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Within *Focus,* we comment on extraordinary market events and analyse capital market-related special topics.

Passive investments change market structure and market behaviour

The importance of passive investments continues to grow. They enable investors to invest quickly, cost-effectively, and supposedly without disadvantage in different asset classes, regions, or segments, even if underlying securities are not very liquid. However, their growing importance is leaving its mark on the behaviour of the overall market and individual securities. Passive investments are one of the drivers of the continuously changing market structure. With a focus on equities, we highlight the key implications of passive investing that investors need to be aware of. However, many findings also apply to bond markets. For active investors, this development also creates opportunities.

The market structure and market behaviour continue to change, investors must take this into account

The trend towards passive investing continues unabated, ...

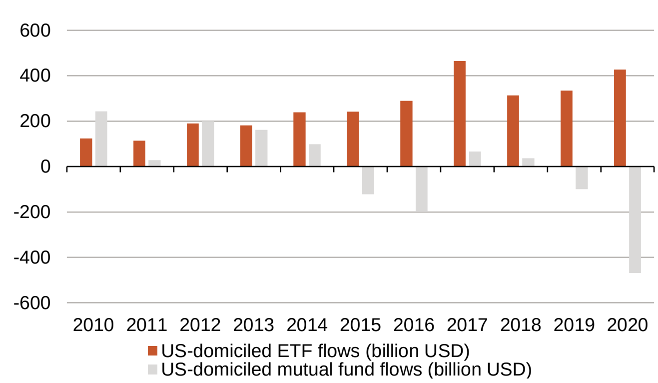
For many investors, entering the capital market no longer means selecting attractive securities themselves or hiring an active portfolio manager to perform the selection. Alternatively, it means putting money into a passive index fund or an exchange traded fund (ETF). This is shown by the capital flows. According to the Investment Company Institute (ICI), US active funds faced outflows of approximately USD 50 billion since 2010, while nearly USD 3 trillion has flowed into US ETFs (see Fig. 1). Especially in recent years, passive products benefitted from inflows, while active funds have experienced outflows. Since the beginning of the year, active equity funds also saw inflows, but the inflows into ETFs were more than three times as large (see Fig. 2).

Retirement plan products and systematic strategies in particular are driving the trend towards passive investments

Retirement plan products and systematic strategies are two driving forces. Already, many 401(k) savings plans (private pension plans in the US) – a market that amounts to 6.7 trillion US dollars in size according to ICI – are passively represented. Net inflows are mainly invested in index funds. While older generations, which are now retiring, still primarily invested in active funds – partly because there was no widespread availability of ETFs before the turn of the millennium – and are now divesting them in retirement, the younger generations are relying more on passive products for their old-age provision. This is probably, as well as poor performance

Fig. 1: Two worlds: Strong outflows among active managers...

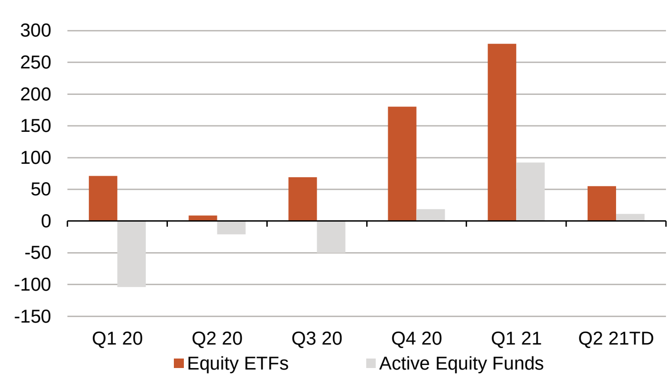
Net flows of US domiciled mutual funds and ETFs



Period: 01/01/2010 - 31/12/2020
Source: www.Bloomberg.com, ICI

Fig. 2: ... versus significant inflows in ETFs

Global net equity fund inflows for ETFs and active funds per quarter since 2020 (USD, bn)



Period: 01/01/2020 - 28/04/2021
Source: BofA Global Investment Strategy, own calculations

figures by some mutual funds – especially those with high costs that are positioned close to their benchmark, – one reason why active funds are struggling with outflows while passive funds are recording inflows. Systematic strategies and Robo Advisors also tend to rely on index products due to their simplicity and supposed liquidity. They tend to increase their equity exposure when price momentum is positive and volatility is low, and reduce it in the opposite case. Therefore, they act in a trend-reinforcing manner.

