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“THE IMPACT OF ETFs AND INDEX FUNDS ON THE STOCK  
MARKETS”

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## ABSTRACT

The purpose of this research is to shed light on a more and more relevant reality, which has largely developed during the last two decades: the ascendance of ETFs and Index Stock Funds. Through the paper will be broken down the impact of these two vehicles of investment on stock market liquidity as well as the effects that passive investing produces on the underlying assets prices.

The main focus is emphasizing the theoretical implications of passive investing related academic research. First chapter will concede wide space to describe the structure and the working process behind the funds, deepening the peculiar “creation-redemption” process of ETFs, the arbitrage process and their pro and cons relative to the active investment vehicles available on the market. Chapter two analyse how ETFs and Index Funds growth can undermine individual securities liquidity, impact on underlying stocks volatility and affect stock market efficiency. The last part provides personal and objective considerations with regards to the present, and the future, trying to define a conscious outline of the topic offering some points of reflection.

Questa ricerca vuole far luce su una realtà sempre più rilevante, evolutasi ampiamente durante gli ultimi due decenni: l’ascesa degli ETFs e degli Index Stock Funds. Il documento vuole spiegare come i due veicoli di investimento influiscano sulla liquidità dei mercati azionari e gli effetti che questi producono sui prezzi degli asset sottostanti.

La finalità principale è enfatizzare le implicazioni teoriche fornite dalla ricerca accademica su tali fondi. Ampio spazio sarà speso nel primo capitolo per descrivere la struttura e il processo di funzionamento alla base dei fondi, approfondendo il peculiare processo di “creation-redemption” degli ETFs, l’arbitraggio ed i pro e i contro rispetto ai veicoli d’investimento attivi disponibili sul mercato. Il secondo capitolo analizza come la crescita degli ETFs e Index Funds possa intaccare la liquidità delle azioni, influire sulla volatilità e incidere sull’efficienza dei mercati azionari. L’ultima parte fornirà considerazioni oggettive e personali rivolte al presente, e al futuro, cercando di disegnare un quadro consapevole dell’argomento offrendo degli spunti di riflessione.

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## ACRONYMS

ETF: Exchanged Trade Fund

SPV: Special Purpose Vehicle

NAV: Net Asset Value

AP: Authorized Participant

AUM: Asset Under Management

VIX: Volatility Index

CBOE: Chicago Board of Exchange

HFT: High Frequency Trading

BofA: Bank of America

NYSE: New York Stock Exchange

# Chapter I - Introduction to ETFs and Index Stock Funds

## 1.1 Introducing ETFs and Index Stock Funds

Finance and investing are developing faster than ever, making the complex money machine hard to understand. The last two and half decades saw a completely new way of deploying cash that satisfied the necessity of small investor of having access to low cost tools for managing savings. Born in the early 90s passive funds such as ETFs and Index Stock Funds progressively took place into the market, changing the rules, the burdens and the boundaries of the game offering a new investment landscape, trading flexibility and the advantages of pooled capital raise. The chapter describes the two passive funds, breaking down the running process and the core features that characterize ETFs and Index Funds.

### 1.1.1 ETFs

An ETF is an open investment fund listed on a stock exchange which tracks a benchmark - that might be an index or a specific basket of securities – by purchasing the same underlying assets and rebalancing the portfolio whenever the referred benchmark changes. These passive instruments are made up by a sponsor company that manages the creation-redemption process. The latter is completely different from mutual fund's one: mutual funds pool money from investors who subscribe fund quotes; then the sponsor company deploys investor's cash to acquire the individual securities from the market. ETFs do not receive retail investors' cash; they instead exchange fund shares for the individual securities – which will compose the underlying basket - with a provider called Authorized Participant<sup>1</sup>. The latter is whom actually deals with retail investors and savers; it places ETF shares within the stock exchanges and receive cash in return<sup>2</sup>. The creation-redemption process happens on the primary market whereas the trading activity happens on the secondary market. To ensure the running process works properly, the sponsor firm relies on one or more APs. In some case the AP and the issuer might coincide<sup>3</sup>. The sponsor firm does not need to undertake neither the asset management nor the stock picking. It just simply tracks the reference benchmark and adjust its holding whenever

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<sup>1</sup> AP is an institutional firm, traditionally large banks or market makers, that is responsible for helping the sponsor of the ETF in the creation-redemption process (it is not legally obliged) through providing the underlying securities. Moreover, the AP is in charge of maintaining the market price of the ETF and the NAV aligned. To do so APs resort to the arbitrage process (it will be explained in point 1.2.2.) APs are the ones who are allowed to deal directly with the funds.

<sup>2</sup> Source: Borsa Italiana – What is an ETF?; Source: Charles Schwab. See picture 1.

<sup>3</sup> Source: Investment Fact Book 2019.

the index changes. That allows the firm to reduce the transaction costs, managing costs and research costs<sup>4</sup>.

### 1.1.2 Index Stock Funds

The other face of passive investing is represented by Index Funds which are passive mutual funds. By investing in a mutual fund, you get a participation right that allows the holder to benefit of the yields matured in proportion of the amount deployed. Alike ETFs they have set-and-watch investment criteria, which is deploying the money into the fund without any active management, but under the structure of a mutual fund: they require narrower conditions<sup>5</sup>, bigger capital to access the fund and they are not subject to intraday trading. The biggest structural difference between mutual funds and ETFs is the mechanism by which they work: mutual funds are run by a sponsor society which, by law, is obliged to settle its shares to a depositary bank which manages the fund capital. The latter is in charge of placing the products to the end investors under the order of the sponsor firm<sup>6</sup>. The other big difference from ETFs is that Index Funds are not listed on the exchange thus it isn't possible to trade them like stocks. Hence, mutual funds shareholders cannot deal among each other in the secondary market at any time of the day; they rather have to deal directly with the fund. In fact, all the transactions are executed at the market closure when the NAV<sup>7</sup> is newly calculated and the sponsor firm, such as a clearinghouse, matches demand and offer of fund shares. Mutual funds' price is equal to the NAV while ETFs are traded at market prices. That means they can be bought and sold at a premium or discount according to market valuations.

## 1.2 Structure and Running Process

### 1.2.1 Creation – Redemption Process

ETFs are characterized by the peculiar “in-kind process”. As “in-kind” suggests, it involves an exchange of fund stocks for individual stocks: In fact, the mechanism consists in issuing ETF shares worth as much as the sum of the individual securities. It is like an initial contribution in-kind of an industrial business (i.e. plant, machinery), however the assets settled are financial

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<sup>4</sup> Source: Investopedia.

<sup>5</sup> After the introduction of MIFID and MIFID II, the class of products sold by the sponsor firm must match investor's risk profile. Moreover, to access a mutual funds it is required a minimum plafond in the order of thousands of dollars.

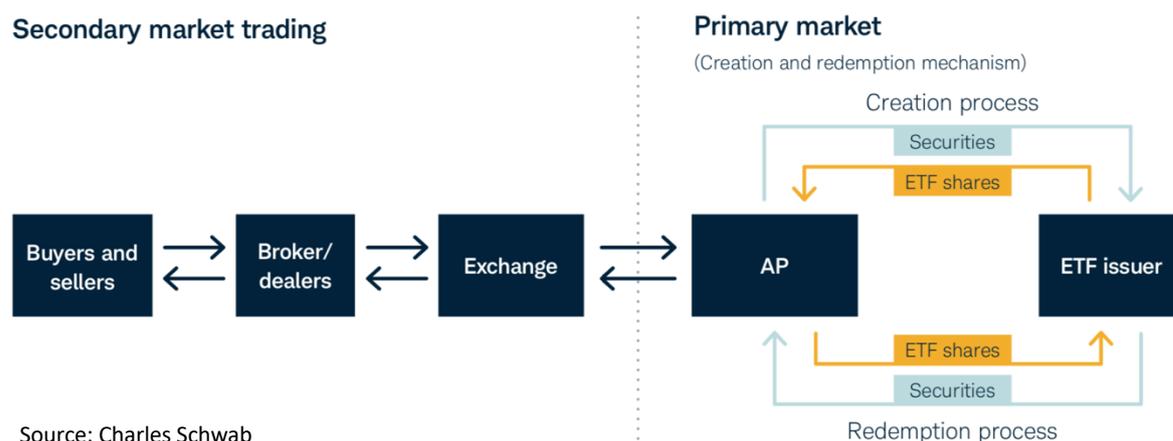
<sup>6</sup> Source: Fidelity.

<sup>7</sup> Net Asset Value:  $(\text{value of assets} + \text{accrued revenues} - \text{accrued costs} - \text{liabilities}) / \text{outstanding shares}$ . In equity ETFs the NAV is the sum of the underlying securities prices.

instruments. The process allows the sponsor firm to operate without cash<sup>8</sup>. An ETF share is created when an AP asks the fund to issue new shares in order to match the market demand. As mentioned before, the process involves an exchange of shares for securities. So, the AP buys the individual securities of the index tracked by the ETF from the market and exchange them directly with the ETF for new fund shares. Then it takes the creation units (usually primary market operations involve blocks ranging from 50,000 or multiples ETF shares) whose value is represented by the NAV and sells it to the end investors on the secondary market at the market price<sup>9</sup>. As shown in picture 1 on the right side, the primary market involves the fund and the authorized participants only. There is where the in-kind process take place. On the left side, it is represented the trading activity that actually happens on the stock exchange.

Creation – Redemption Process and market activity

Picture 1



Source: Charles Schwab

All the primary market transactions are executed at the market closure, when the NAV is newly calculated. That implies there have to be enough individual securities available to be pooled in order to create ETFs shares. However, the fund can accept cash instead of particular assets of the basket. This occurs when some securities are difficult to acquire or not immediately available. For redeeming shares instead, the AP has to buy ETF shares on the secondary market<sup>10</sup>, and gives them back to the sponsor firm in exchange of the underlying securities. ETF shares are not redeemable individually; redemptions are priced by the end-of-day NAV and thus protect shares from dilution. According to data published on the investment company fact book (2019) and data revealed by Vanguard’s CIO Greg Davis, 90% of ETF trading activity<sup>11</sup> happens on the secondary market. In Index Funds, instead, the client goes to a broker or a dealer to buy new shares and provides the cash, that will be then utilized by the fund to purchase the

<sup>8</sup> Source: Charles Schwab.

<sup>9</sup> Source: Investment Company Fact Book 2019

<sup>10</sup> Source: Vanguard – Understanding ETF liquidity and trading.

<sup>11</sup> Refers to the average daily dollar value of ETF shares traded (includes Bond ETFs).

securities on the market. To redeem shares, the fund simply monetizes the position by selling the underlying securities and then gives back the capital to the client<sup>12</sup>. All these operations involve cash.

