

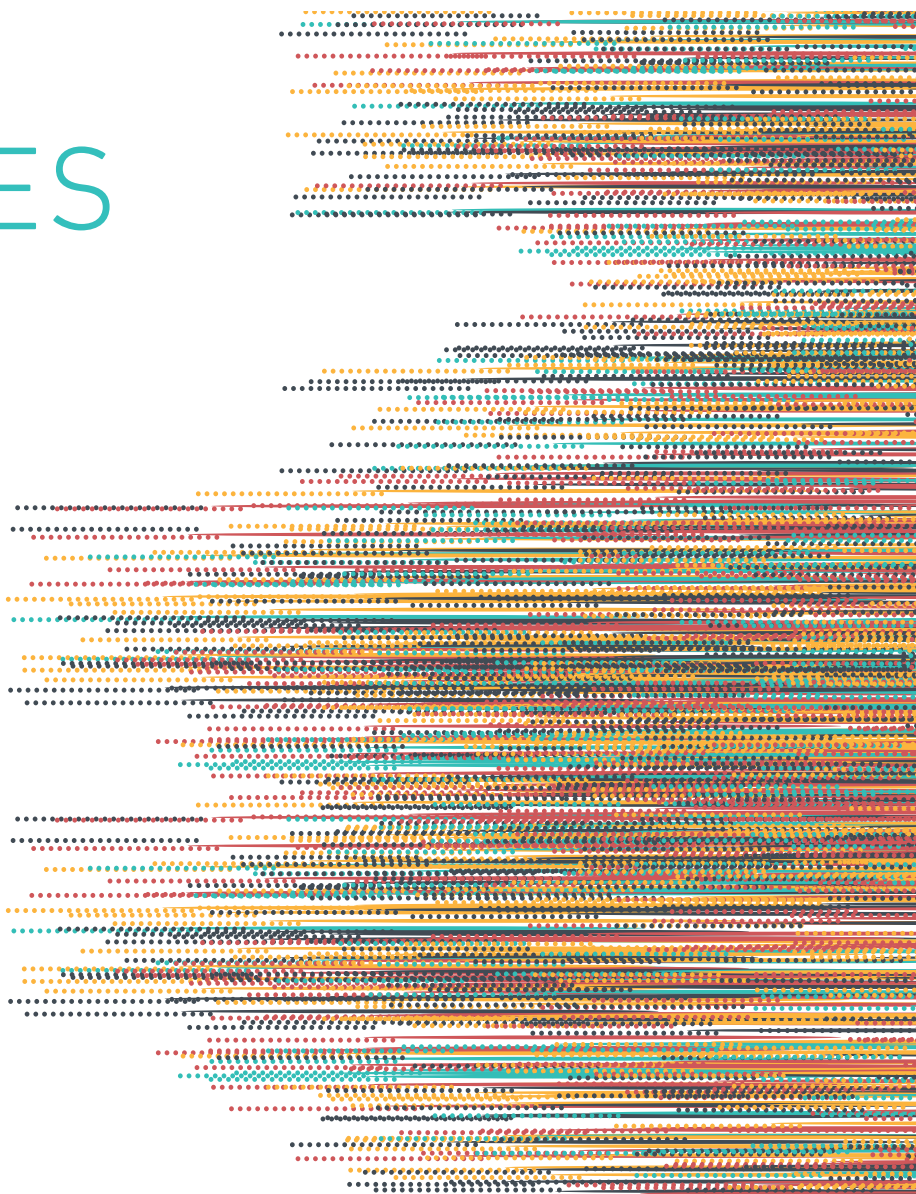


# MSCI LOW SIZE INDEXES



LOW SIZE

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# MSCI LOW SIZE INDEXES

**Size-based investing has been an integral part of the investment process for decades. More recently, transparent and rules-based factor indexes have become widely used tools by Institutional Investors seeking to gain exposure to the size premium.**

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## PERSPECTIVE ON THE SIZE FACTOR

The size factor is one of the most widely recognized investment themes built on the intuition that smaller companies, and by extension smaller market capitalization stocks, may grow faster than larger peers thereby offering the potential for higher returns.

