

## Explanation through example why performance is a zero-sum game around the market return.

Let's look at a simplified example of a market and an index of the market.

Three companies in the market and therefore our index. Our index is a market capitalization weighted index.

| Company Name | Shares Outstanding | Price / Share | Market Value of Co. | Market Weight |
|--------------|--------------------|---------------|---------------------|---------------|
| ABC Co       | 10,000,000         | \$12          | \$120,000,000       | 25.1%         |
| GHI Co       | 5,000,000          | \$52          | \$260,000,000       | 54.4%         |
| PQR Co       | 14,000,000         | \$7           | \$98,000,000        | 20.5%         |
| Total Market |                    |               | \$478,000,000       | 100%          |

This is the market. A market capitalization (market weighted) index measures performance of the market. As an aside, an equal weighted index would hold each company at 33.3%. The market value of our market is \$478,000,000

A participant is defined as a passive participant in this market if their portfolio consists of 25.1% of ABC Co, 54.4% of GHI Co, and 20.5% of PQR Co. They may be active investors in other markets, but they are a passive participant in this market if their portfolio matches the market weight throughout the time period being measured.

Let's say there are three professional money management firms that together manage all money invested in the market. In other words, there are only three participants in the market. One money manager is a passive manager. Their portfolio is invested as the market weights above. The other two are active managers. Each active manager decides whether to hold an over or under or market weight investment in each of the three companies.

In this simplified market, it is intuitive to see that if one active manager overweighted an investment in one of the three companies, the remaining active manager must underweight the same company. In broader terms, any overweight divergence from the market weight by a participant must be offset by an underweight divergence by another market participant.

In terms of performance, if the overweighted company outperforms the index return (market weight return), the active manager outperforms the index. The remaining active manager is underweighted the same company by arithmetic necessity and exactly offsets performance on the negative side of the index return.

In this simplified example the passive manager will always have the middle return performance position pre-cost and will always hold the number 1 or 2 post-cost return position. There will always be an active manager that outperforms the index pre-cost. After-cost they may or may not outperform the index. There is always an active manager that underperforms pre-cost and cost makes the return performance worse.

As the over and underweight positions of the active managers must offset, performance around the market return must also offset. In other words, performance around the market return is a zero-sum game. All managers can grow their portfolio, but the two active managers can't both outperform nor underperform the market in the same time period being measured. This is intuitive in this simplified example.

Adding more market participants or companies in the market, does not change the simple arithmetic of the zero-sum game nature of outperformance around the market return.