### 1.2.2 Trade

Since ETFs are listed on the exchange, their fund shares are daily traded as common stock. ETF shares are therefore subject to speculations, short selling and obviously market laws. The most important is the demand-offer law by which an over-requested stock will be pushed up in its price and an over-supplied stock will be traded at a discount. Ben-David, Franzoni and Moussawi (2012) found evidence of arbitrage activity being a response to mispricing: short interest in ETFs is associated with ETF prices being higher than the NAV<sup>13</sup>. However, Gary L. Gastineau<sup>14</sup> argues that “real arbitrage opportunities, where the arbitrageur covers his costs and earns a trading profit are not common.” Nevertheless, the fact that U.S. domestic ETFs “are priced very close to their true NAVs with only brief excursions any significant distance away” supports the view that arbitrage quickly stabilizes and adds liquidity to the ETF market. In other words, market stability does not indicate that short-term profit opportunities for arbitrageurs are lacking per se, but that they simply may be reaped too quickly to create significant wealth opportunities for a given arbitrageur. Indeed, short-term profit opportunities, and the fierce competition to exploit them, explain why arbitrage has succeeded at stabilizing U.S. ETF markets. A fleeting profit opportunity motivates quick transactions that prevent premiums and discounts from lingering or growing. How does the arbitrage work? Let’s suppose the fund is over-demanded: the price becomes inflated, so the AP, which is in charge of keeping the gap between the NAV and the market price as narrow as possible, has to intervene. To do so, it exploits the arbitrage process: the shares of the fund are overpriced, thus the market price is bigger than the NAV which corresponds to the sum of individual securities prices. The AP buys the underlying assets from the market, exchanges them with new fund shares and then sells them on the secondary market. It gains the gap between the cost of the basket and the price of the shares and by over-supplying the market with new fund stocks, it brings back the market price close to the fair value. Another arbitrage opportunity might occur when two ETFs tracking the same index are traded at different prices. The big financial firm, once recognized the mispricing, will exploit the divergence by buying the cheaper fund shares and exchanging the underlying assets for new shares of the expensive fund. In the opposite case, that is when ETFs

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<sup>12</sup> Source: Investopedia – Mutual Funds

<sup>13</sup> Current short rate interest is around 20% of trading volume. See graph 9.

<sup>14</sup> Gastineau, *supra* note 30, at 237.

are traded at a discount, the AP buys existing ETFs shares and redeems them obtaining the securities. By lowering the supply of shares, the market becomes over-demanded and prices are pushed up. The misprice issue, however, is actually restrained: the most part of ETFs has been experiencing narrow premiums/discounts – usually in the order of cents<sup>15</sup>. The option of redeeming shares is reserved to institutional investors or big financial companies. However, in addition to APs, other market agents are entering the arbitrage process: High Frequency Traders have already taken place within ETF market activity<sup>16</sup>. They can intervene within short time frames (seconds or fraction of seconds) and speculate through the arbitrage process. That allows ETFs to be traded at such tight bid-ask spreads as well as small premiums/discounts. The difference between APs and HFTs, though, is that APs operate to ensure prices fairness, whereas HFTs are mere speculators. Concerns are about the effects of arbitrage on the underlying securities, overall during extreme market fluctuations also considering the existence of leveraged ETFs which can exacerbate price movements and new speculators such as HFTs. These products are tailored to boost market returns. They are usually 2x or 3x, meaning they yield twice or three times the index performance. To do that, they deploy total return swaps<sup>17</sup> or debt. With the latter, they purchase either future<sup>18</sup> or options<sup>19</sup>. Those allows the fund to multiply the exposure to an asset or a basket even without owning it. Thus, the final fund's capital blend is composed by assets and derivatives. The multiplying effects, though, is daily rebalanced: the overall exposure is recalculated every day; that means the overall return is the result of each day leveraged yield.

Index Funds' trading process, instead, involves the sponsor firm – or the depositary bank, if the company has delegated the responsibility – in each transaction. All the orders, indeed, pass through the company in charge of the process, which is in charge of the creating or redeeming shares. So, while ETFs allow the shareholders to trade fund quotes directly with other investors, mutual funds take care of any buy or sell order<sup>20</sup>. The transactions are executed once per day,

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<sup>15</sup> Source: Yahoo Finance – Data as of 6/6/19: VOO spread 8 cents, SPY spread 11 cents.

<sup>16</sup> Source: Financial Times.

<sup>17</sup> It is a swap agreement in which one party makes payments based on a set rate, either fixed or variable, while the other party makes payments based on the return of an underlying asset, which includes both the income it generates and any capital gains. In total return swaps, the underlying asset is usually an equity index, loans or bonds. The asset is owned by the party receiving the set rate payment. Source: Investopedia.

<sup>18</sup> Standardized contracts, traded within regulated markets, in which the counterparties agree to exchange a financial asset at a certain date and at a given price. Source: Investopedia.

<sup>19</sup> Standardized contracts, traded within regulated markets, in which a counterparty obtain the right to exchange a financial asset at a certain date and at a given price. Source: Investopedia.

<sup>20</sup> The sponsor firm or the bank match all the order in and out and provide to settle the quotes through a clearinghouse. The latter transfers the quotes among investors avoiding the actual creation or redemption of fund shares. The outstanding offers which have not been cleared, are actually created or redeemed. In ETFs, a selling order won't be executed until a buying order is placed. Source: Fidelity.

at the closure of the market, when the company publicizes the new NAV - that represents the price at which the offers will be executed. Differently from ETFs in which you are required to buy share by share, you can invest any amount of money, obtaining a fractional number of fund shares: if the NAV is 51\$ and the amount invested is 1,000\$ the actual number of shares issued will be 19.6<sup>21</sup>.

### 1.2.3 Intrinsic Liquidity

ETF liquidity, according to the theory by which ETF shares have the same characteristics of the basket, should be equal to its intrinsic liquidity, that is the one of the underlying assets. However, this is not always true, in fact when an ETF share is created the number of outstanding individual stocks on the market available as free float is reduced; single securities are held steadily by the fund while new passive shares are introduced in the market. So, the number of free-single-stocks waived is transformed into new outstanding passive shares<sup>22</sup>. Thus, ETFs become more liquid than the underlying assets<sup>23</sup>. The process of borrowing individual assets on the market in exchange of fund shares is claimed to be the cause of a possible increase in volatility due to a lack of liquidity. That becomes much relevant when ETF ownership reaches high level of market share. Passive equity market share has almost reached the active counterparty at the end of 2018<sup>24</sup>. Studies (Agarwal et al 2018) confirm a positive relationship between ETF expansion and underlying securities' liquidity. Thus, the growing expansion of the last decade might trigger liquidity issues.

### 1.2.4 Costs

Speaking about costs it is easy to understand why lots of investors are withdrawing money from their active managed funds and going after the set-and-watch strategy. When investing in an ETF there are four key potential costs to keep in mind: first and foremost, trading commissions applied each time a trade is performed by or on behalf of the client whatever the amount is (they vary a lot depending on the sponsor firm chosen; there are either fixed commissions<sup>25</sup> or variable commissions<sup>26</sup>). Second one, operating expenses, which are the reason why ETFs are so attractive: usually publicized as Operating Expense Ratio these fees are charged

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<sup>21</sup> Source: Investopedia.

<sup>22</sup> To create a S&P 500 ETF share, you buy enough individual shares to respect the market cap weights. The value of a fund share will be the sum of the prices of single stocks times their weight. Thus, by trading ETFs the dollar volume should be equal to the one that would have been created by trading the underlying assets. However, the total number of shares traded might change.

<sup>23</sup> Source: Financial Times – <https://www.ft.com/content/6dabad28-e19c-11e6-9645-c9357a75844a>

<sup>24</sup> Source: Morningstar - <https://www.morningstar.com/blog/2019/01/28/us-fund-flows-trends.html>

<sup>25</sup> Fineco applies 19 euros per trade. Source: Fineco.

<sup>26</sup> Degiro: 2 euros + 0,038% per trade. Source: Degiro.

proportionally to the assets deployed, in order to cover portfolio management expenses coming from the tracking process, administration and other costs: these fees are fixed around 0.21%, against 0.86% of active managed funds<sup>27</sup>. Mutual funds are subject to possible additional expenses related to promotion and advertising, for instance the 12b-1 fee<sup>28</sup> charged in US. It goes from 0.25% up to 1% of assets value. It is added to the mutual fund price in order to pay brokerage and marketing commissions, since sponsor firms often rely on a dealer to place their products<sup>29</sup>. Third one the bid-ask spread, often overlooked by investors. The larger the spread and the more frequently you trade the larger the price payed will be, similarly to trading commissions: a stock is priced at 50\$ but the bid and ask price are respectively 48\$ and 52\$, that means an investor can enter immediately the market at a price of 52\$ or exit immediately at 48\$<sup>30</sup>. If the investor wants to enter the market and immediately after leave, he will be paying the cost that is represented by the gap. The bid-ask spread directly depends on the purchasing power of the market maker, the entity that guarantees a least liquidity providing and buying stocks from the market, its inventory management costs and the share turnover<sup>31</sup> of the underlying assets. Forth, the discount and premium to NAV: this is a potential cost, given the fact that it could also represent a benefit on overall return. Let's suppose an ETF is traded at a premium of 1%: the AP, that is the arbitrageur, waives the mispricing reducing the ETF's market price. The potential cost for n investor, who purchases overpriced ETF shares, may arise from the erosion of that 1% premium because of arbitrage<sup>32</sup>.

Another cost not to underestimate is taxation, often forgot but as a matter of fact truly relevant for investors. ETF's taxation is, not surprisingly, more favourable and efficient than the one mutual funds are subject to. By law<sup>33</sup>, profits arising from both capital gains or dividend are subject to taxation (capital gains from underlying securities and net profit distributed at the end of the year). However, through its own peculiarity, ETFs can avoid that tax burden: in-kind redemption, according to US and Italian regulation as well, is not considered one that generates capital gains to happen – until the individual securities are sold – even though the institutional firm will be making profits from the difference between the NAV and the market price. Furthermore, these funds have low asset turnover, so it is unlikely to realize capital gains on selling underlying securities to the market, in order to rebalance the portfolio. Moreover, lower turnover means reduced transaction costs for the sponsor firm, thus for the investor. According

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<sup>27</sup> Source: Lippers, Morningstar, Investment Company Institute 2018. Percentages refers to asset-weighted average cost.

<sup>28</sup> Investment Company Act 1940

<sup>29</sup> Some funds deal with risky and illiquid assets, so they pay a broker to place the products.

<sup>30</sup> Source: Investopedia.

<sup>31</sup> It is a measure of the trading volume of the security.