Academics, beginning with University of Chicago Ph.D. Rolf Banz, have identified the size effect in U.S. stocks. In his 1981 paper, "The Relationship between Return and Market Value of Common Stocks", Banz demonstrated a return premium between stocks of small versus larger companies, which he attributed to either a flaw in the Capital Asset Pricing Model (CAPM) or limited information on companies with little coverage among equity analysts.

In 1992 economists Eugene Fama and Ken French published a seminal paper, titled "The Cross-Section of Expected Stock Returns" outlining a three-factor model (market, value and size) which explains much of a stock's return. Subsequent studies have supported the size effect in global equity markets, and MSCI research includes "size" among the 6 key equity factors.

Amid an abundance of academic and industry research, investors have looked to capture the size effect through a range of approaches. One common approach is to simply overweight small cap securities, through an index or active strategy. While this may capture the size effect, it may also result in an unintended exposure to lower quality stocks.

In this paper we discuss capturing the size factor, using the MSCI Low Size Index, which is designed to achieve high exposure to the size factor by reweighting securities within the large and mid cap universe.

## MSCI LOW SIZE INDEX METHODOLOGY

One common method for capturing the size premium is through strategies that replicate small cap indexes. Traditionally, the large-cap segmentation captures 70% of the overall capitalization. The mid and small-cap capture approximately the next 15% and 14% of capitalization, respectively. The micro-cap segment captures the last one percent of capitalization.

Small-Cap indexes are widely used by active managers as performance benchmarks. Increasingly these indexes have also become the basis for passive investment vehicles, such as exchange-traded funds. One challenge that arises with small-cap indexes is that factor bets may be introduced compared to the broad market. One reason for this is because they do not hold any of the largest capitalization stocks.

In the United States, for example, MSCI has demonstrated how a small-cap index effectively represented the risk and return characteristics of the size premium.<sup>1</sup> This came, however, at the expense of relatively poorer quality and more volatile stocks than the broader market.<sup>2</sup> This matters because low quality and high volatility have historically detracted from returns over long horizons.

The MSCI Low Size Indexes aim to achieve a low size exposure by reweighting stocks in the large and mid-cap universes. The result is an index tilted towards smaller-capitalized stocks across the large and mid-cap segment.

The methodology involves a single step. At each rebalancing, each stock in the index is assigned a weight in proportion to the inverse natural logarithm<sup>3</sup> of the stock's market capitalization. That is, the largest stocks have their weight in the index reduced, but they are not excluded. At the same time, the weight of smaller stocks in the index is increased. The Indexes follow the same semi-annual rebalance schedule and treatment of corporate events as MSCI Global Indexes.

The table below shows an example for a two-stock portfolio. The corresponding weights for each stock for a capitalization weighted, and the Low Size methodology, are highlighted in gray.

	MARKET CAPITALIZATION (\$B)	WEIGHT IN CAPITALIZATION WEIGHTED INDEX	LOG OF MARKET CAPITALIZATION	INVERSE OF LOG OF MARKET CAPITALIZATION	WEIGHT IN LOW SIZE INDEX
STOCK ABC	90	90%	25.2	0.04	48%
STOCK XYZ	10	10%	23	0.043	52%
TOTAL	100	100%		0.083	100%

<sup>1</sup> Oberoi, R., A. Rao, L. Mrig and R.A. Subramanian. (2016). "One Size Does Not Fit All: Understanding Factor Investing" MSCI Research Insight. From Dec 1998 to Sep 2018

<sup>2</sup> Financial quality refers to a firm's leverage, profitability and earnings variability. A relatively low quality firm has a higher debt burden, lower return on equity, and more variable recent earnings. Volatility refers to the market sensitivity and standard deviation of a firm's stock price.

<sup>3</sup> Natural logarithm of a value is its logarithm to the base of the mathematical constant e.