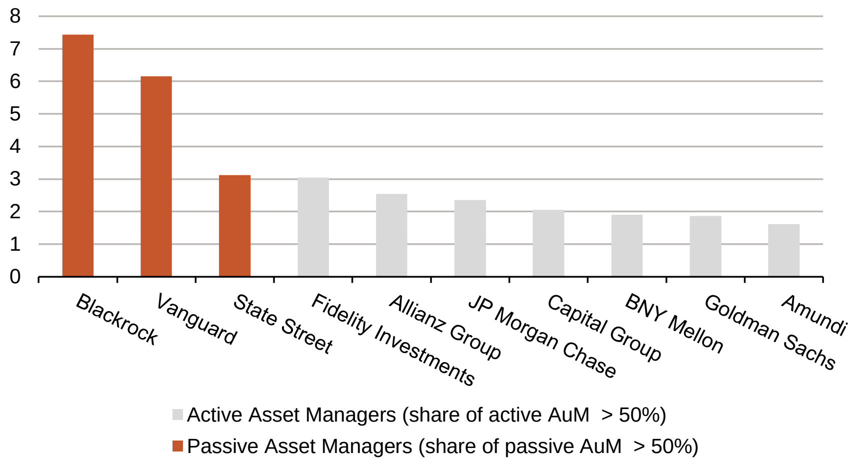
...increases the importance of passive investors and has consequences

Index funds and ETFs already account for 20 to 30 percent of the US stock market today

Index fund and ETF providers have risen to become the largest asset managers in the world (Fig. 3). For nine out of ten companies in the S&P 500, the largest single shareholder is one of the big three ETF providers, Blackrock, Vanguard and State Street. Index funds and ETFs now control at least 20 to 30 percent of the US stock market. Although many financial institutions offer their own index funds to their clients, the big three providers dominate the passive product market with a share of 80% or more and are gaining increasing power as well as control.[1] Even though ETFs represent a way for investors to participate in market developments in a cost-effective, transparent and supposedly efficient manner, the increasing dominance of passive investors also has detrimental effects on markets.

Fig. 3: Dominance of ETF providers

Assets under management of the largest asset managers worldwide in 2019 (USD, trn)



Source: Statista

1. Passive investing favours a more inefficient allocation of capital

Passive investing is largely price inelastic

When an ETF provider records net inflows, the underlying index components are bought in proportion to the index weighting, usually regardless of how fundamentally expensive or cheap the stocks are. Investors, therefore, invest more in stocks that have already performed very well and thus exhibit higher weights, implicitly betting that these trends will continue. In the case of bond ETFs, investors invest especially in bonds of those companies that have the highest debt levels and therefore even disproportionately high risks. Conversely, when the ETFs are sold, all components are sold regardless of the valuation. Consequently, there is no one actively dumping bad investments or selecting good ones. Index funds and ETFs simply reflect the market - albeit insufficiently (see point 2).

[1] See "The New Money Trust: How Large Money Managers Control Our Economy and What We Can Do About It", Graham Steele, American Economic Liberties Project, November 2020.

Fundamentally oriented, active investors tend to react differently to inflows. If the market is characterised by expensive valuations, more cash is held or invested in securities that still appear relatively cheap. At attractive valuation levels, less cash can be held, and more money could be invested. Accordingly, it stands to reason that the enormous increase in valuations over the past few years was not only a function of lower interest rates, but also, at least in part, of the increase in price-inelastic capital flows.