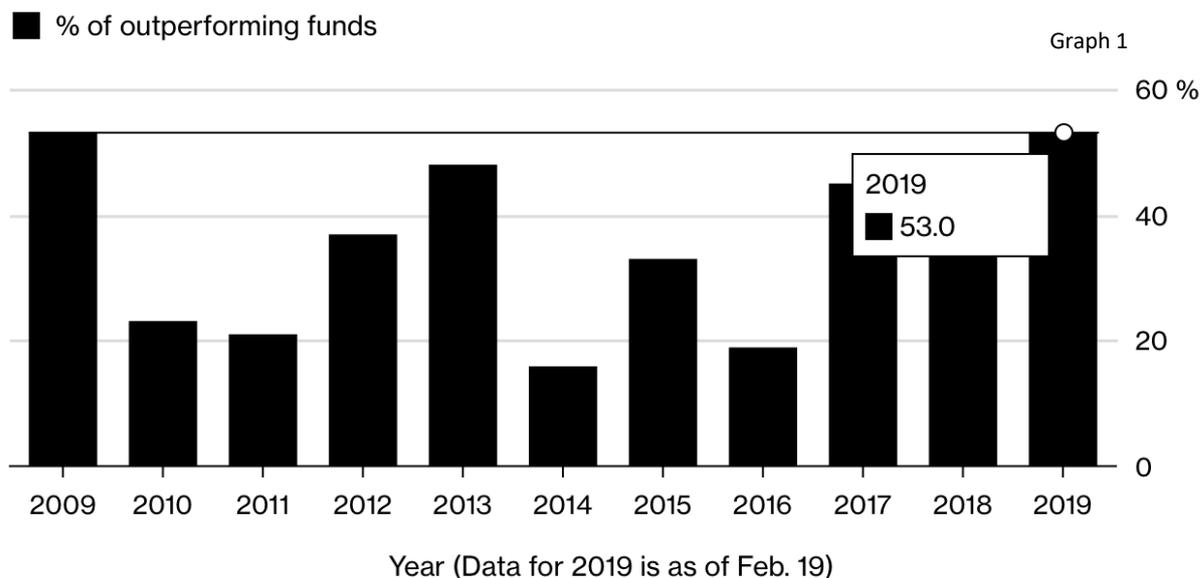
<sup>32</sup> Source: Charles Schwab – Michael Iachini.

<sup>33</sup> Valid for both US and Italy.

to etftrends.com average equity ETF's turnover ratio is around 25% whilst mutual funds' are around 50%. This ratio, expressed in percentage, indicates how much of the portfolio underlying securities have been traded during the last year. 25% means one stock out of four has been transacted and exchanged<sup>34</sup>. Actually, active funds trade twice the passive counterparty. In my opinion, that implies higher transaction costs which are, in turn, charged to the end investors who see overall returns diminish.

### 1.3 Comparison With Active Funds

In order to assess which product offers more value for investors, this paragraph will compare the performance of both types of investing and the differences in portfolio composition. The reason why investors are switching to ETFs and Index Funds is that on average, active managers could not provide returns at the same level the market did. From 2008 to 2018, only 38% of active funds was able to beat the market<sup>35</sup>. That is because of the high commissions applied and the lack of volatility: when the financial environment is more volatile, active managers outperform thanks to their ability of hedging risk. The prove is given by the fact that in 2016, when the market saw its lowest volatility since 2005<sup>36</sup>, the number of outperformers was only around 20%<sup>37</sup>. In 2018 and 2019, instead, the VIX soared, allowing active managed funds to improve their performance. More accurately, 53% of managers is beating the market<sup>38</sup>.



Source: Goldman Sachs

<sup>34</sup> Source: <https://cleartax.in/s/portfolio-turnover-ratio>

<sup>35</sup> Source: Lyxor

<sup>36</sup> Source: CBOE - Volatility Index (VIX)

<sup>37</sup> Source: Lyxor 2017 – Analysing active and passive fund performance

<sup>38</sup> From: <https://www.bloomberg.com/news/articles/2019-02-26/active-manager-revenge-that-began-five-months-ago-isn-t-stopping> Source: Goldman Sachs – graph 1. Data as of Feb. 19.

In fact, as shown in graph 1 which shows the percentage of active funds outperforming their benchmarks, there is an ascendance of active outperformers alongside volatility growth in recent years. However, these numbers are not sufficient to convince investors to entrust their money to active funds. Actually, despite the improve in performance, active funds, in 2018, saw outflows for over \$300 Billion<sup>39</sup> worldwide, meaning the market still prefers passive funds. Graph 2, in columns 1 and 2 (below the column denoted “performance”), shows that passive investing, indeed, provides higher average returns than active funds. However, on a short period of time, the latter has the best mix of risk-return: it is confirmed by the higher Sharpe ratios<sup>40</sup>. On a longer period of time though, index investing takes on the leadership. According to the dataset in graph 2 (columns 5 and 6, below Sharpe ratio), passive funds provided the best value for investors reaching the same ratios of active funds but with higher returns. The better performance, as stated before, was probably due to a low volatile environment that have penalized active managers. Nevertheless, active funds were consistently able to keep the risk lower: the merit is attributable to asset management.

1Y PERFORMANCE/VOLATILITY COMPARISON BETWEEN ACTIVE FUNDS AND THE BENCHMARK Graph 2

1Y PERFORMANCE	PERFORMANCE		VOLATILITY		SHARPE RATIO		% OF ACTIVE FUNDS OUTPERFORMING THE BENCHMARK
	INDEX	ACTIVE FUNDS*	INDEX	ACTIVE FUNDS*	INDEX	ACTIVE FUNDS*	
Universe							
Europe large caps	10.3%	10.0%	8.4%	7.6%	1.3	1.4	45%
Eurozone large caps	9.2%	8.9%	10.3%	9.0%	0.9	1.0	55%
Europe small caps	19.1%	20.5%	8.8%	8.5%	2.2	2.5	72%
Germany large caps	12.5%	14.4%	10.6%	9.9%	1.2	1.5	61%
France large caps	12.8%	11.6%	10.5%	8.5%	1.2	1.4	38%
UK all caps	8.7%	6.3%	9.1%	9.6%	1.0	0.7	30%
Italy large caps	16.4%	18.8%	14.2%	12.7%	1.2	1.5	81%
Spain large caps	10.5%	11.5%	12.9%	10.4%	0.8	1.1	32%
Switzerland large caps	9.9%	9.3%	9.0%	8.8%	1.1	1.1	37%
US large caps	6.3%	5.3%	10.3%	9.8%	0.6	0.6	32%
US small caps	0.6%	2.9%	14.7%	11.8%	0.1	0.3	57%
Japan all caps	11.1%	11.5%	11.5%	10.1%	1.0	1.2	49%
World large caps	7.4%	8.1%	8.5%	7.2%	0.9	1.2	54%
Emerging markets large caps	20.5%	20.2%	11.1%	10.0%	1.9	2.1	42%
China large caps	35.3%	33.8%	14.8%	13.8%	2.4	2.5	24%
Euro govies	0.2%	-0.1%	3.3%	2.8%	0.1	0.1	20%
Euro corporate	2.4%	3.0%	1.9%	1.6%	1.4	2.1	52%
Euro high yield	6.8%	6.1%	1.2%	1.3%	5.7	4.9	16%
Euro inflation linked	1.4%	0.3%	3.6%	2.7%	0.5	0.2	6%
US corporate	-6.7%	-8.3%	7.1%	5.8%	-0.9	-1.4	57%
US high yield	-5.7%	-6.4%	7.3%	7.7%	-0.7	-0.8	56%
Global bonds - EUR HDG	1.1%	2.2%	2.0%	1.4%	0.7	1.8	67%
Emerging debt	1.2%	1.2%	6.7%	6.6%	0.2	0.2	41%

Source: Bloomberg and Morningstar data in EUR from 31/12/2016 to 29/12/2017.

ETFs and Index Funds have such low costs thanks to their nimble running process. That helps the sponsor firm keeping commissions reduced; however, there is a trade off with risk management: passive funds, indeed, have full market exposure: the basket is constructed by following the market capitalization. That means, passive portfolios are overall exposed to large-

<sup>39</sup> Source: Morningstar.

<sup>40</sup> It is calculated as the difference between fund's yield and risk-free yield divided by the standard deviation of the fund (measure of riskiness). Higher values mean better performance.

caps. In support to what just said, graph 3, 4, and 5. The former and the second represent respectively the top 5 largest constituent stocks of MSCI World Index and FTSE All Share Index as of June 2014. There, the top 5 largest stocks accounts for 5.5% and 23.3% of the relative index. Graph 5 confirms that indexes are for the most part exposed to large caps – even though there are actually small and middle-cap funds. The evidence given by graph 5, which explain the distribution of ETF assets, is solid.

The MSCI World Index is vulnerable to under-performance among its top five stocks...

Position	Stock	Weight
1	Apple	1.5%
2	Exxon Mobil	1.3%
3	Google	1.0%
4	Microsoft	0.9%
5	Johnson & Johnson	0.8%



Source: MSCI Barra, Bloomberg, Schroders, 6 June 2014.

Large caps are 27% of equity ETF holdings. Data of graph 5 refers to March 2018: that means the phenomenon wasn't a sporadic event rather a relevant factor, determinant for those investors seeking for diversification. Not only, US ETF market represents 72% of the entire ETF world market<sup>41</sup> and they are managed by only 5 sponsor firms which hold about 85% of passive funds industry<sup>42</sup>. Research evidence (Ben-David, Franzoni and Moussawi 2017) (Schroders 2014) highlights that ETFs create undiversifiable correlation among the constituents, leading to broader systematic risk. Active funds, instead, rely on the ability of managers who are able to hedge risk through the asset allocation. That allows them to properly diversify and rebalance the portfolio in response to market events (Schroders 2014).

... as is the FTSE All Share Index

Position	Stock	Weight
1	HSBC	5.9%
2	Vodafone	5.5%
3	BP	4.3%
4	Royal Dutch Shell A	3.9%
5	GlaxoSmithKline	3.7%



Source: FTSE, Bloomberg, Schroders, 6 June 2014.

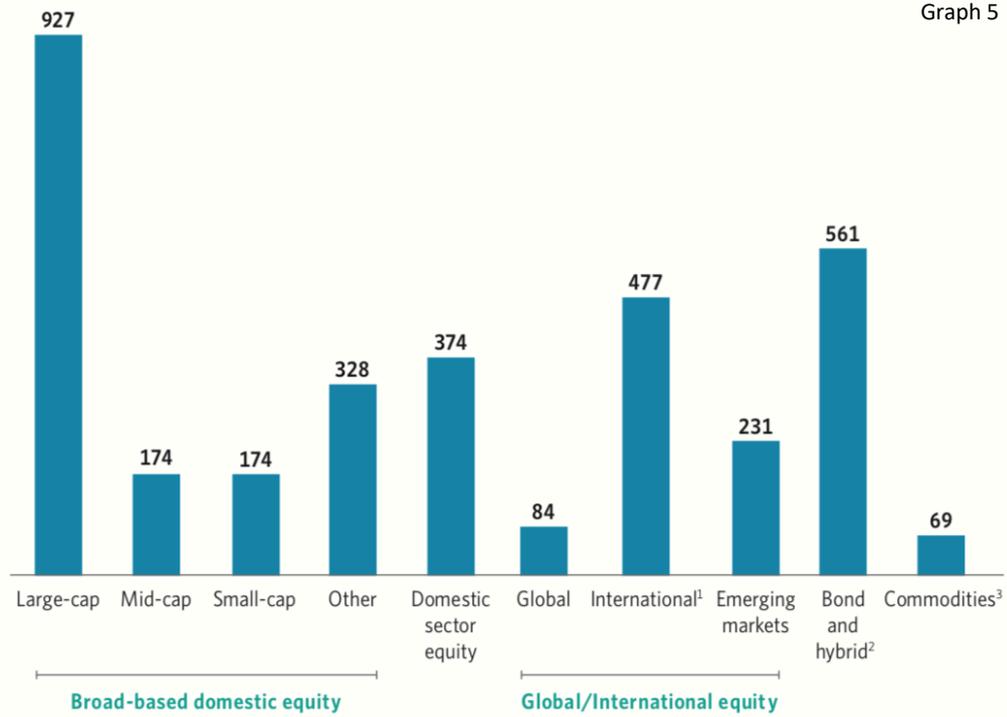
<sup>41</sup> Source: Investment Company Institute.