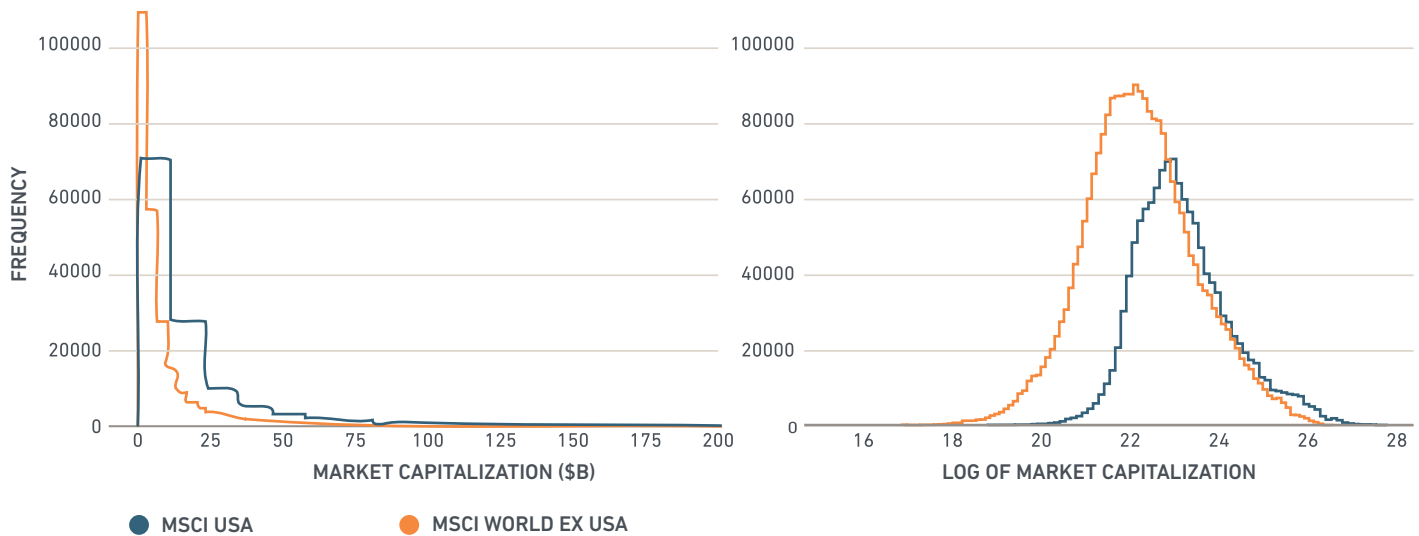
Using the logarithm of market capitalization is designed to address the asymmetrical distribution of capitalization in global equities. Many financial variables, such as book-to-price, have approximately a symmetrical bell-curve distribution over the observation period. Capitalizations, on the other hand, are asymmetrical. This is shown in the histograms in the left panel of Figure 1 below.

For both the MSCI USA and MSCI World ex USA Indexes, there were few stocks with very large capitalizations.

There are no stocks in the left-half of the distribution, as this would imply a negative capitalization. Using the logarithm of the capitalization has two primary effects, shown in the histograms in the right panel.

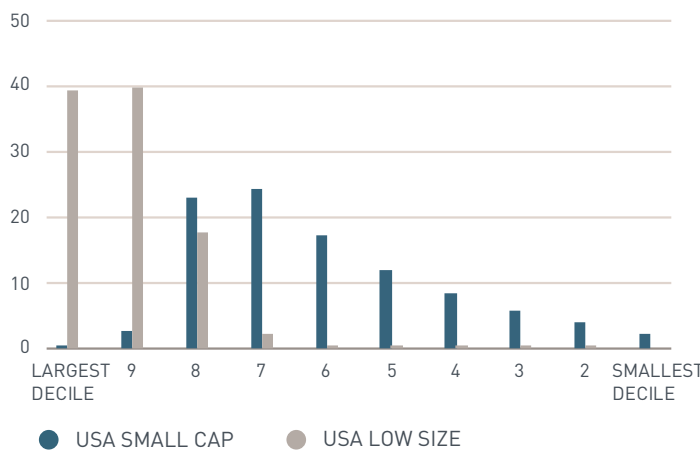
First, it resulted in a more symmetric distribution. Second, it minimized the impact of the largest values. For example, a stock with a \$90 billion capitalization is nine times the size of a stock with a \$10 billion capitalization. The logarithm of 90 billion is however only 10% greater than 1 billion.

