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When passive is not so passive: volatility spillovers by index ETFs to underlying European stocks

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ABSTRACT

This study analyzes the impact of ETFs on the return volatility of their underlying assets, with a focus on European equity. Overall, volatility spillovers from ETFs increase in stock-level ETF ownership and trading volume in developed Europe and decrease in ETF ownership in developing countries, but the magnitude and significance of these effects is conditional on the degree of liquidity of the underlying assets. Both physical and synthetic replication-based ETFs show these types of externalities. Their outcome in terms of informational efficiency is worse for stocks from developing countries, but still uncertain for developed countries. As a result, the price-discovery function of ETFs can still be questioned.

Keywords: ETF, equity, volatility, replication method, fundamental information, noise.

Table of Contents

1. Introduction

The exchange-traded fund market has incredibly grown in the last years and these products are now used by almost the whole spectrum of investor types. While the first ETFs were launched in 1993, in 2021 the global industry experienced record inflows for $1,22 trillion and reached an all-time peak of $9,94 trillion AUM, according to Reuters. Most of this amount is allocated to passive index-tracking ETFs, which are particularly efficient (have low costs) thanks to the use of technology, standardization, and economies of scale. The characteristics that ETFs investors appreciate most are also those differentiating them from mutual funds: ETFs are continuously publicly traded with real-time quotes, often with higher liquidity and at lower costs. Investing and divesting from an exchange-traded fund is often quicker and cheaper compared to a mutual funds, making the former an attractive asset for both long-term investors and short-term traders to get exposure to broad groups of securities. In fact, Amery (2015) shows that in the past years the open interest in futures on stock indexes such as the S&P500 has been surpassed by the AUM of ETF's investing on the same positions, suggesting that ETFs are becoming the first choice to get broad exposure to the stock market.

A further key fact distinguishing exchange-traded from mutual funds is that, since the former are publicly traded, their prices can differ from their NAV, while the mutual fund shares can only be redeemed at predetermined intervals and at their fair value. This makes ETFs one of the most convenient sources of arbitrage opportunities, for both traders and ETF Authorized Participants. These latter, usually banks, are financial institutions directly partaking to the ETF life cycle: they are the source of an additional liquidity layer which allows these basket securities to be as liquid as they are, often even more than the underlying assets. APs are the only players allowed to transact with the ETF sponsor, in trades in which ETF shares can be created in exchange for baskets of underlying securities from authorized participants themselves, or redeemed when APs bring to the sponsor ETF shares in exchange for redemption baskets of underlying assets.

Thus, APs have *de facto* control over the size of the ETFs they serve. The incentive behind their activity is the aforementioned arbitrage: when the premium (discount) between the prices of the ETF shares and the underlying securities is non-zero, through creation (redemption) activity they can profit from it by selling the ETF units (underlying assets) they already obtained by delivering relatively cheaper underlying assets (ETF shares) to the sponsor. The continuous availability of a counterpart together with the economies of scale and scope these institutions enjoy by being involved in other finance-related businesses, lowers the costs APs have to bear for this

type of transactions, and put them in the most favorable position to profit. Nevertheless, also other arbitrageurs can try to take advantage of this kind of mispricing.

From the considerations above, it could be argued that exchange-traded funds have managed to change the dynamics of the financial markets. The type of consequences the introduction of passive ETFs brought has become an important topic among researchers and industry professionals. While management firms claim that the additional liquidity layer mechanism can benefit the market and improve underlying price-discovery (e.g., BlackRock, 2019), in practice there is no clear, unique, evidence in favor of this.

Indeed, many academics have analyzed and elaborated on the potential pitfalls behind "mechanical" and blind indexation to show that, under certain conditions, ETFs do not limit themselves to merely track the performance of their benchmark indexes, and neither they improve the informational environment of the underlying. Rather, these products can make the prices of the tracked assets more unstable, or more correlated with each other, in spite of fundamental and security-specific information (e.g., Ben-David et al., 2018; Da, Shive, 2017; Israeli et al., 2017). Indeed, the relative cheapness of ETFs also attracts noise and high-frequency traders, whose investment rationale and approach differs from informed investors' one and, in fact, may be based on algorithms and other criteria which have little to deal with fundamental valuation.

For these reasons and since exchange-traded products tend to invest in a myriad of instruments constituting most of the capitalization of a market, bad spillovers may even become a new source of non-diversifiable systemic risk (Ben-David et al., 2018).