<sup>42</sup> BlackRock, Vanguard, State Street, Deutsche Bank and Invesco. Source: Investopedia.

## Total Net Assets of ETFs Were Concentrated in Large-Cap Domestic Stocks

Billions of dollars, year-end 2017

Graph 5



Source: Investment Company Institute 2018

## Chapter II – Effects - Actual Data and Implications

### 2.1 S&P 500 stake: stock availability concerns

Since the big crash, passive investing has stepped forward all around the world, gaining consensus among small investors and public institutions as well. In fact, the Bank of Japan holds approximately 60% of outstanding Japanese equity ETFs as part of its asset purchase programme (Haneada and Serita 2017), while the Government Pension Investment Fund (GPIF) equity investment allocation to passive vehicles exceeded 80% in 2016, according to published GPIF data. Passive shares grew really fast last decade, accounting for 8% of global AUM<sup>43</sup> in 2007 up to about 20% in 2017<sup>44</sup> corresponding to an increase from \$1 trillion to \$8 trillion. Across countries, ETFs have gained most prominence in US equities. There, they have expanded to more than \$3.8 trillion (46% of total US equity fund assets) with an average daily trading value of \$96.8 Billion<sup>45</sup>. The rapid expansion of ETFs and Index Funds captured markets' attention: passive investing has an unquestionable ability of providing appealing returns while keeping costs low. However, investors are concerned about the consequences that the creation-redemption process may have on the underlying basket. More specifically, ETFs and Index funds are claimed to be drying up the amount of single stocks available for trading through their primary market activity<sup>46</sup>. Paragraph 2.1 will discuss the effects that both ETF's growth and ETF's market activity have on the underlying assets liquidity.

#### 2.1.1 Bank of America Warnings

In July 2017, CNBC posted an article referred to a note<sup>47</sup> regarding the possibility of liquidity problems on the stock market, caused by the explosion of money flowing towards passive funds, with particular attention to ETFs. The note, issued by the BofA Global Research department, warned: “the actual shares available, or the true float for S&P 500 stocks, may be grossly overestimated”. BofA warnings were due to the prominence that ETFs and Index Funds are gaining year after year. Even though ETF's primary market activity accounts only for 10% of the overall volume, the absolute numbers are considerably relevant. In fact, ETF inflows in 2017 amount for \$471 billion<sup>48</sup> – a 66% increase from the previous year - whilst active funds suffered outflows for more than \$200 Billion<sup>49</sup>. Not only, in 2018, according to graph 6, passive

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<sup>43</sup> Asset Under Management

<sup>44</sup> Bank for International Settlements Quarterly Review, March 2018 Source: Lipper, BIS' calculations

<sup>45</sup> NYSE quarterly report (March 2019)

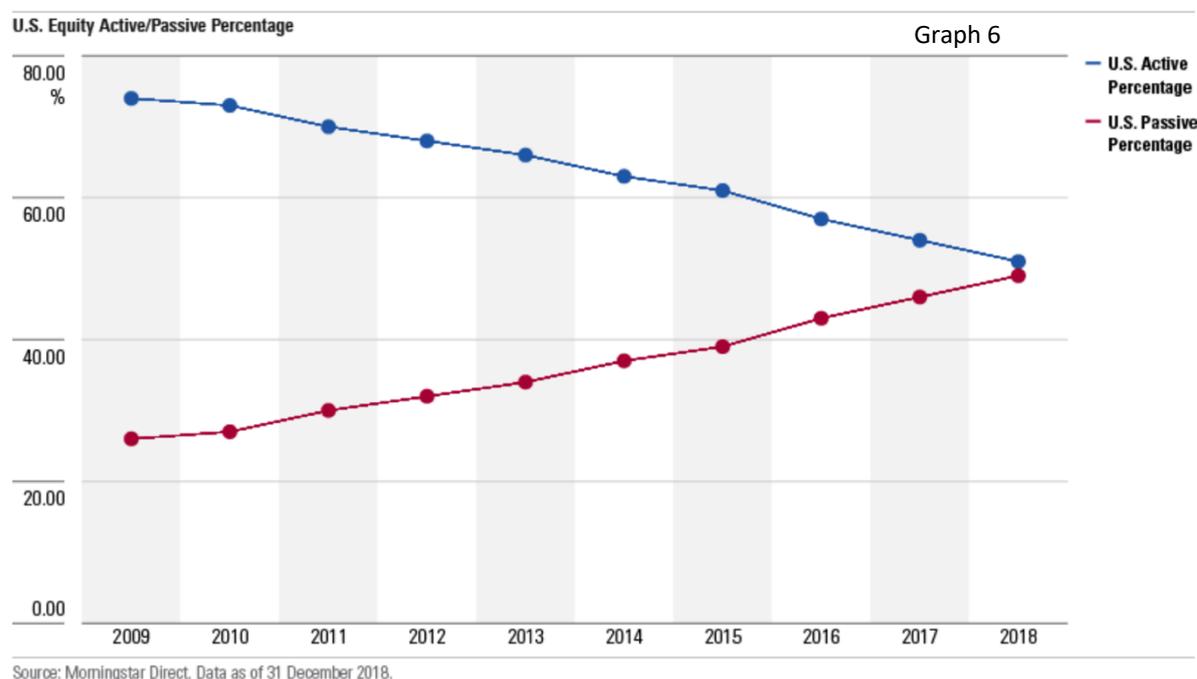
<sup>46</sup> Passive funds currently hold roughly 22% of S&P 500 free float – Citigroup Research (ETF overview 2018)

<sup>47</sup> <https://www.cnbc.com/2017/07/05/etfs-may-lead-to-a-market-liquidity-problem-bank-of-america-says.html>

<sup>48</sup> Investment Company Fact Book 2018

<sup>49</sup> Source: Morningstar

funds have almost reached the active counterparty on the equity fund market. In fact - as confirmed by NYSE data - on the right side of the chart, the two lines representing active and passive equity market share converge almost reaching the 50% level each. That shows how the passive/active share of US equity fund market is about to equalize, as of end 2018, and it is thought to be equalizing somewhen in 2019<sup>50</sup>.



All these numbers confirm that the passive phenomenon is growing fast, representing an important reality of financial markets. This is why, investors are worried about the consequences that it may trigger. During the creation process, ETFs actually “steal” individual securities and substitute them with fund shares. Once passive shares reach 100% of the equity market there are no more individual stocks available for trading (Shiller 2017). That implies that ETFs and Index Funds share of the equity market is inversely proportional to the amount of free stocks<sup>51</sup>. In support at what just said, the monthly trading volume of Apple: 2013 average monthly volume was \$2,133,782,700 against \$711,498,808 of 2018<sup>52</sup>. Going backward furthermore, Apple average monthly volume, in 2004, was \$2,537,534,767 whilst SPY (currently most traded S&P 500 ETF) volume was just \$899,540,525 against \$2,031,716,233 in 2018<sup>53</sup>. Apple stocks’ volume suffered a decline of more than two third since 2004, that occurred alongside passive investing ascent. That is consistent with the fact that passive funds are drying up the stock market liquidity in favour of their own liquidity. In conclusion, although the overall market volume might not change, the composition might differ: as far as I am

<sup>50</sup> Source: Morningstar <https://www.morningstar.com/blog/2019/01/28/us-fund-flows-trends.html>; NYSE data.

<sup>51</sup> Author’s affirmation.

<sup>52</sup> Source Yahoo Finance, Author’s calculation.

<sup>53</sup> Source Yahoo Finance, Author’s calculation.

concerned, passive shares are substituting individual stocks with fund shares. ETFs are becoming more liquid than the underlying assets (Howard Marks 2018).

### 2.1.2 Liquidity Issues - Arbitrage Process

Despite the considerations in point 2.1.1, a paper published by the cooperation between Lyxor ETF Research and ETF Research Academy on November 2017<sup>54</sup> affirms that ETFs are not big enough to produce significant consequences on the market. The document, though, does recognize the existence of a “propagation channel” between ETFs and the underlying securities that is directly related to the creation-redemption process: through this channel, liquidity increases for ETFs while diminishes for individual securities. Another research of the Lyxor and its Partner, published on June 2017<sup>55</sup>, provides support to the academic findings of Agarwal et al: it concludes that ETFs increase the co-movement<sup>56</sup> of liquidity of the constituent stocks leading to a “cost” to investors that comes in the form of a loss of liquidity diversification. The issue deepened by Agarwal, Hanouna, Moussawi, Stahel’s (2018) research confirmed the existence of the relationship and, more accurately, that ETF ownership negatively influences the underlying assets liquidity: the higher the passive ownership the higher the risk of liquidity shocks, due to an increase in the commonality in liquidity of the underlying securities. In plain words, the mechanism of pooling assets in the same basket makes the included securities correlated between each other, thus the wider the amount of stocks pooled the higher the correlation. However, the qualitative analysis suggests that the increase in liquidity commonality is more pronounced for large stocks whilst small stocks benefit of a decrease in correlation (Kamara, Lou and Sodka 2007). These results support the opinion of those investors who have concerns about the fragility of passive investing (Bhattacharya and O’Hara 2018). Portfolio theory teaches to seek out stocks that have low correlations among their selves in order to diversify and reduce the overall risk. The same pattern can be applied to the liquidity of the holdings. It means that given a negative event, the propagation of liquidity crisis is more pronounced and affects, even more than before, the securities lying in the same basket. That becomes relevant during extreme market fluctuations. Stock market liquidity is impaired during market declines, implying a positive relationship between market and liquidity risk (Christoph G. Rosch, Christoph Kaserer 2012). If the individual security market is illiquid – because of ETF ownership and market downturn - APs<sup>57</sup> cannot work efficiently to keep fund price aligned

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<sup>54</sup> Lyxor ETF Research Academy - How ETFS affect financial markets 2017.

<sup>55</sup> Lyxor ETF Research Academy - Expert Opinion Liquidity 2017.

<sup>56</sup> Measure of correlation.

