



FEBRUARY 2017

**ETFs: CHARACTERISTICS,  
OVERVIEW AND RISK ANALYSIS —  
THE CASE OF THE FRENCH MARKET**



**Risk and Trend  
Mapping**

AUTORITÉ  
DES MARCHÉS FINANCIERS



## Summary

There is growing interest in the ETF market, from both investors, seeking yield and low-cost products in a low interest rate environment, and management companies, which thus saw their assets rise significantly to more than EUR 2,800 billion in 2016.

Various episodes, such as the fall in U.S. ETFs and the impact of the closure of the Greek markets in the summer of 2015, nevertheless show that the risks associated with the liquidity and stability of the markets, and of the underlying assets in particular, have not been properly evaluated.

Academic literature on the subject is also inconclusive, with analyses identifying multiple contradictory impacts.

The intention of this study is therefore to shed light on these issues by an analysis of the French ETF market. The results show that the circuit-breaker mechanisms in place on Euronext Paris help limit the risk of large gaps between the traded price of an ETF and the indicative net asset value of the underlying basket. It also seems that take-up rates for Paris market ETFs are not themselves sufficient to have a significant impact on their underlying markets in the event of a massive withdrawal. Lastly, primary flows appear to be counter-cyclical, serving to dampen rather than magnify major price moves.

There is nevertheless a need for vigilance should interest in these products continue to grow. This is particularly true in stressed markets, when ETF unit prices are likely to show a significant discount.

## INTRODUCTION

ETFs have experienced explosive growth in recent years: in Q3 2016, their assets under management (AUM) reached EUR 2,852 billion, i.e. 7% of total assets under investment management worldwide<sup>1</sup> and a 20% annual increase in assets over the last four years.

In Q3 2016, the United States represented 71% of worldwide assets, with EUR 2,153 billion in assets under management and 1,995 ETFs<sup>2</sup>. The 10 largest ETFs by assets under management are also American and alone accounted for 27% of the assets of U.S. ETFs and 19% of worldwide assets. The U.S. market is relatively concentrated: while two leading players account for 63% of assets (BlackRock and Vanguard), they account for only 22% of the number of U.S. ETFs, which are then divided among a number of competitors.

The Asia-Pacific region represented 9% of international assets under management in Q3 2016, of which 5.1% were from Japan alone, with Hong Kong and China also each representing 1% of total assets. Europe represented 16% of ETF assets under management worldwide, with EUR 488 billion in assets.

This growth and, more generally, the development of passive management in recent years reflect the changing market environment. Fund managers have had to address the twofold challenge of rising costs, largely due to post-crisis regulatory developments, and difficulties in generating profits in a low rate environment. These shrinking margins have led to a growing polarisation in the asset management industry, which has had to choose between lowering its costs by shifting towards passive management, or increasing its returns.

The growth in passive management raises a number of questions<sup>3</sup>. The first concerns its impact on market efficiency. Stambaugh (2014)<sup>4</sup> considers that growth in passive management enhances market efficiency by reducing arbitrage opportunities. Similarly, Appel, Gormley and Keim (2016)<sup>5</sup> argue that the growing presence of ETFs in the United States since the financial crisis has had a positive impact on active funds, by encouraging them

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<sup>1</sup> EFAMA International Statistical Release Q3 2016.

<sup>2</sup> All the international comparison figures in this study are taken from an extraction of Lipper data performed in early January 2017.

<sup>3</sup> See I. Ben-David, F. Franzoni and R. Moussawi, 2016, *Exchange Traded Funds (ETFs)*, NBER Working Paper No. 22829 for a comprehensive review of the literature.

<sup>4</sup> Stambaugh, Robert F., 2014, *Investment Noise and Trends*, Journal of Finance 69 (4), 1415–1453.

<sup>5</sup> Appel, Ian R., Todd A. Gormley, and Donald B. Keim, 2016, *Passive Investors, Not Passive Owners*, Journal of Financial Economics 121(1), 111–141.

to adopt more aggressive strategies. In contrast, Wurgler (2011)<sup>6</sup> considers that it promotes distortions in the valuation of the underlying assets by placing upward and downward pressure on asset prices due to the impact of the addition/deletion of these assets to/from the indices, the correlation between asset prices and indices, and greater sensitivity to crashes.

Many questions also concerned, more specifically, the potential risks ETFs are likely to create for the financial system, in view of their rapid growth. Attention was initially focused mainly on two potential risks, counterparty risk and collateral risk, both associated with the use of derivatives in certain replication models and with growth in securities lending. However, these two potential risks are regulated in Europe by the UCITS Directive as well as by ESMA's guidelines on UCITS and other listed funds, which have apply to all European UCITS ETFs since February 2014.

Most of the discussion is now focused on a third risk: the potential illusion of liquidity that ETFs represent, in particular those with less liquid underlyings, as well as their role in the liquidity of the underlyings, especially as a factor in exacerbating volatility, and their price formation mechanisms. To date, the academic literature remains inconclusive on these two topics. Madhavan (2016)<sup>7</sup> and Madhavan and Sobczyk (2016)<sup>8</sup> consider that ETFs, due to their low costs, promote the rapid integration of any new information into their prices, before the prices on the underlying markets. This theoretical view is corroborated by certain empirical studies, such as that of Glosten, Nallareddy and Zhou (2016)<sup>9</sup> which shows that information is incorporated into asset prices more quickly for securities included in the underlying portfolios of ETFs. However, other studies, such as that of Israeli, Lee and Sridharan (2015)<sup>10</sup> do not reach the same conclusions. The authors show that the securities held by ETFs have higher trading costs and higher levels of co-movements with the indices and are characterised by lower informational efficiency. Bradley and Litan (2011)<sup>11</sup> go even further and state that companies may be reluctant to go public due to the increasing number of passive investors on the market (i.e. ETFs) which could slow the price discovery process.

Studies of ETFs' effects on the liquidity of the underlyings identify diverse contradictory impacts. Accordingly, Marshall, Nguyen and Visaltanachoti (2015)<sup>12</sup> demonstrate that the liquidity of ETFs is correlated with the liquidity of the underlying securities, due to the trades resulting from arbitrage activity between the ETF and the underlying assets. The more liquid the underlying asset, the greater the ETF's liquidity due to these arbitrages. Conversely, Petajisto (2016)<sup>13</sup> highlights a significant spread between the price of the ETF and that of the underlyings, in particular for the least liquid assets. Piccotti (2014)<sup>14</sup> also shows that this spread can even be structural for certain ETFs and attributes this to market segmentation, with investors ready to pay a premium for the liquidity benefits offered, in this case, by the ETF. Lastly, on the French market, Deville, Gresse and Séverac (2014)<sup>15</sup> analyse the impact of ETF creation on the mispricing of CAC 40 futures and find that the creation of CAC 40 ETFs has no direct impact on the decrease in mispricings observed six months after their creation and that they do not explain, even indirectly, the improvement in intraday liquidity. They suggest that the effect observed rather results from the structural change in the index market caused by these new funds, which were able to attract new arbitrageurs.

<sup>6</sup> Wurgler, Jeffrey, 2011, *On the Economic Consequences of Index-Linked Investing*, in Gerald Rosenfeld, Jay W. Lorsch, and Rakesh Khurana, eds.: *Challenges to Business in the Twenty-First Century* (American Academy of Arts and Sciences, Cambridge, MA).

<sup>7</sup> Madhavan, Ananth N., 2016, *Exchange-Traded Funds and the New Dynamics of Investing*, Oxford University Press.

<sup>8</sup> Madhavan, Ananth N., and Aleksander Sobczyk, 2016, *Price Dynamics and Liquidity of Exchange-Traded Funds*, *Journal of Investment Management*, forthcoming.

<sup>9</sup> Glosten, Lawrence, Suresh Nallareddy, and Yuan Zou, 2016, *ETF Trading and Informational Efficiency of Underlying Securities*, Working Paper, Duke University.

<sup>10</sup> Israeli, Doron, Charles M. C. Lee, and Suhas Sridharan, 2015, *Is there a Dark Side to Exchange Traded Funds (ETFs)? An Information Perspective*, Working Paper, Stanford University.

<sup>11</sup> Bradley, Harold, and Robert E. Litan, 2011, *Choking the Recovery: Why New Growth Companies Aren't Going Public and Unrecognized Risks of Future Market Disruptions*, Working Paper, The Kaufman Foundation.

<sup>12</sup> Marshall, Ben R., Nhut H. Nguyen, and Nuttawat Visaltanachoti, 2015, *ETF Liquidity*, Working Paper, Massey University.

<sup>13</sup> Petajisto, Antti, 2016, *Inefficiencies in the Pricing of Exchange-Traded Funds*, Working Paper, New York University.

<sup>14</sup> Piccotti, Louis R., 2014, *An ETF Premium Puzzle and a Market Segmentation Explanation*, Working Paper, Rutgers University.

<sup>15</sup> L. Deville, C. Gresse, and B. de Séverac, 2014, *Direct and Indirect Effects of Index ETFs on Spot-Futures Pricing and Liquidity: Evidence from the CAC 40 Index*, *European Financial Management*, 20(2), 352-373.

Events on the U.S. markets, such as the day of 24 August 2015 when some S&P 500 index ETFs suffered as much as a more than 35% disconnect from the net asset value of the underlying index, show that this liquidity risk remains ever present. Accordingly, in the course of its work on the systemic risks that asset management can create, the FSB asked IOSCO to examine to what extent ETFs pose specific liquidity risks requiring an appropriate regulatory framework. More recently, the SEC announced that it was launching a detailed review of the ETF market in the United States amid growing concerns about their role in exacerbating volatility on the financial markets<sup>16</sup>.

This study will first consider the characteristics of ETFs and how they work and then address the various risks associated with ETFs by focusing specifically on the French market and what makes it unique.

## 1. DEFINITION AND CHARACTERISTICS OF ETFs AND HOW THEY WORK

Exchange traded funds (ETFs) are listed investment vehicles<sup>17</sup> that satisfy the following two conditions:

- at least one unit or share class is traded throughout the day on at least one regulated market or multilateral trading facility;
- at least one market maker -undertakes to ensure that the stock exchange value of the units or shares does not vary significantly from the product's net asset value and, where applicable, from the indicative net asset value<sup>18</sup>.

Although an ETF's strategy generally aims to passively replicate a benchmark index, that is not always the case as an ETF can also be actively managed.

ETF management companies may use two different replication methods (see Appendix 1):

- physical replication, where the fund manager selects a portfolio of securities included in the benchmark index in appropriate proportions or a portfolio that is representative of this index; this is referred to as partial physical replication or "sampling", which involves replicating only a sample of the securities included in the index;
- synthetic replication, which is used to match the performance of the index through the use of performance swaps. The ETF management company enters into a total return swap (TRS) with a third party, usually a bank, which provides it with the return of the index for a given nominal exposure.

ETF units can be traded at all times on the secondary market at a price determined by supply and demand at a given point in time, just like equities.

The functioning of the ETF market also relies on a mechanism for creating and destroying units, which is used to adjust the number of fund units outstanding based on demand, and thus to ensure that the units trade at a price which moves in line with the net asset value of the underlying securities portfolio. This unit creation/destruction process takes place once a day on the primary market and can be carried out only by a limited number of qualified entities known as authorized participants (APs)<sup>19</sup> — these are generally major brokers or banks. Antoniewicz and Heinrichs (2014) estimate there are an average of 34 APs per ETF in the United States, although a number of them are inactive. Of those, five on average are also market makers.

Each day, the management company thus publishes the substitute basket (perfect basket). This basket is used to determine the net asset value of the ETF based on the market prices of the securities included in the basket throughout the day. To create new ETF units, the AP can make a cash transfer or an in-kind transfer by creating a basket of securities that reflects the composition of the index. The AP then delivers the cash or basket of

<sup>16</sup> "SEC preparing large-scale review of exchange traded fund industry", Financial Times, 20 October 2016.

<sup>17</sup> Undertakings for collective investments in transferable securities (UCITS) or alternative investment funds (AIFs).

<sup>18</sup> See section III.2 for a detailed analysis.

<sup>19</sup> In theory, the primary market is also open to institutional investors in France. In practice, however, they seldom participate in the primary market given the cost involved.

securities to the ETF management company in exchange for the corresponding number of ETF units. In Europe, for operational reasons, units may be redeemed only in cash, regardless of the replication method selected. These transactions between the ETF management company and the AP are made in large blocks of ETF units known as “creation units”, which are generally (but not always) equivalent in practice to 50,000 ETF units or several million euros or dollars. The AP can then decide whether to keep the units or to sell them either OTC or on the secondary market via a regulated platform.

APs therefore play a key role in this process. First, they ensure that the ETF units do not deviate too far from the market value of their underlying assets (due to the arbitrage opportunities via the primary market<sup>20</sup>). They can also act as liquidity providers on the ETF market (market maker).

There are ETFs for almost every asset class. Equity ETFs have historically been the largest category. They represented 80% of U.S. ETFs in asset terms and 67% of European ETFs (85% of the assets of French listed ETFs) at end-2015. Equity ETFs use four factors to select the stock indices they will replicate: geographic region (single country, regions, etc.), the size of the underlying company (small cap, mid cap, large cap), style (growth, value, dividends paid) and sector (financials, transportation, etc.).

