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## Boosting Exposure to the Small-Size Premium with Ultra-Small Stocks

Long-term market data shows that shares in the smallest companies can be a powerful addition to a diversified portfolio

Factor-based investing has entered the mainstream over the past two decades. This increasingly popular investment strategy involves choosing securities based on factors, which are characteristics or attributes that are common across a broad set of securities and help explain performance. One of the most widely used factors is the size factor—the tendency for stocks of companies with smaller market capitalization to outperform stocks of companies with larger market capitalization.

Many investors have included exposure to small-cap stocks in a diversified portfolio to take advantage of this historical outperformance. But fewer investors have taken an additional step that could help capture an even greater long-term size premium: Diversifying further within the small-cap universe by targeting ultra-small stocks.

One potential reason is that ultra-small stocks are unfamiliar territory to many investors. Often unfairly generalized as “penny stocks” or “junk stocks,” ultra-small stocks have been mischaracterized as scary investments. Ultra-small stocks do indeed carry risk, but for investors with the right risk tolerance, ultra-small stocks have not only outpaced the market historically, but have delivered even stronger returns than small-cap stocks.

When we examine historical market data, we see strong evidence that ultra-small stocks play a powerful role in

generating the small-size premium. What's more, current valuation levels for ultra-small stocks compared to historical averages suggest conditions may be especially favorable for this asset class.

### A record of above-market long-term returns

By looking at the Center for Research in Security Prices (CRSP) size-based portfolios over time, we can see that ultra-small stocks historically have delivered some of the stock market's strongest returns. To create these size-based portfolios, CRSP separates stocks into 10 groups, or deciles, based on market capitalization. The first decile, CRSP 1 (ultra-large stocks), represents the largest stocks by market capitalization, while CRSP 10 (ultra-small stocks) represents the smallest stocks by market capitalization.

Table 1 shows the returns and standard deviation for the 10 deciles and the overall market (all stocks in CRSP 1-10). Starting at the top, we see a general pattern of higher returns as market capitalization decreases. The smallest of small stocks, represented by CRSP 10, generated the highest average annualized returns, at 13.31%.

Since 1926, ultra-small stocks have outperformed the market by 3.49% annually. Compare that to CRSP 1, which offers the lowest returns at 9.31% and has actually underperformed the market since 1926 by 0.51%<sup>1</sup>.

CRSP Decile	% Average Annual Return	% Standard Deviation	% Standard Deviation when Returns are Below Market	% Standard Deviation when Returns are Above Market
1	9.31	17.44	15.42	25.11
2	10.56	20.14	17.21	33.33
3	11.04	21.80	18.75	35.18
4	10.85	22.70	19.17	37.22
5	11.49	23.85	19.78	36.68
6	11.37	24.64	19.78	36.68
7	11.58	26.98	20.70	45.71
8	11.56	28.83	20.94	45.95
9	11.56	30.94	21.78	48.89
10	13.31	35.71	21.58	63.59
<b>Total Market</b> (CRSP DECILES 1-10)	9.82	18.49	16.15	28.02

Source: Bridgeway, CRSP

However, the high returns offered by ultra-small stocks come with a trade-off: Higher volatility. As we see in Table 1, annualized standard deviation (a measure of risk) also increases in magnitude as the CRSP deciles get smaller—35.71% for CRSP 10 compared to 17.44% for CRSP 1.

Not all standard deviation is created equal, though. The last two columns of Table 1 show the standard deviation of returns that are either below or above the average annual return of the overall market. For ultra-small stocks, the overwhelming source of overall standard deviation is on the upside (63.59%). Ultra-small stocks have similar standard deviation on the downside as other small-cap stocks, but significantly higher upside potential. In other words, standard deviation for ultra-small stocks is higher because of volatility from the upside—which is a good thing. Nevertheless, ultra-small stocks do carry more inherent risk than ultra-large stocks. Compared to larger companies, ultra-small companies may only have one product, or rely on a few customers. Ultra-small companies also may have less access to capital and ability to withstand downturns.

This additional risk may explain why ultra-small stocks have historically outperformed. It also gives clues as to why they may continue to outperform, as these barriers are not easily removed.