<sup>57</sup> Those institutional firms which are allowed to deal directly with the fund and are responsible for keeping the ETF price stable.

to NAV. For instance, let's assume an extreme bear market environment: ETF prices are plunging thus the AP should intervene applying the arbitrage process. However, the AP instead of trying to restore prices - incurring in almost certain losses due to its incapability of doing so, because of the harshness of the bear phase – it does not arbitrate or it even short-sells the ETF<sup>58</sup>. That being said, these are only assumptions. Since 2009, when passive industry really started to step into the market<sup>59</sup>, there are no data about ETF reaction to severe market events. They have been benefitting from a prolonged bull market boosted by the QE<sup>60</sup>-approach of developed state governments<sup>61</sup>. Therefore, further conclusions on ETFs' resilience to market fluctuations will be necessarily drawn when related data will be actually available. Up to now, it is only possible to say that according to academic research, an illiquid environment would harm the ability of APs, in case of harsh market events, to keep market prices stable via arbitrage (Kevin Pan and Yao Zeng 2019). The Financial Stability Oversight Council (2015) has raised a similar concern, saying the ETF arbitrage mechanism is vulnerable to breakdowns in severe market stress.

### 2.1.3 Theoretical Developments

By summarizing what explained so far, the liquidity issue generated by passive investing lies directly on the size of the assets held by passive funds as well as the grade of commonality that affects the underlying securities. This Paragraph wants to provide some projections on the effects that the liquidity issue, might cause in the near future, assuming the current macro and microeconomic environment as well as the current phase of the market cycle.

What would be the consequences of an economic downturn in financial markets? Firstly, stock prices would fall. In turn, stock returns would diminish causing stock illiquidity (Chen and Poon 2008). That implies securities' availability evaporates when it is most needed to cover incurred losses (Rosch and Kaserer 2012). By summing up the wide market exposure that affects passive funds as well as the liquidity spiral triggered by market downturns, the severe negative event could produce harsh ETF sell-offs which dries up the liquidity even further<sup>62</sup>. In conclusion, ETFs could worsen bear markets by impairing cross-sectionally the underlying securities' liquidity. Individual stocks would suffer deeper crises leading to more fluctuating markets. That could heavily impact on small ETF owners. Retail investors, attracted to ETFs because they're easy to trade, may not realize how quickly that advantage could change

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<sup>58</sup> Lippers conference Nov. 2018.

<sup>59</sup> ETF market accounted only for \$1 Trillion against \$3.8 Trillion in 2019. Source NYSE data.

<sup>60</sup> Quantitative Easing.

<sup>61</sup> 13D Research company.

<sup>62</sup> Joe Terranova – Chief Market Strategist for Virtus Investment Capitals

(Peter Kraus, CEO of Alliance Bernstein) “The liquidity of the ETF itself relies on market participants – i.e. APs and institutional investors - who actually trade them” said Kraus. “I don’t think investors actually understand that risk”<sup>63</sup>.

## 2.2 Volatility Surges

Volatility is a measure of price stability, hence of the risk. It corresponds to the average deviation from the mean, giving information about how predictable the price will be. ETFs are claimed to be increasing individual stock volatility. More specifically, the arbitrage process propagates non-fundamental demand shocks from the ETF market to the underlying assets (Da and Shive 2012) and ETF ownership leads to higher individual securities’ volatility (Ben-David, Franzoni and Moussawi 2017). The formers affirm that, the more the ETF price diverge from the NAV the more the arbitrage opportunities and the higher the volatility. The latter find that a one-standard-deviation increase in ETF ownership raise daily volatility of individual stocks of 16%.

The propagation of non-fundamental demand shocks via arbitrage is a crucial driver for volatility, especially if combined with a broad ETF ownership: the arbitrage process creates a channel through which demand shocks affecting ETF markets are transferred directly to individual securities; passive ownership offers a dimensional measure of the propagation effect. The following paragraphs will provide an insight to market volatility bias during the explosion of ETF markets.

### 2.2.1 Historical Data

An often-used measure of the market variability is the VIX<sup>64</sup>. It represents the expectation of the market about near-term volatility. Quoted in percentage, it shows the possible range of movement of S&P 500 at a confidence level of 68%. For example, a value of 10% indicates the market can move up or down, at the end of the year, of the same amount with the given probability. To transform the time base, it is sufficient to divide the percentage by the square root of 365 (daily), 52 (weekly) or 12 (monthly)<sup>65</sup>.

Since the index uses option prices to quantify volatility, it is useful to give a glance to the derivatives market in order to interpret graph 7. Options are derivative financial instruments

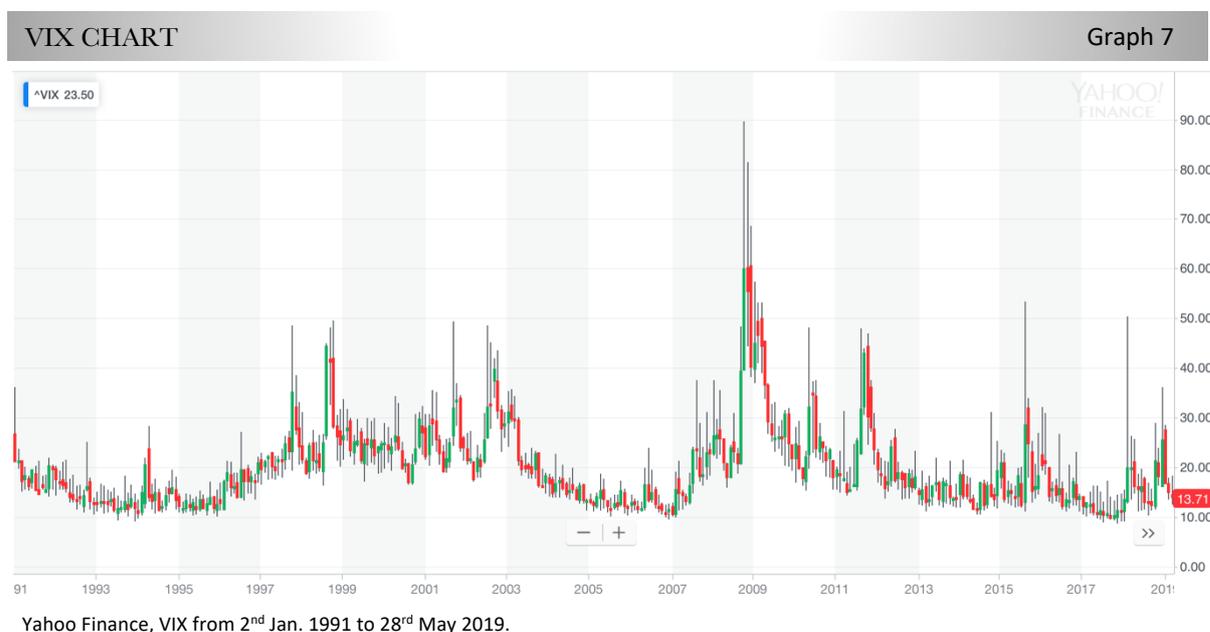
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<sup>63</sup> Source: 13D Research - <https://latest.13d.com/etf-market-crisis-qe-liquidity-passive-investing-6af295f4e667>

<sup>64</sup> CBOE Volatility Index. It is considered as the fear indicator of the market since it represents the expected near-term volatility.

<sup>65</sup> Source: Chicago Board Options Exchange

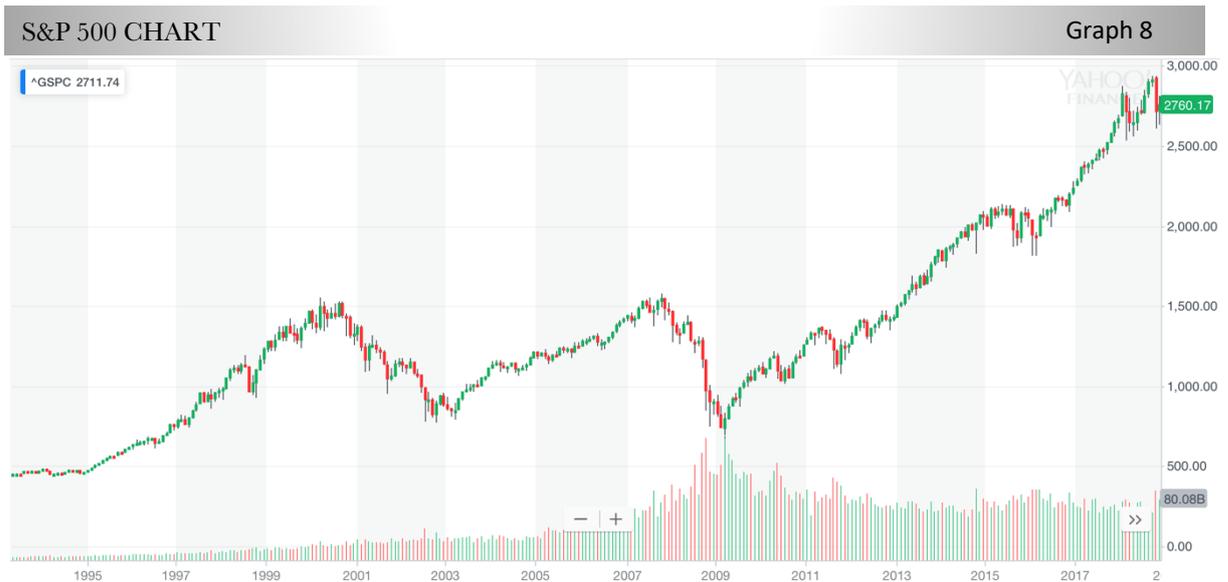
which offer the buyer the right to buy or sell – depending on the contract held – an asset, object of the agreement<sup>66</sup>. There are two types of options: a call-option is a contract which gives the holder the right to buy the asset at a strike price, within the expiring date, in exchange of a fee/premium that is the price of the agreement. A put-option, instead, is a contract which gives the holder the right to sell the asset, within the expiring date, in exchange of a payment. The principle beneath is that the holder will execute the transaction only if the market price is bigger (call) or lower (put) than the strike. So, the higher the premium paid to the owner – the amount of money owed to reserve the faculty of purchasing/selling the asset - the higher the implied volatility: high volatility means higher probability that the strike price will be hit, thus the owner requires more money to conclude the deal<sup>67</sup>. In plain words, when a call stock option seller sees a potential upside volatility, he will not be willing to sell the derivative unless a considerable premium is paid. Vice versa, during a downside phase, a put option buyer will be wary of signing the agreement unless the price is consistent with the risk. The goal of the VIX is to identify a reliable esteem of market movement within 30 days (average). It takes as inputs options with no less than 23 days until expiry and no more than 37 days until expiry<sup>68</sup>. However, the index isn't always reliable and cannot predict effectively all future events. On the other hand, it offers a meaningful view of investors' sentiment and predictions about the market. It is easily notable how the “fear index” (graph 7) soars in proximity of downturns – i.e. when the S&P 500, represented in graph 8, goes down rapidly - and it remains relatively flatter during bull phases. This can be read as growth does not produce negative volatility. Thus, individuals are more confident about the market going only upward, therefore variability is low.



