

FOCUS

14 January 2025

The inefficient market

Passive investing continues its success unabated. In 2024 alone, passive investments recorded a global net inflow of around USD 1.1 trillion. As pleasing as the development of a stronger equity culture and broad participation in corporate profits is, more and more academic studies are pointing to the 'downsides' of exchange-traded funds (ETFs) and the like. Recent studies confirm that index investments reduce the liquidity of individual stocks, increase the volatility of individual stocks, lead to higher index concentration, drive up valuations and make the market as a whole more susceptible to shocks. These findings are consistent with our own analyses of recent years.¹

In this publication, we look at what is currently driving the shift from active to passive equity funds, what could change this trend, and the direct and indirect effects of this shift on equity markets. The power of index providers and ETF companies has increased significantly and the market structure itself has changed. Listed companies are increasingly using the knowledge of non-fundamental capital flows to their own advantage, to the detriment of ETF investors – for example, by increasing the sharebased compensation of their employees in response to inflows from index funds. Active and flexible investors should use the knowledge of increasingly inefficient markets and, above all, incorporate positioning data more into their analysis.

The shift from active to passive funds has continued to increase

Passive investments are growing in importance as they allow investors to invest quickly, cheaply and with seemingly no downside. In recent years in particular, passive products have seen inflows while active funds have seen outflows (Fig. 1).





Time period: 01/01/2021 - 31/12/2024 Source: ICI, Bloomberg, FactSet, own calculations. Within *Focus* we comment on extraordinary market events and analyse capital market related special topics.

More and more academic studies are highlighting the side effects of passive investing. We examine these and the drivers behind the shift from active to passive equity funds.

¹ See Berenberg Markets Focus 'Attention risk: the vulnerability of the markets is growing', 11 October 2018, and Berenberg Markets Focus 'Passive investments change market structure and market behaviour', 5 May 2021

In addition to the steady inflows from 401(k) savings plans (private retirement plans in the US) - a market with c. USD 7.4 trillion assets under management by the end of 2023, according to the Investment Company Institute - the sub-par performance of many active funds is also responsible for this. ETFs now account for more than 50% of fund assets under management in the US.

The increased shifts by investors from active to passive equity funds have implications for the markets. According to Northeastern University, the rise of passive investing is leading to an increase in the average manager skills of active funds, because portfolio managers who do not achieve an excess return have to contend with outflows to a disproportionate extent.² In addition, more money flows into the equity markets on balance because ETFs are 100% invested, while active funds often hold cash of two to five per cent to cover possible outflows or to have dry powder available for possible opportunities in the market. So, by switching from active to passive, an additional 2-5% flows into equity markets. Since active funds often hold non-benchmark securities as potential alpha sources, these have to be reduced as a result of fund outflows, which puts further pressure on these securities and on active funds that are invested in them.

Fig. 2: Reallocations, ceteris paribus, lead to rising stock indices Case study: switch of a fictitious equity fund into an equity ETF

	Active equity fund	Passive equity ETF
Equity component (benchmark)	70 %	100 %
Equity component (non-benchmark)	27 %	-
Cash quota	3 %	-

When switching from active to passive funds, more money tends to flow into equity markets, with non-benchmark stocks being sold and benchmark stocks being bought.

Source: Berenberg, own calculations

This creates a cycle: active funds experience outflows, have to sell non-benchmark and benchmark securities, while inflows allow ETFs to buy only benchmark securities - see the example in Figure 2. This leads to further underperformance of active funds and further outflows. Net, this relationship drives stock benchmarks and their valuations higher – at least as long as index funds, in aggregate, experience massive inflows.

In addition, ETF buying via savings plans often take place automatically on a monthly basis, regardless of the fundamental environment. An ETF savings plan is not interested in interest rates, inflation rates or valuations. Instead, it buys a fixed amount at pre-defined intervals (e.g. monthly). This cycle can only be broken if unemployment rises sharply and thus less money flows into private retirement provisions via index funds. Or if there is a demographic shift from equities to bonds due to an aging population. However, the baby boomers who are now retiring have saved little for their retirement with ETFs, as these have only gained in popularity over the last decade. A recent survey by State Street Global Advisors shows that millennials are leading the way in ETF usage.³ 58% of millennials report using ETFs in their portfolios, compared to 47% of Gen X and 37% of baby boomer investors.

