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**Why Indexation Can Be
a Dangerous Strategy**

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Abstract

In this brief note we argue that for investors that are serious about matching (the risks of) assets and liabilities, straightforward indexation is a doubtful proposition as significant autonomous changes may occur in the industry allocation and accompanying risk-return profile of the portfolio underlying the index. The name of the index may stay unchanged, but the underlying portfolio does not!

1. INTRODUCTION

Over the past 20 years, indexation has become very popular with institutional as well as private investors. Strongly advocated by big names from academia as well as the industry, assets under management by index funds have grown from almost negligible in 1976, when the first index fund was introduced, to far over \$1 trillion now. It is estimated that (excluding closet-indexing) currently 20-40% of institutionally managed assets are indexed, with US institutions quite far ahead of the rest of the world.

The idea behind indexation is very straightforward: since modern capital markets are informationally highly efficient, the added value of chasing alpha can only be negative. There is plenty of evidence to support this hypothesis. No active investment manager seems to be consistently able to beat the index, while the average active manager underperforms the index by about 2% per year. This means that the only way to improve performance is to diversify and cut the costs of security analysis and trading to a minimum. This has led many investors to abandon every form of security analysis and active trading altogether and just buy and hold the market as a whole in the form of the index.

Although it sounds very plausible, the advice that investors should simply buy and hold the index does not follow logically from the idea that markets are informationally efficient. In an efficient market, collecting and analysing information cannot be expected to pay off in terms of a higher expected return. However, without collecting and analysing data investors would not know anything about the risk-return properties of the different assets available. Every stock would look the same. The proper advice should therefore not be to throw in the towel and just buy and hold the largest stocks in the market, but simply to be very careful how one spends one's money. There is little doubt that money spend on chasing alpha is money wasted. Money spend on gaining an understanding of the risk-return trade-offs available in the market, however, is not. It may not directly contribute to a higher return, but it does provide valuable and necessary insights and thereby contributes to better decision-making and risk management. Also, risk management procedures aimed at generating non-linear

payoff profiles, such as the convex payoff of portfolio insurance for example, will require active trading (or the purchase of options, in which case someone else does the trading). Again, the transaction costs involved in this are not money wasted. They are simply part of the price of generating the desired payoff profile.

The danger of buying the index becomes apparent if one realizes that stock market indices are created to reflect the overall movements of the stock market, not to be good investments. The stocks in most major indices are not selected based on their expected future performance or risk-return profile but simply on market capitalization. As a result, the composition of indices tends to be quite unstable. Based on their market capitalization, stocks come and go and their weight within the index changes continuously. The risk-return characteristics of the index can therefore change very substantially over a short period of time. This also has serious consequences for the returns that stock market indices generate. Although the name stays unchanged, the underlying portfolio doesn't. In other words, what we record as 'the return on the index' is the return on a different portfolio every day. With the risk-return profile of indices changing over time, this means that historical index returns may not tell us too much about what to expect from an index portfolio in the near future. In this paper we investigate this matter in somewhat more detail. Throughout we concentrate on the S&P 500 index over the period January 1990 – July 2002.

2. THE INDUSTRY WEIGHTING OF THE S&P 500

One way to get an indication of how much the risk-return profile of a stock market index can change over time is to look at how the index is invested in the various industry sectors. Every industry has its own peculiar risk-return characteristics. A significant change in industry weightings can therefore be expected to change the risk-return profile of the index as well. Let's look at how the industry weightings of the S&P 500 have changed over the last twelve and a half years. Doing so, we distinguish the following industry sectors:

1. **Basic materials** – Mining and metals, forest products, paper, chemicals.
2. **Energy** – Oil and gas exploration, production, refining, marketing.

3. **Consumer non-cyclical** – Food, beverages, alcohol, tobacco, home products.
4. **Consumer cyclical** – Durables, cars, clothing, construction, property.
5. **Consumer services** – Publishing, media, hotels, restaurants, leisure.
6. **Industrials** – Environmental services, heavy equipment, industrial parts.
7. **Utilities** – Electricity and gas.
8. **Transportation** – Railroads, airlines, trucking, shipping.
9. **Health care** – Medical services and products, drugs.
10. **Technology** – Electronics, computer chips and hardware, software, internet.
11. **Telecommunications** – Telephone, cellular phones and pagers.
12. **Commercial services** – Administration, advertising, consultancy, training.
13. **Financial services** – Insurance, banks, thrifts, brokers, mutual funds.

<< Insert Figure 1 >>

Figure 1 shows how an S&P 500 index investor would have been invested in the above industry sectors by the end of January 1990, January 2000 and July 2002. From figure 1 we see that, with the exception of transportation and commercial services, in January 1990 an S&P 500 index investor would have between 5% and 10% percent invested in each of the above industry sectors. In January 2000, however, this would have changed completely. By then the same index investor would have 28% invested in technology stocks and 15% in financial services, which would have come at the cost of basic materials, energy, consumer non-cyclical, industrials and utilities.