Fundamentally oriented, active investors behave differently

Moreover, not only has the share of value investors within the active investor community decreased, but the trend towards passive investments has also supported "growth" rather than "value" companies. For example, companies that pay dividends are "penalised". This is because an index product reinvests the dividends accrued according to free market capitalisation. Accordingly, a stock of a dividend-paying company receives proportionally less demand after the dividend date than a stock of a company that has not paid dividends.

Passive investing "punishes" companies that pay dividends

In a world with only passive investors, capital would only flow into large companies and not necessarily into good, promising, or efficient companies. Even in a centrally planned economy, capital is likely to be distributed more efficiently. Fortunately, this state has not yet been reached. But the magnitude of interest regarding the very low-cost ETF providers representing shareholder rights vis-à-vis companies in the interest of investors can be questioned. After all, the incentive to exert a positive influence on companies to actively outperform the returns of the underlying benchmark market does not, by definition, exist for passive investors in times when "active ownership" (engagement) is becoming increasingly important.

Even in a centrally planned economy, capital is likely to be distributed more efficiently than in a world with only passive investors

2. Passive investing deteriorates the information content of market prices and thus the efficiency of markets

The bulk of passive investment products are based on market cap weighted indices, and in theory, this is a good thing. A market-capitalised index represents at least approximately the market portfolio and only in this case inflows proportionally across all companies do not lead to shifts in relative valuation. This idea corresponds to the financial theory that the "market portfolio" is an efficient portfolio that all market participants hold and ultimately decide to allocate their assets between this market portfolio and cash only based on their risk profile. Imagine, alternatively, that all market participants wanted to invest in an equally weighted index. This would ultimately mean that all companies would have the same market capitalisation, regardless of how large they are. Small caps would be significantly overpriced and large caps too cheap.

Passive flows into and out of market-capitalised indices at least do not lead to a shift in relative valuations....

But even with market-capitalised indices, a problem arises from increased passive investing, because in reality passive capital flows do not even get allocated closely to the "market portfolio".

- Market-capitalised indices only approximately represent the market portfolio. Not all stocks are represented in the index and there are always changes in the index composition.
- ETF providers do not always buy all index constituents, but sometimes only the largest securities with the highest liquidity (optimised sampling) in order to keep both the tracking error to the underlying index and the transaction costs of index replication as low as possible. This aspect is particularly important for broad equity indices and bond indices.

...but passive investors still don't just buy the "market portfolio" - and that has consequences

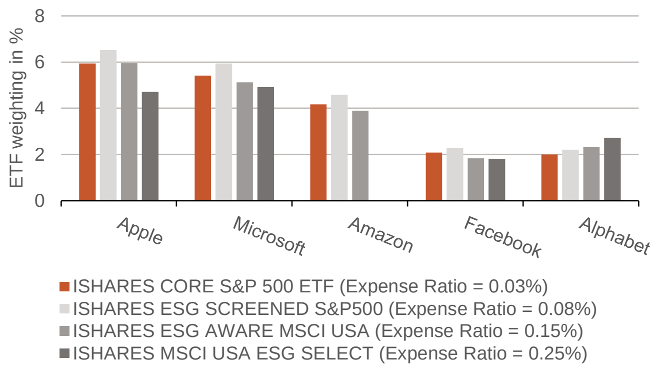
- Investors do not just passively bet on the overall market, but selectively on regions, segments, or investment styles. The so-called megacaps, for example, attract a particularly large amount of money because they are frequently represented in indices. Apple, for example, is highly weighted in the Nasdaq, S&P 500 and MSCI World. Moreover, as a digitalisation winner, the company benefits from its inclusion in many megatrend ETFs. Not to mention the ESG trend, which is currently creating further demand for technology companies that emit no (or very little) CO_2. Many of the current ESG indices have large overlaps with traditional indices with high weights of megacaps. This is very much understandable from an index or ETF provider perspective because the backtests look pleasing thanks to the strong megacap performance in recent years and the higher management fees can be charged for the slightly modified ESG universes (see Fig. 4).
- The increasingly passive mapping of theme investments leads to significant valuation distortions for individual, more illiquid small caps. They are often represented in themed funds, as these often require that a certain minimum turnover share must be achieved in the corresponding thematic field. Since small caps are often "pure plays", they are disproportionately used in thematic vehicles. In addition, these often allocate their holdings on an equal-weighted basis rather than by market capitalisation. If there are larger inflows due to the strong performance of a theme, this particularly reinforces the positive development of the relatively highly weighted small caps. A spiral is set in motion. However, this is a double-edged sword: if the performance clouds over, there are outflows, which reinforce the negative performance of illiquid stocks in particular. This was experienced, for example, by clean energy ETFs. They were among the biggest winners last year and among the relative losers since the beginning of the year (see Fig. 5). Such trends are thus amplified upwards and downwards.

