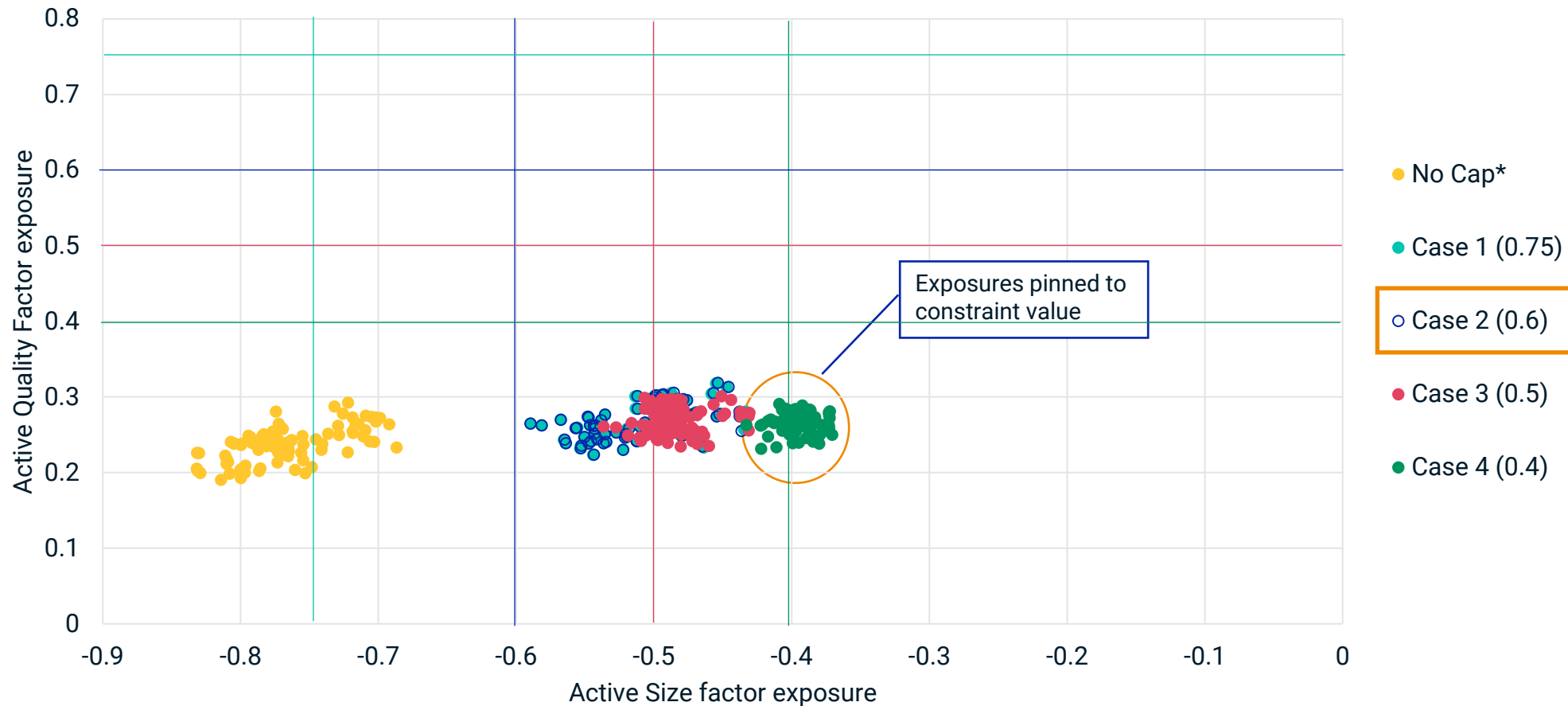
- Average active Size factor exposure was concentrated around the maximum values in Case 3 and 4

Period: Nov 28, 2014, to Dec 31, 2021
 *Annualized Gross returns in USD
 Constituents and active factor exposures are monthly averages



Tighter control led to concentrated exposure to Size (contd..)

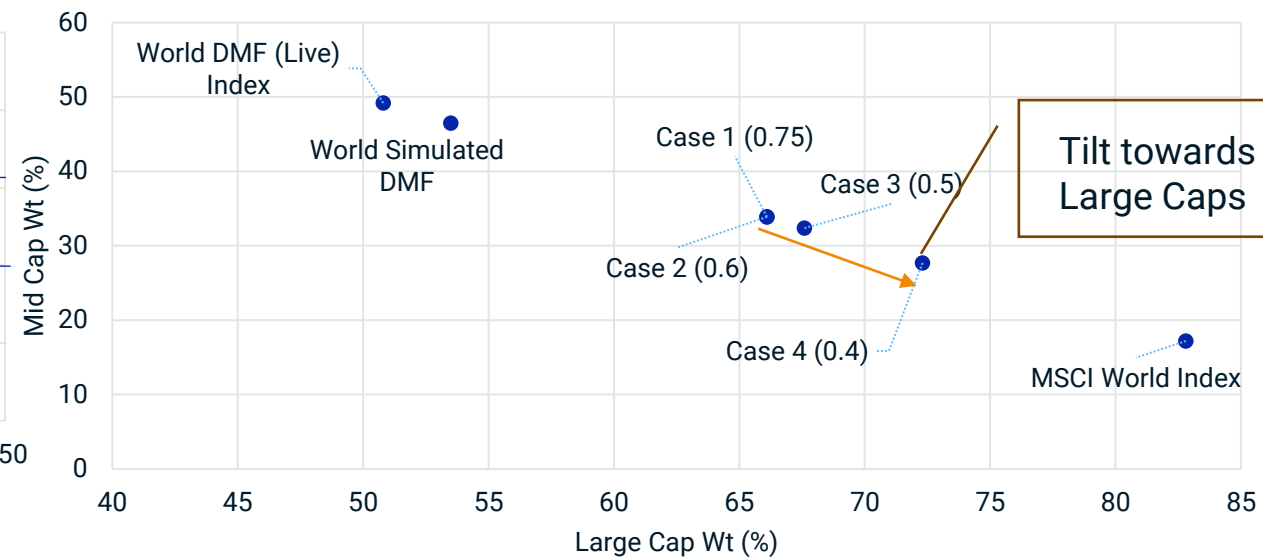
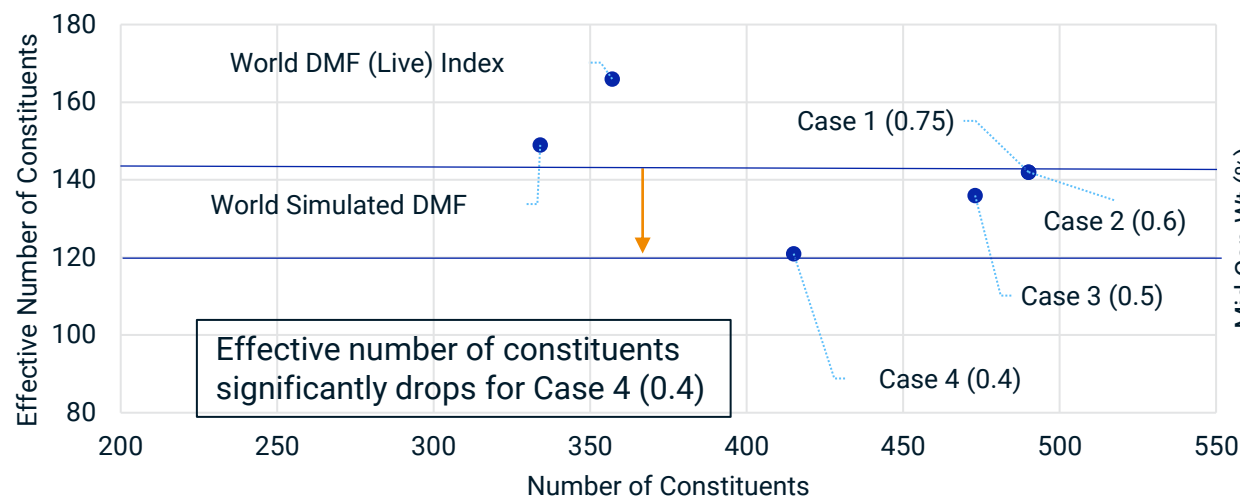
Active Size factor exposure was concentrated around the maximum values in case of 0.4 and 0.5 variants indicating the constraint had been binding frequently in these cases