FIGURE 1



Holdings are monthly for MSCI USA and MSCI World ex USA indexes from Dec 1998 to Sep 2018

FIGURE 4



Visualizing the distribution of capitalization is also helpful in analyzing size factor indexes. Figure 4 groups the US equity universe into deciles of equal sizes based on market capitalization. The weights of the USA Small Cap Index and Low Size Index in each decile are shown.

The Low Size Index historically had a roughly even distribution amongst the two deciles corresponding to the largest stocks. In other words, this represents a tilt toward smaller companies across the large and mid cap universe, without excluding the largest capitalization names. The Small Cap Index, by comparison, holds companies across the smaller deciles.

Holdings are monthly for MSCI USA Small Cap and Low Size indexes from Oct 2007 to Sep 2018. Deciles are based on the MSCI USA IMI index, which contains large and small capitalization stocks.

# INDEX CHARACTERISTICS

## SECTORS AND FACTORS

Sector weights for MSCI USA Low Size and MSCI World ex USA Low Size indexes are shown in Figure 2. These are shown as active weights relative to the broad market MSCI USA and MSCI World ex USA Indexes, respectively. The ranges cover the period from December 1998 to September 2018.

In both regions, Industrials and Consumer Discretionary were historically overweighted. The principal underweight was the Technology sector domestically, and the Energy and Financials sectors internationally.

FIGURE 2  
SECTOR ACTIVE WEIGHT



Holdings are monthly for MSCI USA and MSCI World ex USA indexes from Dec 1998 to Sep 2018. Weights are relative to MSCI USA and MSCI World ex USA, respectively.

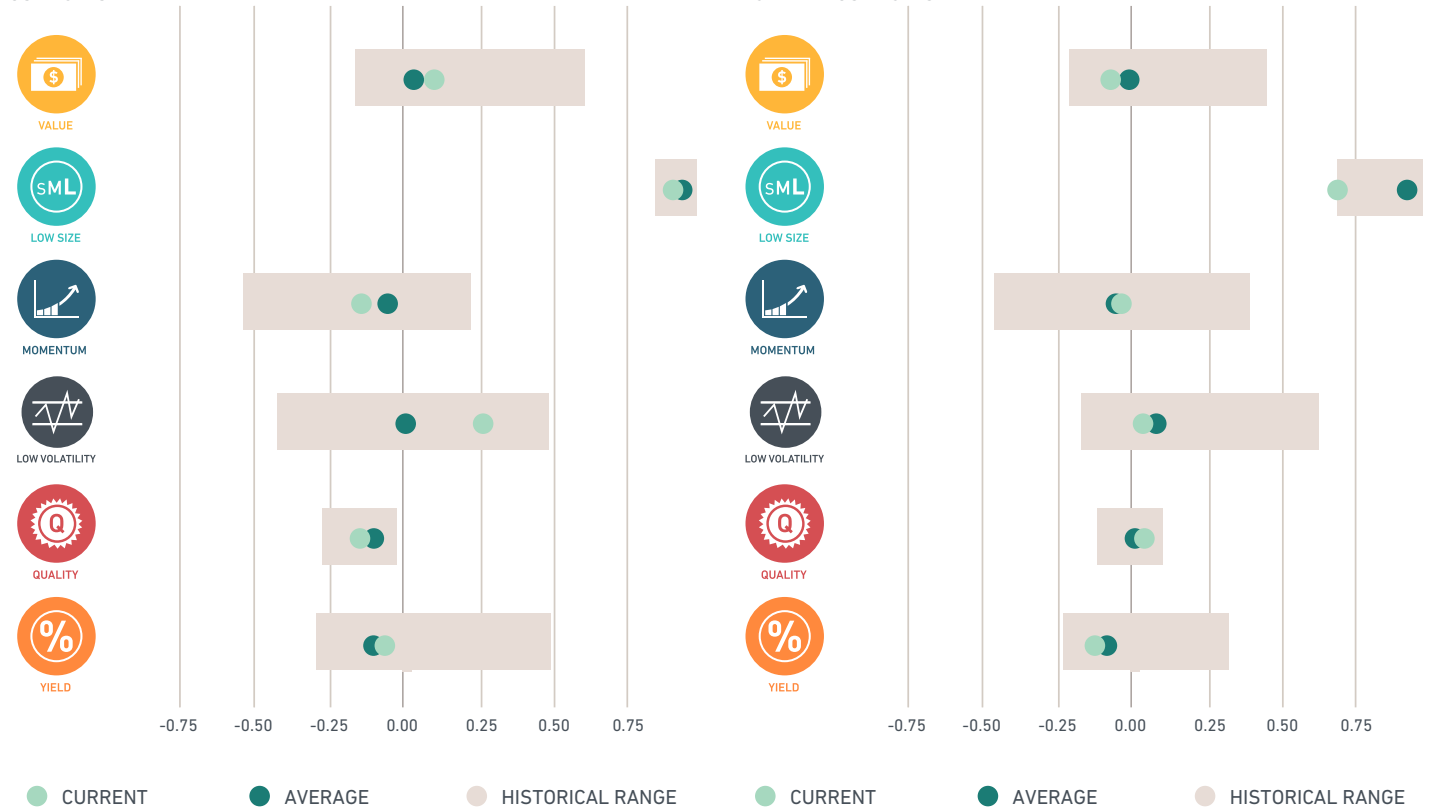
Style factor over and underweights are shown in Figure 3. Here, six key equity factors are plotted, using MSCI FaCS, a factor classification standard. Exposures are relative to the broad market. The ranges cover the period from December 1998 to September 2018.