Passive investing is already distorting price signals and reducing the efficiency of markets...

The theory that the "market portfolio" is an efficient portfolio is thus likely to be increasingly called into question. Because fewer and fewer investors are ensuring this efficiency. If the share price of company A plummets after a major negative news events has occurred, it is because active investors are selling. If Company B's shares soar when it announces it is entering a profitable market, it is because active investors are buying. Passive investors, on the other hand, ignore business reports

Fig. 4: ESG ETFs: large overlap with non-ESG index at higher costs

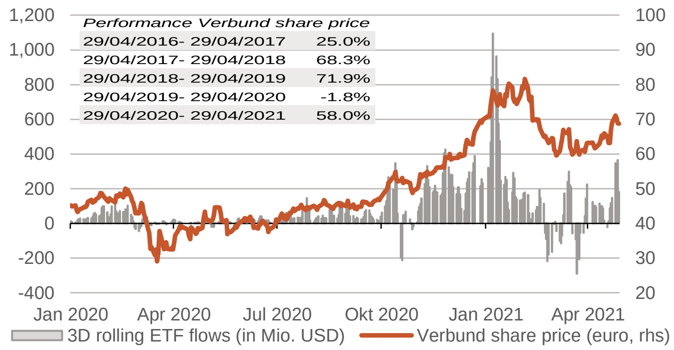
Comparison of the top holdings of the iShares S&P 500 ETF with iShares US ESG ETFs



As of 26/04/2021
Source: iShares, Bloomberg, own calculations

Fig. 5: ETF flows have a reinforcing effect in both directions

Rolling three-day cash flows of iShares Global Clean Energy ETF & iShares Global Clean Energy UCITS ETF and price development of the Verbund share, which is a constituent of the S&P Global Clean Energy Index



Time period: 29/04/2016-29/04/2021
Source: Bloomberg, own calculations

and market rumours. As the proportion of active investors declines, less and less equity research is conducted, and information efficiency decreases. The correlations between individual index components increase with the share of passive investors – their prices move increasingly in the same direction. The volatility of markets increases.[2] There are more abrupt, sharp market movements and volatility spikes (see point 4). Academic studies consequently assume that the price-inelastic security allocation of passive products is already distorting price signals, reducing the efficiency of markets and thus making business and investment decisions more difficult.[3]

...this makes business and investment decisions more difficult

3. Passive investing changes the liquidity situation in the market

Liquidity in the market is increasingly concentrated on a few, highly capitalised listed companies. It is also shifting more and more from opening to closing. The closing auction accounted for a remarkable 7.5% of daily volume in 2018, up from 3.1% in 2010, partly because the closing prices of tracked indices are the benchmark for passive index providers. Consequently, they try to make as many transactions as possible in the closing auction to minimise tracking error. Conversely, liquidity at the opening has deteriorated.[4] Ultimately, the growth of indexing and ETFs not only shifts trading, but can also distort closing prices.