Despite such progresses in knowledge achieved so far, the existing literature is still more focused on studying possible ETF externalities in the U.S., the country where the development of the ETF industry has been faster, since exchange-traded funds are a relatively new type of instrument. Far less research has been done about the way in which underlying securities from Europe are impacted by ETFs. This lower coverage may be justifiable when looking at the different sizes between the U.S. and European markets: in spite of the rapid developments reported also by Refinitiv Lipper (2022), the total ETF AUM invested in European equity equals $108,8 billion (source: Bloomberg) and the overall stock market capitalization is estimated around $14 trillion (ratio 0,81%). These are still small values compared to the $1,23 trillion ETF AUM invested in US equity and $25 trillion US stock market capitalization (ratio 4,92%), which were recorded in 2016.

Yet, these numbers do not consider some relevant differences between US and European markets. Firstly, the former has more participants than the latter one: ceteris paribus, a higher

number of investors with heterogeneous expectations may make arbitrage and price correction faster, thus curbing mispricing and volatility effects caused by ETFs. Secondly, differences in relative sizes between the local ETF and equity markets may be offset by the historically lower levels of floating capital of European companies, which, all else equal, could make any marginal change in ETF activity more relevant in the Old Continent than is the U.S. Lastly, studying the European market may be interesting because of the more widespread commercialization of ETFs making use of a synthetic replication method: instead of physically holding the underlying assets, these products get the exposure needed to their benchmarks by entering into total return swaps with counterparts such as banks or other financial institutions. Nevertheless, by regulation, at least one of the counterparts always needs to trade some securities to manage a collateral or "substitute basket": as reported by Morningstar (2021), many ETF providers require the basket to be assembled with instruments belonging to the same asset class and, almost always, with high correlation with the underlying assets of the fund benchmark. Consequently, it is likely that some instruments among the benchmark securities will be traded when ETF shares are issued or redeemed. In their paper, also Ben-David et al. (2018) suggest possible analogies between synthetic and physical funds.

Indeed, the empirical analyses conducted for this thesis suggest that both physical and synthetic ETF activity can affect the performance of the underlying equity, despite the magnitude of these externalities may still be lower than for the U.S. Nevertheless, the existence, magnitude and nature of these spillovers varies, depending on the original country of the securities and on characteristics such as the starting stock liquidity. ETFs can lead to both increases and reductions in stock return volatility, but overall appear to deteriorate the informational efficiency of the underlying equity prices, without robust evidence of benefits. This last finding is especially validated for the stocks from European countries with a lower level of development.

The remainder of this study is organized as follows: Section 2 summarizes the main findings provided by the academic research on ETFs as of nowadays. Section 3 introduces the hypotheses tested in Section 6, while Section 4 and Section 5 provide a description of the variables used in the empirical analyses and of the process of dataset construction. Section 7 adds final comments and concludes.

2. Literature review

2.1. Introducing ETFs

For a good starting point, Lettau and Madhavan (2018) provide a complete introduction on exchange-traded products and on a number of the most paramount improvements and pitfalls their growth brings to the market.

Among the former ones, the already mentioned structural suitability of ETFs to provide a more liquid, transparent and fairly tradable alternative to mutual funds investing in indexes. The exchange-traded funds, caeteris paribus, are generally far cheaper due to the "externalization" of many transaction costs – an ETF does not directly buy securities from the market, since it is up to the APs to decide whether and when to create and redeem new shares -, fewer or absent reporting and record-keeping duties towards each investor and the ability to avoid taxable capital gain distributions by rather levering on in-kind transfers.

As far as potential drawbacks or issues of ETFs are concerned, Lettau and Madhavan (2018) argue that investors in exchange-traded funds face the risk of an eventual delisting of these products, and of security-lending to short-sellers. Measures taken to counter the first two pitfalls are policies widely implemented by now, spontaneously or by regulation, and similar to those applied for mutual funds: in case of delisting, an ETF would still be backed by an inventory of assets constituted by the creation units, available for sale to satisfy the exiting investors[1]. The composition of the required baskets is specified by the sponsor every day and often contains securities which correspond or are very similar to those present in the replicated index. Even in case some securities were not available anymore because lent out and not returned, securities-lending agreement always come with a collateralization equal to 120% or even more, as a back-up in case of borrowers' default (Morningstar, 2020; Lettau, Madhavan, 2018).