Quality and Size factor exposure is as defined in alpha score of DMF Methodology.

Period: Nov 28, 2014, to Dec 31, 2021, monthly data.

More focus on Large Caps with tighter constraints



	MSCI World Index	MSCI World Diversified Multiple-factor Index	World Simulated DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Degree of index tilt*							
Parent index coverage (%)	100.0	14.7	14.9	18.9	18.9	18.7	18.7
Top 10 constituents weight (%)	12.7	15.6	17.0	17.7	17.7	18.1	19.3
Active share (%)	0.0	88.4	88.3	84.0	84.0	84.0	84.0
Average weight multiplier	1.0	9.8	9.9	6.0	6.0	6.0	6.1
Maximum weight multiplier	1.0	10.9	10.1	10.0	10.0	10.0	10.0
Maximum weight (%)	2.7	2.5	2.6	3.5	3.5	3.5	3.5

Period: Nov 28, 2014 to Dec 31, 2021.

* Monthly averages

Weight of Large Cap constituents increased when moving from 0.75 to 0.4 cap variants

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Information Classification: GENERAL



Reduction in limit had significant impact on Size exposure

Case 4 showed significant reduction in active exposure to Size relative to other variants

	w.r.t MSCI World Index					
Factor*	World DMF	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Value	0.29	0.32	0.24	0.24	0.25	0.29
Size	-0.64	-0.62	-0.51	-0.51	-0.48	-0.40
Momentum	0.13	0.15	0.19	0.19	0.19	0.20
Quality	0.19	0.27	0.25	0.25	0.25	0.26
Factor**						
BtoP	0.15	0.22	0.14	0.14	0.15	0.17
Earn. yield	0.36	0.37	0.29	0.29	0.31	0.34
Size	-0.64	-0.62	-0.51	-0.51	-0.48	-0.40
Momentum	0.13	0.15	0.19	0.19	0.19	0.20
Leverage	-0.31	-0.37	-0.28	-0.29	-0.29	-0.32
Earn. qlty	0.01	0.11	0.10	0.10	0.10	0.10
Inv. qlty	0.27	0.38	0.36	0.36	0.36	0.37
Profitability	0.34	0.44	0.42	0.42	0.41	0.38
Earn. var.	-0.03	-0.07	-0.10	-0.10	-0.11	-0.10

Period: Nov 28, 2014, to Dec 31, 2021, monthly data.

*as defined in alpha score of DMF Methodology

**as defined in GEMLT model



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Information Classification: GENERAL

Stock specific component increased when cap < 0.5

Factor	w.r.t MSCI World Index					
	World DMF	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Active	-1.14%	-0.08%	0.71%	0.76%	0.71%	0.50%
Asset selection	-3.28%	-2.64%	-1.91%	-1.89%	-1.90%	-2.39%
Common factor	2.02%	2.46%	2.18%	2.21%	2.19%	2.44%
Countries	-0.01%	-0.04%	-0.16%	-0.16%	-0.16%	-0.13%
Industries	0.79%	0.88%	0.56%	0.57%	0.61%	0.82%
Styles	1.25%	1.62%	1.79%	1.79%	1.75%	1.74%
BtoP	0.07%	0.16%	0.12%	0.12%	0.12%	0.14%
Earn. Yield	-0.20%	-0.22%	-0.17%	-0.18%	-0.18%	-0.23%
Size	-0.08%	-0.03%	0.00%	0.00%	-0.02%	-0.03%
Momentum	0.71%	0.71%	0.89%	0.89%	0.89%	0.93%
Leverage	0.00%	0.03%	0.01%	0.01%	0.02%	0.02%
Earn. qlty	0.00%	0.04%	0.05%	0.05%	0.04%	0.05%
Inv. qlty	0.12%	0.28%	0.28%	0.28%	0.28%	0.26%
Profitability	0.45%	0.56%	0.50%	0.50%	0.51%	0.49%
Earn. var.	-0.02%	0.05%	0.09%	0.09%	0.09%	0.10%

Contribution from Active, Asset Selection and Styles component for 0.4 cap variant was the lowest among the variants considered