As expected, the principal factor exposure is an overweight to Low Size. Tilts to other factors, on average, are marginal. Note also that the range of the exposure to Value is large, and principally on the positive side. This implies that smaller-capitalized stocks were cheap relative to the broad market for periods throughout the past two decades.

FIGURE 3

USA LOW SIZE

WORLD EX USA LOW SIZE



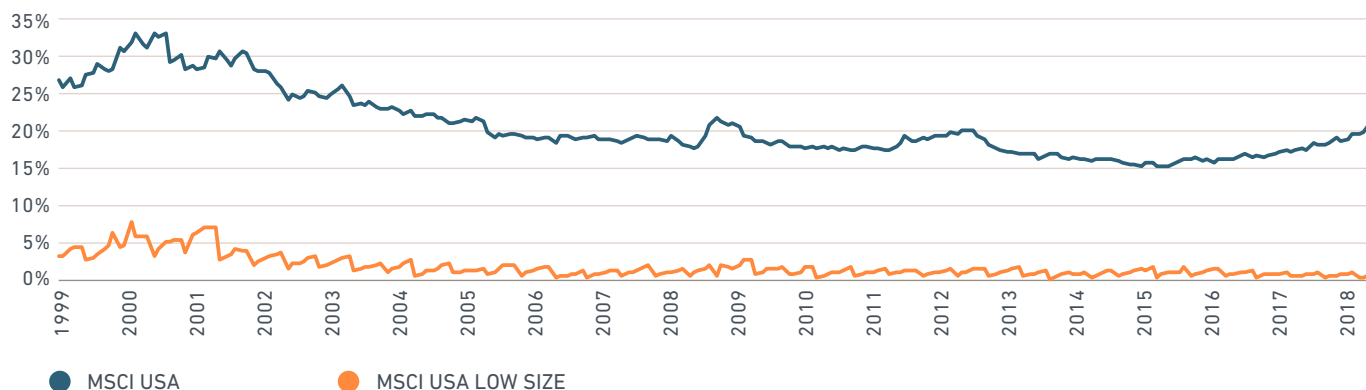
Holdings are monthly for MSCI USA and MSCI World ex USA indexes from Dec 1998 to Sep 2018. Exposures are relative to MSCI USA and MSCI World ex USA, respectively.