Bond ETFs have enjoyed considerable success in recent years, in particular on the other side of the Atlantic, due mainly to the lower-cost liquidity that they offer at a time when the liquidity of the bond markets has been called into question. The range of bond ETFs is almost as broad as that of equity ETFs, as exposure can vary by geographic region, currency, credit quality, duration, business sector, etc. They represent nearly 17% of assets in the United States and 28% in Europe.

Commodity ETFs represent a relatively small share of the ETF industry in general (3% of European assets). The regulations applicable to UCITS require that UCITS ETFs’ exposure to commodities be indirect (mainly through the use of futures contracts).

Currency ETFs have increased access to the currency markets for individual investors, in particular.

A number of ETFs also have more sophisticated strategies, such as absolute return ETFs<sup>21</sup>, smart beta ETFs<sup>22</sup> and tactical funds which provide an opportunity to gain very specific exposures. Some, for example, propose to invest only in products sensitive to volatility. These products, based in particular on the use of leverage or short selling, can be useful for reducing portfolio volatility or, more generally, for managing risk. They may also be used to increase a portfolio’s return by offering exposure to a specific asset class.

Lastly, there are leveraged and inverse ETFs. Leveraged ETFs acquire a certain number of securities that make up the replicated index and combine them either with a long position on futures or with total return swaps on the replicated index. Leverage levels vary from one jurisdiction to the next. In Europe, the framework applicable to UCITS in principle limits leverage to 2<sup>23</sup>, while in the United States, for example, leverage can be much greater<sup>24</sup>. Inverse ETFs take a short position on replicated indices to deliver the inverse performance of certain asset classes. These ETFs are used in particular in tactical investment or short-term hedging strategies.

ETFs fall under the broader category of exchange traded products (ETPs) which comprises a number of other products. The characteristic they share is their ability to be traded on a trading platform. Most, but not all, ETPs

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<sup>20</sup> If the unit price rises above the market value of the underlying securities, the AP then sells the ETF units at their excess value, with the knowledge that it will be able to exchange, on the primary market, a basket of securities or its corresponding value for ETF units at their end-of-day closing value and thus realise a capital gain. And vice versa if the unit price is below the market value of the underlying securities.

<sup>21</sup> The objective of absolute return strategies is to deliver a positive return regardless of market trends. These strategies do not rely on traditional indices and have significant leeway to allocate and diversify the assets in the portfolio.

<sup>22</sup> A smart beta ETF is an ETF that tracks an index whose composition reflects a trading strategy, that is, which aims to outperform its benchmark.

<sup>23</sup> With the exception of UCITS that use the VaR approach.

<sup>24</sup> The SEC is nonetheless currently considering a reform of the law applicable to U.S. mutual funds, under which the leverage these funds may use could reach a maximum of 1.5, or even 3 under certain circumstances.

offer exposure to an index, but not all are structured as a fund. Accordingly, there are exchange traded vehicles (ETVs), exchange traded notes (ETNs) and exchange traded commodities (ETCs), which are similar to unsecured debt securities, and other types of ETPs which, unlike traditional ETFs, are not covered by the UCITS Directive. This means they are not subject to the related requirements, in particular with respect to risk management, and do not necessarily have to obtain authorisation from the national regulator.

If ETFs have been successful, it is because they offer, like “traditional” investment funds, the option of investing in a diversified portfolio of securities, while benefiting from the ease of trading, liquidity and lower costs associated with instruments listed on a stock exchange. Like all listed products, ETFs offer the ability to trade on the markets almost instantly, at a known price any time during the trading session, and provide access to investment techniques generally reserved for equities (market, limit and stop orders). This contrasts with traditional funds, which are bought and sold on a forward pricing basis once a day, with varying delivery times. In addition, ETF management fees are much lower (at about 0.2% to 0.5% of assets<sup>25</sup>) and do not require entry or exit fees on the secondary market.

## 2. THE ETF MARKET IN FRANCE

France is one of the four largest jurisdictions for European ETF domiciliation (with 13% of European assets in Q3 2016), alongside Ireland (56% of assets), Luxembourg (17%), and Germany (10%). The leading listing venues for European ETFs are also highly concentrated: in London (39% of European assets are listed there), Frankfurt (28%) and Paris (14%).

**Table 1 - European ETF domiciliation**

Country of domiciliation	Number of ETFs	Assets (Q3 2016, €bn)	Assets (end-2015, €bn)	Net redemption/subsription flows in 2016 (€bn)	Net redemption/subsription flows in 2015 (€bn)
Ireland	824	273.6	230.9	44.1	35.9
Luxembourg	632	81.0	82.7	-6.3	18.3
France	381	62.3	62.6	5.2	10.1
Germany	112	47.2	49.6	2.2	7.6
Jersey	398	18.7	11.9	4.2	0.7
Other	38	5.1	5.0	0.2	0.6
<b>Total UE</b>	<b>2,385</b>	<b>487.9</b>	<b>442.7</b>	<b>49.6</b>	<b>73.2</b>

Source: Lipper, AMF calculations.

The European branches of U.S. giant BlackRock, which held 47% of European assets in Q3 2016 (EUR 230 billion), rank it among the largest asset management companies in Europe by assets. Accordingly, eight of the ten largest European funds are BlackRock funds. These funds are mainly domiciled in Ireland and Germany and mainly listed on the London Stock Exchange. Similarly, Vanguard has more than EUR 20 billion in assets in Europe (4% of European assets). This compares with the other largest European management companies with a respective 11% of European assets for Deutsche Bank (with funds domiciled in Luxembourg), 9% for Lyxor and 4% for Amundi. Some of these funds may be purchased by French investors. However, this study concerns only products listed in France, in line with the AMF’s field of jurisdiction.

<sup>25</sup> In 2015, equity exchange-traded funds reported an average total expense ratio (TER) of 0.4%. This compares with the average TER of “actively” managed equity funds (excluding collective investment undertakings classified as “index” funds and excluding ETFs) of 2.0%. Source: AMF Households Savings Observatory Newsletter - no. 20 - October 2016.

## 2.1. A RAPIDLY EXPANDING MARKET

The market for ETFs listed on Euronext Paris (i.e. including foreign ETFs listed in France and excluding French ETFs listed abroad) consists of 477 ETFs for total assets under management of EUR 103 billion at end-2016.

This market has grown sharply, with a 66% increase in assets under management between 2014 and 2016 due primarily to a significant rise in inflows (see below). Furthermore, 118 new ETFs were listed on Euronext Paris in the same period, while 97 were delisted, for a net creation of 21 ETFs. This accounts for 15% of the change in assets under management. This expansion of the ETF market is also reflected in the change in trading volumes on platforms and OTC, which increased by more than 26% between 2014 and 2016 to EUR 634 billion<sup>26</sup>.

**Table 2 - Change in assets and trading volumes for ETFs listed on Euronext Paris**

Asset class	Number						Assets under management (€bn)					
	2014		2015		2016		2014		2015		2016	
<b>Equities</b>	369	83%	372	79%	384	81%	54	86%	76	85%	85	83%
<b>Bonds</b>	69	15%	80	17%	85	18%	8	13%	13	14%	16	16%
<b>Commodities</b>	6	1%	12	3%	7	1%	1	1%	1	1%	1	1%
<b>Other</b>	2	0%	5	1%	1	0%	0.0	0%	0.3	0%	0.0	0%
<b>Total</b>	<b>446</b>	<b>100%</b>	<b>469</b>	<b>100%</b>	<b>477</b>	<b>100%</b>	<b>62</b>	<b>100%</b>	<b>90</b>	<b>100%</b>	<b>103</b>	<b>100%</b>

Source: Euronext, Transaction reporting. Trading volumes include all platforms as well as OTC trades<sup>27</sup>.

ETFs listed in France consist mainly of equity ETFs (83% of assets) and, to a lesser extent, bond ETFs (16% of assets). While commodity ETFs represent only 1% of assets under management, other ETFs (currency and alternative) are entirely insignificant.

A further breakdown shows that 40% of equity ETF assets are European equities. ETFs made up solely of French equities total only 6% of equity assets, mainly through CAC 40 ETFs. By comparison, Euro Stoxx 50 assets are twice as great. There has also been a sharp increase in S&P 500 assets, which at end-2016 slightly exceeded Euro Stoxx 50 assets at EUR 11 billion.

In the bond segment, ETFs are overwhelmingly focused on European issuers (84% of assets). Within this category, sovereign bond ETFs represent 51% of assets versus corporate bond ETFs at 29%. ETFs exposed to the riskiest debt (high yield and emerging markets), all issuer nationalities combined, have assets of nearly EUR 1 billion.

<sup>26</sup> This compares with volumes of EUR 1,799 billion for CAC 40 securities and EUR 1,711 billion for CAC 40 futures in 2015.

<sup>27</sup> As is the case with equities, the AMF receives transaction reports on ETFs from investment services providers regardless of trading venue (i.e. Euronext, other platforms or OTC) for instruments for which France is the reference market.

**Table 3 - Assets by underlying market segment**

Equities	2015		2016	
	Assets (€m)	%	Assets (€m)	%
<b>Equities by region</b>				
Euro Stoxx 50	14,550	19%	10,905	13%
S&P 500	7,938	10%	11,070	13%
CAC 40	5,486	7%	4,967	6%
MSCI USA	4,408	6%	3,616	4%
MSCI World	2,419	3%	2,578	3%
Other	26,701	35%	34,377	40%
Subtotal	61,503	81%	67,513	79%
<b>Equities by sector</b>				
Stoxx Europe 600 Banks	1,015	1%	715	1%
Other	3,473	5%	3,761	4%
Subtotal	4,489	6%	4,476	5%
<b>Other</b>	10,206	13%	13,472	16%
<b>Total equities</b>	<b>76,197</b>	<b>100%</b>	<b>85,462</b>	<b>100%</b>
<b>Bonds</b>				
<b>EU issuers</b>				
Sovereign debt	7,546	59%	8,273	51%
Corporate debt	3,239	26%	4,632	29%
of which investment grade	2,406	19%	3,867	24%
of which high yield	833	7%	765	5%
Covered Bonds	154	1%	127	1%
Subtotal	10,939	86%	17,664	109%
<b>U.S. issuers</b>	331	3%	892	5%
<b>Emerging issuers</b>	199	2%	268	2%
<b>Other (money market, futures)</b>	1,230	10%	15,085	93%
<b>Total Bonds</b>	<b>12,699</b>	<b>100%</b>	<b>16,245</b>	<b>100%</b>
<b>TOTAL all asset classes</b>	<b>90,236</b>		<b>102,979</b>	

Source: Euronext.

The bond segment benefited greatly from the increase in assets between 2014 and 2016: bond assets more than doubled during the period, while equity ETF assets increased by 60%.

Inflows were particularly advantageous to the corporate segment, which represented 80% of additional assets, of which 29% in the high-yield segment. Trading volumes in this segment also doubled between 2014 and 2016, versus a 28% rise in the equity segment. This growth in assets and volumes of bond ETFs is due, first, to the accommodative monetary policies that supported the bond market and, second, to concerns about a potential deterioration in liquidity conditions on the bond markets, and on the corporate bond market in particular. From this standpoint, ETFs are perceived as a more liquid way to gain exposure to the underlying asset class (see below).

The commodities segment consists of only six ETFs, the largest of which (60% of assets) is based on the highly diversified Thomson Reuters Jefferies CRB index and the second-largest, with 12% of assets, on this same index excluding energy.

Lastly, while the number of benchmark indices is high (more than 350), they are concentrated in a limited number of index providers: MSCI, STOXX and S&P represent 29%, 15% and 14% of assets under management, respectively.



## 2.2. HEAVY CONCENTRATION BY INSTRUMENT AND MANAGEMENT COMPANY

This concentration is also evident from an analysis of the breakdown of assets and trading volumes. The two largest ETFs of the 477 that are listed, which account for EUR 11 billion in assets, represented 13% of total assets in 2016. Similarly, the two most actively traded ETFs accounted for 10% of trading volumes, a concentration that appears to be stronger for the bond segment (16% of trading volumes for the two largest ETFs).

As for the concentration of ETF management companies, Lyxor and Amundi dominate the market with 42% and 35%, respectively, of assets under management in 2016.

**Table 4 - Breakdown of assets by management company**  
(end-2016, EUR billion)

	Combined		Equities		Bonds	
<b>LYXOR International</b>	42.9	41.6%	31.7	37.1%	10.2	62.8%
<b>Amundi</b>	36.1	35.1%	32.1	37.5%	4.0	24.8%
<b>THEAM Easy ETF</b>	5.8	5.6%	5.6	6.6%	0.15	0.9%
<b>HSBC ETF</b>	3.5	3.4%	3.5	4.1%	0.0	0.0%
<b>State Street Global Advisor</b>	3.5	3.4%	2.5	3.0%	0.9	5.7%
<b>Other</b>	11.3	10.9%	10.0	11.7%	0.9	5.7%
<b>Total</b>	103	100%	85.5	100%	16.2	100%

Source: Euronext.

Lastly, French ETFs primarily offer synthetic replication, with this technique applied to 70% of assets. This percentage has fallen significantly from 2014, when it stood at 80% of assets<sup>28</sup>.