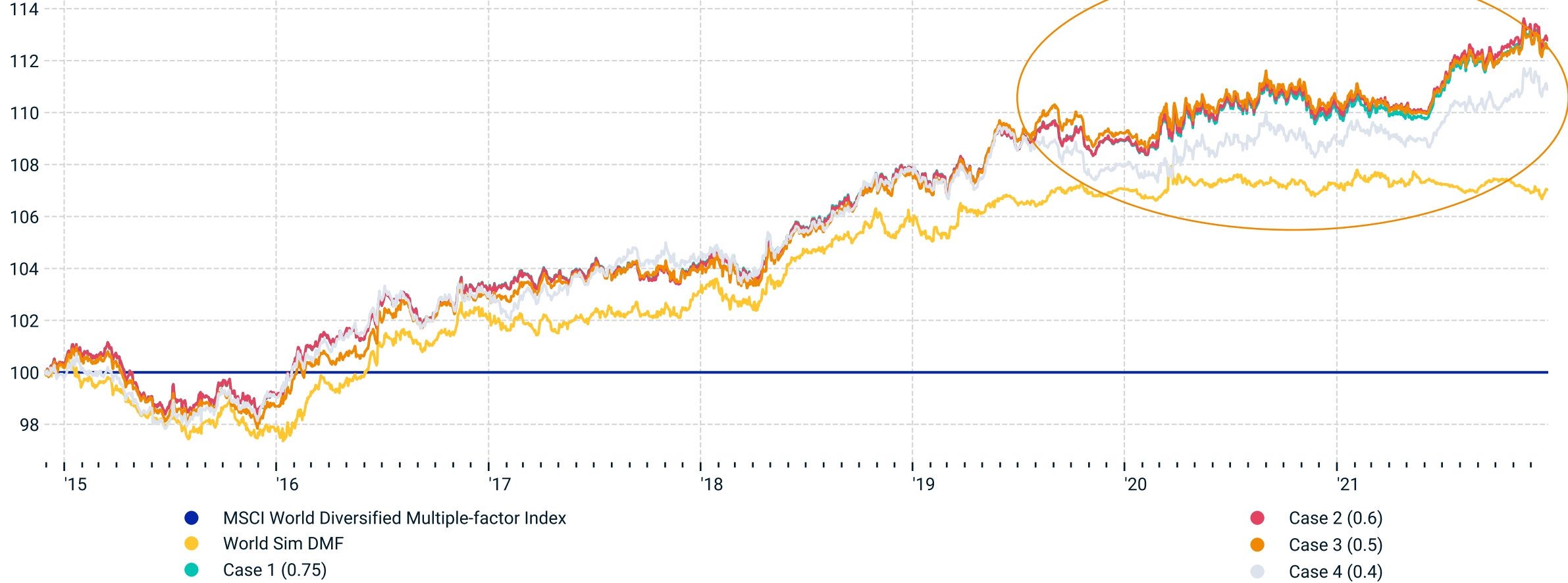
Performance attribution using Barra GEMLT model over Nov 2014 –Dec 2021, Annualized gross returns in USD

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Information Classification: GENERAL

Case 4 diverged significantly in recent period relative to other cases

Relative performance



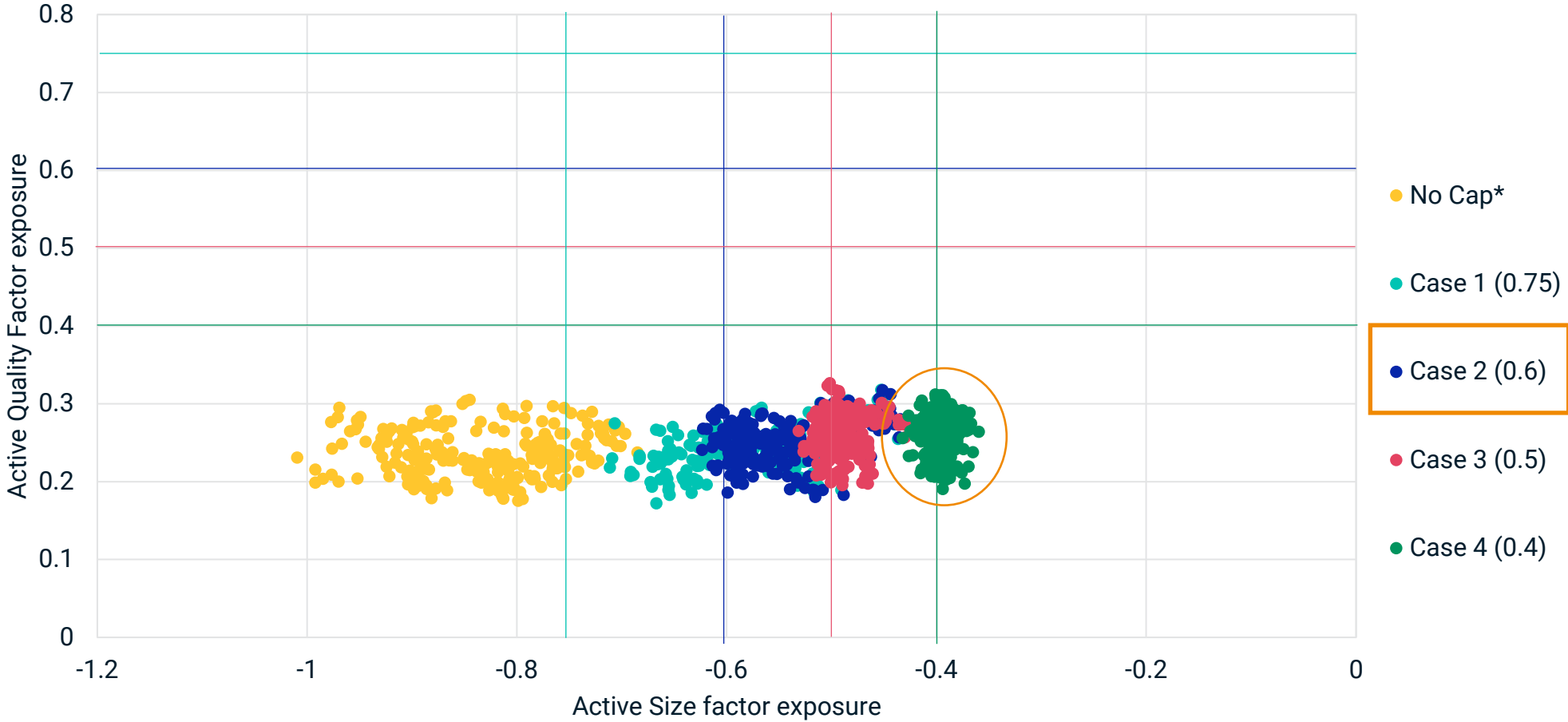
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Information Classification: GENERAL

Annualized Gross returns in USD

Concentration observed in long-term analysis was consistent with short term observations. Case 2 was more dispersed.