Market liquidity is increasingly concentrated and also shifts towards the closing auction

In addition, ETFs have another significant impact on market liquidity. In a "normal" market environment, ETF market makers provide liquidity as intermediaries between ETF buyers and sellers in the secondary market. Transactions through reissuance or redemption of ETF shares in the primary market represent only a fraction of the total turnover. Trading ETF shares seems unproblematic, even for asset classes that are rather difficult to trade and less liquid. But if either side fails for the most part, the liquidity of the ETFs is reduced to that of the underlying market. ETFs based on a less liquid underlying can thus improve liquidity in a normal market environment, but this liquidity can suddenly decay during periods of stress. Investors run the risk of succumbing to a liquidity illusion.

ETFs based on a less liquid underlying can increase liquidity in the normal market environment,...

...in times of stress, however, this liquidity may not be available

4. Passive investing is one of several drivers of increasing, extreme market movements

In 2020, there were almost three times as many abrupt, sharp market movements across all asset classes as in the year of the financial market crisis in 2008 (see Fig. 7). We look at daily movements that are at least four times larger than the standard deviation (volatility) of the daily movements of the respective last 100 days. The probability of the occurrence of such extreme movements was about 200 times higher in 2020 than under the assumption of a normal distribution of returns, which is still the basis of many model-based investment strategies. Even if fundamental developments and changes in expectations of capital market participants were extreme in 2020, these can only partially explain the extent of the developments in the markets.

2020: 200 times more "black swans" observed than expected assuming normally distributed returns

In our opinion, the main reason for the change in market behaviour is the discrepancy between continuously increasing liquidity requirements and deteriorating (qual-

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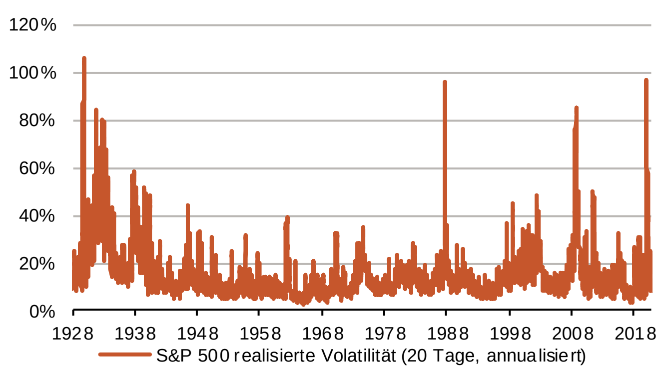
[2] See "Do ETFs Increase Volatility?" Itzhak Ben-David, Francesco A. Franzoni and Rabih Moussawi, 2017, Journal of Finance, Forthcoming. "The Shift from Active to Passive Investing: Risks to Financial Stability?" Kenechukwu Anadu, Mathias Kruttli, Patrick McCabe and Emilio Osambela, Federal Reserve Bank of Boston, Working Paper SRA 18-04, May 2020.

[3] See "On the Economic Consequences of index-linked investing", Jeffrey Wurgler, NBER Working Paper 16376, September 2010. "Is there a Dark Side to Exchange Traded Funds? An Information Perspective", Doron Israeli, Charles M. C. Lee and A. Sridharan, Review of Accounting Studies, Vol. 22, 1048-1083, 2017.

[4] See "Who trades at the Close? Implications for Price Discovery, Liquidity, and Disagreement", Vincent Bogousslavsky & Dimitriy Muravyev, 3 December 2020.

Fig. 6: Extreme stock market volatility in 2020...

