

## Research Report

# The Dark Side of ETFs and Index Funds

RECENTLY, PASSIVE ETFs AND INDEX FUNDS HAVE BECOME POPULAR AMONG INDIVIDUAL INVESTORS. IN OUR STUDY, WE INVESTIGATE WHETHER INDIVIDUAL INVESTORS BENEFIT FROM USING THEM. WITH DATA FROM ONE OF THE LARGEST BROKERAGES IN GERMANY, WE FIND THAT INDIVIDUAL INVESTORS WORSEN THEIR PORTFOLIO PERFORMANCE AFTER USING THESE PRODUCTS IN COMPARISON TO NON-USERS. SINCE THESE SECURITIES MAKE MARKET TIMING EASIER, FURTHER ANALYSIS REVEALS THAT THE DECREASE IN USERS' PORTFOLIO PERFORMANCE IS PRIMARILY DUE TO BAD MARKET TIMING.

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### Introduction

Index-linked securities, namely passive Exchange Traded Funds (ETFs) and index funds, have become increasingly popular over the last twenty years (see Figure 1). The first retail index mutual fund was launched in 1976 by John Bogle at Vanguard. The First Index Investment Trust, derisively known as "Bogle's Folly", was based on the S&P 500 index. By 2011, the assets of the Vanguard index funds, modeled on the S&P 500 Index, totaled USD 200 billion (Bogle, 2011). Of households that owned mutual funds, 33% owned at least one index mutual fund.

The first ETF was launched in Canada in 1990. As Figure 1 points out the market for ETFs in Europe also skyrocketed over the last decade.

In 2010, there were more than 1,000 ETFs available to investors and invested assets were above USD 250 billion as the World Federation of Exchanges states. For 2009 Deutsche Börse reported a turnover in ETFs in Germany almost as high as the German stock turnover. In 2012, there were 4,731 ETFs worldwide with USD 2 trillion in assets (the same size as hedge funds), accounting for 16% of NYSE trading volume.

Our study investigates whether these index-linked securities have benefited individual investors and tries to reveal reasons, provided that we find that these products are not helpful. This is an important question to answer, considering how popular these index-linked securities are becoming among individual

investors. In the US, many companies actively seek ways to include ETFs in 401(k) defined contribution pension plans (Ensign, 2012) and even some regulators – both in the US and in Europe – are promoting ETFs to individual investors.

### Background & Literature

Classical finance theory would suggest that individual investors benefit from using index-linked securities like ETFs. These products invest in well-diversified security baskets, and the benefits of diversification have been formalized in seminal papers in finance: Markowitz (1952) suggested we diversify by buying

optimal portfolios and Tobin (1958) later added the argument that we require only two optimal portfolios. In his capital asset pricing model Sharpe (1964) concluded that one of these two portfolios was the market portfolio. French (2008) measured the benefits of passive investing and concluded that "the typical investor would increase his average annual return by 67 basis points over the 1980-2006 period, if he switched to a passive market portfolio." Given that individual investors significantly under-diversify and over-trade, benefits of diversification and passive investing may be even larger for them than for institutional investors. In addition to under-

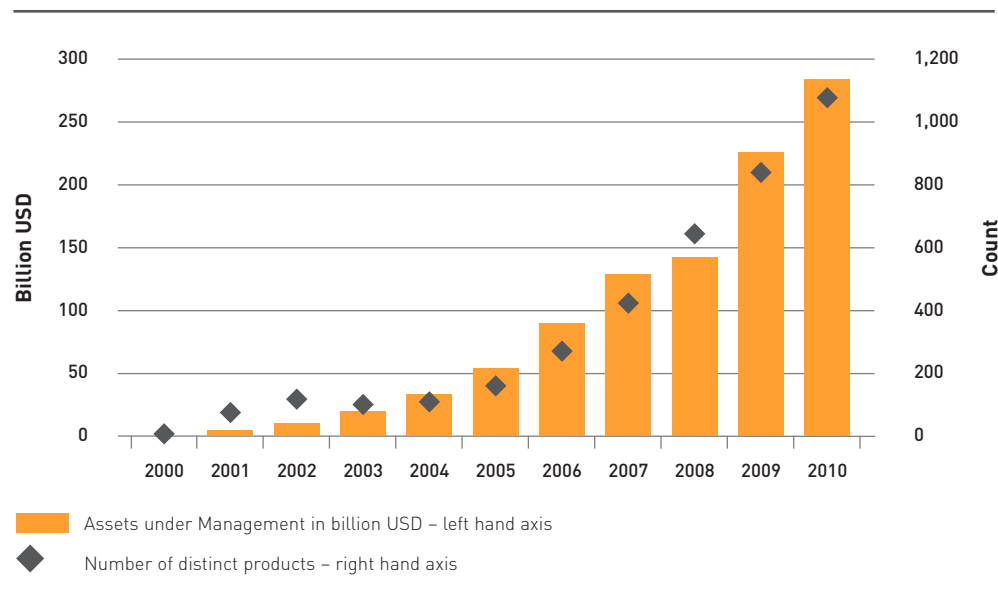


Figure 1: ETF market development in Europe; Source: Blackrock

diversification and over-trading, the portfolios of individual investors who participate in equity markets are typically concentrated in companies whose headquarters are close to the home of an investor (“home bias”, e.g., Calvet et al., 2007). In the presence of these investment “biases”, individual investors face a high potential of performance improvement by using passive investment products.