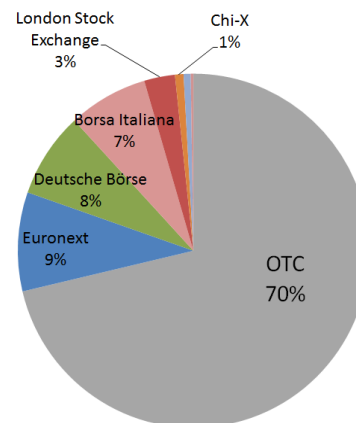
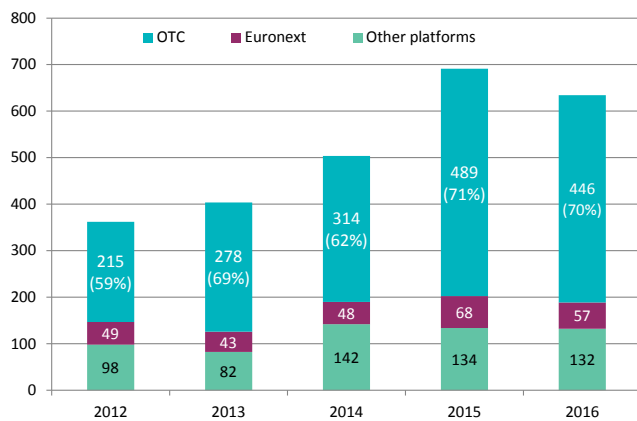
## 2.3. TRADING IS MOSTLY OTC

Trading volumes for French ETFs in 2016 stood at EUR 634 billion, of which EUR 446 billion was OTC (i.e. 71% of volumes) and EUR 57 billion was on Euronext Paris (9% of volumes). Other European platforms where certain ETFs are multi-listed accounted for the balance. Alternative platforms (Chi-X, Turquoise) are not commonly used for ETFs, unlike the equity markets, where they account for about 20% of trades.

While volumes have grown steadily, they rose even more sharply in 2015 (up 37%), driven by OTC trades (up 53%) and, to a lesser extent, by trades on the French regulated market (up 43%), the volumes on other platforms having fallen by 6%. The LSE's particularly low market share in Paris-listed ETFs is due to the low volumes of ETFs traded in euros in London.

<sup>28</sup> See Appendix 2.

**Chart 1 - Change in trading amounts by type of trade and main trading venue in 2016 (EUR billion)**



Source: Euronext, MiFID transaction reporting.

The post-trading transparency imposed on French investment service providers is currently being extended to all OTC transactions on listed ETFs (with a coming change in the AMF's General Regulations). This evolution will constitute a transitional tool<sup>29</sup> for competitiveness and transparency of the Paris market place.

## 2.4. LARGE AVERAGE TRADE SIZES

The average size of an equity ETF trade is much larger than that of direct/cash equity trades. It is nearly EUR 39,000 on average on Euronext (versus EUR 8,000 to EUR 12,000 on average for CAC 40 securities and EUR 105,000 for CAC 40 futures). The average size of OTC ETF trades is EUR 2.3 million, or 23 times greater than OTC equity trades (EUR 100,000 on average).

In the bond segment, the average size of an OTC ETF trade is in line with that observed on the French underlying markets (about EUR 3 million); however, on platforms, the average trading size on bond ETFs are 25 times smaller than cash bond trades.

**Table 5 - Breakdown of ETF trades by average size on Euronext (table on left) and OTC (table on right) (2015)**

Euronext Paris	Total	Equities	Bonds	OTC	Total	Equities	Bonds
more than €500k	0%	0%	2%	More than €20m	1%	0%	1%
€100k to €500k	10%	4%	36%	€10m to €20m	4%	4%	8%
€50k to €100k	20%	19%	25%	€5m to €10m	12%	10%	16%
€10k to €50k	56%	63%	31%	€1m to €5m	48%	47%	57%
Less than €10k	13%	14%	5%	€500k to €1m	17%	18%	13%
				Less than €500k	19%	22%	4%
<b>Average size</b>	<b>40,067</b>	<b>38,667</b>	<b>62,436</b>	<b>Average size</b>	<b>2,449,236</b>	<b>2,299,217</b>	<b>3,015,668</b>

Source: Euronext, Transaction reporting.

<sup>29</sup> This change in the AMF's General Regulation would only be transitional insofar as MiFIR, which will be applied from January 3<sup>rd</sup>, 2018 forward, extends the post-trade transparency obligation to all transactions on ETF.

The main reasons for the large ETF trade sizes are, first, the growing interest from institutional investors and, second, market makers' ability to act as counterparty, as they are able to hedge their positions through highly liquid instruments, which are themselves generally traded in large quantities:

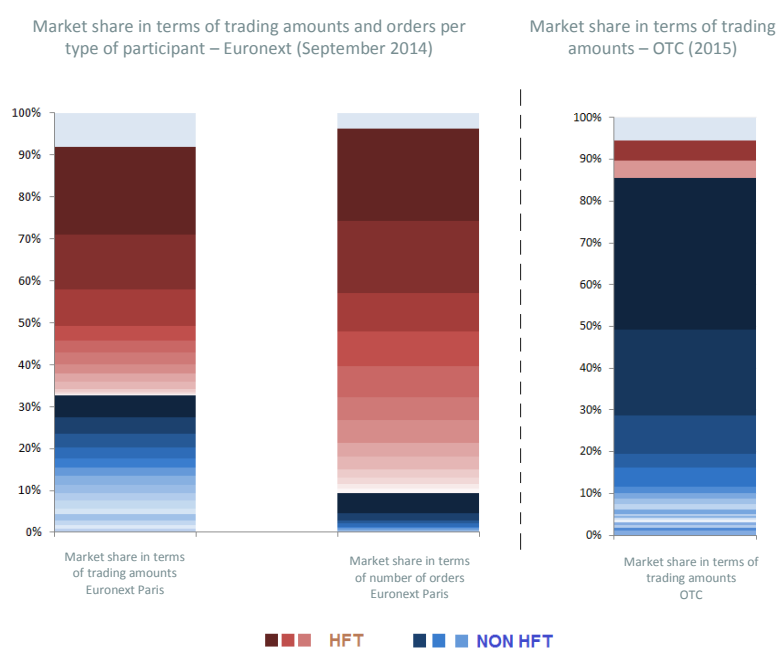
- for equity ETFs, and in particular those whose underlyings are the major blue-chip indices, the existence of futures on the same underlying as the ETF allows liquidity providers to offer competitive quotes in large size comparable to those for the futures;
- for sovereign debt ETFs, bonds are generally highly liquid on the secondary market, as they benefit from active market makers which operate on the interbank market with trade sizes far above the average trade sizes observed for ETFs; and
- for corporate debt ETFs, the bonds included in the indices may be hedged through interest rate swaps, sovereign bonds and index CDS which are themselves highly liquid.

## 2.5. SIGNIFICANT MARKET MAKING-RELATED HIGH-FREQUENCY TRADING ON THE REGULATED MARKET

High-frequency trading represents more than 60% of ETF trading volumes on the Paris regulated market (or 17% of the total market given the percentage of OTC). This percentage is greater than that observed in the equity markets, where it has stabilised at 45% on average for CAC 40 securities. It includes the activity of "pure" high-frequency traders (HFTs), the three largest of which have a 40% market share, as well as "mixed" players, which are more traditional participants (banking institutions) that have developed an HFT market-making activity. Based on number of orders given, HFTs account for more than 85% of order book activity due to their market-making commitment to Euronext.

Unsurprisingly, an analysis of OTC volumes points to mostly non-HF traders. However, it is highly concentrated, as two participants account for 57% of trading amounts.

**Chart 2 - Market share in terms of trading amounts and orders per type of participant**

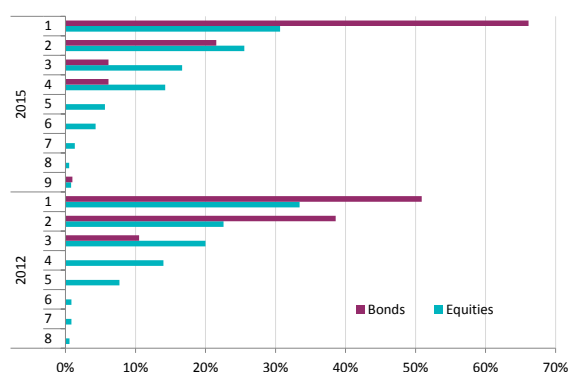


Source: Euronext, Transaction reporting.

A detailed analysis of market-making activity (identified by a specific flag in AMF data<sup>30</sup>) shows that the percentage of ETFs whose quotes are regularly proposed by a single market maker is fairly low. They represent 19% of assets (31% of equity ETFs and 66% of bond ETFs in number terms) and 5% of trading volumes.

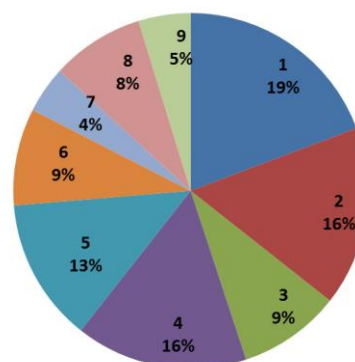
Conversely, more than 80% of assets are invested in ETFs with at least four market makers. The two largest equity ETFs (in asset terms) accept quotes from eight and nine different market makers, respectively. The two largest bond ETFs only have two and four. Furthermore, the number of bond ETFs with only one market maker increased from 50% in 2012 to 65% in 2015, likely reflecting concerns about the underlying liquidity.

**Chart 3 - Change in number of market makers per ETF (number of ETFs)**



Source: Euronext.

**Chart 4 - Breakdown of assets by number of market makers in 2015**



## 2.6. MEASURING ETF PERFORMANCE

While in some jurisdictions ETFs may consist of actively managed funds, ETFs listed in France are currently all trackers: they seek to replicate, as closely as possible, the performance of a benchmark index defined and calculated by a third-party provider. Even smart beta ETFs are based on indices determined in a systematic and non-discretionary manner.

An ETF's performance is therefore not measured in terms of absolute return<sup>31</sup> but relative to its benchmark. Two key indicators are commonly used:

- tracking difference, which measures the difference in net return between the ETF and its benchmark over a stated period of time;
- tracking error, which measures volatility in the daily difference in net return between the ETF and its benchmark.

The indicators are calculated on a total return basis (accounting for any distributions) and, for ETFs, based on their daily net asset value (NAV).

<sup>30</sup> The market maker status is based on an agreement with Euronext (liquidity provider agreement) between a market member (an investment company) and a listed entity (here, an ETF). Within this agreement, the market maker undertakes to ensure a continuous presence on a range of securities, and to provide a purchase and a sale order in the order book. This status has been put in place to improve the liquidity of securities.

<sup>31</sup> An ETF is an asset allocation vector for institutional fund managers, who invest in ETFs after they themselves have allocated their risks. If a fund manager does not replicate his or her index as closely as possible, there is a risk, from the investor's standpoint, that the desired diversification has not been achieved.

Fund managers seek to maximise tracking difference while minimising tracking error, which are mainly affected by the following factors:

- the management fees, proportional to assets, that the management company charges the fund;
- transaction costs (mainly related to portfolio rebalancings);
- a generally imperfect replication of the benchmark;
- the ETF manager's ability to postpone index rebalancings or smooth them over time in order to limit their impact;
- the lack of synchronisation between ETF coupon payments and the actual coupon payments of the index constituents;
- the opportunities for securities lending, which can improve the fund's performance.

Appendix 2 provides the tracking difference/tracking error matrices for European ETFs<sup>32</sup>, grouped by category. The following observations may be drawn:

- Most of the ETFs that replicate the most liquid equity indices (Euro Stoxx 50, CAC 40 and S&P 500 quoted in USD) have tracking differences of -0.15% to 0.70% with relatively low tracking errors of less than 0.40%<sup>33</sup>.
- In contrast, S&P 500 ETFs quoted in euros have tracking differences similar to those quoted in USD but much higher tracking errors, sometimes of more than 1.70%<sup>34</sup>.
- On average, bond ETFs (sovereign or corporate) have worse relative returns than equity ETFs: for most of them, their tracking difference ranges between -0.60% and 0.10%, with a tracking error of less than 0.50%. Some<sup>35</sup>, however, have a slightly higher tracking difference (0.50%) but this comes at the expense of a much higher tracking error, nearly 1.4%, which could mean that their manager has deviated more sharply from their benchmark, likely in order to optimise their performance.
- Commodity and emerging country equity ETFs have lower performances, with tracking differences of -1.30% to -0.20%; their tracking errors remain below 0.50% as with corporate bond ETFs and equity ETFs in euros.

Investors are attracted to ETFs for several reasons: apparent liquidity, low management fees, transparency, etc. However, the risks associated with the liquidity and stability of the markets, in particular for the underlyings, have not been properly assessed. The remainder of this study will endeavour to identify the main risks associated with the expansion of the ETF market (risks borne by ETF holders and risks to which ETFs subject their underlying asset class) and to provide an initial analysis for the French market.

### 3. RISKS ASSOCIATED WITH ETF OWNERSHIP

While the debate was initially polarised by counterparty and collateral risks, the UCITS Directive and UCITS guidelines have attempted to mitigate these risks. The authorities are now more focused on the impact ETFs have on the underlying markets due to the potential illusion of liquidity, which would foster high volatility on these markets and impair their price formation mechanism.

<sup>32</sup> The base included in these examples is larger than the funds for which Paris is the reference market. Source: TrackInsight.

<sup>33</sup> To give some idea of the order of magnitude, a tracking error of 1.00% means that the difference in daily performance between the ETF and its benchmark is on average 0.05% per day.

