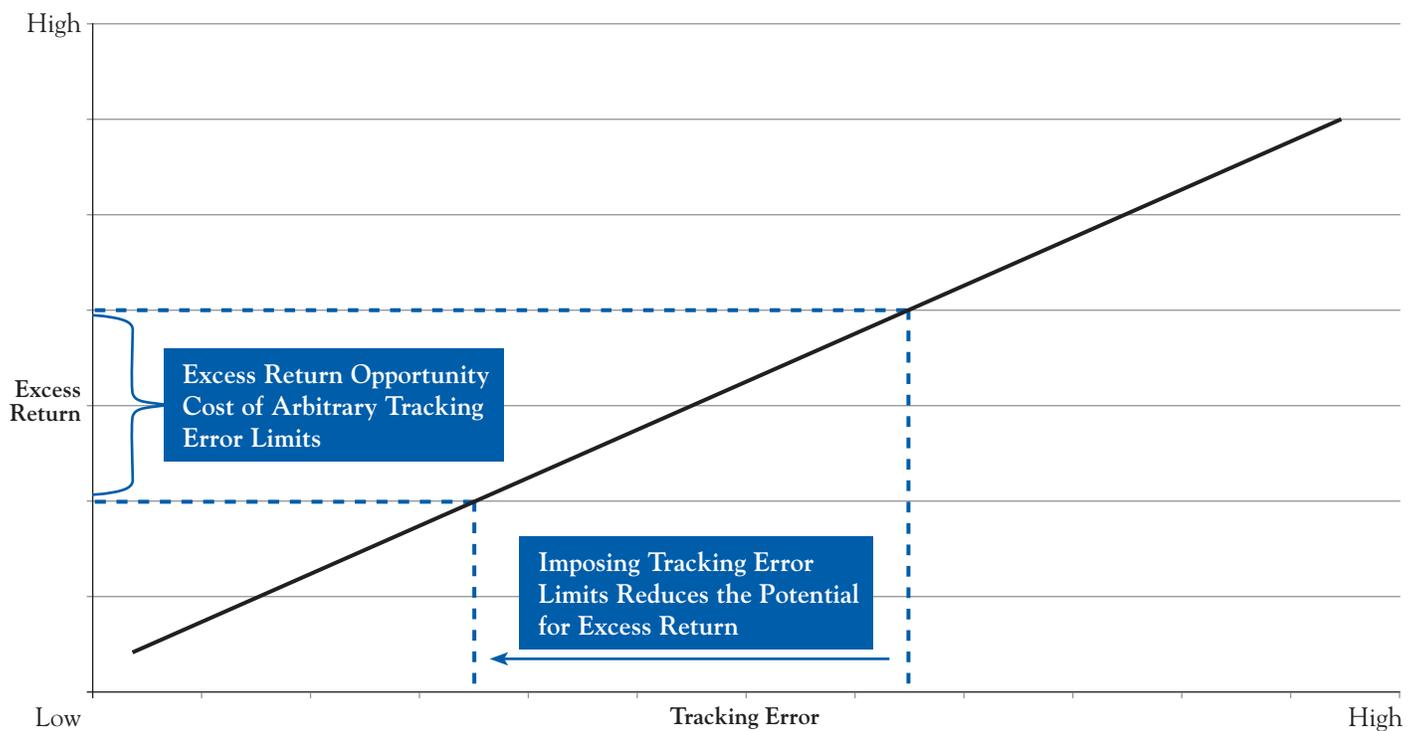


## DO TRACKING ERROR LIMITS ALSO LIMIT EXCESS RETURN AND DIVERSIFICATION?

There is significant interest on the part of many investors and consultants in limiting portfolio tracking error. However, the fixation on a given tracking error “budget” may be a mistake if the goal of the investor is to achieve better than market returns using an active manager. Recall that tracking error is the standard deviation of the difference between two return series (such as the returns of an investment manager and a given benchmark). Intuitively it makes sense that an index fund would have an extremely low tracking error against the benchmark that it is designed to replicate. Conversely, an extremely high tracking error may indicate that a portfolio is not being compared to the appropriate benchmark.