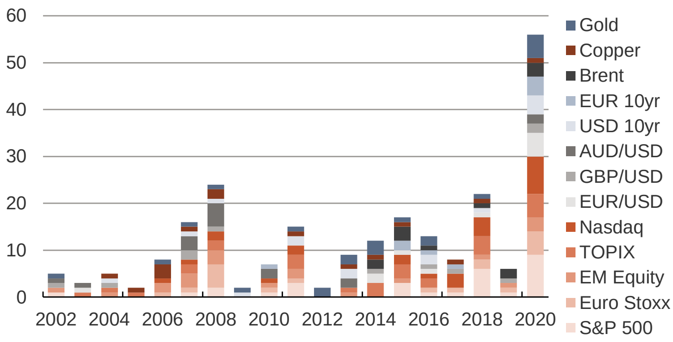
Fluctuation range of the US stock market - 2020 only comparable to 1929 and 1987



Time period: 01/01/1928-31/12/2020
Source: Bloomberg, own calculations

Fig. 7: ... with extreme market movements in all asset classes

Number of daily movements at least 4 times greater than the standard deviation of the daily movements of the last 100 days in 13 different assets



Time period: 01/01/2002-31/12/2020
Source: Bloomberg, own calculations

ity of) market liquidity.[5] The advance of passive investing plays a significant role in this at various points.

Changed market structure favours strong market movements: increasing liquidity requirements...

On the one hand, an increasingly trend-reinforcing behaviour of many market participants can be observed by means of passive investments. These make it possible to invest easily and at supposedly low costs in asset classes that are usually difficult to trade and less liquid or, in the case of bonds, come in too large tranches. Low interest rates, the substitution of government bonds with corporate or emerging market bonds and higher equity ratios make multi-asset portfolios riskier, less well diversified, and more vulnerable. As a result, multi-asset investors are also increasingly behaving pro-cyclically, for example, by reducing risk in falling markets, often easily and quickly by using passive investments. The importance of systematic investment strategies such as target volatility approaches, risk parity approaches, CTAs or short volatility strategies has also increased significantly, not least due to Robo Advisors. As a rule, these strategies have a procyclical effect and thus reinforce trends, mostly by means of passive investments.

...with decreasing liquidity. The advance of passive investing plays an essential role here

On the other hand, liquidity in the markets has deteriorated significantly with fewer and fewer investors who sometimes act contrary to the market, the more limited risk budgets of the banks' trading desks, the rise of electronic trading platforms and so-called high frequency traders (HFTs), the requirements of MiFID II and the advance of passive investing (see point 3.). As a result, there are repeated upward and downward exaggerations and sharp correction movements.

5. Passive investing is both a curse and a blessing for active investors

More inefficient markets tend to offer active investors more opportunities...

The increasing inefficiency of the markets and increased exaggerations in one direction or the other offer active investors more and more opportunities. For example, they can try to anticipate the behaviour of passive investors and position themselves respectively. Impressive examples are the increasing index additions of Chinese mainland stocks or bonds. On the other hand, if the strong trend towards passive investments continues and market behaviour becomes less and less fundamentally justifiable, this makes active investment decisions more difficult. A fundamentally

[5] See article by Prof. Dr. Meyer in "Anlagechancen 2019: Die Hausse vor dem Ende", Verlag FUCHSBRIEFE, October 2018; Berenberg Markets - Focus "Attention risk: the vulnerability of the markets is growing", 11 October 2018; Berenberg Markets - Focus "How black swans became a plague", 20 April 2020; Berenberg Markets - Focus "Corporate bonds – 2020: a year of extremes or the new normal? ", 8 July 2020.

correct investment decision may not work out for a long time if passive capital flows run in the other direction. This leads to the current paradox that fewer active investors still outperform than underperform, although the dominance of passive investors is continuously increasing.