<sup>66</sup> Source: Investopedia

<sup>67</sup> Source: Investopedia

<sup>68</sup> Source: CBOE



Yahoo Finance, S&P 500 from January 1991 to May 2019

Graph 7 and 8 are represented with candle sticks instead of a common line. Candle sticks represent market movements – green upward and red downward – for a given period of time. Each candle has tails on and below it: they represent the range of price at which the security has been traded. Longer tails mean wider range. Price range is a measure of stock volatility within the given period of time.

As a consequence, in my opinion, recessions and relevant events, such as political elections (2016) or unpredicted shocks (trade war 2019), are the cause of high volatility. The evidence is provided by the tails of the candle sticks in graph 7 and 8. They represent the price range in which stocks have been traded. The longer the tails the higher the range and, in turn, the volatility. Tails are short during bull phases whilst they become longer during bear market such as 2000-2003 and 2008-2009 periods; also, on the occasion of US political elections and recent trade war events, candle sticks of both chart 7 and 8 are by far longer. Since 2004, VIX average daily value is rising, compared to the previous 23 years (20,20 from 2/1/1990 to 31/12/2003; 22,89 from 2/1/2004 to 24/5/2019<sup>69</sup>). Apple stocks are subject to higher monthly volatility as well: 2004-2007 average (pre-crisis) was around 3.236% while 2011-2018 average (post-crisis) is around 4.409%<sup>70</sup>. VIX growth and individual stock volatility may be attached to ETF ownership increase as stated by Ben-David, Franzoni and Moussawi (2017). Next paragraph will explain how ETFs affect underlying assets' volatility.

## 2.2.2 Correlation Between Indexing and Volatility

Numerous researches (Agarwal, Hanouna, Moussawi, Stahel 2018) (FED, Bank of Boston 2018) (Lyxor 2017) showed how the inclusion in an index increases securities co-movement in

<sup>69</sup> Source: CBOE data, Author's calculations.

<sup>70</sup> Source: Yahoo Finance, Author's calculations.

liquidity. Academic findings show that ETFs also produce an increase in volatility of individual securities, due to index inclusion and arbitrage activity propagating non-fundamental shocks from ETF markets to the underlying assets (Da and Shive 2013) (Pruit and Wei 1989) (Greenwood 2008) (Malamud 2015) (Claessens and Yafen 2011). In addition, other studies (Khine Kyaw and David Hiller 2011) (Namitha K. Cheriyan, Daniel Lazar 2018) show that, at individual stock level, there is an inverse relationship between liquidity and volatility. Thus, both ETF ownership, which diminishes liquidity, and arbitrage activity impact on individual stock volatility. While passive ownership indirectly impacts on the underlying securities through liquidity, the arbitrage process directly affects single asset volatility: when the ETF price diverge from the NAV, APs, through the arbitrage process<sup>71</sup>, close the price gap. If the ETF is traded at a premium, the value, at which NAV and market price will be realigned, will be above the net value and below the fund price – vice versa when it is traded at a discount. This process reiterated over time, even in small amounts, makes single stocks prices fluctuate up or down. These changes aren't linked to any increase or decrease in fundamentals, they are rather generated by demand-shocks which are transferred from ETF markets to individual securities through arbitrage (Da and Shive 2012). By deepening the causes of ETF demand-shocks, it springs up that “emotional investing” plays a relevant role. It is investing following one's own level of confidence about the market: after several years of investors surveys, research has stated that the majority of small investors follow their gut when approaching financial markets. More specifically, they enter the market when it has already reached its late phase, and they leave the market when things are going poorly. That means they buy expensive and sell cheap (Barclays Research Centre). They only enter at the late phase of the expansion, buying stocks when they are at their lowest value for money point<sup>72</sup>. This late entry boosts markets, extending the bull phase beyond its natural cycle. That produces irrational demand-shocks<sup>73</sup><sup>74</sup>. Returning to passive funds, the same issue could happen within ETF shareholders. Not only, the same researchers confirmed how the asymmetric information between market makers and small investors plays against the latter: the “turnover test” held by the research centre, demonstrates how those investors who traded their portfolio the most, were also the ones gaining the lowest returns. During severe movements, small investors could be the most vulnerable, incurring into deeper losses due to their incapability of understanding the market.

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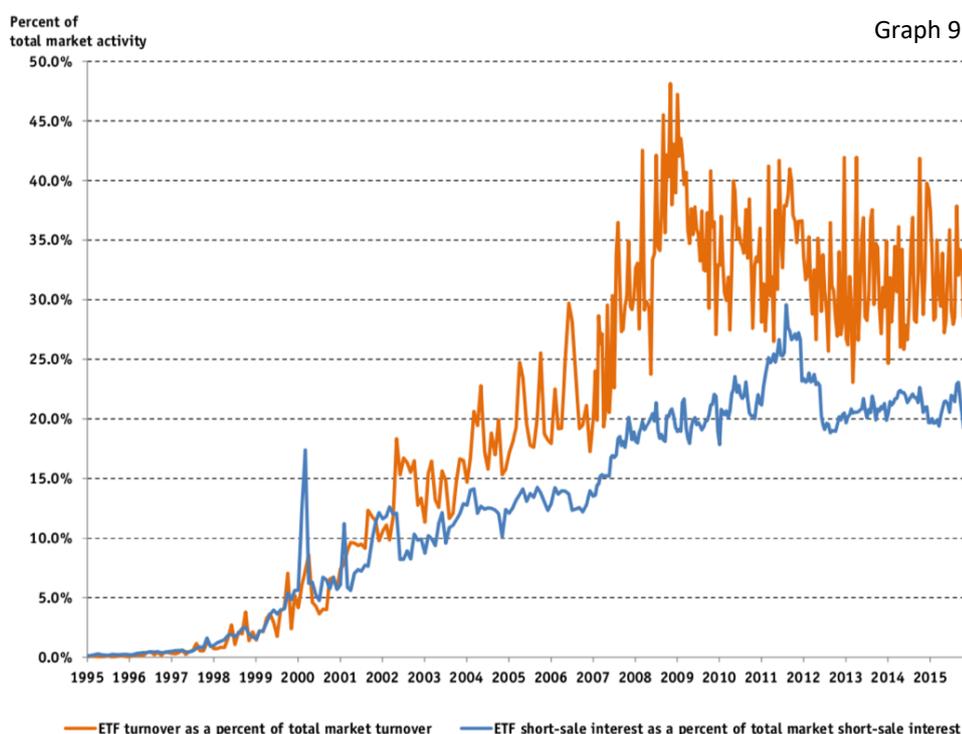
<sup>71</sup> Creating or redeeming fund shares in order to realign prices through either over-supplying or over-demanding the market. The process involves the exchange of shares for individual securities or vice versa.

<sup>72</sup> Measure the utility derived from a purchase. It is based not only on the minimum purchase price but also on the maximum efficiency and effectiveness of the purchase. Source: Business Dictionary.

<sup>73</sup> Households and Mutual Fund owners hold roughly 61% of US stock market. 90% of mutual fund owners are other households.

<sup>74</sup> Author's consideration.

So far, ETFs are claimed to affect the underlying assets by increasing liquidity co-movement, reducing liquidity and boosting volatility. In addition, it has been proven that indexing causes asset return and liquidity among the collection of securities to move together, leading to broader propagation of shocks (Sullivan and Xiong 2012). In fact, once stocks are added to the S&P 500, stocks betas tend to increase (Vijh 1994) (Barberis, Shleifer and Wurgler 2004). Consistent with those findings, Da and Shive (2018) found evidence that ETF ownership boosts stocks' return co-movement, meaning that volatility increases cross-sectionally for all the individual stocks of the basket. Not only, there is a positive relationship between trading activity and volatility (Khine Kyaw and David Hiller 2011). By summing up those factors, it results that the higher the ETF trading activity the higher the amount of volatility transferred to all the underlying assets.

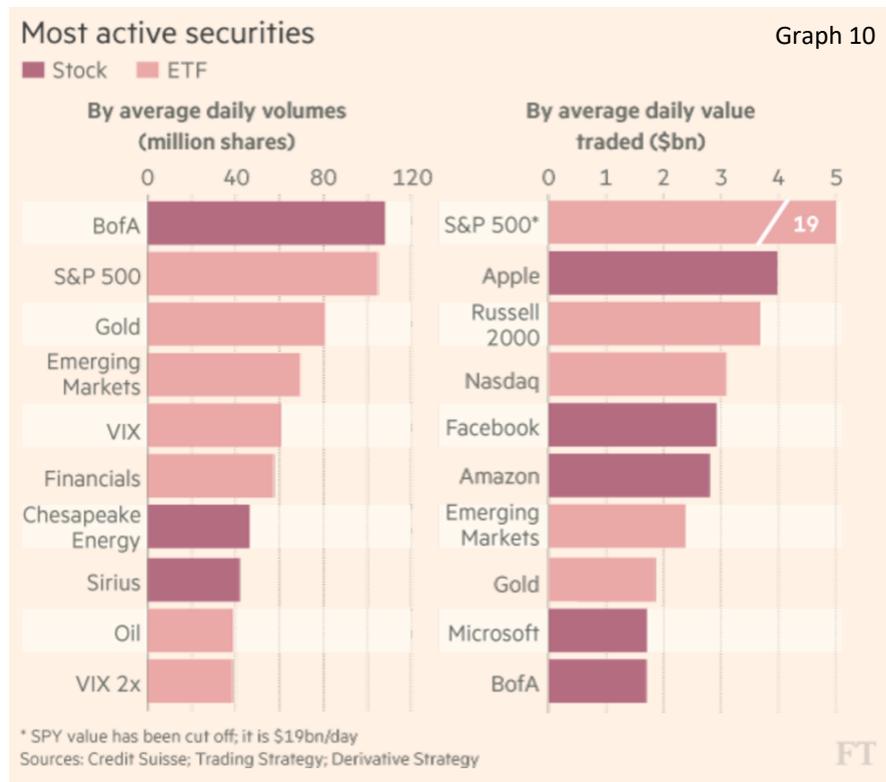


**Title: ETF turnover and short-sale interest as a percentage of total common share and ETF market turnover and short-sale interest (January 1995-December 2015)**

Trading volume information is obtained from CRSP on common shares (CRSP share code 10 and 11) and Exchange Traded Funds, which were identified using CRSP and Compustat. Short-sale interest was obtained from Compustat on all common shares (CRSP share code 10 and 11) and Exchange Traded Funds, which were identified using CRSP and Compustat. The percentage of ETF trading volume as a percentage of total common share and ETF trading volume has increased from less than 5% from 1995 to 2000 to between 25% to 45% in the period 2008 to 2015. Similarly, ETFs represent a growing proportion of all equity sold short. Over the period 2008 to 2015 the short-sale interest on all ETFs has steadily represented about 20% of all equity short-sale interest.

Data: Center for Research in Security Prices – Source: Agarwal et al (2018)

Graph 9 represents ETF's share of market trading activity (in orange) as well as ETF's share of total market short-sale interest<sup>75</sup> (in blue). As shown by the orange line, ETF trading activity has significantly soared over the last two decades. Indeed, ETFs are traded individually more than the underlying assets: in graph 10, it is possible to see the 10 most traded securities within US stock market – data as of 2016.