Further complications about ETFs arise for products tracking benchmarks whose constituents are illiquid, or unfrequently traded, or even not simultaneously traded due to different time zones (e.g., ETFs investing in a world market index, or in corporate bonds mostly exchanged OTC). As long as these exchange-traded funds are quoted in such conditions, they could be seen as a sort of double-edged sword: they offer an easier a way to get, hedge or wind down exposure to such underlying securities but, on the other hand, their price will likely differ from the real NAV due to the fact that last official price of some index members is not updated. Although the ETF sponsors provide the market with an estimate for the NAV typically every 15 seconds, this value

[1] The term "creation (redemption) unit" refers to the basket of securities (or cash, in case of synthetic ETFs and far more rarely for physical funds) an AP deliver to (receive from) the ETF issuer in exchange for ETF shares. The size of these transactions in terms of ETF shares is fixed and predetermined in the ETF Prospectus.

may not represent a completely reliable measure, posing limits and risk to any potential arbitrage trade and thus discouraging APs and other traders from correcting mispricing. Indeed, a model developed by Madhavan and Sobczyk (2016) analyzes the price dynamics of exchange-traded funds: in it, arbitrage gradually corrects the gaps between the price of ETFs and the value of the underlying basket. A metric for the speed of price discovery resulting from such model empirically shows that, generally, price discovery is completed earlier for U.S. equity-focused funds and later for international-bond funds, consistently with the previous considerations.

Finally, the increasing complexity of factor, sector, inverse, leveraged, and synthetic ETFs further make these products difficult to understand to retail investors, who may misevaluate them and end up with a poorly diversified portfolio when allocating an excessive sum of their money to these specialized ETFs.

2.2. ETFs and market information

One of the main topics in the literature about exchange-traded funds is whether such assets improve the market information on the underlying securities or deteriorate it. According to Lettau and Madhavan (2018), those ETFs authorized to do security lending can help improve liquidity and price efficiency of these underlying instruments.

Glosten, Nallareddy, Zou (2021) somewhat agree, documenting that the market activity concerning these basket securities is positively related with the level of short-term informational efficiency of a stock price, especially for small stocks. According to their findings, ETFs favor especially the incorporation of systematic earning information, and this contribution is fundamental-driven: in fact, the post-earnings announcement drift is attenuated in securities more affected by ETF operations. Since short sellers can also employ ETFs to circumvent stock-level short sale constraints of that equity, they cause a reduction of the cost of expressing negative views for segments of the market, curbing asset bubbles in this way.

By contrast, nevertheless, no benefit on short-run informational efficiency is found for stocks which already enjoy a strong informational environment or a high analyst coverage. Furthermore, consistently with the evidence provided by Israeli et al. (2017) and presented below, this informational benefit is limited to the short run: the authors guess and prove that ETF activity incorporates current-quarter earnings (including sector-level news and macroeconomic news) into current-quarter stock returns in a timely manner, but it does not enable any better reflection of future expectations into prices.

Israeli, Lee and Sridharan's (2017) findings complement those by Glosten, Nallareddy, Zou (2021): besides confirming the benefits from exchange-traded funds in the short term, they

empirically prove that an increase in ETF ownership leads to a deterioration of the degree of speed at which change in fundamental future expectations are incorporated into the prices of the underlying assets. The authors' reasoning is that, in a frictional market, a change in ownership by ETFs may be a significant economic event: most times, the shares controlled get locked-up and available only for creation-redemption transactions, thus out of daily traders' reach. Therefore, information-driven trades become less easy to close: indeed, Israeli et al. (2017) observe increasing search and trading costs in ETF ownership, together with higher return synchronicity and decreasing analyst coverage. Suh effects are due to the generally lower bid-ask spreads of ETFs compared to their benchmark instruments' ones, the possibility to sell short them even when the underlying assets cannot, and superior freedom in deciding when to take or wind down positions: in the end, many speculators and active traders are induced to move from individual securities to these funds.

The consequence of this combination of effects is that the costs of formation of forward-looking expectations about individual ETF holdings increase in the length of the forecast horizon, leading to a decline in future earnings response coefficient and in the overall informativeness of the market. Thus, since robust forward-looking expectations become costlier to obtain than current evidence, the results by Glosten et al. (2021) and Israeli et al. (2017) can coexist.

2.3. ETF returns and flows, behavioral finance and price quality

Given the analogies between exchange-traded and mutual funds, some academics wanted to mirror part of the studies already conducted on these latter. For example, Blitz, Huij and Swinkels (2012) investigate whether the insights by, for example, Elton, Gruber and Busse (2004) on the negative relation between US passive mutual fund expenses and their relative performance with respect to the benchmarks can be replicated also with both ETFs and index funds in Europe. They succeed in detecting the same pattern but, moreover, identify dividend withholding taxation as a further and equally important driver. In fact, European funds' relative performances are even worse than expectably by looking only at total expense ratios. This last finding was not documented for US funds by previous research. Indeed, the reason for such lower performances lies in the impact of dividend withholding taxes European funds are subject to when investing, e.g., in America or Japan: despite not obtaining the full cash flows from their US-based investments, such funds are not awarded any reduction expenses ratios to account for this. As a result, the many funds investing from Europe to the US or Japan are likelier to underperform their American and Japanese equivalents almost by construction, and indeed such differences in returns

are positively related with the magnitude of the tax rates applied time by time and country by country (Blitz, Huij, Swinkels; 2012).