Because of this volatility, even though ultra-small stocks have generated positive long-term returns, they do not always outperform the market. This is especially true over shorter time periods, as the historical data reveals. Consider Table 2, which shows that in the short term—such as holding periods of one to three years—ultra-small stock portfolios have underperformed the market about 50% of the time. However, the likelihood of beating the market generally increases with longer holding periods. By the 20-year mark, ultra-small stocks have outperformed the market about 80% of the time.

Period	% of Periods in which Ultra-Small Lagged Market	% Average Relative Return when Ultra-Small Underperforms Market	% Average Relative Return when Ultra-Small Outperforms Market
1 year	49.45	-12.28	29.82
3 year	51.69	-7.99	20.02
5 year	43.68	-6.41	13.62
10 year	31.71	-3.53	7.99
15 year	27.27	-2.79	6.72
20 year	20.83	-2.13	5.29

Source: Bridgeway, CRSP

Some investors may find ample incentive to ride out short-term declines: When ultra-small stocks rebound, the rewards can be substantial. The second and third columns of Table 2 show that for periods when ultra-small stocks outperform the market, their average relative returns are more than double the magnitude of their average relative underperformance during periods when they lag the market. For example, during one-year periods when ultra-small stocks lag, they do so by an average of 12.28%. Yet for one-year periods when ultra-small stocks outperform the market, they do so by 29.82%.

To further illustrate this point, Graph 1 shows the rolling three-year performance difference between ultra-small stocks and the market. You can see that the magnitude of the periods of outperformance—spikes in the graph where

data points are above 0%—is much higher than the magnitude of the periods of underperformance when data points fall below 0%.

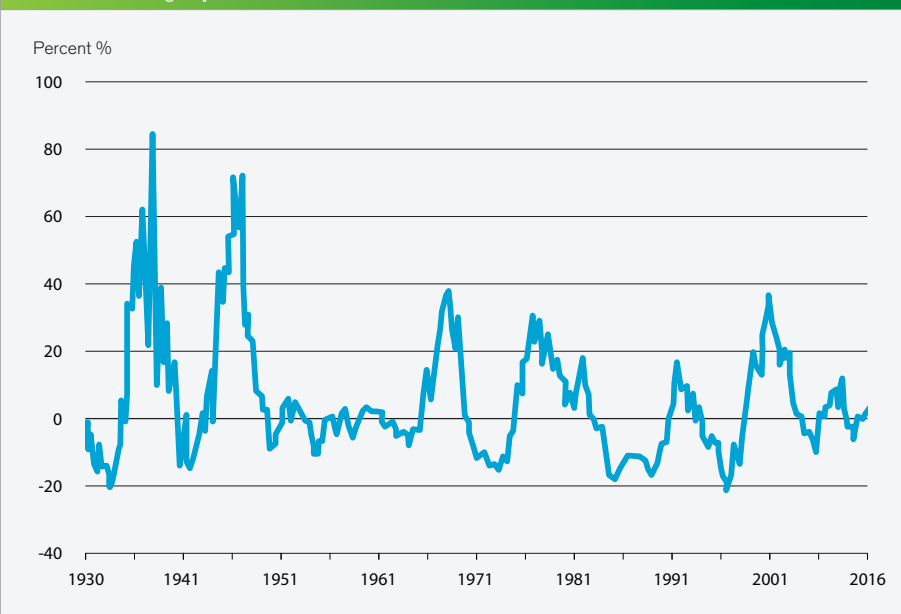
These swings in the magnitude of the ultra-small premium might appear dramatic, but remember that Graph 1 is looking at returns over relatively short, three-year periods. Given historical trends and the cyclical nature of premiums, investors who can hold ultra-small stocks for decades are more likely to see short-term volatility normalize into a more stable premium.