Active Size factor exposure was concentrated around the maximum values in case of 0.4 and 0.5 variants indicating the constraint had been binding frequently in these cases



Quality and Size factor exposure is as defined in alpha score of DMF Methodology.

Period: Dec 29, 2000, to Dec 31, 2021, monthly data.



*This case corresponds to case 3 in the original consultation document i.e. it uses the model data as of previous day of rebalancing and has size & momentum factors exposures normalized, relative to the parent universe

Findings of long-term analysis were consistent with short term observations

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI World)				Perf Attribution (w.r.t MSCI World)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI World Index	7.3	15.4	1643	3.5	--	--	--	--	--	--	--	83	17	--	
	MSCI World DMF (Live) Index	10	15.3	421	40.3	3.7	0.26	-0.75	0.13	0.12	-1.03%	0.06%	3.43%	48.7	51.3	-0.96/-0.58
	World Simulated DMF	10.7	15.4	396	40.8	3.9	0.31	-0.70	0.15	0.26	-1.07%	0.04%	4.30%	52.7	47.3	-0.92/-0.55
1	Case 1 (0.75)	9.9	15.4	562	40.3	3.2	0.23	-0.56	0.19	0.24	-0.82%	-0.13%	3.43%	65.1	34.9	-0.67/-0.45
2	Case 2 (0.6)	10.0	15.5	548	40.2	3.1	0.23	-0.54	0.19	0.24	-0.75%	-0.09%	3.41%	65.3	34.7	-0.61/-0.45
3	Case 3 (0.5)	10.1	15.3	512	40.1	3.2	0.25	-0.49	0.19	0.25	-0.62%	-0.13%	3.39%	67	33	-0.51/-0.45
4	Case 4 (0.4)	9.9	15.2	450	40.1	3.2	0.28	-0.40	0.20	0.25	-0.90%	0.01%	3.31%	71.7	28.3	-0.42/-0.37

Period: Dec 29, 2000, to Dec 31, 2021

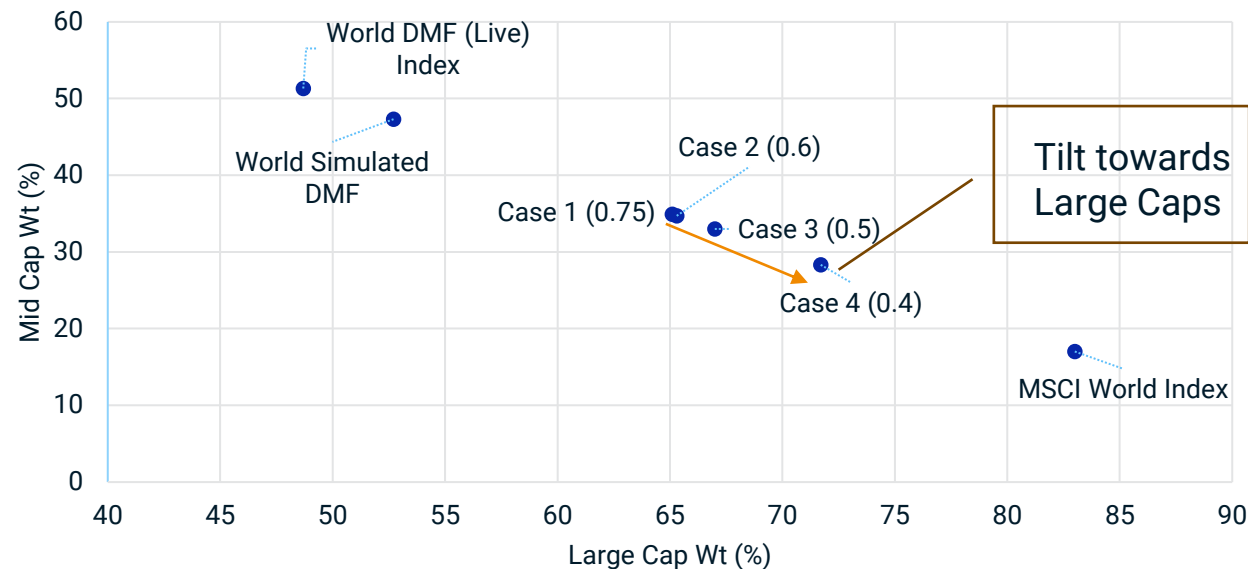
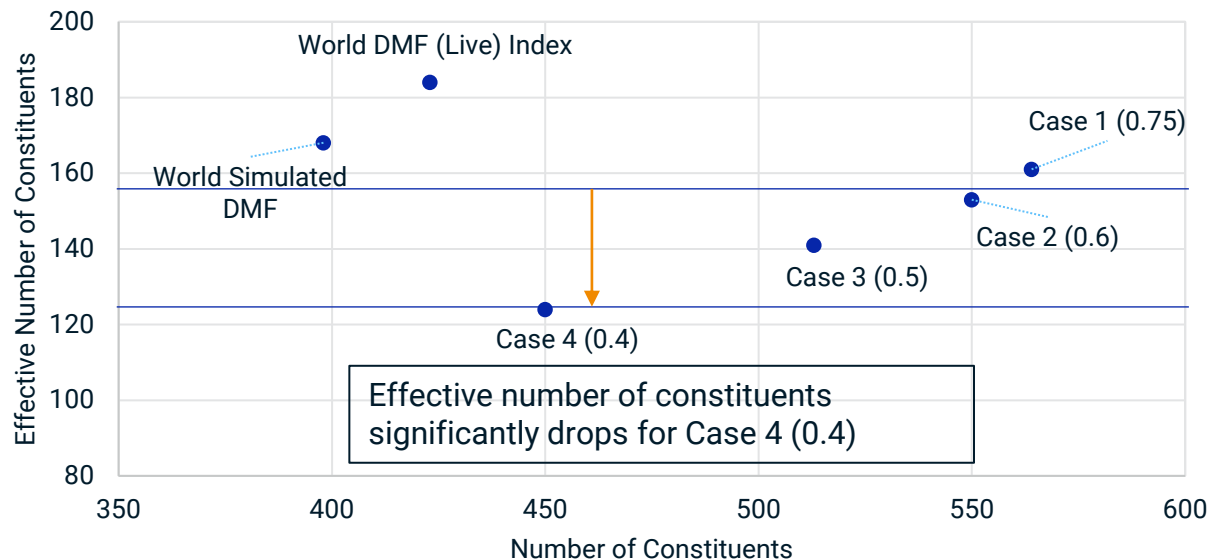
*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Shift towards Large Caps from Case 1 to Case 4 in long-term analysis as well