## CAPACITY AND CONCENTRATION

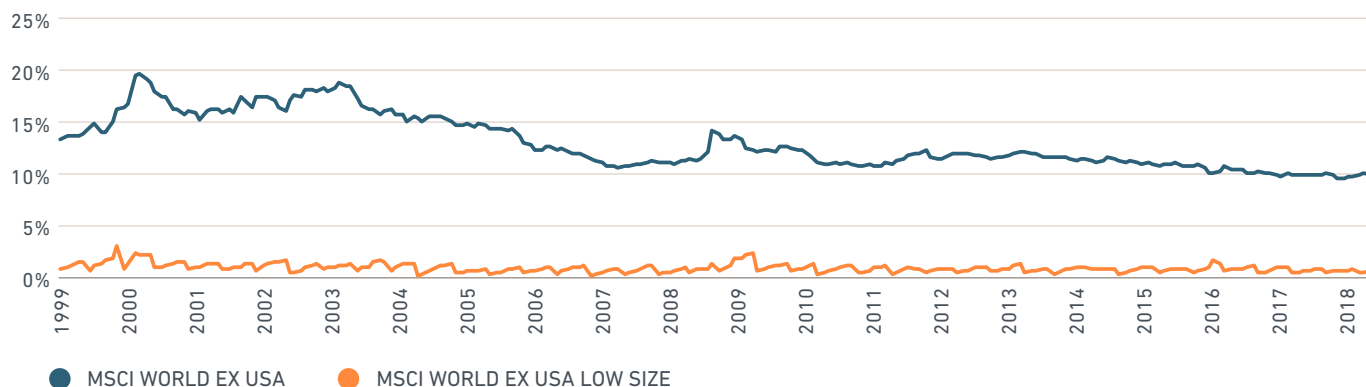
A common measure of portfolio concentration is the cumulative weight of the top ten stocks. Capitalization-weighted indexes in the US and internationally typically have 10% to 20% of their weight in the top ten stocks. This is shown in the pair of blue lines below on each plot in Figure 5. The Low Size Indexes, in contrast, have approximately 3% to 5% of their weight in the top ten stocks, shown in the yellow lines. This implies the Low Size Indexes tend to have less concentration in single stocks.

FIGURE 5

### TOP TEN SECURITY WEIGHT (USA)



### TOP TEN SECURITY WEIGHT (WORLD EX USA)



Holdings are monthly for MSCI USA and MSCI World ex USA indexes from Dec 1998 to Sep 2018.

A concern for investors could be capacity constraints given that more weight is allocated to smaller-capitalized stocks. Capacity metrics are below in Table 2. There are several observations.

First, the Low Size Indexes held the same number of stocks as the parent indexes. Only the weights differed. Second is the approximately equal allocation to large and mid-cap stocks (e.g 45% to Large and 55% to Mid in the US). Third is the low level of stock ownership in both Low Size indexes. At a \$1B allocation, for example, only 6 bps and 8 bps of the available free float market capitalization, were held in the smallest stock in the USA and World ex USA Low Size Indexes, respectively. An ownership stake of 5% is typically considered a threshold for disclosing to regulators in the United States.

TABLE 2

CAPACITY AND CONCENTRATION METRICS

	MSCI USA	MSCI USA LOW SIZE	MSCI WORLD EX USA	MSCI WORLD EX USA LOW SIZE
<b>Concentration<sup>1</sup></b>				
AVG NO OF STOCKS	542	542	1080	1080
PARENT INDEX COVERAGE (%)	100.0	100.0	100.0	100.0
TOP 10 SEC WT (%)	21.0	3.3	13.2	1.7
<b>Size Family Exposures<sup>2</sup></b>				
LARGE (%)	84.1	45.1	81.2	41.8
MID (%)	15.9	54.9	18.8	58.2
SMALL (%)	0.0	0.0	0.0	0.0
MICRO (%)	0.0	0.0	0.0	0.0
<b>Capacity of the Index<sup>3</sup></b>				
<b>Stock Ownership (% of Float Market Cap)</b>				
AVERAGE	0.00	0.01	0.01	0.02
95 <sup>TH</sup> PERCENTILE	0.00	0.03	0.01	0.04
MAXIMUM	0.00	0.06	0.01	0.08
<b>Stock Ownership (% of Full Market Cap)</b>				
AVERAGE	0.00	0.01	0.00	0.01
95 <sup>TH</sup> PERCENTILE	0.00	0.03	0.01	0.03
MAXIMUM	0.00	0.05	0.01	0.06

<sup>1</sup> Monthly average

<sup>2</sup> Monthly average, size family data available from June 2008

<sup>3</sup> Assuming a fund size of USD 1.0 bn as of the latest index review



Shown in Table 3 are key performance metrics on twenty years of simulated history for the MSCI USA Low Size and MSCI World ex USA Low Size Indexes. Both indexes resulted in a higher return, similar to higher risk, and higher turnover than the broad market.

