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# Measuring the Opportunity for Active Management

## Where Large Becomes Small, and Micro Means Huge

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## Summary

Observing index returns on a daily basis can easily mislead an investor. Our natural biases can lead to universal statements that may be proven wrong, like "the Russell 2000 never beats the Russell 2500" or "Microcap may offer stronger returns, but the volatility has been much higher". The study of behavioral finance has shed some light on investors' tendency to employ selective memory and confirmation bias based on limited direct experience. Our experience investing in microcap stocks led us to some counterintuitive thoughts. We started by observing that on a daily basis, the microcap index seemed to be experiencing less volatility than the small cap indexes. We initially set out to test this hypothesis and understand the reasons. In exploring this relationship we discovered a number of interesting points about volatility, correlations, the effects of ETFs, and what these factors mean for active investment managers.

Ultimately, we found that the data supports our anecdotal observations; the small cap indexes have been more volatile, especially in recent periods, than the microcap indexes. One of the most significant drivers is the increase in the use of passive investment tools such as ETFs. This is also a major factor influencing changes in stock behavior within the small cap indexes, including individual stock volatility and correlations. By extension, volatility and correlations within stock universes have a major impact on active managers' abilities to outperform their indexes.

Ultimately, the lack of liquid ETF alternatives has helped preserve the active management opportunity in the microcap space, while also helping keep the volatility of the microcap index down.

## Index Volatility – The Data

In Exhibit 1 below we have highlighted stock and index volatility over the past eleven years using the Russell indexes. It is not a surprise to see that as we go down the cap spectrum, the volatility of the average individual stock rises. Of course individual stock volatility and index volatility are two distinct measurements. Index volatility also rises significantly as you move from large cap to small cap, but it is surprising to see that the trend reverses as you continue down to microcap. Microcap index volatility has been lower than small cap index volatility. It is a simple, but somewhat counterintuitive, observation, but our findings are clear: microcap stocks are more volatile than small cap stocks, but microcap indexes have been less volatile than small cap indexes.

**Exhibit 1. Annualized Average Stock and Index Volatility - 12/00 to 12/11**

| | Average Stock Volatility | Index Volatility |
|---|---|---|
| Mega Cap | 32.02 | 19.14 |
| Large Cap | 33.77 | 19.36 |
| Small Cap | 48.07 | 24.42 |
| Microcap | 51.50 | 21.98 |

Source: Russell Investments, Factset, Acuitas Investments

The reason why microcap indexes tend to have lower volatility also explains a large portion of why active microcap investing offers such attractive opportunity for excess returns.

## An Explanation

The simplest and most direct explanation for the lower volatility of the microcap index versus the small cap index is that microcap stocks behave more independently and have lower correlation with each other than small cap stocks. The ratio of index variance to stock variance can serve as a good estimate of the correlation between the stocks that compose an index. In Exhibit 2 we compared the estimates of the average stock correlations within several indexes. It is apparent that the estimated correlation

between stocks in the index falls as we go down in market capitalization. That is, in general stocks act more independently as we go down the cap spectrum.

**Exhibit 2. Estimated Stock Level Correlation by Market Cap Segment**

| | Average Stock Volatility | Index Volatility | Estimated Average Correlation |
|---|---|---|---|
| Mega Cap | 32.02 | 19.14 | 0.36 |
| Large Cap | 33.77 | 19.36 | 0.33 |
| Small Cap | 48.07 | 24.42 | 0.26 |
| Microcap | 51.50 | 21.98 | 0.18 |

Source: Russell Indexes, Factset, Acuitas Investments

This data led us to question why small cap correlation is so much higher than microcap. We believe that the widespread use of derivatives – namely ETFs and futures on small cap indexes – is a large piece of the explanation. For example, trading in the iShares Russell 2000 Index ETF (TK:IWM) began in May 2000. By 2011, its dollar trading volume was over $100 billion per month. For comparison, all of the stocks in the Russell 2000 have a total dollar trading volume of approximately $450 billion per month. The iShares ETF represents over 20% of the total trading volume of stocks in the Russell 2000.

In Exhibit 3 on the next page, we compare the trading activity in the iShares Russell 2000 ETF (divided by the total trading in Russell 2000 stocks) with the estimated stock level correlation in the Russell 2000.

The gray bars highlight the periods of rising stock level correlation and rising ETF volume. Periods of falling stock correlation and falling ETF volume are highlighted with green bars. It is evident that in recent years the two measures are moving in unison much more frequently. Additionally, prior to 2005 the Russell 2000 Index had few correlation spikes above 30%, while correlation has been above 30% much of the last five years. Since the time iShares ETF volume surpassed 10% of the Russell 2000 stock volume in 2005, the trading in the ETFs appears to have had a large impact on the trading behavior of the individual stocks.