More capital is flowing into markets as a result of the shift into passive funds. Meanwhile, the pressure on non-benchmark equities is increasing.

ETFs drive benchmark stocks and valuations upward through inflows, while active funds experience outflows, which puts pressure on non-benchmark stocks and thereby increases the likelihood of further underperformance by active funds.

We believe that the steady inflows into equity ETFs can only stop if:

1. Unemployment in the US rises, causing ETFbased retirement savings plans to decline.

2. There is a demographic shift from equity to bond ETFs.

² See Huang, D. (2024). The Rise of Passive Investing and Active Mutual Fund Skill. SSRN Electronic Journal. http://dx.doi.org/10.2139/ssrn.4190266

³ See https://www.ft.com/content/61970443-4677-4dc3-bdce-dec8b6093e9f



Fig. 3: Millennial investors use ETFs the most Representation of ETF usage across generations



Period: 01/04/2024 - 25/04/2024

Source: State Street Global Advisors, Australia Services Limited.

Accordingly, it will likely take some time before equity market ETFs as a whole experience substantial outflows due to, for example, target-date funds.⁴ These investment funds do not allocate assets based on fundamental indicators, but automatically adjust their investment strategy based on a specified target year (e.g. the start of retirement). The closer the target year gets, the more defensive the fund becomes, shifting from riskier assets such as equities to safer ones such as bonds. The primary investments are in equities and bonds. Should this change in the future, it could put pressure on equity benchmarks. If, for example, these funds were to start investing in gold, bitcoin, commodities, private credit or private equity in the future, this would be at the expense of the equity quota.

Companies meet the increased demand for stocks through index funds

One interesting question in the context of continuous ETF inflows is who actually sells the index securities to the ETF providers. A recent study indicates that companies are the most important liquidity providers in the form of stock compensation or convertible bonds.⁵

However, the tendency of companies to take the opposite position to the demand from index funds is not symmetrical with regard to purchases and sales by index funds. In particular, there is a strong tendency for companies to issue shares when passive investors are net buyers, while the reaction of companies is muted when index funds are net sellers. In quarters when index funds are net buyers, the beta according to the study is -0.95. This means that in these quarters the market is balanced by companies issuing shares in a ratio of almost one to one. If no distinction is made between falling and rising markets, the beta is -0.64. This means that, on average, companies provide 0.64 percentage points of their shares when passive investors demand one percentage point of the outstanding shares.

3. In the future, the so-called target date funds will focus more on diversification and allocate to other asset classes such as gold, Bitcoin, commodities, private credit or private equity, at the expense of the equity allocation.

Companies increasingly issue shares through employee share programmes and thus serve the increasing demand for shares from index funds.

However, there is a strong tendency for companies to issue shares when passive investors are net buyers, while there is limited buying by companies when index funds are net sellers.

⁴ See Berenberg, (2022), Markets – Focus on 'The increasing influence of target-date funds on the markets' ⁵ See Sammon, M. & Shim, J. (2024), Who Clears the Market When Passive Investors Trade?, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4777585



Fig. 4: Companies meet the demand for shares from index funds Cumulative beta of the various market participants to changes in demand from index funds



Source: Sammon & Shim, 03/10/2024, Who clears the market when passive investors trade?

Fig. 5: Sharp increase in share-based remuneration Development of stock compensation of S&P 500 companies (in USD billions) since 2010



S&P 500 Stock Based Compensation (in USD billion)

Time period: 01/01/2010 - 31/12/2023 Source: Factset, own calculations.

In response to the inelastic demand of passive funds for equities, listed companies are increasingly using equity compensation programmes and stock issuance. The S&P 500 index members at the end of 2023 reported share-based compensation of 36 billion US dollars in the calendar year 2010. Thirteen years later, this figure had already risen to 221 billion US dollars, an annual increase of 15%. Around a third of share-based compensation now comes from tech companies.

