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Axioma Research Paper

No. 024

**November, 2010**

# Is This An Equity Correlation Bubble?

Anthony Renshaw, PhD
Director, Applied Research

An historical examination of equity correlations suggests that equity correlations will remain at historically high levels. The correlations may not be as high as those achieved during the two recent correlation spikes, but they are likely to be higher than those experienced prior to 2007.

In addition, the recent return correlations of non-US equities in US dollar have been noticeably higher than the correlations of the returns in their local currencies. The indication is that currencies returns have become an increasingly large and increasingly common component of non-US equity performance, a fact that should be considered for those implementing currency hedges.


# Is This An Equity Correlation Bubble?

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## 1. Introduction

A recent research article by Matthew Rothman of Barclays noted that the cross-sectional correlations across stocks were at all time highs in June and July 2010. One might wonder whether in the coming year(s) stock correlations will:

(a) Remain at historically high values, creating elusive alpha and stock picking opportunities for investors; or

(b) Come down to historically "typical" values, which may well be accompanied by a rallying market (and a sigh of relief from investors).

An historical examination of equity correlations suggests that equity correlations will remain at historically high levels. The correlations may not be as high as those achieved during the two recent correlation spikes, but they are likely to be higher than those experienced prior to 2007.

In addition, the recent return correlations of non-US equities in US dollar have been noticeably higher than the correlations of the returns in their local currencies. The indication is that currencies returns have become an increasingly large and increasingly common component of non-US equity performance, a fact that should be considered for those implementing currency hedges.

There are, of course, many possible explanations of the rising correlations, and each explanation provides a different perspective on the current state of the market. On the one hand, some observers have noted that many quantitative portfolio managers appear to have increasingly used and traded with the same underlying quantitative factors. As a result, their reactions to market events tend to be similar and their subsequent "crowded" trading lead to increased correlation. This story has been circulating since at least July 2007 when the Quant world experienced a "Quant Scare."

On the other hand, most people suspect that the emergence of the ETF market has driven a lot of the increased equity correlation. When someone trades an ETF, all the equities underlying the ETF are traded in an extremely correlated manner, and it is easy to believe that this is a significant part of the rising correlations. For Global Equities, ADRs are

having a similar effect. This can be seen explicitly in the difference between global equity correlations measured in U.S. dollars vs. local currencies.

So what has really been happening? New investment opportunities and tools such as ETFs have altered the way in which the market works, and, as a result, old insights need to be updated. This is not a new story on Wall Street. Just take a look at how Graham and Dodd's original data and ideas have evolved over 80 years.

## 2. Correlation of Equity Returns

We examine the historical realized, asset-asset correlations for four different equity markets: (1), US large cap, represented by the Russell 1000 Index; (2), US small cap, represented by the Russell 2000 Index; (3), global developed, represented by the Russell Developed ex U.S. Large Cap Index; and (4), global emerging market, represented by the Russell Emerging Markets Large Cap Index. The two US Indexes are reported monthly since 1/31/95; the two global Indexes are reported monthly since 1/29/99. All returns are computed in US dollars. For each month and each market, we compute all possible asset-asset, 60-day, forward realized return correlations[1]. For example, if an Index has 1000 assets, then there are $1000 \times 999 / 2 = 499{,}500$ possible asset-asset pairs. We compute all of these correlations, and then calculate the average correlation for each day and market.

Figure 1 shows the average realized correlation across all asset-asset pairs for each month and each market using a dark blue line. The two dashed red line indicate the all-time highest realized correlation and the lowest post-crisis correlation. The dates and values associated with these red lines are given in Table 1.

| Index | All Time High | | | Post-Crisis Low | | |
|---|---|---|---|---|---|---|
| | From | To | Corr. | From | To | Corr. |
| Russell 1000 | 4/30/10 | 7/27/10 | 0.610 | 12/31/09 | 3/31/10 | 0.314 |
| Russell 2000 | 4/30/10 | 7/27/10 | 0.502 | 1/29/10 | 4/27/10 | 0.184 |
| Russell Dev exUS Large Cap | 8/1/08 | 7/23/08 | 0.421 | 4/30/09 | 7/23/09 | 0.214 |
| Russell Emerging Large Cap | 3/31/10 | 6/23/10 | 0.369 | 9/30/09 | 12/23/09 | 0.181 |

**Table 1.** The highest all time realized, average asset-asset correlation and the lowest post-crisis correlation.

[1] 20-day forward correlations exhibit similar albeit noisier trends.