To illustrate the concept, consider the following:

### THEORETICAL EXAMPLE

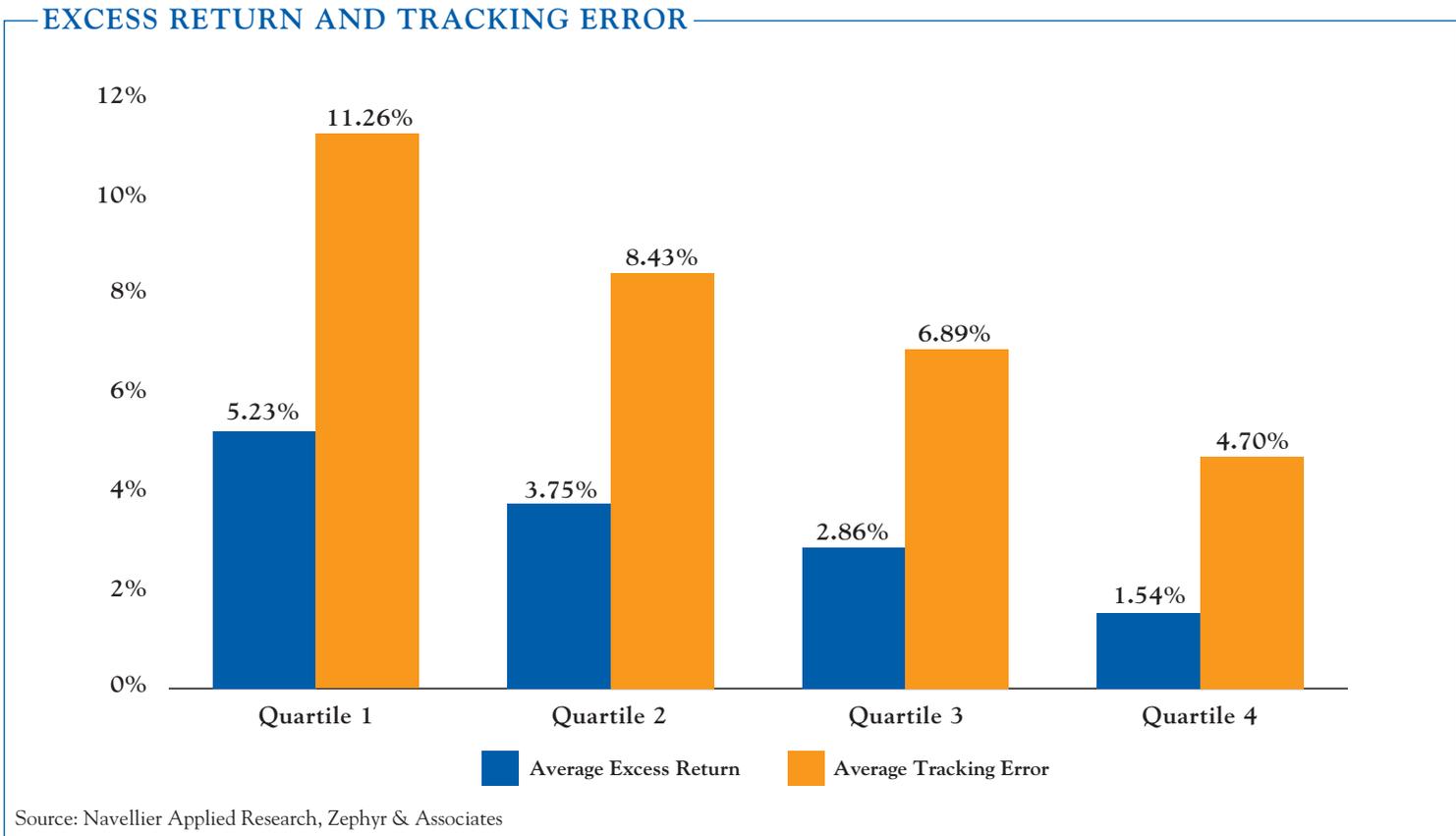


Source: Navellier Applied Research

At the intersection of the two axes, tracking error and excess returns are both zero. As tracking error increases, the potential for excess returns also increases. Yet while the concept of increasing tracking error to achieve excess returns may appear obvious, many times the desired tracking error level is highly restrictive. In using the above graph, tight tracking error mandates can be shown to reduce excess return potential. Interestingly, empirical data can be shown to illustrate the concept vividly.

Using the Zephyr Separate Account Quarterly data base, Navellier Applied Research developed a set of large cap growth managers with a ten-year track record (as of 12/31/2007) and an r-squared to the Russell 1000 Growth index of 75% or more. A total of 148 managers met the criteria. The resulting annualized excess return was then broken into quartiles and averaged. The corresponding tracking error for each return quartile was also averaged and plotted side by side.