<sup>34</sup> Db x-trackers S&P 500 UCITS ETF (DR) 1C (EUR Hedged) and AMUNDI ETF S&P 500 UCITS ETF (C).

<sup>35</sup> PIMCO Short-Term High Yield Corporate Bond Index UCITS ETF (EUR Hedged).

### 3.1. COUNTERPARTY AND COLLATERAL RISK LIMITED BY ENHANCED EUROPEAN FRAMEWORK

#### *Risks affecting all ETFs, regardless of their replication method*

In the case of synthetic replication, the ETF is exposed to the default risk of the counterparty in a TRS entered into to replicate the performance of the corresponding index. Physical replication ETFs, which hold a portfolio of securities, often use securities lending to generate additional revenue and increase their returns, which also exposes them to counterparty risk<sup>36</sup>.

In Europe, there are no securities lending amount limits; a fund may lend up to 100% of its assets. U.S. funds cannot lend more than 33% of their NAV<sup>37</sup>. However, in practice, in Europe the annual averages observed are lower than those observed for certain U.S. funds: the European market for securities lending by ETFs represented USD 26 billion in September 2015 and has remained stable for the last five years, with the percentage of securities on loan consistently below 5%<sup>38</sup>. In the United States, the market for securities lending by ETFs represented USD 90 billion over the same period and 20%-40% of an ETF's assets<sup>39</sup>.

Additionally, in both types of replication, transactions affected by counterparty risk lead to an exchange of collateral, which limits this risk but likewise exposes ETFs to collateral risk. In the case of so-called unfunded synthetic ETFs, the collateral received is owned in full, which is not the case for funded synthetic ETFs or for collateral received in securities lending transactions entered into with physical replication ETFs, which therefore limits the collateral risk for these products.

In securities lending transactions, ETFs also use an Agent, which is not generally a counterparty but rather an intermediary. There is an additional risk if the agent is also a principal actor and therefore a counterparty. A physical replication ETF may therefore be exposed not only to the potential risk related to the nature of the collateral, but also to the potential risk related to the equality of the agent (and to whether or not it is regulated).

The use of securities lending could increase significantly in the coming years, as could the risks involved, as leading management firms have recently announced their intention to make more frequent use of this practice. BlackRock has decided to lift its previous self-imposed cap of 50% of securities on loan. Similarly, Vanguard, which had not used securities lending, authorised this practice for 12 of its largest European ETFs in September 2016<sup>40</sup>.

A new practice has also been developed in recent years where units of ETFs are now accepted as collateral for securities lending transactions. While this activity remains marginal at this stage, some participants, such as Markit, are calling for further growth<sup>41</sup>.

#### *Concerns fading under the European regulatory framework*

The vast majority of ETFs in Europe are structured as UCITS and are therefore subject to all the provisions of the relevant directive. As such, they are subject to constraints in terms of eligible assets, diversification of portfolio assets and risk management. The entry into over-the-counter derivatives contracts and the use of efficient portfolio management techniques, including securities lending, are also governed by limits on the counterparty risk to which ETFs are exposed because of these transactions<sup>42</sup>. They must also meet the explicit requirements

<sup>36</sup> In March 2016, BlackRock reported annual returns from securities lending for its European equity funds ranging from 0.01% for one-year loans to 0.15% for three-year loans.

<sup>37</sup> Investment Company Act of 1940.

<sup>38</sup> Behaviour is not the same across Europe: some Irish funds can lend up to 100% of their assets while French funds have traditionally made little use of securities lending.

<sup>39</sup> *Securities lending raises worries*, 15 September 2015, Financial Times (source of data: Markit). One fairly instructive example of this practice cited in the article is that of the iShares \$ Treasury Bond 7-10yr UCITS ETF (IBTM), which on average lent 47.48% of its assets, generating a return of 0.09% in one year.

<sup>40</sup> "Vanguard tees up securities lending for ETFs", Financial Times, 1 September 2016.

<sup>41</sup> *Securities Lending Times*, "ETFs As Collateral, The Results 2015".

<sup>42</sup> Articles 50 to 52 of the UCITS Directive.

for these transactions set out in specific European texts. They are thus subject to the transparency and risk management obligations (in particular the margin payment requirements) provided for in EMIR<sup>43</sup> for derivatives contracts and the disclosure and transparency obligations provided for in the SFTR<sup>44</sup> for securities lending.

UCITS ETFs are also subject to the ESMA guidelines (2012/832/FR), which aim to provide an initial regulatory response to concerns expressed about ETFs at a time of rapid growth in this market segment<sup>45</sup>. These guidelines seek to ensure that investors are properly informed about the counterparties to which the funds are exposed and the amount of collateral used for the derivatives contracts or efficient portfolio management techniques employed by the UCITS ETF.

Management companies must also monitor:

- the risks resulting from the correlation between collateral received and the swap or securities lending counterparty,
- the necessary collateral diversification in terms of country risk.

Lastly, and also in accordance with these guidelines<sup>46</sup>, management companies should include, in their policies and risk control procedures, stress tests and limits on ETF portfolios, based on the assumption of a counterparty default<sup>47</sup>.

In addition to the counterparty and collateral risk issues that European regulations have helped mitigate recent market events, such as the fall in ETFs in the United States on 24 August 2015, have helped highlight the liquidity risk posed by ETFs in general, as well as the role they play in liquidity and in the price formation mechanism for the underlying assets. In particular, the question arises as to what extent, in the event of a shock on an underlying instrument, the ETF can act as liquidity provider or, in contrast, potentially exacerbate volatility. The remainder of this study will therefore attempt to assess this risk in the French market.

### 3.2. LIMITED RISK OF DECORRELATION FROM THE UNDERLYING INDEX DUE TO THE CIRCUIT-BREAKER MECHANISM IN PLACE ON Euronext PARIS

Investors do not necessarily trade an ETF at its net asset value (NAV)<sup>48</sup>: on the primary market, while it is true that redemptions and subscriptions are processed at NAV, the management company charges APs transaction fees<sup>49</sup>.

On the secondary market, the price actually traded is determined by supply and demand and can deviate significantly from an ETF's indicative net asset value (iNAV). This iNAV, published every 15 seconds by Euronext, is the indicative fair value of the ETF.

<sup>43</sup> Regulation (EU) No 648/2012.

<sup>44</sup> Regulation (EU) No 2015/2365.

<sup>45</sup> The AMF incorporated all the provisions included in the ESMA guidelines in its 2013-06 position titled "ETFs and other UCITS issues".

<sup>46</sup> AMF Position 2013-06 also states: "A UCITS receiving collateral for more than 30% of its assets should have an appropriate stress testing policy in place to ensure regular stress tests are carried out under normal and exceptional liquidity, in order that the UCITS can evaluate the liquidity risk associated with the collateral".

<sup>47</sup> In the absence of a high correlation between the collateral and the index, it is essential to develop stress tests to measure the impact of counterparty default on the prices and liquidity of the portfolio securities. In the event of counterparty default, it is important to be able to liquidate securities not correlated to the index quickly and as efficiently as possible in order to enter into a new swap with another counterparty or create a physical ETF.

When the ETF consists largely of securities included in an index, or the correlation is very high, this is equivalent to management based on the physical replication ETF model. In the event of a perfect correlation between the collateral and the index, a counterparty default would automatically have a limited impact (provided that the nominal value of the swap is in fact reset daily, reducing the daily counterparty risk to the day's performance). Nevertheless, this type of situation with a correlation, if not perfect at least not as high, remains the exception for synthetic ETFs.

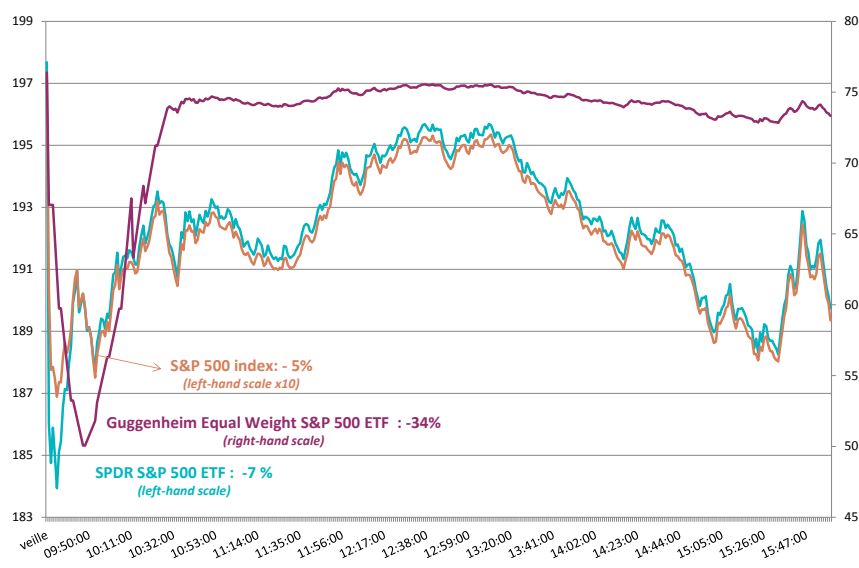
<sup>48</sup> Net asset value (NAV) corresponds to the net asset value at the end of the day, which is the real value (i.e. the price) at which ETF units trade on the primary market. Indicative net asset value (iNAV) is used only as the reference with which the price quoted on the secondary market is compared.

<sup>49</sup> The ETF management company charges a fee generally corresponding to the actual portfolio adjustment costs. For example, for the Lyxor ETF CAC 40, this fee is capped at 0.11% for subscriptions and at 0.015% for redemptions.

For each trade, the difference between the price actually traded and the ETF’s prevailing iNAV is referred to as “fairness”. Since ETFs are associated with arbitrage opportunities, this measure is generally very close to zero. Fairness that deviates on a one-off basis would indicate a temporary problem with the ETF’s liquidity.

On 24 August 2015, the U.S. ETF market showed just how vulnerable it is to spikes in volatility, as large numbers of ETFs were quoted at anomalous prices for several minutes (see Box 1). The behaviour of the Guggenheim S&P 500 Equal Weight (RSP) ETF<sup>50</sup> is particularly striking: the difference between the theoretical value and the traded value reached nearly 35%.

**Chart 5 - Change in the price of the Guggenheim S&P 500 Equal Weight (RSP) and SPDR S&P 500 (SPY) ETFs relative to the S&P 500 Equal Weight benchmark index between the end of the session of 21/08/2015 and the session of 24/08/15**



Source: Bloomberg.

<sup>50</sup> At the end of every quarter, the rebalancing of the benchmark index is calculated such that the 500 constituents of the index each have a weight of 0.20%.



**Box 1: Description of the events of 24 August 2015 in the United States**<sup>51 52 53</sup>

At the end of August 2015, volatility on the U.S. equity market spiked due in large part to concerns about weak global growth and events on the Chinese market in June. On 24 August, market activity hit record levels. Even before the open, the international equity markets had fallen by 3% to 5% and the E-mini S&P 500 futures<sup>54</sup> had hit its limit down of 5%. At 9:40 a.m. New York time, nearly half the securities listed on the NYSE were untraded, as listing rules limit the availability of information before the open. There was heavy selling pressure when the market opened, as it was flooded with aggressive sell orders (that is, with no price or sale period restrictions), with the amount of orders placed nearly four times higher than normal. Most of the securities that began to trade did so at abnormally low levels (with discounts of as much as -20%). Trading in several hundred securities was continually halted because of the limit up/limit down rules (773 limit ups were identified, and 505 limit downs).

These significant market imbalances made it impossible for the market makers for several U.S. equity ETFs to play their arbitrage role due to the lack of reliable information on the prices of futures and the underlying equities. Trading was suspended in about 20% of ETPs quoted on the U.S. market during the day. The absence of market makers led to significant price distortions, as some ETFs saw their price plunge by more than 45% although the underlying index only lost about 10 points. This is likely to re-open the debate on the structure of ETFs and their role in stabilising or exacerbating volatility under stressed market conditions. In contrast, a number of ETF management companies believe this event highlighted the destabilising impact of the listing rules adopted after the 2010 flash crash with the intention of limiting market volatility. Nevertheless, the fact remains that ETFs were especially hard hit, as more than 300 ETFs could not trade for nearly 35 minutes.

It is worth noting that the events of 24 August in the United States did not have a significant impact in Europe. French ETFs have not had to deal with periods of massive outflows; however, ETF management companies have made sure, in particular, that the market makers for each fund would continue to operate.

Such a risk is extremely limited in France due to the circuit-breaker mechanism in place on Euronext Paris: based on the last iNAV calculated, the market operator establishes a corridor outside of which trades may not take place. If order matching were to result in a trade at a price that falls outside the corridor, the ETF is halted for a 30-second period which may be repeated. The boundaries of the corridor are set at either +/-1.5 % of iNAV or +/-3%, at the ETF management company's discretion<sup>55</sup>. A halt in trading on the regulated market does not stop trades from taking place OTC at prices that may fall outside the boundaries of the corridor. In that case, the buyer/seller will have to find a counterparty willing to trade at the bid/ask price.

**This protection mechanism has proven particularly effective.** As seen in the following chart, illustrating the aggregate length of halts per day for all ETFs listed on Euronext Paris, the most volatile trading sessions in 2015 led to a large number of temporary suspensions. Each one was triggered by a trade made at a price outside the corridor<sup>56</sup>. On 24 August 2015 in particular, ETFs were subject to an average halt of two minutes per instrument (compared with three seconds on average per ETF on other days in 2015).