Pink bars represent ETF shares. These are prominent both in volume traded (number of shares) and in value traded (\$bn). This is a dramatic shift from 2013 when only three ETFs appeared on the top 10 list. This shift toward ETFs can also be seen on the “primary” market, in data on stock market listings: IPOs have largely flatlined after the Dot.com bust while ETF listings continue to climb<sup>76</sup>.

In conclusion, ETFs are already playing a relevant role within financial markets despite the consideration of some investors (i.e. Lyxor)<sup>77</sup>. Volatility issues, arising from both arbitrage process and lack of liquidity, will significantly harm market stability if ETFs and Index Funds would gain larger equity market share (BIS Quarterly Review 2018). Indeed, ETFs inflows lead

<sup>75</sup> “When expressed as a percentage, short-sale interest is the number of shorted shares divided by the number of shares outstanding. For example, a stock with 1.5 million shares sold short and 10 million shares outstanding has a short interest of 15% (1.5 million/10 million = 15%)”. Source: Investopedia.

<sup>76</sup> Financial Times - <https://www.ft.com/content/6dabad28-e19c-11e6-9645-c9357a75844a>

<sup>77</sup> Author's consideration.

to price distortions in both fund shares and underlying assets and they increase return unpredictability as well (David C. Brown et al 2019).

## 2.3 Market Distortion

### 2.3.1 Pricing Securities

According to classic definitions, assets value should be equal to its fundamentals, thus the Net Present Value of the expected returns. Studies (Lucas Pastor and F. Stambaugh 2003) (Acharya and Pedersen 2003) found the existence of a relationship between expected returns and liquidity, and required returns and illiquidity. More specifically, the expected returns are correlated to the sensitivity of stock returns to aggregate liquidity -i.e. higher liquidity implies higher expected returns, thus higher prices. Whilst, required returns are increasing in the covariance between stock illiquidity and market illiquidity – investors require higher results for illiquid securities; thus, they are willing to pay cheaper prices or receive higher yields. Considering the liquidity effects brought by passive funds to individual securities, heavy increases in passive ownership will sensibly harm pricing fairness (BofA’s note July 2017<sup>78</sup>): “ETFs may drive massive P/E distortions” BofA said. The issue arose by BofA regards the possibility that passive funds, by boosting prices of individual securities included in indexes through an increase in stocks demand, could harm P/E reliability. More specifically, they could increase P/E values for listed stocks, creating a gap with non-listed stocks. The multiple would be overvalued and non-deployable for comparing companies of the same sector. What are the factors that could drive up share prices in the current financial environment though? There are few: firstly, an increase in demand for both S&P 500 securities and ETFs shares. Second, the buybacks phenomenon; over the last decade companies bought own shares from the market in order to reduce the number of stocks (further reducing liquidity) and push up prices<sup>79</sup> - this practice has been appreciated especially by top managers whose compensation was also in stock option. As shown in graph 9, there is a strong correlation between buybacks (blue sticks) and the S&P 500 (red line). Moreover, because stock prices increase, companies need to raise the absolute value of buybacks and dividends to keep relative returns at the same level<sup>80</sup>. Indeed, the evidence is given by the fact that the aggregate buybacks and dividends, shown in graph 11, increased while the relative returns, shown in graph 12, remained relatively flat<sup>81</sup>.

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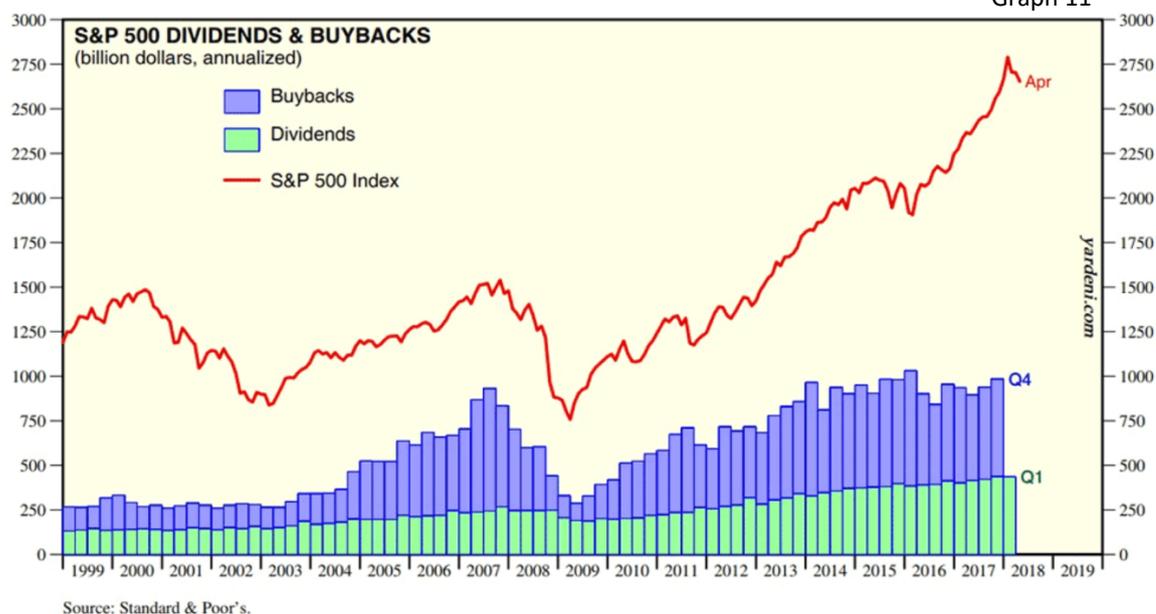
<sup>78</sup> Source: CNBC.

<sup>79</sup> Source: Investopedia.

<sup>80</sup> For instance, a stock is worth \$100 with relative return from buybacks + dividends of 10% (\$10). If the stock price goes up to \$110, the company will deploy cash for \$11 to keep relative returns at 10%.

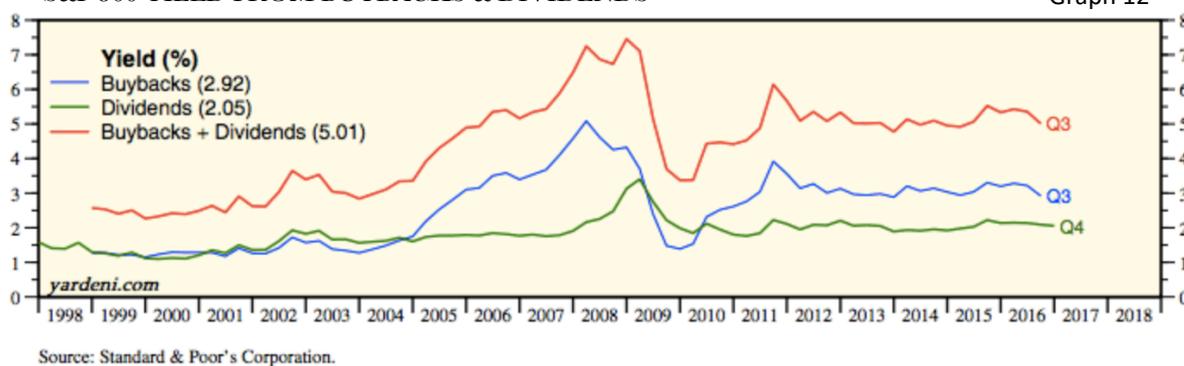
<sup>81</sup> Refers to post-crisis period.

Graph 11



S&amp;P 500 YIELD FROM BUYBACKS &amp; DIVIDENDS

Graph 12



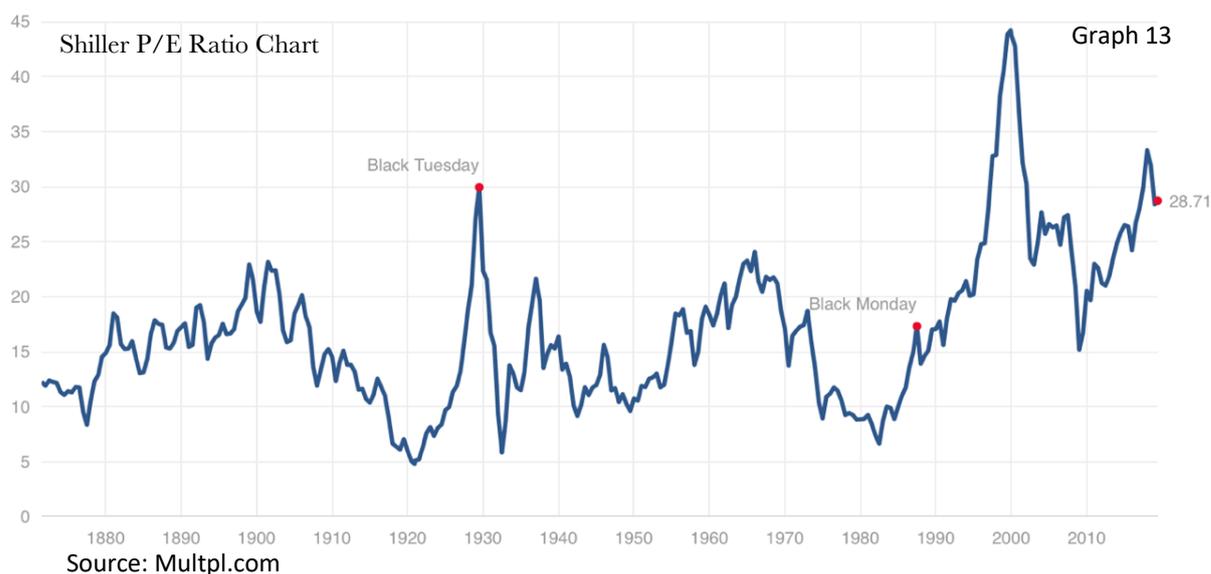
Companies are spending more cash for buybacks and dividends than for CAPEX<sup>8283</sup>, meaning they are more short than long-focused. Not only, buybacks trend paced beside the increase of bond-issuance: Blundell-Wignall. and Roulet (2013) argue that debt issuance has been used to finance buybacks. The use of debt to push up prices is fostering ETF (equity) industry. Index components prices are boosted by debt-backed buybacks. Indeed, by comparing the S&P 500 with the S&P 500 buybacks index<sup>84</sup>, it results that the latter has a Sharpe Ratio of 0.64 whilst the former only 0.33; meaning buybacks considerably improve stock returns (UBS – asset management 2015). The boost given by indexing and buybacks made stock prices soar; securities have reached one of the highest valuations ever compared to earnings, becoming overvalued<sup>85</sup>. Indeed, the Shiller P/E ratio – which is the S&P 500 P/E multiple adjusted by inflation – represented in graph 13, shows that market prices are currently at their third highest

<sup>82</sup> Companies' funds allocated for acquiring, upgrading or maintaining operating long-term assets. Source: Borsa Italiana.