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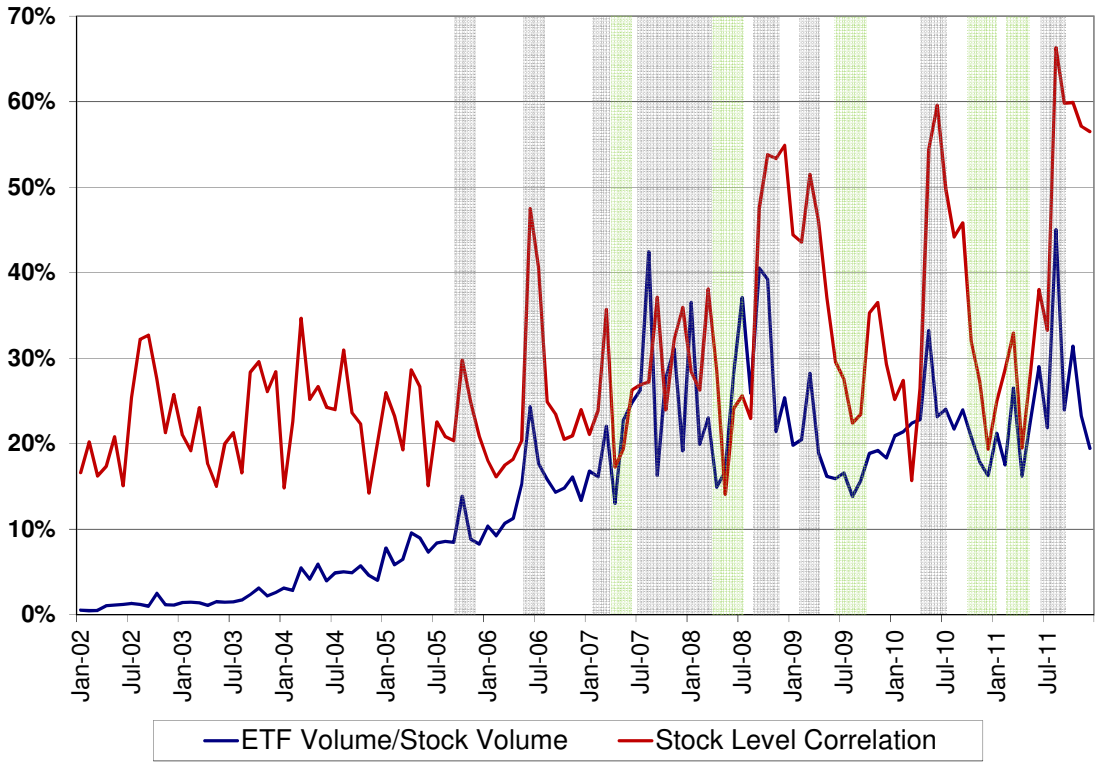
**Exhibit 3. Estimated Stock Level Correlation vs. ETF Volume, Russell 2000**




Source: Russell Indexes, Factset, Acuitas Investments

## Why Does Stock Correlation Matter?

Simply put, correlation matters because a high correlation environment makes it harder to pick winning stocks. Average stock level correlation is one important measure of the "stock picking environment." Low correlation suggests that investors are paying more attention to the characteristics of the stocks themselves as opposed to macro themes. In essence, investment managers that are able to add value are more likely to do so in periods where companies are trading more independently.

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## Understanding the Impact of Volatility and Correlations on Portfolios

In order to explore the relationships between stock volatility, correlations and portfolio risk further, we built a model that estimates tracking error at different market cap levels, using the volatility measures previously noted. We used a simple model, assuming a 1000 stock index, and varying number of stocks in the portfolio. Exhibit 4 shows that as the number of stocks in the portfolio increases, the tracking error declines. Tracking error is highest in microcap as correlation between stocks is the lowest and stock volatility is the highest. With low correlation between stocks, the result is bigger bets and more performance variability despite the same number of names.

**Exhibit 4. Estimated Portfolio Tracking Errors by Market Cap Segment**

| | | | | Estimated Tracking Error | | | |
|---|---|---|---|---|---|---|---|
| | Average Stock Volatility | Index Volatility | Estimated Average Correlation | 25 Stock Portfolio | 50 Stock Portfolio | 100 Stock Portfolio | 200 Stock Portfolio |
| Mega Cap | 32.0 | 19.1 | 0.36 | 5.07 | 3.54 | 2.44 | 1.62 |
| Large Cap | 33.8 | 19.4 | 0.33 | 5.46 | 3.81 | 2.62 | 1.75 |
| Small Cap | 48.1 | 24.4 | 0.26 | 8.18 | 5.71 | 3.93 | 2.62 |
| Microcap | 51.5 | 22.0 | 0.18 | 9.20 | 6.42 | 4.42 | 2.95 |

Source: Russell Indexes, Factset, Acuitas Investments

In Exhibit 5 we have focused on only small cap, using the same framework to see what happens to estimated tracking error when average stock-level correlation changes.