<sup>51</sup> *Equity Market Volatility on August 24, 2015*, US SEC Research Note, December 2015.

<sup>52</sup> *Time to Reexamine the Entire Exchange Traded Fund Ecosystem*, 25 October 2015, Financial Times.

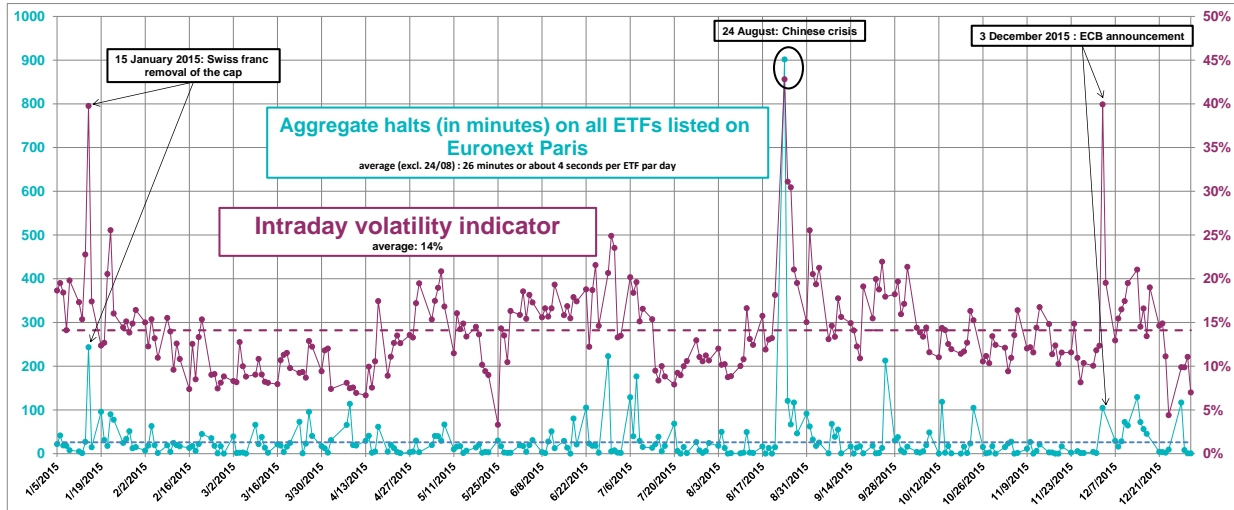
<sup>53</sup> *Lessons of Wall Street's August Turmoil*, 28 December 2015, Financial Times.

<sup>54</sup> E-mini S&P futures are the most liquid S&P index futures.

<sup>55</sup> At the industry's request, Euronext has made it possible to set narrower corridors than 1.5% but this option has not yet been used in practice.

<sup>56</sup> However, it is not possible to extrapolate the number of trades avoided based on the aggregate halt times, as an order-generated halt can be repeated every 30 seconds as long as no opposite-side order permits a trade within the corridor.

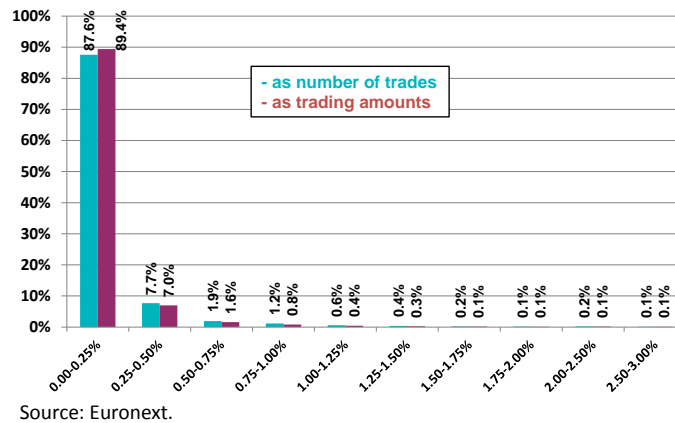
**Chart 6 - Aggregate halts per day on ETFs listed on Euronext Paris  
(in minutes, excluding delayed opens)**



Source: Euronext.

Excluding periods of stress, the distribution of price spreads between the ETFs' iNAV and the actual trade price<sup>57</sup> did not really have any outliers: whether as number of trades or trading amounts, nearly 90% of trades were made at less than 0.25% of the iNAV price and more than 95% at less than 0.50%.

**Chart 7 - Distribution of spreads observed between trade price and iNAV (excluding at auction) in 2015**



Source: Euronext.

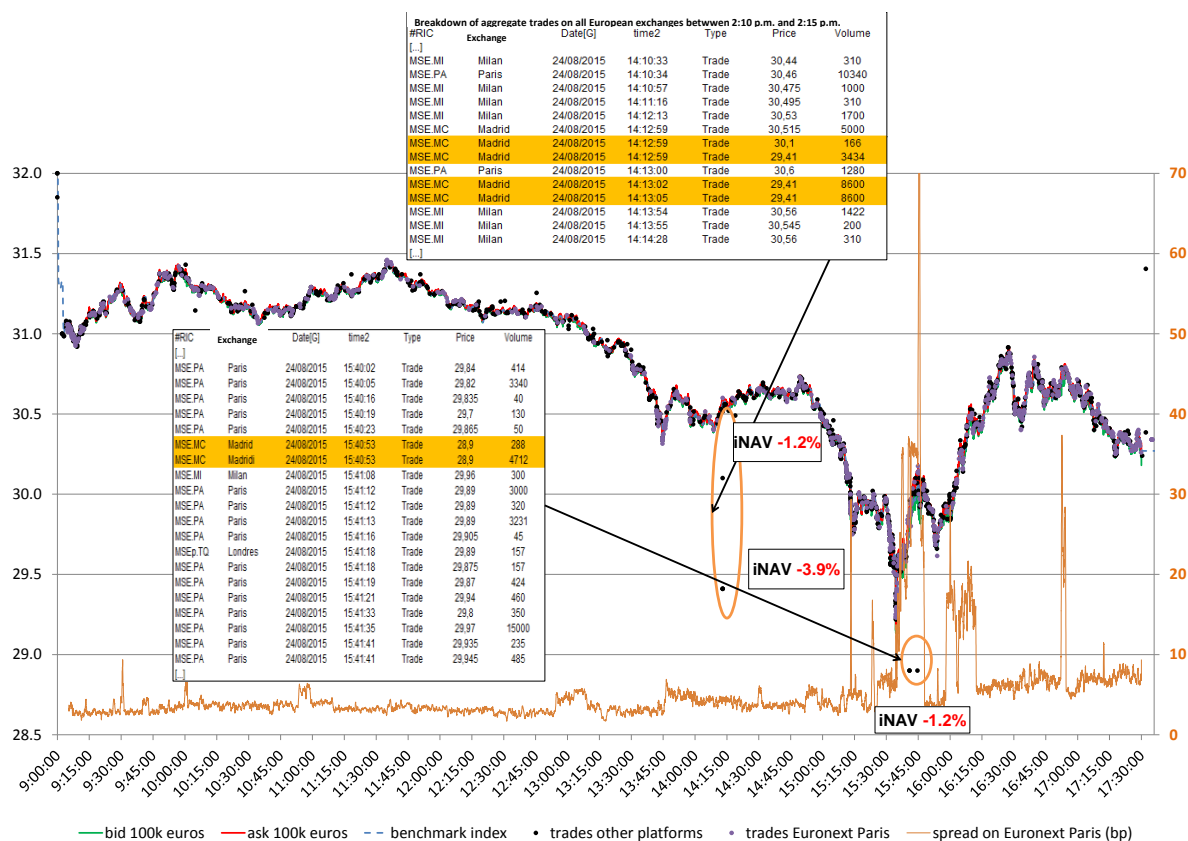
The protection mechanism in place on Euronext Paris appears to be relatively specific to the French market. On the other leading European markets (including the LSE and Xetra), the circuit-breaker models applicable to ETFs are similar to those existing on Euronext Paris for equities, consisting of a dynamic suspension limit based on the reference price for the last trade<sup>58</sup>. Such a mechanism would therefore not prevent a string of consecutive aggressive sales from widening prices regardless of the iNAV.

<sup>57</sup> Methodology note: as the indices are published by Euronext only every 15 seconds, the spread is measured relative to the average of the index values before and after the trade.

<sup>58</sup> For the LSE, this limit ranges from 2.5% to 5% depending on the ETF. On Xetra, these limits are not public out of concerns about potentially manipulative behaviour.

In fact, no mispricing was detected on Euronext Paris during the day of 24 August. However, deviations were observed on other markets, but seemingly to a lesser extent than in the United States<sup>59</sup>. One example of mispricing was the Lyxor Euro Stoxx 50 ETF (“MSE”), which is listed on different platforms. In that case, 25,000 ETF units were traded in the book on the Spanish market, at more than 3% below iNAV (see chart below). At the same time, the underlying index futures were fully liquid. On Euronext Paris, this trade would not have been possible and would have generated a 30-second halt. However, the price spread for this ETF widened quite sharply to 17 basis points (bp) on average between 3:30 p.m. and 4:00 p.m., compared with about 3 bp at the beginning of the day and 7 bp at the end of the day. This is a reminder that, even within the boundaries of the corridor, ETFs remain exposed to spread widening in periods of stress, which contributes to ETFs’ liquidity risk. For example, the chart below also shows the change in that ETF’s spread on different European platforms and on Euronext during that trading session.

**Chart 8 - Consolidated prices on various platforms and spread on Euronext for the Lyxor Euro Stoxx 50 ETF on 24 August 2015**



Source: Euronext.

However, unlike platform trades, OTC trades have no protection mechanism and in theory there is nothing to prevent an ETF from trading at a price that deviates significantly from its iNAV. OTC trading methods, in particular voice trading and trading based on an ETF’s iNAV, nevertheless make the risk of accidental mispricing highly unlikely, similar to what occurs when stop orders are triggered on a platform.

The Surveillance Division looked for instances of OTC transactions that were reported at prices much lower than the prevailing iNAV on the ETF, but no such examples were identified in 2015<sup>60</sup>.

<sup>59</sup> Examples sought on other European exchanges are limited to a non-exhaustive sample of ETFs.

<sup>60</sup> Due to the lack of accurate time stamps on the OTC transaction reports, only trades made at a price outside the ETF’s daily band widened to +/-3% were sought. After restating the data as needed to account for potential errors in calculating iNAV as calculated by Euronext and

### 3.3. ETF LIQUIDITY RISK STILL AT THE CENTRE OF THE DEBATE

While ETFs can provide improved access to an asset class or market segment that is inherently difficult to access (emerging markets, commodities, high yield, real estate, etc.), an ETF's liquidity depends on the underlying's liquidity, as well as on the APs' presence in the market.

Consequently, in extremely stressed market conditions, an ETF management company could find it impossible to trade the underlying assets and thus refuse to redeem units.

That was the case for the Euronext Paris-listed Lyxor ETF FTSE Athex 20 in July 2015, after the closure of the Greek stock exchange. In the total absence of prices, the ETF's iNAV was suspended on Lyxor's initiative and the ETF did not trade for nearly a month (quotes on Euronext Paris and the processing of redemption/subscription orders by the management company were suspended but the ETF continued to trade OTC)<sup>61</sup>. Trading resumed on 3 August, the day the Greek market re-opened.

#### Box 2: Closure of the Greek stock exchange and subsequent suspension of the Lyxor ETF FTSE Athex 20<sup>62</sup>

The Lyxor ETF FTSE Athex 20 (EUR 216 million in AUM at the time of the events) suspended its trading between 29 June and 3 August 2015 following the closure of the Greek market on 26 June. Lyxor stated it was unable to provide a NAV for its ETF or to honour unit creation and destruction orders. It therefore decided to remove this ETF from its primary listing. The company indicated it would consider resuming trading only when the Greek stock exchange reopened and provided the market was able to absorb a normal day of unit creation and destruction for this ETF. The company also asked the Frankfurt, Paris and Milan exchanges, where the ETF was listed, to suspend trading on the secondary market.

Nevertheless, for the entire duration of this episode, units of the Lyxor ETF FTSE Athex 20 continued to trade on the over-the-counter market; their price was then determined by market makers based on the implied value of futures or ADRs/GDRs (American/Global Depository Receipts) listed in New York or London.

This incident raised the question of how an ETF is valued when a portion of the underlying index or the index as a whole ceases trading. Some ETF management companies have opted to use the last existing valuation (that was the case for the db X-trackers, for example) while others, such as the iShares ETFs, rely on fair value. For example, when the Athens stock exchange was closed, the valuations for the iShares ETF MSCI Emerging Markets, which is 33% Greek assets, and the iShares ETF Euro Stoxx Small Cap, in which Greek assets account for 2.37% of the total allocation, were made on the basis of the fair value determined from the implied prices observed in the market via the funds that continued to trade. The Global X FTSE Greece 20, a tracker (USD 322 million) marketed by U.S. fund manager Global X, continued to trade on the NYSE Arca despite the closure of the Greek stock exchange.

This example serves as a reminder that the liquidity of an ETF can always ultimately be impaired by that of its underlying.

Under extreme circumstances, ETFs can therefore be suspended from trading, on both the secondary and primary markets (with the regulator's consent).