In the case of return and tracking error, the result is plotted here:

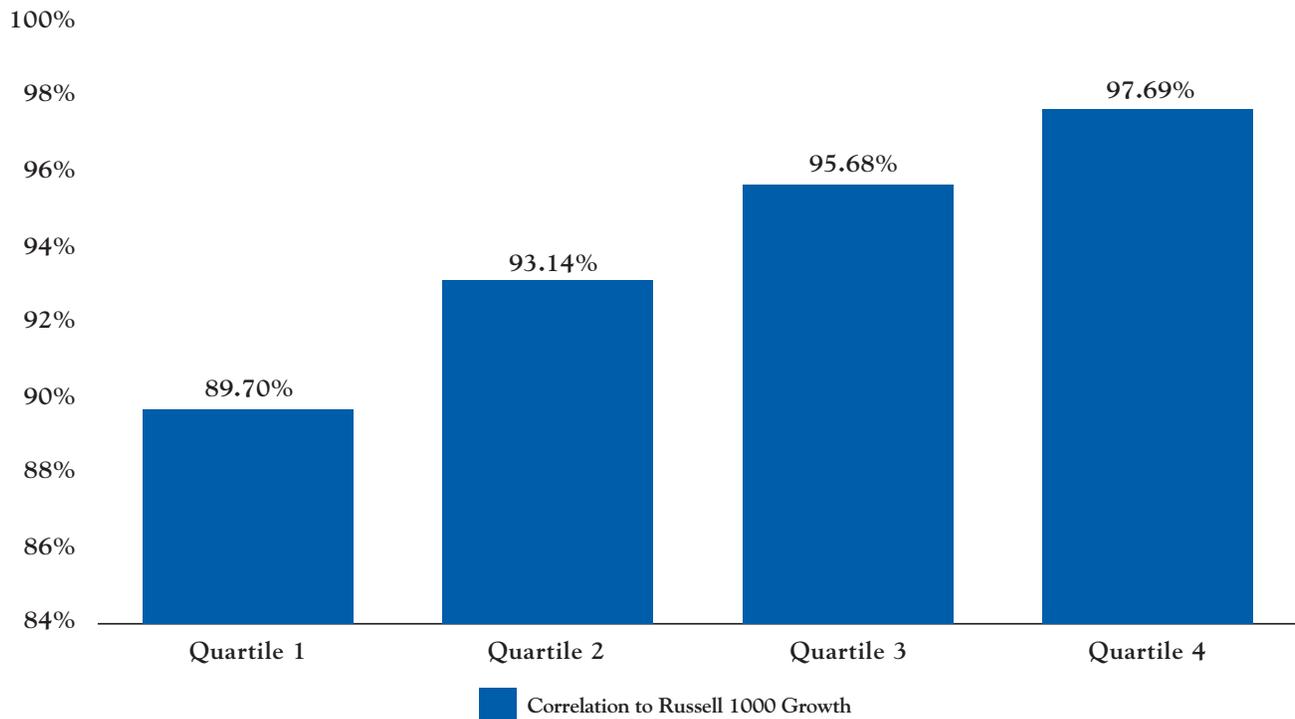


The graph clearly reflects a linear relationship of returns falling as tracking error declines which supports the case from the earlier theoretical graph. Namely, lower tracking error reduces excess benchmark returns. Thus the question can be asked: is an arbitrary tracking error limit creating a significant opportunity cost in terms of annualized excess returns? Empirically, the answer appears to be yes.

Impacts on diversification:

As tracking error falls, it stands to reason that correlation to the benchmark also rises. Using the same data set, the increase in correlation of the quartiles sorted by highest excess returns can be seen here:

### CORRELATION TO BENCHMARK



Source: Navellier Applied Research, Zephyr & Associates

Again, requirements for low tracking error also necessarily result in higher correlation to the benchmark. It can be argued that the end result is a reduction in diversification on a total portfolio level.

Conclusion:

Requirements of low tracking error to a valid benchmark on the part of an active manager result in the, perhaps unintended, consequence of lower potential excess returns and lower diversification benefits due to higher average correlation. Put simply, consider the analogy of tracking error as a leash on a dog. A very short leash reduces the ability of a dog to perform tasks. However, a longer leash allows the dog to more easily perform a wider variety of duties. Thus, investors should consider carefully the impact of arbitrary tracking error limitations on their overall portfolio and portfolio returns.

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