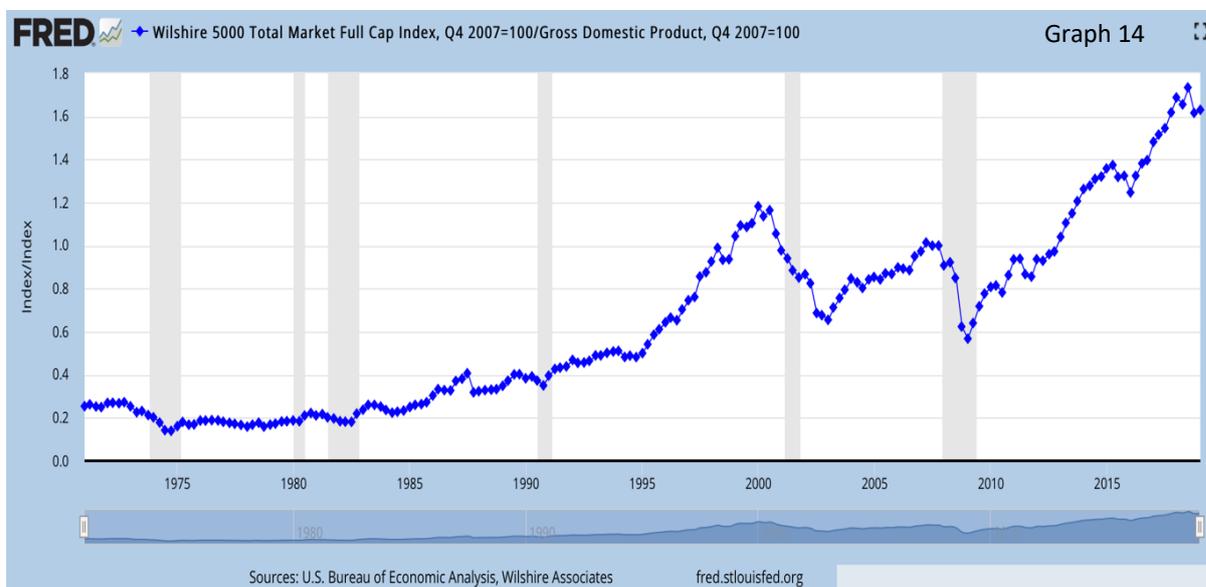
<sup>83</sup> (Buybacks + Dividends)/CAPEX= 140% Source: Deloitte.

<sup>84</sup> Composed by the first 100 stocks of S&P 500 with the highest buyback ratios.

<sup>85</sup> Source: Forbes 2018.



value of all time relative to earnings. Moreover, the Wilshire GDP index<sup>86</sup>, which represents the market capitalization of 5,000 stocks of US market relative to US GDP. As shown in graph 14, the Wilshire index has reached its highest value ever in Q3 2018 at 173%. It means stock prices are by far higher than the real economic value<sup>87</sup>. The great ascendance of market prices, shown in both graph 13 and 14, made ETFs compelling to most investors. The switch toward passive funds has boosted index prices as well. In conclusion, ETFs, thanks to the favourable financial environment, are boosted by market demand-driven shocks and the help of companies' short-termism. (McKinsey 2017). In my opinion that creates a virtuous cycle in which markets corroborate ETFs and vice versa.



<sup>86</sup> "One of the best indicators of current stock value" – Warren Buffet.

<sup>87</sup> Author's consideration.

### 2.3.2 Noise Traders – HFT

Where do sponsor firms make money out of passive funds? Well, in addition to basic fees, they gain from the arbitrage process - even though price spreads are in the order of pennies, the huge overall volume traded compensate. The process, however, is mainly controlled by computers via algorithms.

During the last decade, a new sort of market players took place into financial world. The so-called High Frequency Traders. HFTs are entities endowed with powerful computers, located nearby the exchange servers, which float the market with millions of offers<sup>88</sup> “immediate-or-cancel” type, in order to map the current market position. Then they find, through algorithms, the optimal trade to place. The position isn’t held more than one day, making these agents mere speculators. They exploit their capability of reaching faster than the other the exchange servers, where the orders are executed (Zhang 2010). There, they intercept other agents’ buying or selling requests; then they match orders with narrow price gap by adding up the missing basis points. That, thanks to their ability to track the order book imbalances, which allows them to operate ahead of future price changes; when they see unfavourable imbalances, they immediately cancel out risky orders (Goldstein, Kwan and Philip 2016). On a large scale this process actually ensures conspicuous profits<sup>89</sup>. The other face of HFTs, related to ETFs, is that these entities are the ones who actually allow fund shares price to stay in line with the NAV via arbitrage<sup>90</sup>. The business model of HFT has been largely criticized for their blame on volatility and the possibility of manipulating the market: arbitrage on minuscule price divergences with huge volumes<sup>91</sup> and no real interest in holding securities. Zhang (2010) reports that HFT activity and stock price volatility are positively correlated. More specifically, HFTs trade more aggressively when markets are volatile, exacerbating order book imbalances (Goldstein, Kwan and Philip 2016). Applied to ETFs, that have high trading activity, if in large scale, might produce dangerous turbulences<sup>92</sup>. More accurately, the algorithms which control the system may produce harsh sell-offs in volatile markets: when they perceive some negative indicators (too high volatility), they program to sell positions. A clear example is 6<sup>th</sup> May 2010 flash crash: 70% of shares that fell 60% in that day were ETFs because of HFT. This problem is important because ETF trading activity soars when markets are volatile (Bloomberg 2018) and HFT

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<sup>88</sup> Only 1% is actually executed.

<sup>89</sup> Goldman Sachs revenues for market making is more than 25% of total revenues. Data as of 2018. Author’s calculations. Source: <https://www.goldmansachs.com/investor-relations/financials/current/annual-reports/2018-annual-report/annual-report-2018.pdf>

<sup>90</sup> APs and other institutional investors have HFT divisions.

<sup>91</sup> In 2017, Aldridge and Krawciw estimated that in 2016 HFT on average initiated 10–40% of trading volume in equities. (Source: Aldridge, I., Krawciw, S., 2017. *Real-Time Risk: What Investors Should Know About Fintech, High-Frequency Trading and Flash Crashes*. Hoboken: Wiley).

<sup>92</sup> A 10% increase in HFT activity lead to 3-5% increase in individual securities volatility (CONSOB 2015).

activity accounts for approximately 80% of market activity (VAND Capital 2017). Up to date, high velocity traders have been providing consistent liquidity to ETF markets, keeping bid-ask spreads tight<sup>93</sup> (BlackRock 2018). However, academic research found that they do add liquidity to only the more nourished side of the order book. Partington, Philip and Kwan (2015) note that “supplying liquidity on the thick side of the order book is of little value, as there is already a surplus there. The real value is supplying liquidity on the thin side of the order book, where it is most needed”. In addition, they cite research showing that “depending on the size of the order, the impact when non-HFT orders are removed is between 3 and 15 times larger than the impact when HFT orders are removed. This is attributed to non-HFTs supplying much more depth in the order book”<sup>94</sup>. Not only, they found that, after HFTs became prevalent, institutional investors’ limit orders are less likely to be executed: the probability is decreased from 50% to 30%.

In conclusion, if we apply to ETFs those effects produced by HFT, it may result that tight bid-ask spreads are, in reality, just the consequence of an imbalanced order book and a potential non-HFT market movement could be so harsh, that high velocity traders couldn’t cover the impact<sup>95</sup>. Moreover, HFTs don’t look to fundamentals, they rather operate by finding arbitrage opportunities. Prices could become just the result of algorithms calculations<sup>96</sup>. That may mean markets would be subject to computers decisions, even though under human supervision. Physical traders may be negatively affected from algorithm-based trading. Retail investors may be harmed even more because of the asymmetric information<sup>97</sup>.

### 2.3.3 Harming Diversification Benefits

Enclosing assets in a large pool and selling it to the mass, implies that millions of investors will hold the same identical packet. As shown before, ETF ownership increase underlying stocks correlation. Let’s suppose all of the existing securities listed in a stock exchange are embedded in the same basket; the correlation among the underlying assets would increase dramatically. Stocks from different sectors would be then considered as stocks of a unique sector. That unarguably harms diversification benefits deriving from portfolio theory. Thus, stock betas need to be recalculated upward, now taking account of a broader systematic risk brought by indexing. Moreover, as already stated before, passive funds are particularly sensible to

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<sup>93</sup> 2.5 cents for BlackRock’s US listed S&P 500 ETF.

<sup>94</sup> Source: <https://www.etf.com/sections/index-investor-corner/swedroe-high-frequency-tradings-impact?nopaging=1>

<sup>95</sup> Author’s consideration.

<sup>96</sup> Source: Financial Times article - <https://www.ft.com/content/cdbdd01a-95b4-11e8-95f8-8640db9060a7>

<sup>97</sup> Author’s consideration.

macroeconomic events; world's becoming more and more globalized. International events could expand their effects within multiple countries – i.e. off-shoring production would make businesses sensible to both domestic and foreign nations' regulations. Thus, even though the largest ETFs currently offer the broadest diversification, in the hypothesis of a market prevalently owned by passive shareholders, these benefits could vanish.

## **Chapter III – Conclusions**

I conducted this research with the scope of investigating the effects of passive investing on stock markets. More specifically, what ETFs and Index Stock Funds cause to individual stock liquidity and volatility, giving an insight to market efficiency implications. After all that have been said so far, it results that passive investing has reached a prominent equity market share, in spite of some biased considerations, and it's stepping even forward. Passive ownership, especially ETF's one, is claimed to be undermining underlying stocks liquidity. That affects the effectiveness of AP's arbitrage, with particular regards to heavy bear markets. ETFs are also blamed for increasing individual securities volatility through the arbitrage process; the latter creates a propagation channel through which non-fundamental demand shocks are transferred from ETF markets to single stocks. Not only, indexing increases co-movement in both liquidity and volatility of underlying components. That means the broader the passive ownership the less these products are diversified; market movements could become sharper.

The huge ascendance of ETFs combined with companies' short-termism corroborated market prices fostering the growth of investors' interest toward passive instruments; that created a virtuous cycle that fuelled ETFs inflows and stocks price raise. This demand-driven expansion invalidates the reliability of P/E multiple as a benchmark.

Last findings regard recent market players such as high frequency traders. These agents exploit algorithm and faster computers to probe the market and intervene onto mispriced securities via arbitrage. At first impact they might seem liquidity providers for those stocks, however, they are claimed to be so “only for the thick side of the order book”. Their impact as liquidity providers is by far lower than non-HFT agents, even though they represent a huge share of trading activity.

As far I am concerned, ETFs could trigger harsh downturns as well as inflate bubbles during bull markets. The combination of the liquidity issue with the increase in commonality increases stocks betas. Investors should be warned about ETFs effects and the real risk they incorporate. Regulation boards are already taking supervisory measures with respect to passive instruments, especially toward leveraged and synthetic ones. I personally suggest that these financial

products, particularly because they attract households and small savers, may be placed by expert brokers who should be able to match investors needs and product riskiness.

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