Accordingly, companies are increasingly using knowledge of non-fundamental flows. For example, a member of Palantir's management board recently tweeted that his company's inclusion in the Nasdaq index should force ETFs to buy stock in the billions':

"We are moving @PalatirTech to Nasdaq because it will force billions in ETF buying and deliver 'tendies' to our retail investors. Player haters be aware that we've been hated for decades (plural). Everything we do is to reward and support our retail diamondhands following."

Source: Carmen Reinicke (Bloomberg), 18/11/2024, Palantir director deletes X-account after 'ETF purchase' post: https://www.bloomberg.com/news/articles/2024-11-18/palantir-pltr-board-member-deletes-x-account-after-etf-buying-post

However, after sending the tweet, he felt compelled to quickly delete it – after all, it shows how companies are using the enthusiasm for passive investing as free riders. Meanwhile, there are even investor relations agencies such as ModernIR⁶ that advise companies on how they can benefit from passive flows. ModernIR advertises on its homepage that listed companies should focus less on active investors, who have more outflows than inflows, and more on passive capital. Consequently, the earnings reporting cycle should be optimised and capital allocation reconsidered.

The biggest profiteers of the ETF boom are, besides the ETF providers, the stock exchange operators and index providers, who are earning a fortune from the ETF boom through license fees. Moreover, their power has increased significantly in recent years, as they decide on the fate of individual companies with their index adjustments. If a company is included in a major index, it can expect strong inflows and higher valuations. If a company drops out of an index, there is less non-fundamental demand. Hedge funds and arbitrage strategies exploit this knowledge to buy entry candidates before index inclusion and sell exit candidates before index exclusion.

Tech companies in particular are responding to the demand for passive funds with increasing sharebased compensation.

Meanwhile, there are already IR agencies that advise listed companies on how to benefit from nonfundamental ETF inflows.

Among those profiting from the ETF boom are ETF and index providers, while hedge funds deliberately exploit the index effect (index adjustments), often to the detriment of index investors.

⁶ See https://modernir.com/

They take advantage of the so-called index effect, in which stocks added to an index generate positive excess returns in the days leading up to the official inclusion, while stocks removed from an index generate negative excess returns. After an index adjustment, there are often mean-reverting effects, at least in the short term.⁷ The fool here is often the index investor who invests in stocks that have risen sharply before being included in the index and often initially fall for a while after being included – see Tesla (TSLA) versus Apartment Investment & Management Company (AIV) in December 2020.

The December 2020 reshuffle, which saw AIV removed from the S&P 500 and TSLA added, spectacularly conformed to this pattern – after six months, AIV had a relative return advantage of 78% over TSLA.





Time period: 18/12/2020 - 18/06/2021

Source: Rob Arnott, Research Affiliates, Juni 2024, Revisiting Tesla's Addition to the S&P 500: What's the Cost, Before and After?

Accordingly, index rebalancing is often a buy-high sell-low strategy – expensive stocks that have performed well are added, while stocks that have performed poorly and are cheap are removed from the index. For example, a June 2024 study showed that the introduction of an ETF for the Australian S&P/ASX 300 Index significantly increased the index effect, particularly when adding companies to the index.⁸ Passive ETF flows caused a 5.86% increase in cumulative abnormal returns in the period between the announcement and the date of the effective index change compared to a scenario without ETFs.

The index concentration is increasing

The index concentration in the S&P 500 has increased significantly in recent years. The seven largest stocks now account for more than 30% of the S&P 500. There are fundamental reasons for this. The largest US companies all have scalable business models and are capital-efficient. They are benefiting from the AI boom and their profits are booming. Moreover, the US has grown much faster than most other economies in recent years. However, the high index concentration also has non-

The concentration of the index in the $S \Leftrightarrow P$ 500 is growing, with large stocks benefiting from a high index inclusion rate, while smaller stocks and value stocks tend to be penalised.

