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Money continues to flow into index funds with no sign of abatement. Industry consensus figures show about \$200 billion in domestic index equities in comparison to the approximate \$3 trillion capitalization of NYSE stocks. Index investment is motivated by disenchantment with active managers, who mostly fail to outperform the indexes on a consistent basis. Is there a limit to the portion of equity funds that can be allocated to this passive investment strategy? And what are the consequences of living in an increasingly indexed world?

The argument for indexing is straightforward and hardly bears repetition: "The average actively managed dollar must underperform the average passively managed dollar, net of costs" (Sharpe [1991]). Garcia and Gould [1991] assert that indexing is a way to get active management, all of it in fact, for free — although one must accept the bad with the good.

The case for indexing and its theoretical support, the Efficient Market Hypothesis, raises a perplexing question. If the market is so efficient, then all the effort and money spent looking for undervalued stocks is a waste. This waste in itself would be a gross inefficiency of sorts. "Markets require analysts and active managers to remain efficient. That's the central paradox of the Efficient Market Hypothesis" (Laing [1991]).

GO TO AN EXTREME TO MAKE A POINT

Let's envision a mostly indexed world with only a few active managers. A careful analysis of this hypothetical world and its absurd stock market mechanics will clearly demonstrate the potential danger of indexing.

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For the sake of simplicity in our hypothetical world, let's assume that all passive investors are indexed. In fact, many passive investors are far from indexed. They are mostly unsophisticated individuals, who are natural candidates for underperformance and in a sense may subsidize the active investors.

First, those who control inclusion of stocks in relatively narrow but widely followed indexes (e.g., S&P 500) will gain more and more power. A large share of this country's capital (sticking to domestic equities for the sake of simplicity) will be allocated by a committee rather than according to the investment merits of individual corporations.

With limited stabilizing force from active investors, our hypothetical equity market would be very volatile. Any exogenous shock to the system would have far-reaching consequences. With almost everyone indexed, there would be few market makers (taking on a position would throw them off their indexed status).

With few active investors, prices would have to drop substantially to provide an inducement to be on the other side of a sell trade. So we would have an equity market that's very illiquid and unstable, highly susceptible to the impact of any large order, and hence terribly volatile. With this insight, it seems quite possible that the somewhat increased volatility in recent years is attributable more to indexing than to program trading and derivatives.

THE PARADOX

The obvious conclusion is that there is a limit to indexing. The more capital involved in indexing, and the virtual absence of active investors pushing prices back in line, the farther prices will drift from their fair value, meaning more opportunity for active investors to buy low and sell high. Eventually the market should reach an equilibrium level of active management. At this level, on the margin, the cost of active management will equal the added value from stock selection.

This statement seems intuitively obvious. Yet it pointedly contradicts the theorem that active management must underperform in aggregate and, hence, should optimally be zero. How can this be reconciled?

This paradox is not new, but a solution has yet to be offered. "Can one be average and stick with the average and outperform the averages? And if it is so

extraordinarily profitable to be average, then will not the average take advantage of the average strategy and destroy the economics of sticking with the averages?" (Aldrich [1987]).

MYSTERY RESOLVED

The answer to this paradox is obtained by looking at total returns on equities *plus* cash. In this case the active investors, by satisfying indexers' liquidity needs, will earn a liquidity premium.

Let's go back to our hypothetical world and make the paradox even more pointed by saying that we have swung so far out of equilibrium that every remaining active investor (AI) can easily determine whether a stock is undervalued or overvalued.

In this world, two AIs will never trade with each other. Possible parties to a trade would be indexer with indexer and AI with indexer. Let's concentrate on the latter. The former trade would presumably occur at prices determined by the latter.

Assume that all indexers' trades are motivated by cash flow needs. Say they want to hold a fixed portion of their assets in equities. Indexers' liquidity needs will be the force driving the market, and (we assume that) AIs will discipline themselves to act in such a way as to buffer the liquidity needs of the indexers. In other words, they sell (buy) only when indexers are buying (selling).

Let's consider a day when indexers are net sellers and AIs are net buyers. To simplify matters further, assume that all trading occurs at the close. Indexers are not only informationless traders, but also price-insensitive. Their sole concern is matching the performance of the index over any given time period. So if a client liquidates a portfolio at the close, the index manager is not worried about the market impact of selling those stocks, because that will be reflected in the index performance over that time period.

On these days, the market will be down sharply and stocks will trade well below their fair values. This will induce AIs to come in and buy shares. The reverse should occur on days when indexers are buyers.

As this phenomenon persists over time, AIs will achieve superior performance. True, over any given time interval without trades, the indexers and AIs in aggregate will have the same performance. But the trading patterns discussed above will result in equity/cash asset mix shifts in each camp to the detri-

ment of indexers. In other words, total holding-period return for AIs will be better than HPRs for indexers. This important point is best illustrated using a numerical example.

1. Indexer is an informationless, price-insensitive investor who buys and sells the market basket when needed without regard to price. AI is the active investor on the other side of the trades. Suppose Indexer holds ten shares, last priced at \$100/share, and has \$200 in cash. Hence Indexer's initial total value is \$1,200. Let AI begin with 0 shares and \$100 cash. AI's initial value is \$100.
2. In order to raise \$100 cash, Indexer sells two shares knocking their price down to \$50/share. Hence Indexer's eight remaining shares are now worth \$400. Thus Indexer has \$400 in equities and \$300 in cash; AI has two shares, each worth \$50, and no cash.
3. Indexer now buys two shares of equities, bidding the price up to \$125/share, at which AI sells. Indexer now has ten shares, valued at \$1,250, and has spent \$250 of the \$300 cash, leaving \$50 in cash. Indexer's total value is $\$1,250 + 50 = \$1,300$; remember initial value was \$1,200. Return over the entire period is $13/12$, or about 8%. AI now has no shares and \$250 cash. With an initial value of \$100, AI's return over the period is 150%.

CONCLUSIONS

The startling conclusion is that Active Investors in aggregate *can* outperform indexers in any period when interim trading (and consequent asset reallocation) takes place. Sharpe [1991] appears to endorse this

line of reasoning. After flatly stating that active managers "must underperform," he says in a footnote that it is possible for active managers to gain from their "willingness to provide desired liquidity."

Even though at all times AIs in aggregate own an indexed portfolio, the pricing and timing of their purchases and sales can enable them, as a class, to outperform the index. *This will happen whenever AIs, as a class, are able to identify value correctly and make the appropriate asset allocation decisions (an important caveat!).*

When AIs buy, they reduce their cash holding, and vice versa when they sell. When there is substantial market impact caused by indexers, these asset shifts by default will favor the AIs (i.e., those trading with the indexers) at the expense of the indexers.

An important conclusion is that indexers should insist on individually managed accounts rather than commingled funds. Otherwise, long-term investors will share in the increasingly higher market impact costs of the shorter-term (asset shifting) indexers. Finally, the numerical example shows that performance measurement consultants should measure equity plus cash rather than equity-only returns.

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