TABLE 3

KEY METRICS: DEC 31, 1998 TO SEP 28, 2018

	MSCI USA	MSCI USA LOW SIZE	MSCI WORLD EX USA	MSCI WORLD EX USA LOW SIZE
TOTAL RETURN <sup>1</sup> (%)	6.3	8.4	4.9	7.5
TOTAL RISK (%)	14.4	16.1	16.3	16.2
RETURN / RISK	0.44	0.52	0.30	0.46
SHARPE RATIO	0.30	0.39	0.17	0.33
ACTIVE RETURN (%)	0.0	2.1	0.0	2.6
TRACKING ERROR (%)	0.0	5.2	0.0	4.3
INFORMATION RATIO		0.40		0.59
HISTORICAL BETA	1.00	1.06	1.00	0.96
NO OF STOCKS <sup>3</sup>	542	542	1080	1080
TURNOVER <sup>2</sup> (%)	2.9	21.4	3.1	20.9
PRICE TO BOOK <sup>3</sup>	2.8	2.3	1.8	1.5
PRICE TO EARNINGS <sup>3</sup>	19.8	23.2	17.8	21.9
DIVIDEND YIELD <sup>3</sup> (%)	1.9	1.7	2.8	2.6

<sup>1</sup> Gross returns annualized in USD

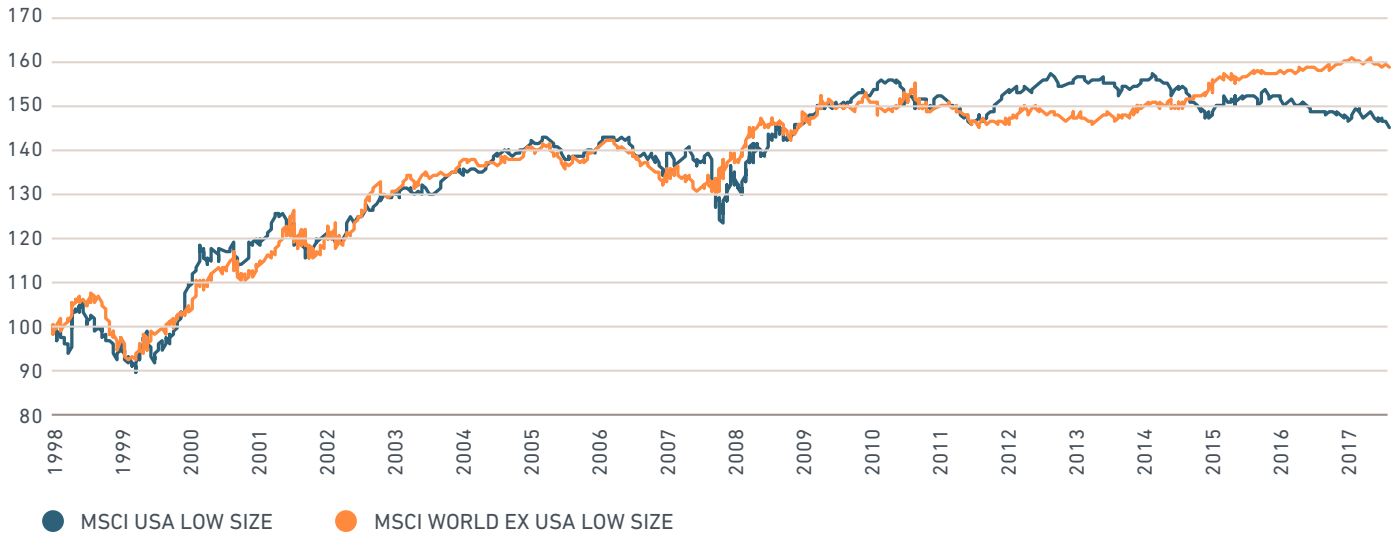
<sup>2</sup> Annualized one-way index turnover over index reviews