⁷ See Arnott.R., (2021), Revisiting Tesla's Addition to the S&P 500: What's the Cost, Before and After?, https://www.researchaffiliates.com/publications/articles/832-revisiting-teslas-addition-to-the-

sp500#:~:text=Tesla%20entered%20the%20index%20in,day%2C%20Friday%2C%20December%2018. ⁸ See Howard, C. (2024), ETF flows and the index effect, https://papers.srn.com/sol3/papers.cfm?abstract_id=4875607#:~:text=Further%20analyses%20con-

firm%20ETF%20flows,assets%20altering%20the%20index%20effect.

fundamental reasons. The S&P 500 has by far the highest passive penetration in the US. No index experiences more non-fundamental inflows or outflows. For example, one study from October 2024 shows a significant reduction in the price elasticity of demand for all types of investors, with passive investment pressure mainly affecting stocks with higher market capitalisation.⁹ The results suggest that the increase in passive investment accounts for about 15% of the increased inelasticity of demand for stocks. In other words, passive flows are often inelastic, with price and thus valuation playing no role. Another study shows that stocks with a high index inclusion rate (IXI), i.e. stocks that are included in multiple heavily passively tracked indices, exhibit superior returns, driven primarily by passive capital inflows rather than fundamental factors. The underperformance of value and small-cap stocks in recent decades may be partly due to the dominance of passive investing.¹⁰

Fig. 7: Significant outperformance of equities with a high index inclusion rate

Cumulative performance of equities with a high (High IXI) and low index inclusion rate (Low IXI) and relative performance of equities with a high index inclusion rate vs equities with a low index inclusion rate (quotient)



Source: Pouya Behmaram, 21/10/2024, From Realized to Expected: The Passive Investing Impact.

Another study¹¹ comes to a similar conclusion: According to this study, cash inflows into passive funds lead to a disproportionate increase in the value of large companies in particular, which are overvalued by the market. These effects are strong enough to drive up the overall market, even if the inflows are solely due to investors switching from active to passive funds. Consistent with the theory, the largest companies in the S&P 500 show the highest returns and volatility increases after inflows into the index. One reason for this is that a company's liquidity often does not scale with its market capitalisation. Low liquidity leads to higher bid-ask spreads and can increase volatility, as even small orders can move the price significantly.

The increasing concentration of the S&P 500 means that diversification is steadily declining. Although investors pro forma buy 500 companies when investing in the S&P 500, only a few stocks drive the index return, and the risk of an index investment

Academic studies show that passive inflows increase valuations and volatility.

High concentration in the S&P 500 reduces diversification and makes the index vulnerable to mega-cap losses.

⁹ See Behmaram. P. (2024), From Active to Passive: The Consequences for Demand Elasticity, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4823976#:~:text=The%20analysis%20reveals%20a%20significant,inelasticity%20of%20demand%20for%20stocks.

 $^{^{10}}$ See Behmaram. P. (2024), From Realized to Expected: The Passive Investing Impact, https://papers.srn.com/sol3/papers.cfm?abstract_id=4996354

¹¹ See Jiang. H. & Vayanos, D. & Zheng, L. (2024), Passive Investing and the Rise of Mega-Firms, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4851266



increases accordingly. Should the mega caps fail to meet their high profit expectations and the stocks fall accordingly, this is likely to drag down the S&P 500 as well – especially given that the index weighting of these stocks is so enormous and many of these mega caps are included in a large number of ETFs. Microsoft, for example, is included in 766 U.S.-listed equity ETFs and, as a tech company, is even represented in a utilities ETF, accounting for one-third of the nearly 1,800 U.S.-listed domestic equity ETFs.¹²

The fragility of individual stocks continues to increase

Recently, there have been particularly large price movements, both up and down, in individual companies, especially during the reporting season or in ad hoc news – even in mega caps. In our opinion, these extreme movements can be attributed to three factors. Firstly, inflows into index funds drive up valuations, so the downside is particularly high when there is disappointment. Especially since intraday liquidity has tended to decrease in recent years, and trading liquidity has shifted towards the closing.¹³ Since companies rarely report at the close, but often before the open or after the close, the range of fluctuation is greater for liquidity reasons.