	MSCI World Index	MSCI World Diversified Multiple-factor Index	World Simulated DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Degree of index tilt*							
Parent index coverage (%)	100.0	12.9	12.9	17.6	17.5	17.7	17.8
Top 10 constituents weight (%)	11.6	15.0	16.2	16.7	17.3	18.2	19.5
Active share (%)	0.0	88.6	88.7	84.2	84.2	83.9	83.8
Average weight multiplier	1.0	9.7	9.8	5.8	5.8	5.8	5.9
Maximum weight multiplier	1.0	10.3	10.0	10.0	10.0	10.0	10.0
Maximum weight (%)	2.2	2.5	2.5	2.8	2.9	2.9	3.0

Period: Dec 29, 2000 to Dec 31, 2021.

* Monthly averages

Weight of Large Cap constituents increased when moving from 0.75 to 0.4 cap variants

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Appendix

Cumulative Risk/Returns characteristics were stable in all 4 cases

Key metrics

	MSCI World Index	MSCI World Diversified Multiple-factor Index	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Total return* (%)	11.7	10.6	11.6	12.4	12.5	12.4	12.2
Total risk (%)	14.2	14.2	13.8	13.6	13.6	13.5	13.5
Return / risk	0.82	0.75	0.84	0.92	0.92	0.92	0.90
Sharpe ratio	0.77	0.69	0.79	0.86	0.86	0.86	0.84
Active return (%)	0.0	-1.1	-0.1	0.7	0.8	0.7	0.5
Tracking error (%)	0.0	3.0	3.1	2.9	2.9	2.9	3.0
Information Ratio	nan	-0.38	-0.02	0.24	0.26	0.24	0.17
Historical beta	1.00	0.97	0.95	0.93	0.93	0.93	0.93
Number of constituents***	1629	357	334	490	490	473	415
Turnover** (%)	2.6	40.4	40.8	40.0	40.0	40.0	40.0
Price to book***	2.4	2.0	2.0	2.2	2.2	2.2	2.1
Price to earnings***	20.5	14.9	15.1	16.1	16.1	15.9	15.5
Dividend yield*** (%)	2.3	2.2	2.2	2.1	2.1	2.1	2.2

Period: Nov 28, 2014 to Dec 31, 2021. * Gross returns annualized in USD ** Annualized one-way index turnover over index reviews *** Monthly averages

Performance (%)

	MSCI World Index	MSCI World Diversified Multiple-factor Index	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
YTD	22.3	21.1	20.8	23.8	24.0	23.4	23.4
1 Yr	22.3	21.1	20.8	23.8	24.0	23.4	23.4
3 Yr	22.3	18.3	18.7	20.0	20.1	20.1	19.5
5 Yr	15.6	13.4	14.4	15.3	15.4	15.4	15.1

Gross returns for the period ending Dec 31, 2021. Returns are annualized for periods longer than a year



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Long-term Analysis 2000-2021

Reduction in limit had significant impact on Size exposure

Case 4 showed significant reduction in active exposure to Size relative to other variants

	w.r.t MSCI World Index					
Factor*	World DMF	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Value	0.26	0.31	0.23	0.23	0.25	0.28
Size	-0.75	-0.70	-0.56	-0.54	-0.49	-0.40
Momentum	0.13	0.15	0.19	0.19	0.19	0.20
Quality	0.12	0.26	0.24	0.24	0.25	0.25
Factor**						
BtoP	0.16	0.24	0.16	0.16	0.15	0.17
Earn. yield	0.30	0.34	0.26	0.27	0.29	0.33
Size	-0.75	-0.70	-0.56	-0.54	-0.49	-0.40
Momentum	0.21	0.20	0.23	0.23	0.23	0.23
Leverage	-0.20	-0.31	-0.26	-0.27	-0.28	-0.30
Earn. qlty	0.02	0.15	0.13	0.13	0.14	0.15
Inv. qlty	0.19	0.39	0.35	0.36	0.36	0.35
Profitability	0.22	0.37	0.34	0.34	0.36	0.34
Earn. var.	0.01	-0.07	-0.10	-0.11	-0.11	-0.11



Period: Dec 29, 2000 to Dec 31, 2021, monthly data.

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Information Classification: GENERAL

*as defined in alpha score of DMF Methodology

**as defined in GEMLT model

Stock specific component increased when cap < 0.5

Factor	w.r.t MSCI World Index					
	World DMF	World Sim DMF	Case 1 (0.75)	Case 2 (0.6)	Case 3 (0.5)	Case 4 (0.4)
Active	2.71%	3.41%	2.60%	2.75%	2.79%	2.65%
Asset selection	-1.03%	-1.07%	-0.82%	-0.75%	-0.62%	-0.90%
Common factor	3.65%	4.25%	3.27%	3.30%	3.21%	3.34%
Countries	0.16%	-0.09%	-0.02%	-0.02%	-0.05%	0.03%
Industries	0.06%	0.04%	-0.13%	-0.09%	-0.13%	0.01%
Styles	3.43%	4.30%	3.43%	3.41%	3.39%	3.31%
BtoP	0.31%	0.45%	0.32%	0.31%	0.30%	0.31%
Earn. Yield	0.41%	0.50%	0.38%	0.40%	0.44%	0.48%
Size	0.42%	0.43%	0.32%	0.30%	0.25%	0.20%
Momentum	1.05%	1.00%	1.01%	1.02%	1.00%	0.98%
Leverage	0.01%	0.02%	0.01%	0.01%	0.00%	0.02%
Earn. qlty	0.03%	0.16%	0.16%	0.15%	0.16%	0.18%
Inv. qlty	0.21%	0.51%	0.45%	0.46%	0.47%	0.44%
Profitability	0.32%	0.43%	0.40%	0.40%	0.43%	0.41%
Earn. var.	0.00%	0.04%	0.05%	0.05%	0.05%	0.05%