<sup>3</sup> Monthly averages

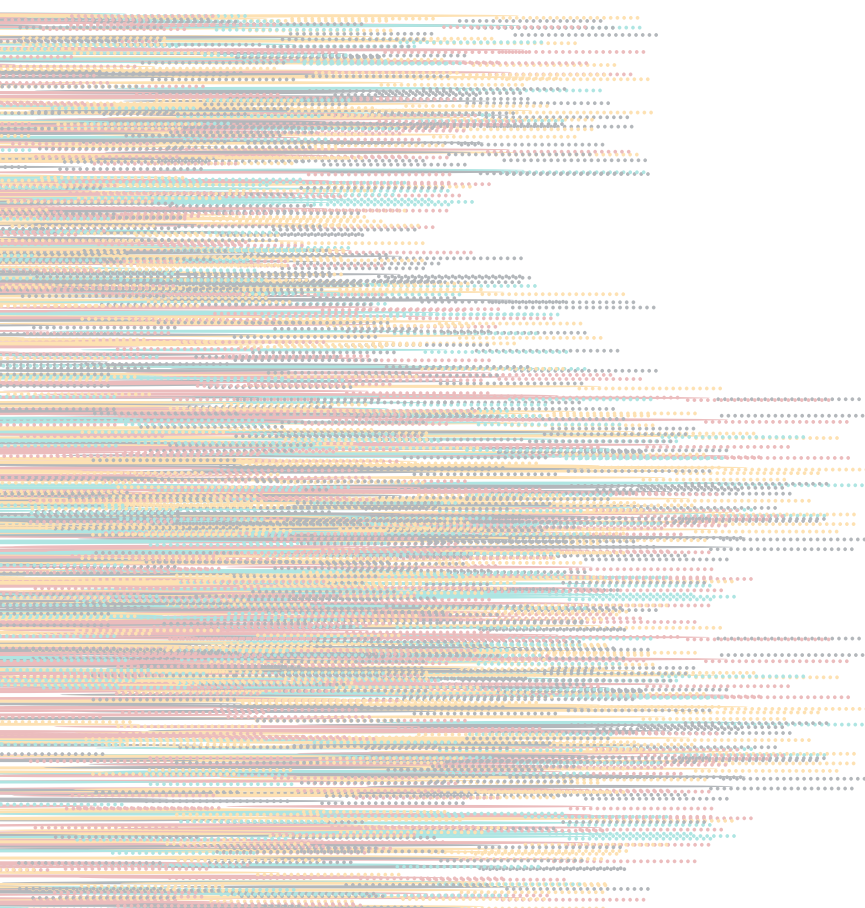
While the size premium has been rewarded over long horizons (Figure 6), it is worth noting that there were also extended periods of underperformance. For example, there are two recent periods in the United States (1998-2000 and 2014-2018) when the largest firms outperformed the market. Many of these firms were in the technology sector. The index underperformed during these periods given that it underweighted large cap technology stocks.

FIGURE 6

RELATIVE RETURN



Returns are Gross in USD from Dec 1998 to Sep 2018.  
Returns are relative to MSCI USA and MSCI World ex USA, respectively



## CONCLUSION

MSCI offers a range of index methodologies to represent the performance of the size effect, including the Low Size Index, discussed herein. The MSCI Low Size Index methodology is designed to maintain the diversification and investability characteristics common to market capitalization indexing, however with a distinctly lower average market capitalization profile. While not indicative of future returns, the historical returns for the MSCI Low Size Index were higher than the parent index over long horizons but with periods of weak relative performance. The methodology benefited from relatively muted exposure to lower quality stocks, common among market cap weighted small cap indexes for example, though other factor exposures are time varying.

Although size-based investing has been a strategy for decades, it is only in recent years that transparent, rules-based indexes have provided effective tools to help investors gain exposure to the size factor premium. The MSCI Low Size Index provides one option for investors seeking to access the size premium while preserving many broad market characteristics.

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LOW SIZE

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