The upside potential of passive investment products is especially pronounced for ETFs, because ETFs offer some additional advantages over open-end index funds. First, the fees of ETFs are lower compared to the funds.

Second, ETFs trade in real time. Third, ETFs may have tax advantages in some countries.

On the other hand, it is also conceivable that individual investors might not benefit from using index-linked securities like ETFs. There is some evidence that investors may not be using these products wisely. The first dimension of this evidence addresses fund fees. Hortaçsu and Syverson (2004) found large fee differences, although the analyzed index funds were otherwise highly comparable. Similarly, Elton et al. (2004) showed that S&P 500 index funds have become standard products that differ from

each other principally in price. They found that investors in these funds irrationally prefer more expensive funds with the possible explanation that they fall for successful marketing rather than choosing by low expenses. Choi et al. (2010) confirmed this behavior in an experiment. They provided evidence that more financially sophisticated investors pay fewer fees. Second, it is possible that although index-linked securities force the individual investor to buy a basket and therefore curb his temptation to pick stocks, these securities may enhance the investor’s temptation to time the underlying index. In Germany, for example, by 2009, the turnover in ETFs (data obtained from Deutsche Börse) had become about the same as the turnover in stocks (data obtained from the World Federation of Exchanges). Third, it seems conceivable that investors may find it difficult to choose an ETF or an index fund because the choice set contains securities linked to more than 200 different underlying indices. Finally, and in contrast to expectations, not all of the available indices mimic well-diversified market baskets, but some track very narrowly defined sectors or industries.

**Findings**

The key contribution of our study is that we use the individual trading data of a large number of individual investors to test the null hypothesis that individual investors have benefited by using index-linked securities like ETFs (see Figure 2 for the passive share in our sample).

Our first set of findings is as follows: Before investors begin to use passive investment products, namely in the pre-period, in which none of our investors use these products, those who will become users trade more often, have higher portfolio values, and have more idiosyncratic risk in their portfolios. Their portfolio performance is higher, but not significantly so.

However, the key question is what occurs after use? To answer this question, we first need to make sure that we compare users before and after the first use with investors that were comparable before the users started to use ETFs. Therefore, we match a user to a non-user based on all investor-specific variables that are significantly different between these two groups such as age, gender and number of trades or the investor’s idiosyncratic variance share.

In order to measure the effect of index-linked securities on portfolio performance, we use several measures: Raw returns, market-adjusted returns and alphas from 1- and 4-factor models. We use a global index (MSCI All Country World Index) as well as the broadest local index (CDAX) as benchmarks.

Results reveal that using ETFs is not beneficial for users. In fact, positive changes in portfolio performance are lower for users than for non-users. This holds true for any of the above portfolio performance measures



Figure 2: The use of index-linked securities in our sample

using any benchmark index. Our overall conclusion is that individual users of index-linked securities worsen their portfolio performance compared with non-users.

Unwise use of these index-linked securities may explain the worsening of users' portfolio performance after use. Another reason could be the deterioration of the returns of the other securities. To rule out the second reason, we divide users' portfolios into a passive part consisting of ETFs and index funds and an active part consisting of all other products. We analyze the performance of these two parts separately, compare them to the full portfolio and test the differences at the single investor level. We find that the performance deterioration for portfolios of ETF-users is driven by an underperforming passive part. We also find that the addition of ETFs and index funds makes the full portfolio less efficient (the Sharpe ratio of the full portfolio is lower than the Sharpe ratio of the active part). This means that investors not only have a worse performance in their passive part as compared to their active part, but even the diversification benefit to the full portfolio is virtually non-existent. This finding is contradictory to expectations and naturally raises the question why the passive part fails to meet these expectations.

After establishing the use of index-linked securities as a cause for performance deterioration of private investors, we investigate in a second step how investors use, or rather misuse, these products. As in Odean (1999), we

check all purchases and sales transactions in ETFs and index funds to measure security selection and market timing skills. We find that the returns following purchases are significantly lower than returns following sales for a 1-month, 6-months or 12-months horizon. If we decompose these returns into the market return (market timing) and the market-adjusted return (security selection), we find that the deterioration in returns is arising from the market return.

This indicates that market timing might possibly be the reason for the performance deterioration. On the other hand, market-adjusted returns (security selection) often improve after use. Concerns that results might be driven by the choice of a benchmark seem not to be valid, since we find similar results for the CDAX and the MSCI World indices.

### Conclusion

We conclude from the above results that poor market timing and not poor security selection is responsible for the performance deterioration experienced by the users of index-linked securities like ETFs.

By definition, trading in index-linked securities is trading in baskets. This should prevent individual investors from making wrong stock picks, and so it should not be surprising to find that users of index-linked securities have non-negative security selection skills after using these products. The more interesting result is that users of index-linked securities worsen their market timing ability by

using these products. The reason must be that users employ these easy-to-trade index-linked securities – which are highly correlated with the market – to make bets on market phases. And they bet wrong.

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