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after eliminating reporting data for trades in foreign currencies, we were not able to identify trades falling into that category that we did not think were reporting issues (e.g. incorrect currency).

<sup>61</sup> Some ETFs invested exclusively in Greek stocks continued to trade on the U.S. and U.K. market. For indices made up only partially of Greek stocks, the reference price generally used was the last quoted price (e.g. MSCI) or the last quoted price adjusted for the traded price for ETFs still open for trading referenced above.

<sup>62</sup> *Suspension du Lyxor ETF FTSE Athex 20, une première en Europe*, l'Agefi Hebdo, 16 July 2015.

Similarly, the very specific role played by the AP in how ETFs function, captures much of the risk associated with these products. Most of the advantages of ETFs are derived from the AP and its role in ETFs' unit creation/destruction mechanism. The AP's unique role in arbitrage, combined with the existence of a secondary market where supply and demand are matched, should therefore guarantee satisfactory liquidity in these markets. However, in a liquidity stress situation in which prices are no longer readily available, this mechanism could prove counterproductive: according to Malamud (2015)<sup>63</sup>, the dual role of the AP, which ensures the ETF's market price is in line with the market value of the underlying assets but also provides liquidity to the ETF market, makes the unit creation/destruction mechanism a factor in the spread of systemic risk. The level of liquidity in the primary market can lead to corrections of the ETF unit price deviation from the value of its asset. However, since the creation/destruction process only takes place once a day, the impact of friction costs and the AP's expectations come into play, and lessen its ability to act as a liquidity provider. This effect is particularly significant in periods of stress, as the AP is not able to absorb excessive liquidity demand shocks and may have to withdraw from the market. In that case, the AP could cease to perform its arbitrage role and thus play a role in passing the stress on to the underlying assets. The AP would then act as the channel through which liquidity risk is transmitted between the ETF and the underlying instruments (and vice versa if the liquidity risk stems from concerns about the underlying instruments).

In June 2013, at a time of extreme volatility on the bond and emerging markets after the Fed announced changes in monetary policy (the so-called "taper tantrum" period), one AP, Citigroup, ceased to honour redemption requests after reaching an internal collateral limit. While this episode's effects were short-lived (only a fleeting increase in the bid-ask spreads of certain ETFs affected by this decision), since other APs continued to fulfil their unit creation/destruction commitments, it nevertheless highlighted the APs' dominant role.

## 4. IMPACT OF ETFs ON THE UNDERLYING MARKETS

Given the risks associated with ETF liquidity, there are nonetheless concerns about an ETF's ability to preserve this liquidity in the event of a shock to the underlying instrument, and about their impact on their underlying instruments in the event of a redemption run. This latter concern is particularly acute when the size of the fund is large relative to the underlying market and raises the question of the advisability of limiting the size of an ETF based on the depth of the replicated index.

### 4.1. ETF TAKE-UP ON THE EUROPEAN AND FRENCH UNDERLYING MARKETS REMAINS LIMITED

The flip side to the increasing appeal of ETFs, as demonstrated by the swell in assets and trading volumes, is the emergence of the potential decorrelation of liquidity from that of the underlying securities. However, excessive investment in markets too thin to handle ETFs could theoretically result in bubbles and increase the risk of sudden capital outflows. For example, Nomura Asset Management was forced to halt subscriptions for its three leveraged Nikkei ETFs between 15 October 2015 and 11 December 2015, as they represented nearly a quarter of open positions on the Japanese stock index.

The table below compares ETF assets in Europe with positions in the underlying asset classes.

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<sup>63</sup> Malamud, Semyon, 2015, *A Dynamic Equilibrium Model of ETFs*, Swiss Finance Institute Working Paper.

**Table 6 - Take-up rate by underlying segment in 2015**

Underlying	ETF assets (€bn)	Underlying assets (€bn)	Take-up rate
<b>EU equities</b>	131	11,930	1,1%
<b>Euro stoxx 50*</b>	37	2,477	1,5%
<b>CAC 40</b>	5	903	0,6%
<b>Corporate bonds</b>	42	10,500	0,4%
<b>of which EU high yield</b>	7	5,153	0,1%
<b>EU sovereign debt bonds</b>	33	10,120	0,3%
<b>EU sovereign debt bonds (emerging countries)</b>	14	9,577	0,1%

\* this includes certain ETFs whose underlying is pan-European, different from the Euro Stoxx 50 and not sector-based.

Note: the underlying equity and bond assets correspond respectively to the aggregate capitalisations (non-free float) and notional amounts issued<sup>64</sup>. The CAC 40 category covers only ETFs whose underlyings consist exclusively of CAC 40 shares.

Sources: Bloomberg, Lipper.

ETFs listed in Europe have a very low take-up rate relative to the assets of the baskets to which their benchmarks correspond. ETFs that track the CAC 40 index (mainly listed on Euronext Paris) thus have a take-up rate of 0.6% (1.5% including the share of French stocks in the Euro Stoxx 50), and those whose underlying is the Euro Stoxx 50 have a take-up rate of about 1.5%, which is low. Bond ETFs, whether corporates or sovereigns, have an even lower take-up rate.

According to Ben-David, Franzoni and Moussawi (2016), this compares with daily ETF volumes in the United States of more than 36% of total volumes, for a capitalisation representing about 10% of the underlying markets.

Other smaller market segments could pose a specific risk, such as small cap ETFs and or equal-weighted ETFs, where each component in the basket has the same weight (which overweights the smaller capitalisations in the basket):

- The largest ETF in the first category (MSCI EMU Small Cap) had about EUR 450 million in assets at the end of December 2015; however, a closer look reveals that the main components of the reference basket are in reality “large” midcaps. The largest of these stocks have capitalisations in excess of several billion euros, making the estimated share of the take-up of this ETF for the individual stocks very low<sup>65</sup>.
- The equal-weighted category is virtually non-existent among ETFs for which Paris is the reference market, with just one representative for assets of only EUR 67 million.

At this stage, and while it is difficult to be categorical about the ETF take-up rate in the smallest market segments, it does not seem that the ETF take-up rates in the Paris market alone are sufficient, to have a significant impact on their underlying markets.

<sup>64</sup> Ideally, the take-up rate of ETFs relative to companies’ free float for equities and relative to the actual amounts of bonds outstanding (i.e. that will not be held until maturity) should have been evaluated. However, the take-up rates relative to gross assets were deemed sufficiently low to not require a further investigation into these data.

<sup>65</sup> For the 10 largest components of the basket, the take-up rate was on the order of 0.1% with a maximum of about 1%.

## 4.2. AN ANALYSIS OF REDEMPTION/SUBSCRIPTION ACTIVITY DOES NOT INDICATE ANY IMPACT ON THE UNDERLYING MARKET

### *An increasingly active primary market*

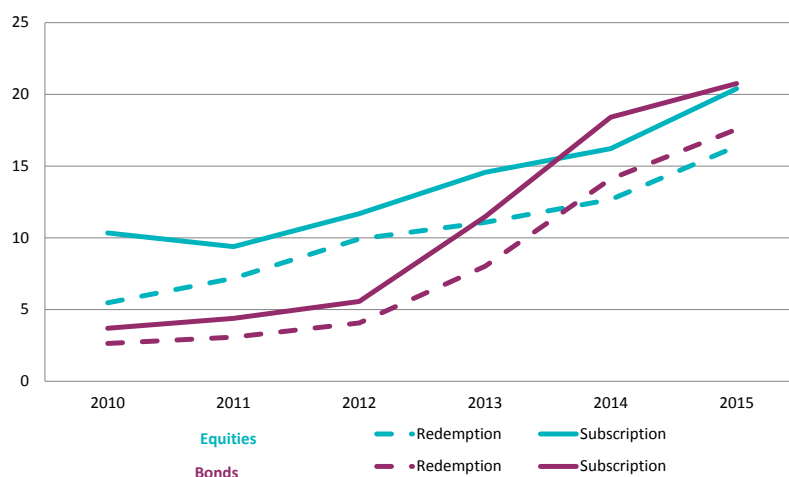
An analysis of primary market activity can be obtained through an examination of activity in Euroclear securities adjustment accounts, which record, on a daily basis, the creation and cancellation of securities following unit subscription and redemption requests sent to the management company by APs<sup>66</sup>.

A historical review of these accounts shows that the average number of days when there is activity on the account (credit or debit) has increased significantly in the last five years, whether for equity or bond ETFs. When activity was recorded, ETF accounts did so on average on 36 days in 2015, versus a maximum of 10 days in 2010. Specifically:

- The 10 ETFs with the highest number of redemption/subscription days, ranging from 120 days to 160 days in 2015 (or more than every other day), represented nearly 20% of total assets under management.
- In contrast, 40% of ETFs, representing 14% of total assets, had at most one redemption/subscription day per month over the same period.

The trend towards greater activity on the primary market suggests that APs/market makers do not wish to hold excessive ETF inventories and prefer to make more frequent adjustments through redemptions/subscriptions.

**Chart 9 - Average number of days on which redemptions or subscriptions were recorded per ETF (2015)**

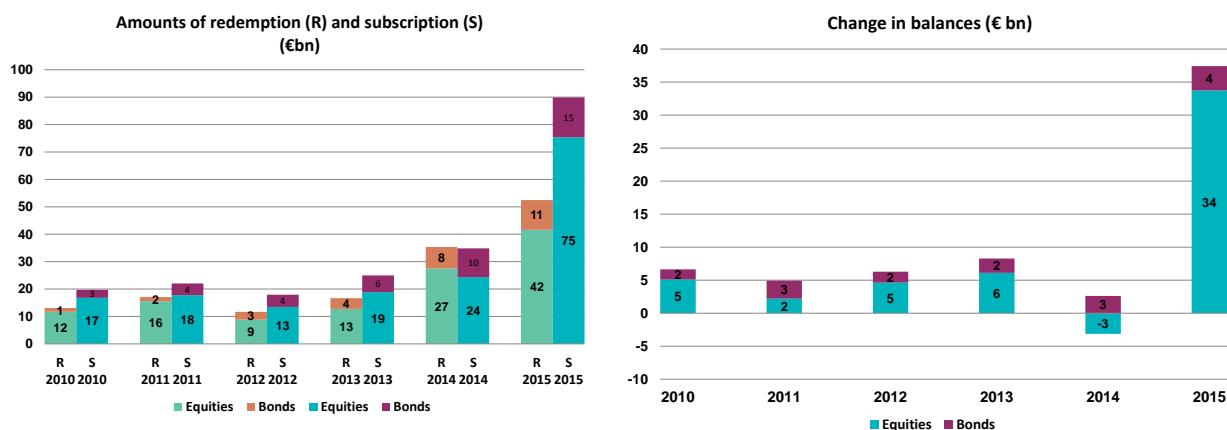


Source: Euroclear.

The logical consequence of this heightened activity on the primary market is the significant increase in total redemption and subscription amounts in 2015, in particular subscriptions for equity ETFs, which almost tripled relative to the previous year. For example, the two largest ETF management companies listed on Euronext Paris, Lyxor and Amundi, announced record net inflows of EUR 4.8 billion and EUR 3.8 billion, respectively, in Europe during this period.

<sup>66</sup> Eight-five percent of assets under management are managed via Euroclear France accounts, for which the AMF has detailed data.

**Chart 10 - Total redemption (R), subscription (S) and balances in billions of euros**



Source: Euronext.

One of the leading French ETF management companies had primary market trading volumes of EUR 56 billion in 2015.

*Do ETF unit destructions coincide immediately with market downturns?*

If that were the case, ETFs could be suspected of causing or contributing to the price move. Relative to longer-term market trends, are primary flows on ETFs generally pro-cyclical or counter-cyclical?

This analysis was conducted by comparing all primary trades of a major ETF management company (provided at the AMF's request) with the price moves in the underlying market for the year 2015.

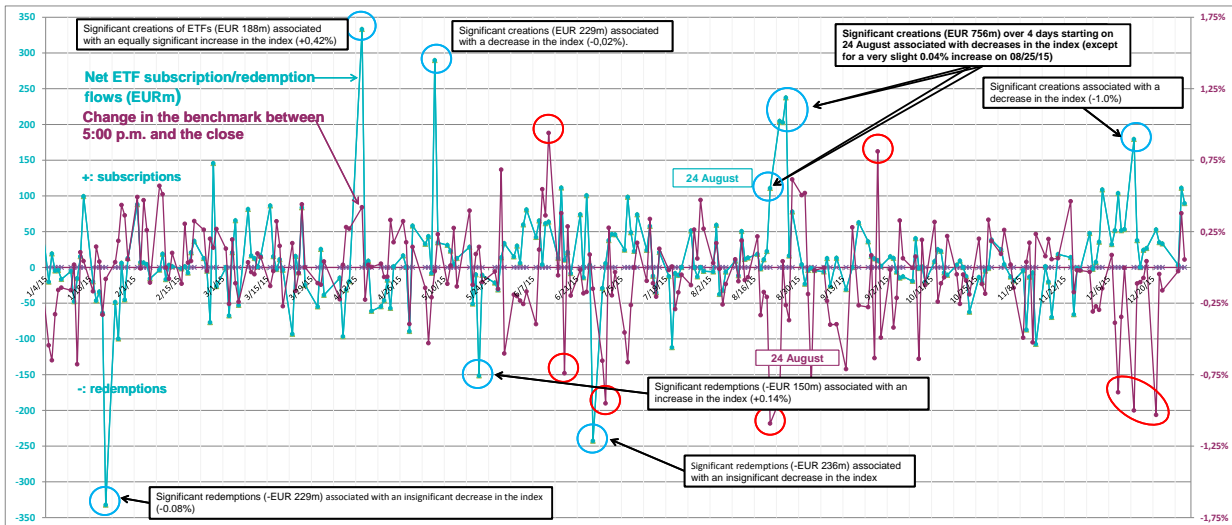
The short-term impacts of redemptions/subscriptions on the end-of-day change in the underlying indices can be seen through a first approach shown in the (chart below, which presents the daily redemption/subscription requests for 2015 for all of this management company's CAC 40 and Euro Stoxx 50 ETFs, adjusted for the ETF's leverage and direction (long or short).