... but with continuous strong inflows into passive investments, it can take a long time for the fundamentals to materialise

We believe that the trend towards passive investing as a pendulum. It is currently still swinging in the same direction, but, in our opinion, it is likely to lose momentum in the future, the more and the stronger active strategies beat their benchmarks due to the increasing opportunities after costs. However, it will probably be years before the pendulum starts swinging in the other direction. After all, simple product structures, low costs, certain tax advantages in the US[6], easy market access via neobrokers with low barriers to entry, simplified access to financial education (social media, YouTube, etc.), and in anticipation of an increasing investment rate into equities among the general population should continue to lead to significant inflows into passive investments for the time being. As described at the beginning, however, active equity funds have seen significant inflows again this year, albeit only a fraction of the inflows of passive products (see Fig. 2).

Trend towards passive investing likely to lose momentum the more and stronger active strategies outperform again

For the time being, however, we can continue to expect significant inflows into passive investments

It will definitely be exciting by the time the generations that primarily put their savings into passive products retire. Then they are likely to shift equity holdings into less risky investments or consume them. In the aggregate, equity index funds would then have to contend with outflows, which is likely to weigh heavily on the equity market and especially the mega caps, ceteris paribus. However, this is still decades away. And who knows, maybe it will be just then that the Western central banks decide to expand their purchase programmes to include equity ETFs.

6. Dominance of passive investors and systematic strategies determines typical course of events in crises

As long as passive vehicles continue to collect money through savings plans on a net basis, sharp selloffs in the equity market are likely to come from the active investment community. This requires an external shock. A portion of investors will then reduce risk, leading to falling prices, weakening momentum, lower liquidity and rising volatility. If the resulting impulse is large enough, the systematic investors follow suit and reduce risks, usually undifferentiated by the means of passive investments. As a result, other investors increasingly reduce their equity quotas and correlations rise in the sell-off, creating opportunities in individual investments. A negative cycle develops until the systematic investors hardly hold any shares. Corporate share buyback programmes, less delta hedging by options traders, pension fund rebalancing and monthly savings plans by retail investors then ensure that the market stabilises and recovers quickly, as happened in March 2020. A few purchases, due to the extremely low liquidity, caused the markets to bounce back upwards quickly and significantly. The improving price momentum and the decrease in volatility then also led to active and systematic investors demanding more shares again. Ultimately, the continuous passive "savings plan" inflows have then at least partially acted as a stabiliser during the crisis. They ignore fundamental events such as pandemics.

[6] See "ETF Heartbeat Trades, Tax Efficiencies, and Clienteles: The Role of Taxes in the Flow Migration from Active Mutual Funds to ETFs" Rabih Moussawi, Ke Shen und Raisa Velthuis, December 8, 2020. https://ssrn.com/abstract=3744519

Lessons for investors – do not buck the trend, but keep an eye on risks and contrasting opportunities

In our opinion, active investors should use ETFs especially for tactical positions or in efficient markets. In addition to that, they should be aware of the opportunities and risks of passive capital flows and take advantage of this knowledge:

- For investors, opportunities are increasingly arising in equities/segments that benefit particularly from passive flows. These include, for example, changes in benchmark composition such as the increasing importance and thus weighting of Chinese investments in global equity and bond indices.
- As an active investor, one can use ETFs especially in efficient markets such as the US equity market. Otherwise, there is an advantage to consider investments in niche markets that have little or no ETF penetration. These are then less correlated to the overall market, often less volatile and are likely to perform better, especially in times of crisis.
- In an environment of increasingly passive and systematic investing and negative real interest rates, fundamental indicators such as valuations play a subordinate role in the asset allocation decision. More decisive is the correct assessment of how key investor groups are positioned, act and what is likely to happen next. The analysis of sentiment, investor flows and positioning data plays a central role here. Investors should in particular keep an eye on rule-based investment strategies. Whenever these exhibit extreme positions on average, a contrarian behaviour may offer itself.
- Investors should also keep a close eye on when the trend reverses and ETFs are net sold. While this is likely to take years (or decades) for the market, it may well happen more quickly and more often for sector, regional and thematic ETFs. Index stocks, which are disproportionately held by such ETFs, are then likely to come under particular pressure.

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