This effect is also intensified by the fact that information efficiency has increased significantly, at least on the day of the company's results. In the past, people would learn about company results from the newspaper with a few days' delay. The internet has significantly accelerated the gathering of information and the neo-brokers now ensure that even private investors can follow and trade company results in real time. Hence, the new information is priced in quickly, especially since equity analysts can also provide an assessment of the company more quickly due to technical progress (including artificial intelligence). The faster price adjustment to the new information leads to higher volatility mathematically – see Figure 8:

Fig. 8: Faster price adjustments mechanically lead to higher volatility x-axis = trading days (0 = company reporting date), y-axis = hypothetical share price movements



Source: Berenberg, own calculations.

The final factor fuelling increased stock volatility is the market structure itself. Many investors are increasingly investing directly or indirectly in momentum strategies – index investments are also a momentum strategy, for example: outperformers are

Individual stocks have become more fragile. In our opinion, the increased extreme movements are due to three factors.

1. Higher valuation levels and lower intraday liquidity.

2. Information efficiency is accelerated by the internet, neo-brokers and AI, which mechanically leads to faster price adjustments and higher volatility.

^{3.} The rise in momentum strategies and leveraged products is increasing the volatility of individual securities.

¹² See https://modernir.com/the-horde/

¹³ See Bogousslavsky, V. & Muravyev, D. (2023), Who Trades at the Close? Implications for Price Discovery and Liquidity, https://papers.srn.com/sol3/papers.cfm?abstract_id=3485840

given a higher index weighting by design or are included in the index in the first place, while underperformers receive a lower weighting or are even dropped from the index. In addition, the volume of leveraged ETFs and traded call options on US individual stocks has exploded recently. Buying a call option on a stock is also a momentum strategy, as the option's delta (sensitivity to the price of the underlying) increases with the stock price, even non-linearly. The opposite applies in falling markets.



Time period: 02/01/2015 - 16/12/2024 Source: Bloomberg, own calculations.

The market makers are 'short gamma'¹⁴ for these products, i.e. they reinforce trends in both directions. If the price of a share rises, the share must be bought into the strength. The opposite applies when prices fall. The more money flows into these products, the more volatile the underlying equities become.

Conclusion - key points for investors

The dominance of passive investments is fundamentally changing the market structure. Investors and companies are profiting from the enthusiasm for ETFs in the short to medium term, but the long-term risks such as overvaluation and increased fragility should not be underestimated. If there are no external shocks, the US markets, especially the mega caps represented in many indices/ETFs, and valuations should continue to rise, driven by liquidity.

However, markets have become structurally more fragile since the financial crisis. This is due to a feedback loop in which investors rush into a limited number of momentum trades (especially market capitalisation-weighted ETFs) and then face a lack of trading liquidity when exiting (when liquidity is most urgently needed). This effect is intensified by the fact that listed companies take advantage of the undifferentiated demand for equities through passive flows and sell equities when markets rise. However, the reverse does not apply to the same extent: companies buy far fewer equities when markets fall. As a result, there is a structural shift towards a leptokurtic return distribution with so-called 'fat tails'. These types of distribution have a higher probability of occurrence of small positive or negative returns on the one hand and very

¹⁴ See Berenberg Markets – Focus on the 'Power of the Options Markets', 5 May 2023.

high positive or negative returns on the other. Longer phases of calm with moderate returns alternate with volatility shocks and extreme returns.

As long as in aggregate ETFs continue to see inflows, the probability of rapid recoveries (V-shaped recoveries) after corrections driven by non-fundamental inflows into equities remains high. Accordingly, momentum strategies should continue to perform well. It also makes sense for investors to hold stocks with high index inclusion rates to benefit from non-fundamental flows. However, at some point in the next few years, we will see a demographic turning point in these inflows. At that point, stocks with a high index inclusion rate in particular are likely to come under pressure. Flexible, active strategies could benefit from these inefficiencies.

As long as ETFs continue to see inflows, momentum strategies should also continue to work well. However, should ETFs experience longer periods of outflows in the future, the highly weighted index securities in particular are likely to come under pressure.