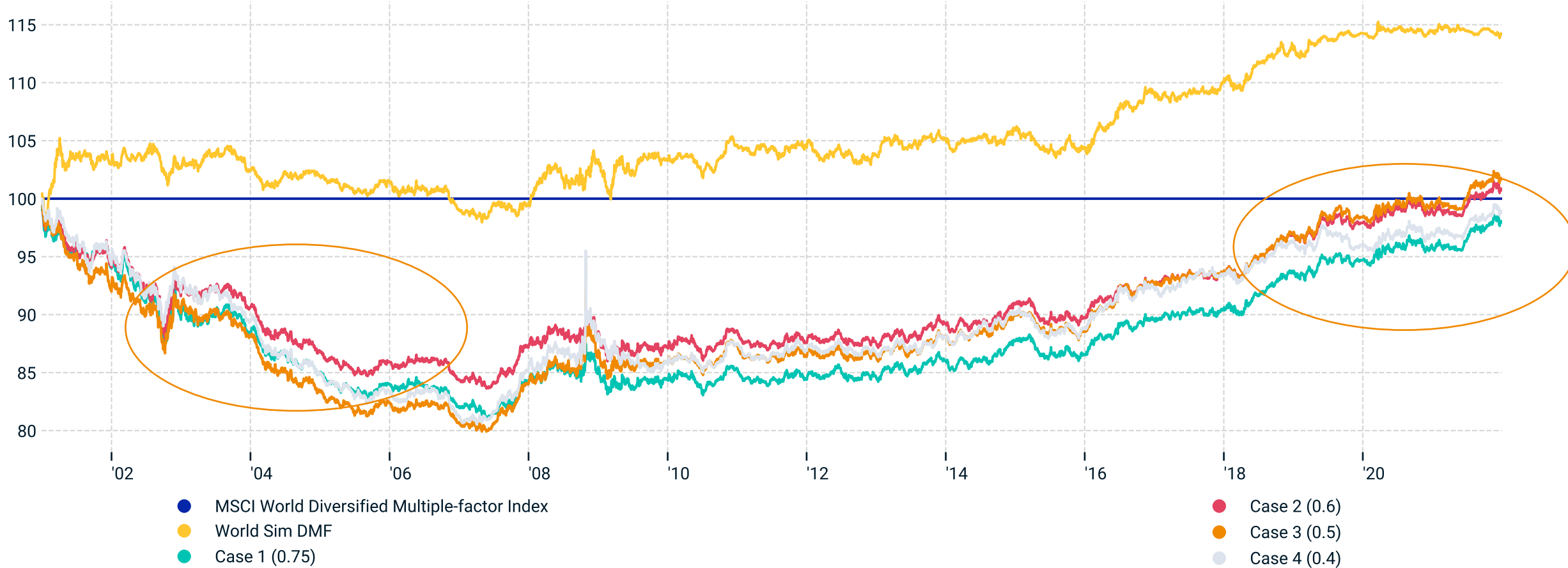
Performance attribution using Barra GEMLT model over Dec 2000 –Dec 2021, Annualized gross returns in USD.

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Long-term performance (w.r.t Live DMF Index)

Relative performance



USA, Europe and EM Regions

USA Region – Summary

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI USA)				Perf Attribution (w.r.t MSCI USA)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI USA Index	14.8	14.6	628	2.7	--	--	--	--	--	--	--	--	85.2	14.8	--
	MSCI USA DMF (Live) Index	12.0	14.7	147	40.5	3.6	0.30	-0.62	0.13	0.16	-4.12%	0.15%	1.05%	57.7	42.3	-0.68/-0.56
	USA Simulated DMF	12.6	14.3	144	40.9	3.8	0.31	-0.59	0.15	0.24	-3.66%	0.16%	1.27%	60.2	39.8	-0.63/-0.54
1	Case 1 (0.75)	13.6	14.2	183	40.0	3.3	0.24	-0.42	0.19	0.22	-2.86%	-0.02%	1.63%	75.1	24.9	-0.49/-0.30
2	Case 2 (0.6)	13.6	14.2	183	40.0	3.3	0.24	-0.42	0.19	0.22	-2.86%	-0.02%	1.63%	75.1	24.9	-0.49/-0.30
3	Case 3 (0.5)	13.5	14.1	183	40.0	3.3	0.24	-0.42	0.19	0.22	-2.90%	-0.09%	1.61%	75	25	-0.49/-0.30
4	Case 4 (0.4)	13.2	14.1	174	40.0	3.4	0.25	-0.38	0.20	0.22	-3.39%	0.16%	1.54%	77	23	-0.42/-0.31

Period: Nov 28, 2014, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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USA Region – Summary (Long History)

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI USA)				Perf Attribution (w.r.t MSCI USA)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI USA Index	8.5	15.1	575	3.8	--	--	--	--	--	--	--	--	84.5	15.5	--
	MSCI USA DMF (Live) Index	9.8	15.1	144	40.5	4.4	0.29	-0.67	0.13	0.11	-1.51%	-0.37%	3.19%	54.8	45.2	-0.82/-0.56
	USA Simulated DMF	10.9	14.8	140	40.9	4.6	0.29	-0.64	0.15	0.23	-1.21%	-0.25%	3.85%	58.7	41.3	-0.75/-0.53
1	Case 1 (0.75)	9.8	15.2	178	40.2	3.5	0.20	-0.45	0.19	0.22	-1.29%	-0.50%	3.03%	73.9	26.1	-0.52/-0.38
2	Case 2 (0.6)	9.8	15.2	178	40.2	3.5	0.20	-0.45	0.19	0.22	-1.28%	-0.51%	3.02%	73.9	26.1	-0.52/-0.38
3	Case 3 (0.5)	9.9	15.1	177	40.1	3.5	0.20	-0.45	0.19	0.22	-1.21%	-0.48%	3.02%	74.2	25.8	-0.51/-0.38
4	Case 4 (0.4)	9.5	15	164	40	3.5	0.22	-0.39	0.20	0.22	-1.48%	-0.38%	2.85%	76.1	23.9	-0.41/-0.36