<< Insert Figure 2 >>

Although the above change in industry allocation is extremely large, it took 10 years to materialize. This does not mean, however, that industry weightings always change slowly. Comparing the January 2000 and the July 2002 allocations shows that in only two and a half years time our index investor's exposure to the technology sector would have come down from 28% to 15%. His exposure to the financial services industry on the other hand would have increased from 15% to 23%. Figure 2 shows the evolution of the weights of the sectors consumer non-cyclical, health care, technology and financial services over the period July 1997 – July 2002. From the

graph we clearly see how volatile the weights of these four sectors in the index have been over the past five years. During the first half of 2000, S&P 500 index fund investors were more than 30% invested in technology stocks; more than twice as much as in 1997-1998 and almost four times as much as in 1990-1993 (not shown). In 2002, however, the weight was down to 15% again.

3. BARRA RISK INDEX EXPOSURES OF THE S&P 500

Another way to gain some insight into the changing risk-return profile of the S&P 500 is to have a look at the evolution of the BARRA Risk Index Exposures. These are sensitivities to a number of risk indices, computed each month by combining fundamental and market data. Risk index exposures are expressed as standardized numbers. The average stock in the estimation universe (11,500+ US stocks) has an exposure of zero. BARRA distinguishes the following twelve risk indices:

1. **Volatility** - Captures relative volatility using measures of both long-term historical volatility and near-term volatility (such as high-low price ratio, daily standard deviation, and cumulative range over the last 12 months).
2. **Momentum** - Captures common variation in returns related to recent stock price behaviour.
3. **Size** - Captures differences in stock returns due to differences in market capitalization of companies.
4. **Size non-linearity** - Captures deviations from linearity in the relationship between returns and log of market capitalization.
5. **Trading activity** - Measures the amount of relative trading in each stock. Stocks that are highly traded are likely to be those with greater institutional interest. Such stocks may display different returns.
6. **Growth** - Uses historical growth and profitability measures to predict future earnings growth.
7. **Earnings yield** - Combines current and historical earnings-to-price ratios with a measure of analyst-predicted earnings-to-price.
8. **Value** - Distinguishes between value stocks and growth stocks using the ratio of book value of equity to market capitalization.

9. **Earnings variability** - Measures the variability in earnings and cash flows using both historical measures and analyst predictions.
10. **Leverage** - Measures financial leverage of a company.
11. **Currency** - Measures the sensitivity of a company's stock return to the return on a basket of foreign currencies.
12. **Dividend yield** - Computes a measure of predicted dividend yield using the past history of dividends and the market price behavior of the stock.

<< Insert Figure 3 and 4 >>

Similar to figure 1, figure 3 shows the risk index exposures of an S&P 500 index investor by the end of January 1990, January 2000 and July 2002. From the graph we see that the risk index exposures of the S&P 500 do not only deviate significantly from the average stock in BARRA's estimation universe (which by construction has risk index exposures equal to zero), but also that they may vary considerably over time. Figure 4 shows the evolution of the S&P 500's exposures to volatility, momentum, trading activity, growth and earnings yield. Comparing this graph with figure 2 shows that the change in these risk index exposures closely follows the rise and fall of the relative importance of technology stocks in the S&P 500.

In sum, whether one simply looks at the way the S&P 500 is spread over the various industry sectors or approaches risk in a more sophisticated way, it is clear that buying and holding the S&P 500 will leave an investor with a portfolio with risk-return characteristics that may show significant autonomous swings over time. For investors that are serious about matching (the risks of) assets and liabilities this makes straightforward passive indexation a doubtful proposition.

4. CONCLUSION

In this brief note we have argued that simply buying and holding the index in an attempt to minimize costs and thereby improve performance can be a dangerous strategy as significant autonomous changes may occur in the industry allocation and accompanying risk-return profile of the underlying portfolio. The name of the index may not change, but the underlying portfolio does! Leaving job protection aspects aside, indexation appears to be the result of taking the implications of market efficiency just a little too far. To the extent that it is not purely aimed at beating the market, there is nothing wrong with spending some money on data, analysis and trading. Investors need to collect and analyse data to find out what risk-return profiles are on offer in the marketplace. In addition, they may need to trade quite actively to ensure their portfolio stays in line with their risk-return requirements or desired payoff profile. It is a fact of life that responsible investment management requires one to incur costs. The trick is to avoid those costs that have little or no value added, but not to avoid making costs altogether.