**Exhibit 5. Estimated Stock Level Correlation by Market Cap Segment**

| | | | | Estimated Tracking Error | | | |
|---|---|---|---|---|---|---|---|
| | Average Stock Volatility | Index Volatility | Estimated Average Correlation | 25 Stock Portfolio | 50 Stock Portfolio | 100 Stock Portfolio | 200 Stock Portfolio |
| Small Cap | 48.1 | 24.4 | 0.26 | 8.2 | 5.7 | 3.9 | 2.6 |
| Small Cap | 48.1 | 24.4 | 0.30 | 7.9 | 5.5 | 3.8 | 2.5 |
| Small Cap | 48.1 | 24.4 | 0.40 | 7.4 | 5.1 | 3.5 | 2.4 |
| Small Cap | 48.1 | 24.4 | 0.50 | 6.7 | 4.7 | 3.2 | 2.1 |
| Small Cap | 48.1 | 24.4 | 0.60 | 6.0 | 4.2 | 2.9 | 1.9 |

Source: Russell Indexes, Factset, Acuitas Investments

Holding other variables constant, a period of higher correlation leads to lower forecasted tracking error or active risk. The results of Exhibit 4 and Exhibit 5 are clear; as stock level correlations increase, each position in the portfolio will behave more like every other position, and all positions will behave more like the index. Effectively, there are fewer independent bets in the portfolio, and it is more difficult for managers to differentiate themselves through stock selection.

It is important to note that if index volatility remains constant, stock volatility increases as correlations increase. Greater stock volatility will tend to drive tracking errors higher. As such, the related impacts of higher volatility and higher correlations will tend to have offsetting effects on tracking error. Exhibit 6 demonstrates the impact of each.

**Exhibit 6. Estimated Tracking Error by Volatility and Correlation Regimes**

| | Low Correlation | | High Correlation | | Average Size of Effects | |
|---|---|---|---|---|---|---|
| # of Stocks in Portfolio | Average Volatility | Elevated Volatility | Average Volatility | Elevated Volatility | Higher Correlation Effect | Higher Volatility Effect |
| 25 | 8.2 | 10.2 | 6.6 | 8.2 | -1.8 | 1.8 |
| 50 | 5.7 | 7.1 | 4.6 | 5.7 | -1.2 | 1.3 |
| 100 | 3.9 | 4.9 | 3.2 | 3.9 | -0.9 | 0.9 |
| 200 | 2.6 | 3.3 | 2.1 | 2.6 | -0.6 | 0.6 |

Elevated volatility is defined as 25% higher than the entire period (60% compared to 48%), and higher correlation is 0.52 (compared to 0.26 for the whole period).

Source: Russell Indexes, Factset, Acuitas Investments

What we have shown in Exhibit 6. Is that a "normal" period – *lower correlation and average volatility* – can have the same estimated tracking error as a period of *high correlation and high volatility* – because these effects offset each other.

As an example, in low correlation markets stocks behave differently, so there are many "ideas" available for an active manager to use. If stock A and B behave differently, then a manager has 2 available ideas to use that will have different performance patterns. If they move together, then it doesn't matter if the manager holds stock A or B. When stock level correlation rises, the number of "ideas" available to an active manager decreases because stocks are behaving more like one another, meaning less opportunity for managers to demonstrate skill. Unfortunately, the associated increase in volatility will drive tracking error up at the worst possible time, effectively compounding the manager's excess returns at the worst possible time.

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**What Does this Mean for Microcap?**

The impact of ETFs and other passive instruments on the small cap market have been remarkable. There are two key ways that the increased use of these instruments has impacted the small cap market. First, small cap index volatility has increased substantially as investors increasingly see these passive instruments as efficient ways to increase and decrease risk in portfolios over short periods. Second, the flood of money into and out of these instruments has caused the correlations among small cap stocks to increase considerably.

By comparison, microcap stocks do not have liquid ETFs or derivative products. This enables microcap stock correlations to remain low, while at the same time keeping the aggregate volatility of the microcap index lower than the small cap index. This bodes well for active management in the microcap space. Active microcap investors are able to capitalize on the attractive combination of low stock correlations and high stock volatility, without experiencing greater volatility at the aggregate level. In addition to the attractive statistical characteristics of microcap stocks, there are incredible investment opportunities available by exploiting the informational inefficiencies in the universe (covered in our 2/2/11 research note).

This gives active investors ample opportunity to capitalize on the inefficiency of the microcap space. The low correlations give investors a broad opportunity set of independent bets from which to select winners, while the high stock volatility means managers who can demonstrate skill will be rewarded to a greater extent. This gives active microcap managers the richest, most favorable environment to pick stocks in the United States.