A positive blue line value indicates net creations of "adjusted" ETF units (expressed in millions of euros for the day) and inflows into equities. The change in the index<sup>67</sup> between 5:00 p.m. and 5:35 p.m. is indicated in red. This is the only period that should be considered when assessing ETFs' potential impact on prices, as the day's redemption/subscription orders need to be transmitted to the management company before 5:00 p.m. After that time, it can theoretically start to execute the underlying basket.

<sup>67</sup> The greater of the change in the CAC 40 and the change in the Euro Stoxx 50 was used as the upper bound in the event of positive net flows (subscriptions). In the event of negative net flows (redemptions), it is the lower of these changes that was used to show a potential decline in the index.



**Chart 11 - Impacts of primary flows of CAC 40 and Euro Stoxx 50 ETFs on the price of the underlying indices**



Source: AMF analysis in conjunction with the management company, Thomson Reuters.

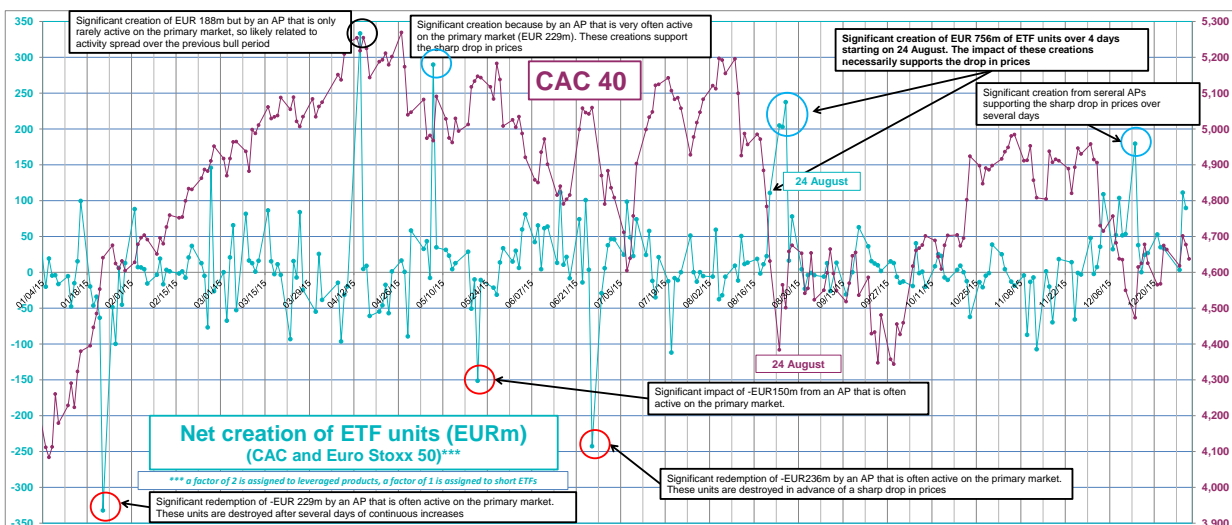
This chart shows, in particular, that the most significant redemptions and subscriptions (blue circles) are not generally associated with changes in the index (just one of the subscription examples identified was associated with a relatively significant simultaneous increase in the index, of 0.42%).

Conversely, the largest changes in the index (red circles) are not associated with significant primary flows in the same direction.

The primary flows observed do not suggest any impact on the underlying market. This analysis confirms the analysis based on an asset comparison.

In this second approach, primary flows are compared with moves in the index in the trading sessions prior to the redemption or subscription.

**Chart 12 - ETF primary flows compared with trends in the underlying index**



Source: AMF analysis in conjunction with the management company, Thomson Reuters.

The chart shows that the most significant primary flows (blue circles) seem fairly counter-cyclical: the most significant redemptions are observed after bull markets. Similarly, the most significant subscriptions occurred

after a string of bearish trading sessions of varying lengths. In particular, the events of 24 August were associated with net creations of units, in large sizes, on the day itself and on the next three days. ETFs therefore seemed to serve to dampen rather than magnify major price moves in 2015.

## CONCLUSION

The French ETF market, like that of other countries, has grown markedly in recent years with nearly EUR 63 billion in assets in Q3 2016.

It is characterised by a heavy concentration by management company and by instrument, as well as by significant OTC activity (more than 70% of trading volumes).

The analysis of the French market raises few major concerns, at this stage, about the risks currently posed by this market segment: (i) the circuit-breaker mechanisms in place on Euronext Paris limit the risk of a massive divergence between the traded price of an ETF and the indicative net asset value of the underlying basket, as was the case in the United States on 24 August 2015; (ii) at this stage, and while it is difficult to be categorical about the take-up rate of ETFs in the smallest market segments, it does not seem that the take-up rates of ETFs in the Paris market are sufficient, in and of themselves, to have a significant impact on their underlying markets in the event of a massive withdrawal; and (iii) primary flows appear to be counter-cyclical, serving to dampen rather than magnify major price moves.

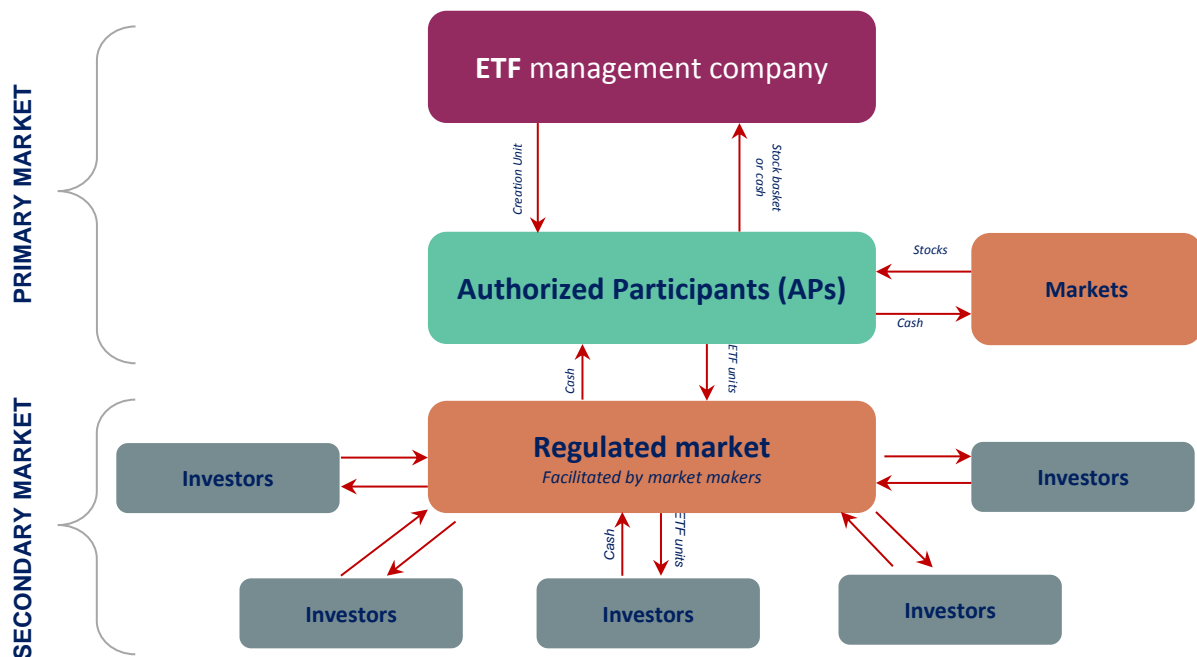
However, the analysis shows that liquidity risk remains: an ETF's liquidity is ultimately tied to that of its underlying securities and relies heavily on the key role played by the AP. A major event affecting most or all of its underlying market segment can lead to trading halts on both the secondary and primary markets. The most recent striking example is the closure of the Greek stock exchange in July 2015, which resulted in the lengthy suspension of ETFs.

If investors' interest in these funds, supported by the low interest rate environment and the hunt for yield and lower costs, continues, there will be a need for heightened vigilance with regard to the potential impact that the excessive influence of passive management would have, particularly in stressed markets, when ETF unit prices are likely to show a significant discount and the effects of correlation could further exacerbate volatility on the underlying markets. There remain several areas of focus. First, the recent growth in this market calls for continued vigilance with regard to the change in the take-up rate of ETFs on their underlying markets. Second, if investors' interest in these funds, supported by the low interest rate environment, continues, additional efforts may need to be made to ensure they are properly informed about the risks — and the liquidity risk in particular — associated with these products. Lastly, in stressed markets, when ETF unit prices are likely to show a significant discount, there will be a very specific need for vigilance with regard to their impact on the underlying markets.

## Appendix 1: How the different replication models work

There are two investment strategies for index replication in the market. Exposure to the benchmark index can be gained through the purchase of securities included in this index; this is referred to as **physical or direct replication**. Exposure can also be gained through derivative financial instruments, including performance swaps (or TRS, for total return swaps); this is referred to as **synthetic or indirect replication**.

### 1) Physical replication:



Physical replication ETFs buy some or all of the securities included in the replicated index. When they do not hold all the securities, this is called “sampled” or “optimised” replication. This approach is used primarily when the replicated indices are made up of a large number of securities, like the iShares ETF which replicates 700 of the more than 1,800 securities included in the MSCI World Index. This method does not result in full replication and can prove problematic if the index is volatile; on the other hand, it optimises replication costs. Physical replication, whether sampled or otherwise, involves friction costs that can vary based on the liquidity of the underlying market, insofar as the ETF has to rebalance the composition of the fund with the same frequency as that of the index and acquire all the securities in the index (including those present in small amounts). Lastly, physical replication ETFs generally use securities lending/borrowing which can improve the fund’s performance but exposes investors to collateral and counterparty risk. The securities on loan are then no longer held physically by the ETF, which generally receives collateral.

Every day, the management company publishes a list of the securities held by the fund, for example, an ETF that replicates the S&P 500 will want to invest in some or all of the constituents of the S&P 500 in accordance with the weighting proposed by the index. This list of securities published daily is called the creation basket. This basket acts as a portfolio and is used to determine the intrinsic value of the ETF’s net asset value based on market prices for the securities that make up the basket.

To create new ETF units, the AP may make an “in-kind” transfer (as would a secondary market investor ) or a “cash” transfer. The second solution is to build a basket of securities in similar proportions to those proposed by the index, either by going to the market to buy the necessary securities or by using the securities in its inventory. The AP then delivers the cash or basket of securities to the ETF management company in exchange for the corresponding number of ETF units. These transactions between the ETF management company and the AP are made in large blocks of ETF units known as creation units, which are generally (but not always) equivalent to 50,000 ETF units. The AP can then decide whether to keep the units or to sell them either OTC or on the secondary market via a regulated platform.

Conversely, if the AP wishes to destroy ETF units, it must amass a certain number of units to create at least one creation unit, which it then delivers to the ETF management company in exchange for the basket of underlying securities, which is then called the redemption basket. It is often argued that this in-kind redemption mechanism mitigates the risk of a run on the ETF primary market. However, some ETFs — virtually all of them in Europe — require that fund units be redeemed for cash<sup>68</sup>.

This unit creation/destruction process takes place once a day, at the end of the day; however, the AP may post the bid-ask spread it is offering and execute trades throughout the day, as the AP knows the composition of the basket that will be needed to create or destroy units. This time lag between the publication of the composition of the basket in the morning and the unit creation/destruction process at the end of the day gives the AP an arbitrage role and keeps ETF unit prices in a narrow corridor around the market value of the underlying securities.

Insofar as the price of an ETF unit on the secondary market is determined through supply and demand mechanisms, if the number of buyers exceeds the number of sellers at a given point in time, the unit price rises. If the price rises above the market value of the underlying securities, the units are then said to trade at a premium; the AP can then fulfil its role as arbiter and sell the ETF units at their excess value with the knowledge that it will be able to trade a basket of securities for ETF units at their market value at the end of the day and thus realise a capital gain. The mechanism works in the same way when the reverse is true, i.e. when the price of ETF units is below the fund’s net asset value calculated on the basis of the portfolio assets; in that case, the fund units are said to trade at a discount to their net asset value. This arbitrage band — the price at which it becomes advantageous for the AP to take action on the market in its role as arbiter — varies depending on the liquidity of the underlying securities and the related transaction costs. The arbitrage spread creates a price fluctuation band around the fair value of the ETF which prevents the price of the ETF from diverging too far from its fair value.

In addition to the APs, which act as intermediaries between the primary and secondary markets, there are also market makers, which, depending on the arbitrage opportunities, regularly post bids to buy or sell ETF units and thus help increase liquidity on the secondary market. While all APs are market makers, not all market makers are necessarily APs, as they do not all have access to the primary market.