Figure 1: Sector weights S&P 500 index

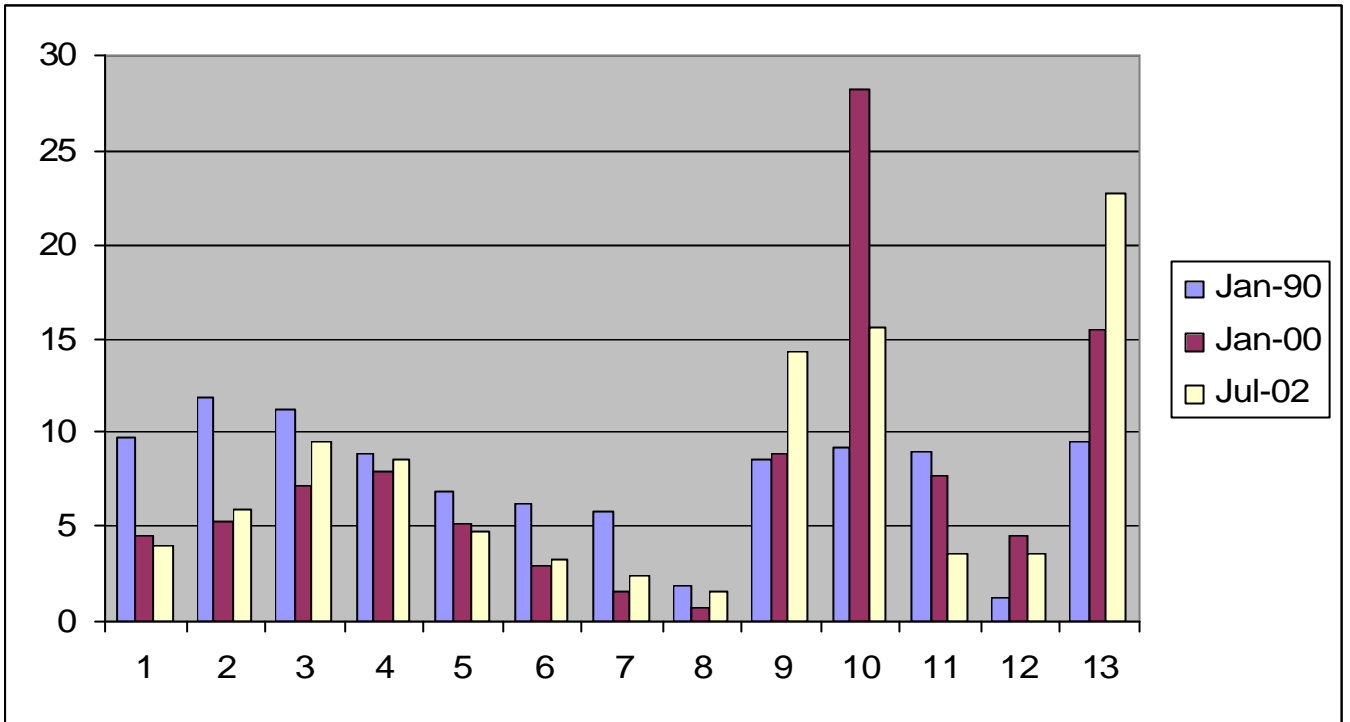


Figure 2: Sector weights S&P 500 index over July 1997 – July 2002

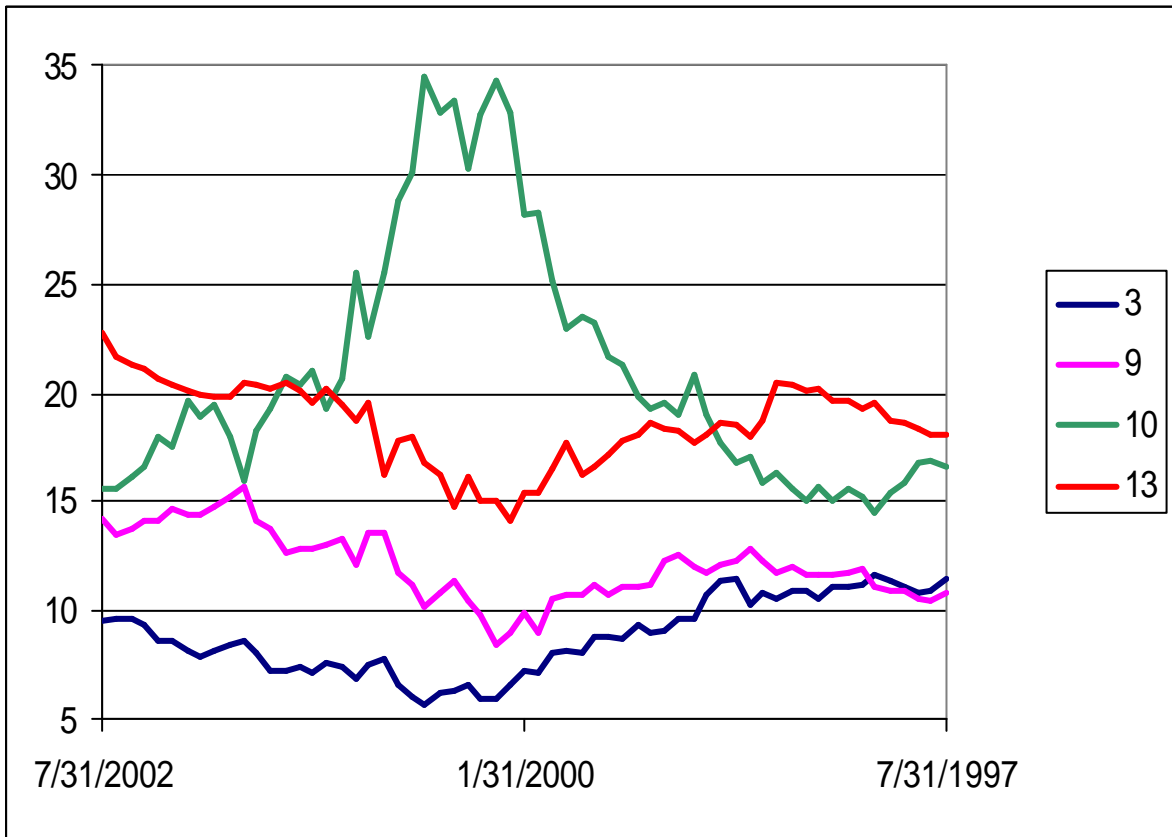