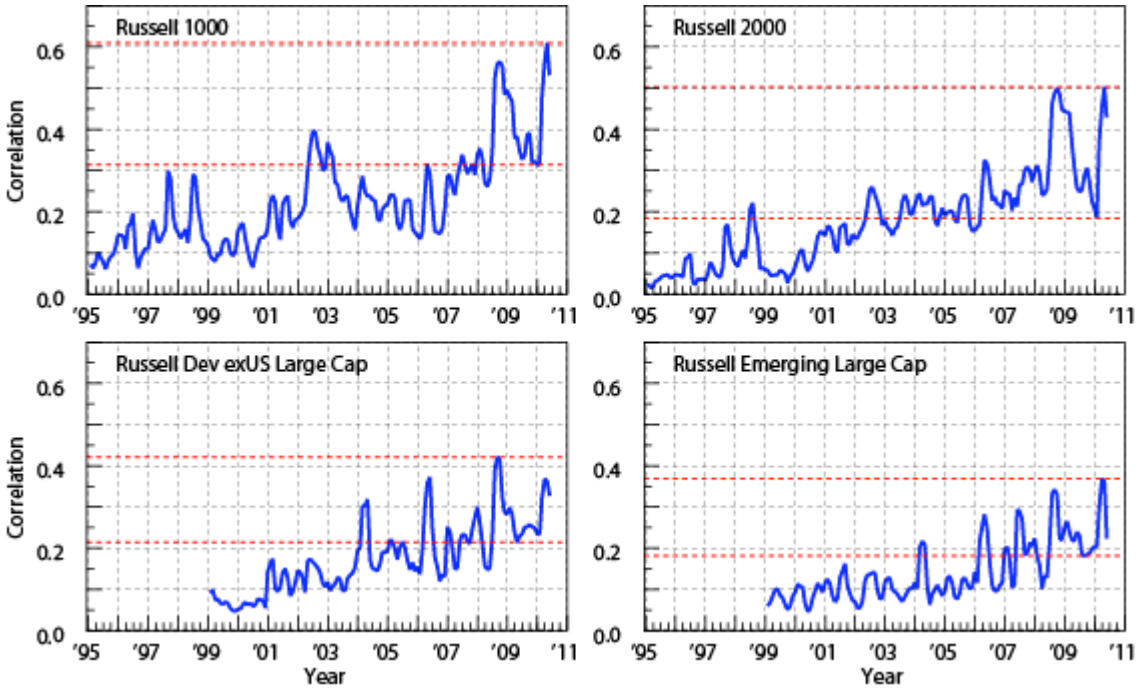


**Figure 1.** The average asset-asset 60-day forward return correlation for four markets: Russell 1000 Index (top left), Russell 2000 Index (top right), Russell Developed ex U.S. Large Cap Index (bottom left), and Russell Emerging Markets Large Cap Index (bottom right). The red lines indicate all-time high and post-crisis low correlations.

The correlations since 2007 corroborate the truism that stock correlations converge towards one as markets falter and dissipate as markets recover. All four graphs exhibit two peaks, one in late 2008 (the financial crisis) and another in mid-2010 (the European debt crisis). In between these peaks, the market rally was accompanied by a sizeable reduction in average correlation.

From a longer historical perspective, however, the recent correlation spikes have merely punctuated a longer term trend of steadily increasing asset-asset correlations. In the US, equity correlations have been increasing steadily for the last 15 years. In fact, the post-crisis "lows" are as high as or higher than most correlations prior to 2008 (R1000) and 2006 (R2000). Globally, correlations did not start to rise until 2002 or 2004 and still remain below the US levels. Nevertheless, the recent "lows" are as high as or higher than most of the correlations prior to 2007.

## 2. The Contribution of Currency Returns to Equity Correlations

For the two non-US markets shown in Fig. 1, the returns are computed in US dollars. Figure 2 compares those average return values to those computed using returns in the local currency.

These results need to be interpreted with some caution. The computation of returns over markets that open and close at different times using daily data can be misleading due to the fact that some markets (Japan) close before the US market even opens[2]. In particular, correlations can be affected by the apparent lag between the earlier and later market closing prices. Nevertheless, we present this data as-is to evaluate present market conditions.

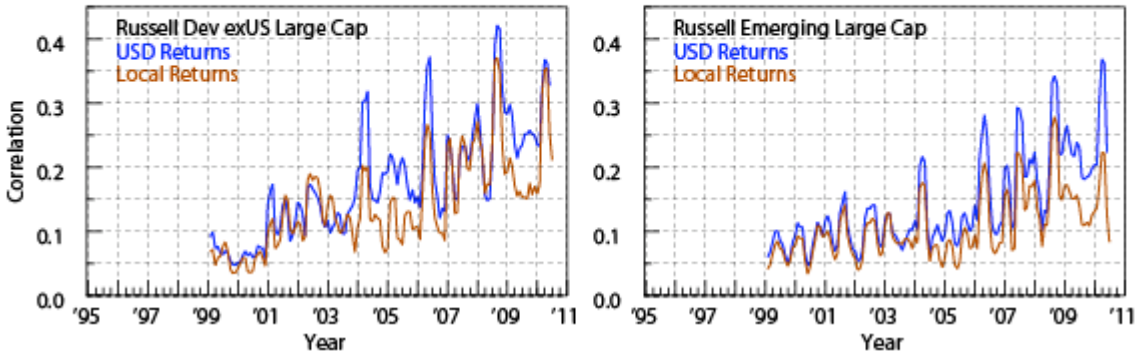


**Figure 2.** The average return correlation for the Russell Developed ex U.S. Large Cap Index (left) and the Russell Emerging Markets Large Cap Index (right) computed in US dollars (blue – same as Fig. 1) and in local currency (brown).

Prior to 2003, there was little difference between the USD and local currency return correlations. Since the financial crisis, however, the USD denominated returns have been significantly more correlated than the local returns, typically greater by 0.05 to 0.10. This difference persisted throughout the 2009 market rally as well as the most recent correlation spike. Historically, the only similar separation of these two values occurred for the Russell Developed ex U.S. Large Cap Index from 2003 to 2007.

This data suggests that currency returns have become an increasingly large and increasingly common component of non-US equity returns. This, of course, makes intuitive sense since the most recent correlation spike was driven, in part, by a currency-linked event, the European debt crisis. Furthermore, all equities using the same currency (Euros, for example) will experience the same currency return on every trading day. As a result, high US dollar returns (which include the currency returns) make sense.

[2] See "Returns-Timing: The Problem of Asynchronous Data," Axioma White Paper, May 6, 2010.

This separation of correlations has implications for investors using currency hedges on non-US equity investments. Depending on the method and frequency with which such hedges are applied, the investor's realized returns may exhibit higher realized correlations than those experienced by the local currency equity returns.