Period: Dec 29, 2000, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Information Classification: GENERAL



Europe Region - Summary

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI Europe)				Perf Attribution (w.r.t MSCI Europe)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI Europe Index	6.5	15.9	441	2.2	--	--	--	--	--	--	--	80	20		
	MSCI Europe DMF (Live) Index	8.6	15.8	109	40.5	3.9	0.18	-0.71	0.13	0.15	-0.51%	1.25%	1.38%	37.8	62.2	-0.82/-0.53
	Europe Simulated DMF	8.8	15.8	106	40.5	3.4	0.25	-0.64	0.15	0.22	-0.49%	0.93%	1.79%	39.8	60.2	-0.74/-0.52
1	Case 1 (0.75)	8.4	15.6	161	40	3	0.17	-0.52	0.19	0.20	-0.55%	0.73%	1.41%	55.9	44.1	-0.61/-0.46
2	Case 2 (0.6)	8.4	15.7	160	40	3	0.17	-0.52	0.19	0.20	-0.60%	0.74%	1.42%	56.2	43.8	-0.59/-0.46
3	Case 3 (0.5)	8.4	15.5	154	40	2.9	0.18	-0.48	0.19	0.21	-0.50%	0.68%	1.39%	58	42	-0.51/-0.45
4	Case 4 (0.4)	8.5	15.5	141	40	2.9	0.19	-0.40	0.20	0.21	-0.54%	0.80%	1.39%	62.4	37.6	-0.42/-0.38

Period: Nov 28, 2014, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Information Classification: GENERAL



Europe Region – Summary (Long History)

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI Europe)				Perf Attribution (w.r.t MSCI Europe)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI Europe Index	8.1	18.1	485	2.8	--	--	--	--	--	--	--	--	81.7	18.3	--
	MSCI Europe DMF (Live) Index	11.6	18.3	139	40.2	4	0.17	-0.77	0.13	0.08	0.29%	0.40%	2.70%	41.6	58.4	-0.99/-0.56
	Europe Simulated DMF	11.5	18	130	40.8	3.4	0.23	-0.68	0.15	0.23	-0.13%	0.30%	3.15%	43.3	56.7	-0.93/-0.52
1	Case 1 (0.75)	11.2	17.8	190	40	3.1	0.17	-0.53	0.19	0.20	0.03%	0.18%	2.73%	58.9	41.1	-0.71/-0.43
2	Case 2 (0.6)	11.3	17.9	187	40	3.1	0.18	-0.52	0.19	0.20	-0.04%	0.31%	2.75%	58.7	41.3	-0.60/-0.43
3	Case 3 (0.5)	11.1	17.9	179	40.1	3	0.19	-0.48	0.19	0.20	-0.09%	0.28%	2.70%	59.8	40.2	-0.51/-0.42
4	Case 4 (0.4)	11.3	17.9	164	40	3	0.20	-0.39	0.20	0.21	-0.18%	0.47%	2.70%	64	36	-0.42/-0.37

Period: Dec 29, 2000, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Information Classification: GENERAL



EM Region - Summary

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI EM)				Perf Attribution (w.r.t MSCI EM)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI EM Index	5.7	16.9	1074	7.5	--	--	--	--	--	--	--	85	15	--	
	MSCI EM DMF (Live) Index	6.7	17.1	195	41.2	4.4	0.22	-0.74	0.13	0.13	-1.18%	0.37%	1.43%	56	44	-0.87/-0.63
	EM Simulated DMF	5.5	16.8	188	41.3	4.1	0.30	-0.66	0.15	0.24	-1.96%	0.18%	1.89%	58.4	41.6	-0.79/-0.50
1	Case 1 (0.75)	5.4	16.6	269	40	3.8	0.23	-0.64	0.19	0.22	-1.39%	-0.14%	1.56%	70.2	29.8	-0.71/-0.55
2	Case 2 (0.6)	5.6	16.6	260	40	3.9	0.24	-0.59	0.19	0.23	-1.26%	0.01%	1.59%	71.5	28.5	-0.62/-0.52
3	Case 3 (0.5)	6	16.6	245	40	4.1	0.28	-0.50	0.19	0.24	-0.67%	-0.18%	1.59%	73.5	26.5	-0.52/-0.47
4	Case 4 (0.4)	6	16.5	233	40	4.1	0.29	-0.40	0.20	0.26	-1.11%	-0.06%	1.58%	76.1	23.9	-0.42/-0.37

Period: Nov 28, 2014, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Information Classification: GENERAL



EM Region – Summary (Long History)

Case	Simulated Index Name	Return* (%)	Risk (%)	No of Cons	Turn over (%)**	TE(%) (w.r.t MSCI World)	Active Factor Exp (w.r.t MSCI EM)				Perf Attribution (w.r.t MSCI EM)***			Size Family Exposures		5pc/95pc value of Active Size exp
							Value	Size	Momentum	Quality	Asset selection	Industries	Styles	Large (%)	Mid (%)	
	MSCI EM Index	9.3	21.2	1	880	--	--	--	--	--	--	--	85.1	14.9	--	
	MSCI EM DMF (Live) Index	12.8	22.2	1.03	204	4.6	0.24	-0.84	0.13	0.06	-0.46%	0.18%	3.46%	52.3	47.7	-1.03/-0.68
	EM Simulated DMF	12	21.7	1	195	4.3	0.35	-0.79	0.15	0.19	-1.21%	0.03%	4.64%	55.2	44.8	-0.99/-0.56
1	Case 1 (0.75)	11.8	21	0.97	273	3.9	0.26	-0.65	0.19	0.19	-0.57%	-0.13%	3.76%	69.2	30.8	-0.72/-0.58
2	Case 2 (0.6)	11.8	21.1	0.98	259	3.9	0.27	-0.59	0.19	0.20	-0.65%	0.07%	3.80%	71.1	28.9	-0.62/-0.55
3	Case 3 (0.5)	12	21.1	0.98	241	3.8	0.28	-0.50	0.19	0.21	-0.31%	0.06%	3.75%	73.4	26.6	-0.52/-0.47
4	Case 4 (0.4)	12.1	20.9	0.97	225	3.8	0.29	-0.40	0.20	0.23	-0.17%	0.04%	3.51%	75.8	24.2	-0.42/-0.37