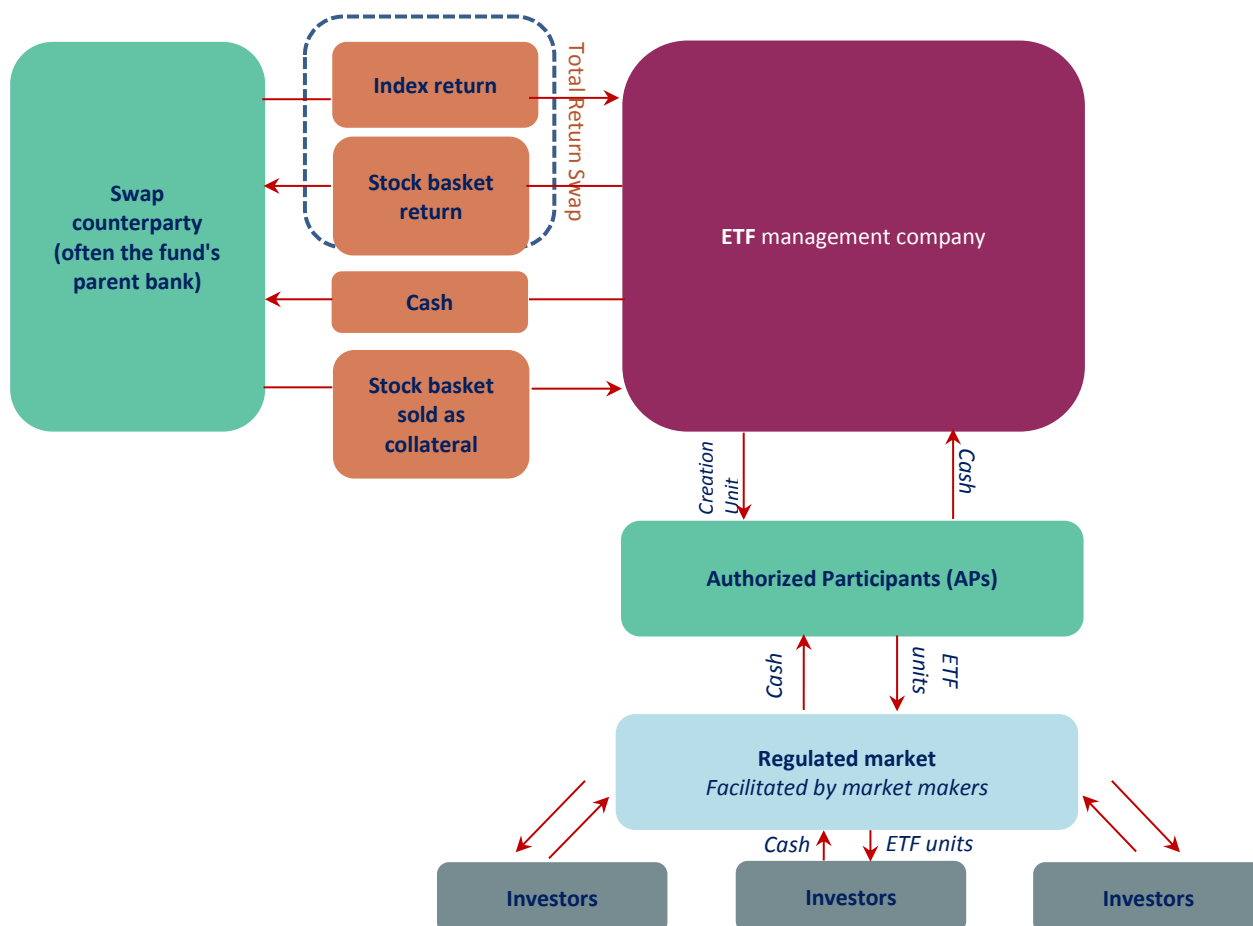
## **2) Synthetic replication**

A synthetic replication ETF buys one or more TRS from one or more financial institutions in a call for tenders (the counterparty is the one that offers the best conditions for replication, pricing, risk reduction, operational set-up, etc.). These TRS define an index formula which pays the ETF the return on the index. As they involve over-the-counter derivatives contracts, they expose investors to collateral and counterparty risk. An ETF can then receive collateral or buy a basket of securities whose performance is offset by the TRS and which acts as collateral.

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<sup>68</sup> U.S. ETFs, most of which are physical replication ETFs, carry out in-kind redemptions, while in Europe redemptions are made mainly in cash, regardless of whether the replication technique selected is synthetic or physical. In France for example, the AMF instruction no. 2011-19, applicable to UCITS funds, currently imposes redemptions to be exclusively in cash, except in the event of the liquidation of the fund or when the investors have signified their agreement to be reimbursed in securities. This instruction implies that redemptions are mainly provided for in cash.

Synthetic ETFs typically have a lower tracking error<sup>69</sup> than physical ETFs. Synthetic ETFs work in the same way on the primary market as physical ETFs (described above), except that subscriptions and redemptions by the AP may only be carried out in cash and not in kind.



The physical replication model has traditionally prevailed in the United States. These funds are generally governed by the Investment Company Act of 1940 which limits the use of derivatives. This model has naturally been adopted by Anglo-Saxon fund managers that promote European ETFs.

The synthetic replication model has traditionally been popular in Europe and continues to prevail in France. The primary reason for the rise of this replication technique is that it dramatically simplifies the operational set-up: as synthetic ETFs are under no obligation to trade all of the index underlyings directly, they are generally less exposed to replication risk. This is the case in particular for very large indices and for emergings where markets are often difficult to access. There are other lesser reasons for the rise of this replication technique in Europe. For example, certain asset classes, such as commodities, are not eligible for direct investments by UCITS: commodity UCITS ETFs therefore all use synthetic replication.

<sup>69</sup> The term "tracking error" represents volatility, updated on an annual basis, in the difference between the periodic return of the portfolio less the periodic return of the benchmark index. Tracking error is used to assess the accuracy and consistency with which an ETF replicates its benchmark index on a daily basis.

Overall, “physical” or “optimised” replication is the most widely used technique worldwide, representing 90% of international assets and thus reflecting the very significant weight of U.S. actors (and of BlackRock in particular) on the ETF market. This 90% breaks down into 36% full replication and 54% partial or optimised replication, reflecting the very significant weight of the United States on the ETF market. In Europe, 25% of assets are based on synthetic replication<sup>70</sup>.

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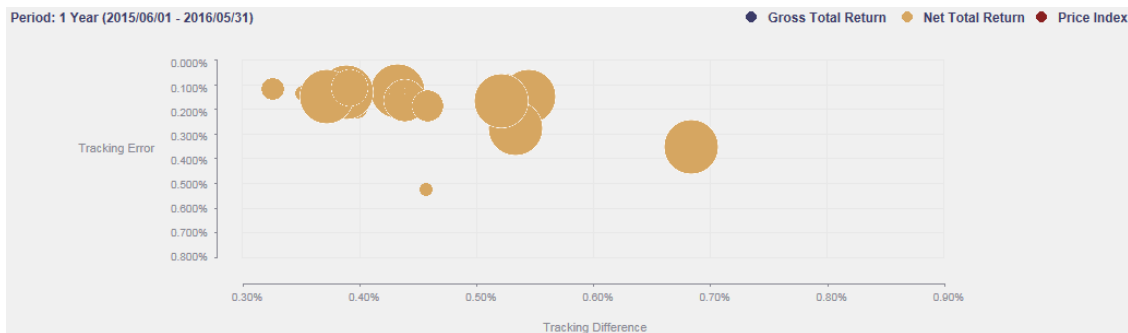
<sup>70</sup> Source: Lipper, Q2 2016.

## Appendix 2 – Fund performance: tracking difference and tracking error

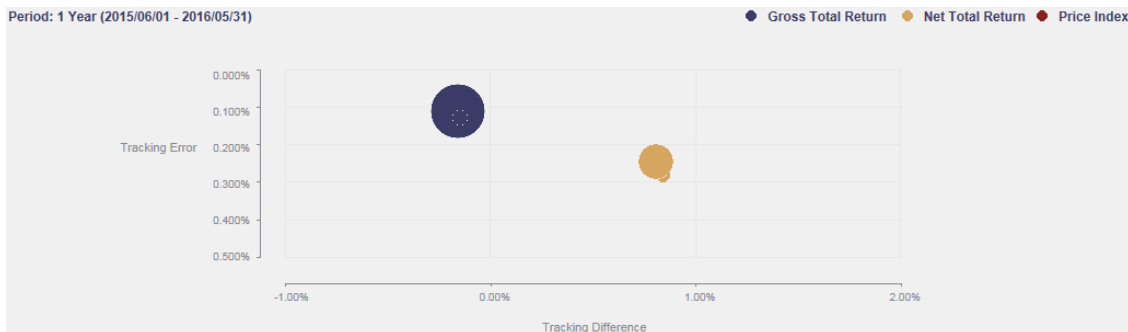
The charts below represent the performance of a broad sample of ETFs for the period from July 2015 to June 2016 based on the TrackInsight database. Their performance is determined based on their tracking difference (X-axis) and their tracking error (Y-axis). Their assets are represented by the size of the bubbles.

Note: a tracking error of 1.00% corresponds to a daily difference in return between the ETF and its benchmark index of 0.05%.

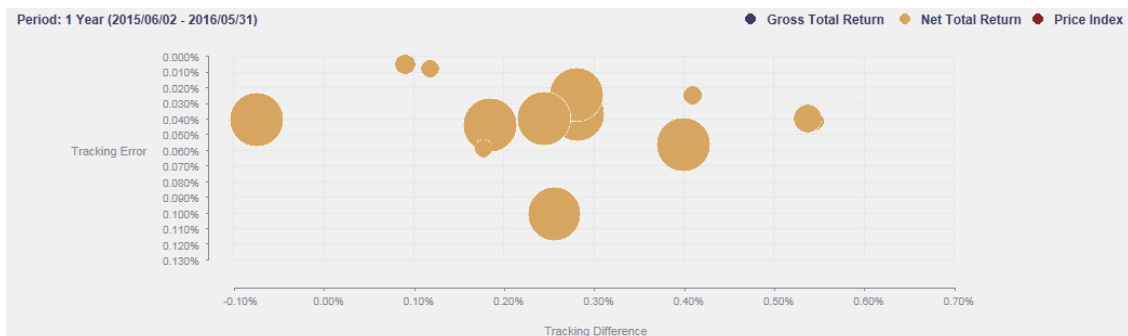
### ETFs whose name contains *Euro Stoxx 50* (quoted in EUR)



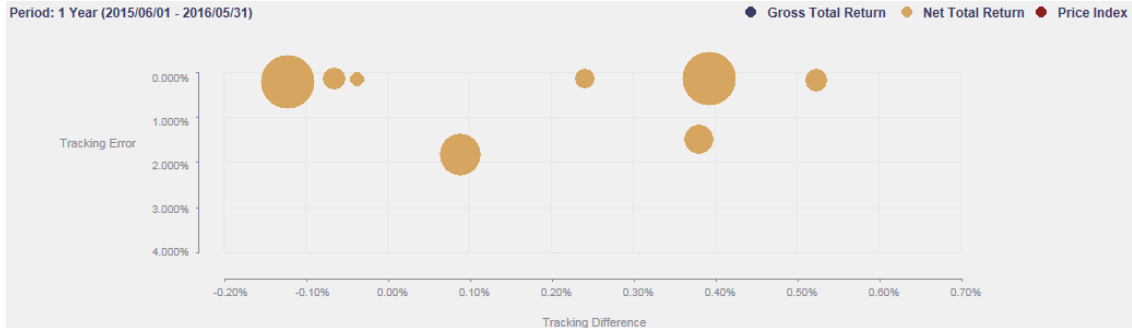
### ETFs whose name contains *CAC 40* (quoted in EUR)



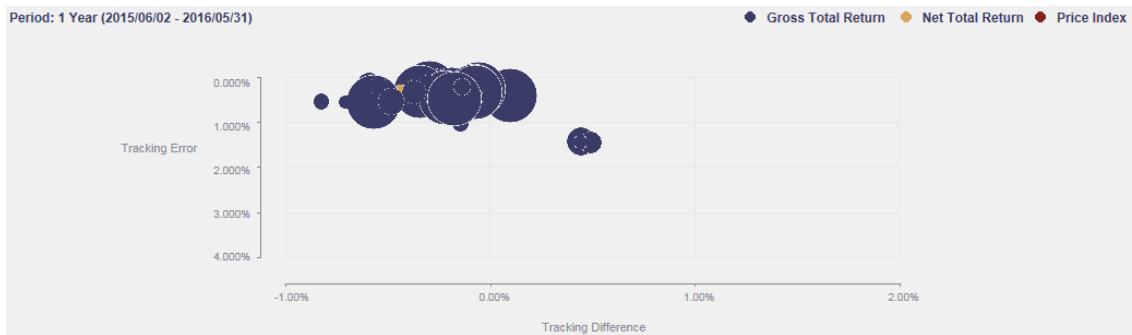
### ETF whose name contains *S&P 500* (quoted in USD)



**ETFs whose name contains *S&P 500* (quoted in EUR)**



**ETFs whose name contains *Corporate Bonds* (quoted in EUR)**



**ETFs whose name contains *emerging* (quoted in EUR)**