### How Valuation can affect Ultra-Small Performance

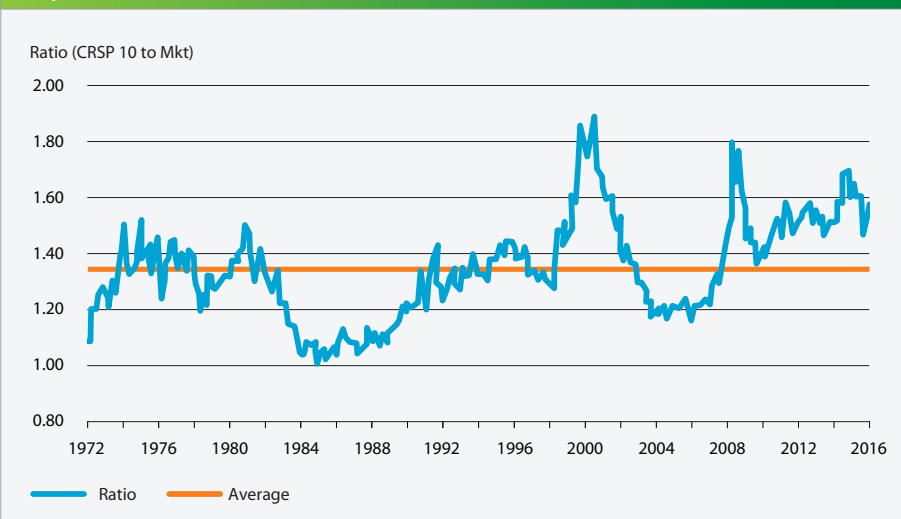
Although historical data reveals compelling evidence for the potential returns of ultra-small stocks, we also must acknowledge that the market has changed considerably since 1926. What hasn't changed is that shares of ultra-small companies continue to be inherently riskier than shares of ultra-large companies, and thus have the potential to deliver considerably higher returns. But with many investors and market-watchers pondering the current valuation levels of the overall market, it's worth considering whether ultra-small stocks are relatively cheap or expensive compared to the total market—and how valuation historically has affected their performance.

Graph 2 shows the ratio of median book-to-market (BtM) for ultra-small stocks to the median BtM for the overall market. The solid orange line represents the average ratio since 1972 (the earliest period for which Compustat has sufficient coverage). Ratios above this line signal that ultra-small stocks are cheaper than their historical average.

**Graph 1: Rolling 3-year Performance Difference Between Ultra-Small Stocks and The Market**



**Graph 2: Ratio of Median BtM for CRSP 10 to Median BtM for the Overall Market**



Source: Bridgeway, Compustat

As of December 31, 2016, the current ratio is in the 90<sup>th</sup> percentile of historical data—meaning that ultra-small stocks are quite cheap. Not surprisingly, cheaper ultra-small stocks have historically translated into strong subsequent results.

Table 3 divides the ratio of median BtM for ultra-small stocks to median BtM for the overall market into quintiles, and then shows the average relative forward 10-year AAR for each one. Relative returns for ultra-small stocks have been strongest when the asset class has been the least expensive, and weakest when ultra-small stocks have been the most expensive.

**Table 3:** Forward Returns Based on Quintiles of Median BtM for Ultra-Small Stocks to Median BtM For Market, 1972-2016

	Average % Relative 10-Year Forward AAR
<b>1</b> ULTRA SMALL STOCKS ARE MOST EXPENSIVE	-4.94
<b>2</b> MORE EXPENSIVE	0.34
<b>3</b> AVERAGE	1.89
<b>4</b> LESS EXPENSIVE	3.88
<b>5</b> ULTRA SMALL STOCKS ARE LEAST EXPENSIVE	6.39

Source: Bridgeway, Compustat

Given their current low relative valuation, combined with historical evidence of ultra-small stocks' long-term return premium, we believe that the case for adding ultra-small exposure to a diversified portfolio remains strong and compelling. Ultra-small stocks may underperform the market over shorter periods, but the longer you hold them, the more likely you are to enjoy significant outperformance. For investors with the right risk tolerance and time horizon, history has shown that while the stocks may be ultra-small, the potential rewards have been anything but insignificant.

<sup>1</sup> Because of oversized market cap weighting of the large stocks in CRSP 1, the decile's performance has significant impact on overall market (CRSP 1-10) results.

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