Period: Dec 29, 2000, to Dec 31, 2021

*Gross returns annualized in USD; **Annualized one-way index turnover; ***Annualized Gross returns in USD; Constituents and active factor exposures are monthly averages

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Appendix

Risk and return metrics

	Definition
Total return (%)	Annualized index return
Total risk (%)	Annualized index risk (based on monthly returns)
Return / risk	Ratio of annualized return and annualized risk
Sharpe ratio	The Sharpe ratio is computed as the ratio of index excess returns and annualized total risk where excess return is defined as the difference between the annualized total index return and the risk free rate corresponding to the currency of analysis
Active return (%)	Difference of the annualized index return and the annualized benchmark return
Tracking error (%)	Annualized standard deviation of active returns (based on monthly data)
Information Ratio	Ratio of index active return and tracking error (based on monthly data)
Historical beta	Beta is a measure of the level of co-movement between an index and its benchmark. It is calculated as the correlation between index and benchmark returns multiplied by the ratio of total risk of the index and its benchmark (based on monthly data)
Average number of constituents	Average number of constituents (based on monthly data)
Turnover (%)	Annualized Average one-way index turnover over rebalancing dates
Price to book	Price to book harmonic average (based on monthly data)
Price to earnings	Price to earnings harmonic average (based on monthly data)
Dividend yield (%)	Dividend yield (%) average (based on monthly data)
Total risk (%)	Annualized index risk (based on monthly returns)
Downside deviation (%)	Annualized lower semi-deviation of index total returns (based on monthly data)
Sortino ratio	Ratio of the Average excess return (above a specified Acceptable Return, MAR, assumed to be 0%) and downside deviation

	Definition
VaR @ 95% (%)	5th percentile of historical index returns (based on monthly data)
VaR @ 99% (%)	1st percentile of historical index returns (based on monthly data)
Expected shortfall (CVaR) @ 95% (%)	Average of returns below Var @ 95% (based on monthly data)
Expected shortfall (CVaR) @ 99% (%)	Average of returns below Var @ 99% (based on monthly data)
Maximum drawdown (%)	Maximum index drawdown (based on daily data)
Maximum drawdown period (months)	Maximum index drawdown period (based on daily data)
Skewness	Skewness of index returns (based on monthly data), measures the degree of asymmetry of the return distribution.
Kurtosis	Kurtosis of index returns (based on monthly data), measures the degree of peakedness of the return distribution.
Tracking error (%)	Annualized standard deviation of active returns (based on monthly data)
Maximum active returns drawdown (%)	Maximum active return drawdown (based on daily data)
Maximum active returns drawdown period (months)	Maximum active return drawdown period (based on daily data)
Active risk contribution (%)	Asset active weight multiplied by its marginal contribution to active risk and divided by the total index active risk
Cross-sectional volatility contributions (%)	Contributions to cross-sectional volatility (based on monthly data, 12-month moving average)

Appendix

Capacity, concentration, liquidity and cost of replication metrics

	Definition
Average number of constituents	Average number of constituents (based on monthly data)
Effective number of constituents	Average effective number of stocks (based on monthly data). The effective number of stocks is a measure of index concentration and ranges between 1 (for a single stock) and the number of stocks in the Index (for an equal-weighted index). It is calculated as the inverse of the Herfindahl-Hirschman Index (HHI)
Parent index coverage (%)	Average sum of the constituent weights in the benchmark (based on monthly data)
Top 10 constituents weight (%)	Average sum of the top 10 constituent weights (based on monthly data)
Large (%)	Average weight of the large cap stocks in the index (based on monthly data). Data available from June 2008 only (launch of the Global Investable Market Index Methodology)
Mid (%)	Average weight of the mid cap stocks in the index (based on monthly data). Data available from June 2008 only (launch of the Global Investable Market Index Methodology)
Small (%)	Average weight of the small cap stocks in the index (based on monthly data). Data available from June 2008 only (launch of the Global Investable Market Index Methodology)
Micro (%)	Average weight of the micro cap stocks in the index (based on monthly data). Data available from June 2008 only (launch of the Global Investable Market Index Methodology)
Ownership - average (%)	Average ownership of an index constituent given a fund size assumption. As of the last rebalancing date
Ownership - 95th percentile (%)	95th percentile ownership of an index constituent given a fund size assumption. As of the last rebalancing date
Ownership - maximum (%)	Maximum ownership of an index constituent given a fund size assumption. As of the last rebalancing date

	Definition
Active share (%)	Average index active share (one-way index turnover relative to the benchmark) (based on monthly data)
Average weight multiplier	Average weight multiplier relative to the benchmark (based on monthly data)
Maximum weight multiplier	Average maximum weight multiplier relative to the benchmark (based on monthly data)
Maximum weight (%)	Average maximum index weight (based on monthly data)
ATVR (%)	Weighted average ATVR that measures trading volume in a security as a proportion of market capitalization.
Days to trade - average	Average days to trade for periodic index review given a fund size and maximum daily trading limit assumptions
Days to trade - 95th percentile	95th days to trade percentile for periodic index review given a fund size and maximum daily trading limit assumptions
Days to trade - 95% of all trading volume	Days to complete 95% of all trading
Turnover (%)	Annualized Average one-way index turnover over rebalancing dates
Performance drag at 25 bps (bps)	Performance drag assuming a 25 basis point transaction cost. Annualized average over rebalancing dates
Performance drag at 50 bps (bps)	Performance drag assuming a 50 basis point transaction cost. Annualized average over rebalancing dates
Performance drag at 75 bps (bps)	Performance drag assuming a 75 basis point transaction cost. Annualized average over rebalancing dates

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