Figure 3: BARRA risk index exposures S&P 500

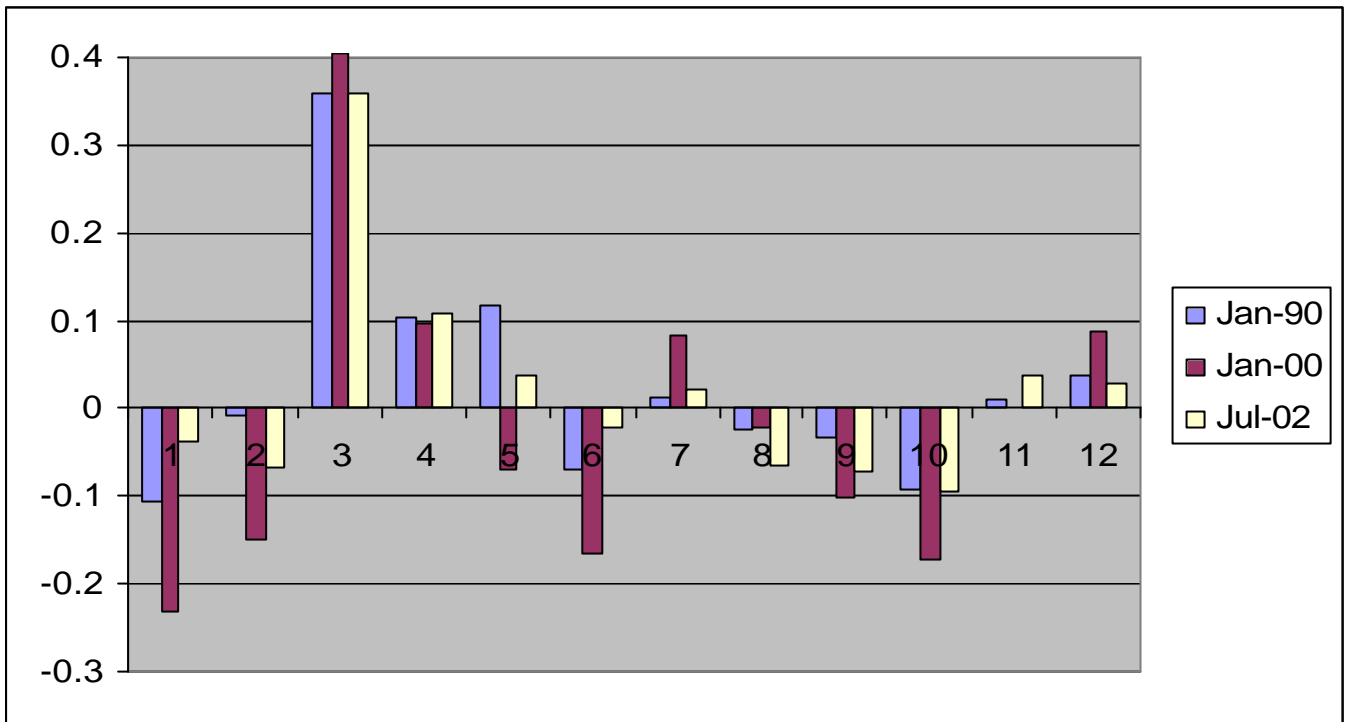


Figure 4: BARRA risk index exposures S&P 500 over July 1997 – July 2002