PUBLISHING INFORMATIONS

PUBLISHER

Prof Dr Bernd Meyer, CFA | Chief Strategist Wealth and Asset Management

AUTOREN



Ulrich Urbahn, CFA | Head of Multi Asset Strategy & Research is multi-asset portfolio manager and is focussed on the generation of investment ideas and capital market communication +49 69 91 30 90-501 | ulrich.urbahn@berenberg.de

IMPORTANT NOTICES

This information is a marketing communication. This information and references to issuers, financial instruments or financial products do not constitute an investment strategy recommendation pursuant to Article 3 (1) No. 34 Regulation (EU) No 596/2014 on market abuse (market abuse regulation) nor an investment recommendations pursuant to Article 3 (1) No. 35 Regulation (EU) No 596/2014, both provisions in connection with section 85 (1) of the German Securities Trading Act (WpHG). As a marketing communication this document does not meet all legal requirements to warrant the objectivity of investment recommendations and investment strategy recommendations and is not subject to the ban on trading prior to the publication of investment recommendations and investment strategy recommendations. This document is intended to give you an opportunity to form your own view of an investment. However, it does not replace a legal, tax or individual financial advice. Your investment objectives and your personal and financial circumstances were not taken into account. We therefore expressly point out that this information does not constitute individual investment advice. Any products or securities described may not be available for purchase in all countries or only in certain investor categories. This information may only be distributed within the framework of applicable law and in particular not to citizens of the USA or persons resident in the USA. The statements made herein have not been audited by any external party, particularly not by an independent auditing firm. Any future returns on fund investments may be subject to taxation, which depends on the personal situation of the investor and may change in the future. Returns on investments in foreign currencies may increase or decrease due to currency fluctuations. The purchase, holding, conversion or sale of a financial instrument, as well as the use or termination of an investment service, may give rise to costs that affect the expected income. In the case of investment funds, you should always make an investment decision on the basis of the sales documents (key information document, presentation of past performance, sales prospectus, current annual, if applicable, semi- annual report), which contain detailed information on the opportunities and risks of the relevant fund. In the case of securities for which a securities prospectus is available, investment decisions should always be made on the basis of the securities prospectus, which contains detailed information on the opportunities and risks of this financial instrument, otherwise at least on the basis of the product information document. An investment decision should be based on all characteristics of the fund and not just on the sustainability-related aspects. All the aforementioned documents can be obtained from Joh. Berenberg, Gossler & Co. KG (Berenberg), Neuer Jungfernstieg 20, 20354 Hamburg, Germany, free of charge. The fund sales documents and the product information sheets for other securities are available via a download portal using the password »berenberg« at the Internet address https://docman.vwd.com/portal/berenberg/index.html. The sales documents of the funds can also be requested from the respective investment management company. We will be pleased to provide you with the specific address details upon request. A fund investment involves the purchase of shares in an investment fund, but not a specific underlying asset (e.g. shares in a company) held by that fund. The statements contained in this document are based either on own company sources or on publicly accessible third-party sources, and reflect the status of information as of the date of preparation of the presentation stated below. Subsequent changes cannot be taken into account in this document. The information given can become incorrect due to the passage of time and/or as a result of legal, political, economic or other changes. We do not assume responsibility to indicate such changes and/or to publish an updated document. For important disclosures and information on index- and market data, see https://www.berenberg.de/en/legal-notice/license-notice/. Past performance, simulations and forecasts are not a reliable indicator of future performance. Please refer to the online glossary at www.berenberg.de/glossar for definitions of the technical terms used in this document. Date: 14 January 2025

Joh. Berenberg, Gossler & Co. KG Neuer Jungfernstieg 20 20354 Hamburg (Germany) Phone +49 40 350 60-0 Fax +49 40 350 60-900 www.berenberg.com MultiAssetStrategyResearch@berenberg.de

The following publications are part of the series Berenberg Markets:

Monitor Focus Investment Committee Minutes

www.berenberg.de/en/publicatio