Also researchers in behavioral finance have questioned whether the ETFs' clientele behaves as mutual fund investors do. Clifford, Fulkerson and Jordan (2014) investigate the existence of a tendency for return chasing among passive ETF investors: this would be quite surprising as these instruments' goal is not to beat their benchmark, but only to stick to it. Nevertheless, the results show that, in line with Frazzini and Lamont's (2008) dumb money hypothesis, passive ETF flows follow past performance despite the lack of ability to time returns. This evidence is particularly strong in broad market index products, but are still present in other styles (e.g., sector or foreign). Only broad index fund outflows show a limited timing ability. The authors note that the common aspects between mutual funds and ETFs lead to similar consequences on ETF flows: high spreads and volume fuel flows, although the opposite occurs if these trading and liquidity metrics are extremely volatile.

The last findings above strictly relate to the discoveries by another branch of the academia, less interested in behavioral research but still focused on flow-based phenomena: Brown, Davies, Ringgenberg (2020) exploit a dataset on APs' trades to empirically test their theoretical result that ETF flows, uniquely identifiable as APs' creation/redemption activity, signal non-fundamental demand shocks. A trading strategy shorting high-flow ETFs and buying low-flow ones each month delivers monthly excess returns from 1.1 to 2% before transaction costs and Sharpe ratios up to 0.99. These long-short portfolios remain profitable for 3-6 months, before starting to deliver negative performances: in other words, APs' activity is mainly driven by noisy demand from a market that seems behaving in a dumb rather than skilled way. Importantly, this return predictability is not found by the authors in passive mutual funds.

Also Staer (2016) detects a relation between exchange-traded fund flows and contemporaneous underlying index returns: this association is positive and significant, and its magnitude as a response to a one standard deviation flow shock ranges from 7 to 52 basis points and increases in the most recent period. About 38% of this return shocks reverts in the next 5 days, suggesting that ETF flows cause an excessive price pressure effect on the underlying instruments.

Other evidence on potential noise spillovers from ETFs to their benchmark instruments is offered by Baltussen, van Bekkum and Da (2019), who observed an historical switch in the sign of serial daily and weekly return correlation, from positive to negative, across many stock market indexes in the developed world around 2000. The fact that this switch occurred also for the products related to these indexes is in line with the presence of arbitrage between the two. In fact, the authors find that this change in autocorrelation values is partly reflected by the rise of index

products such as mutual funds, futures, and ETFs, and by the arbitrage mechanism behind them, a key element especially for exchange-traded funds.

2.4. ETFs and comovements.

Great interest has been shown for the various kinds of comovement caused by exchange-traded funds to their underlying instruments. Since ETFs provide an easy and cheaper way to trade many individual securities, traders may opt for them when interested in betting on a view they have, regardless such view regards only some of the main constituents of the basket or all of them. In both cases, these trades may push other traders and arbitrageurs to buy or sell the underlying securities as a part of an operation they think could be profitable as a whole, overlooking the individual assets' performance. Consequently, the basket constituents could share greater commonality in some characteristics than otherwise, without ETFs presence.

As a confirmation to this hypothesis, Da and Shive (2017) found evidence of increasing comovement for returns, both the fund and stock level and on daily and weekly bases, when analyzing stocks held by U.S. equity ETFs. These funds' turnover is strictly related to this comovement, which is stronger among small and illiquid shares, is excessive and, again, nonfundamental. In fact, there is evidence of reversal when looking at both fund returns and stock lagged market betas. These betas have negative regression coefficients associated, suggesting that the past fluctuations of prices along with the market are not persistent, excessive and thus likely driven by noise rather than accurate information, according to the authors.

Sushko and Turner (2020) agree when they point out that the growing popularity of passive indexing may imply higher correlation of returns, less security-specific price information and changes in market prices dynamics. They show that inclusion in the S&P500, one of the indexes most often replicated by passive funds, increases the daily correlation of stocks' trading volume and liquidity.

Further support to the commonality field is provided by Agarwal, Hanouna, Moussawi, Stahel (2019), who empirically document an increase of commonality of liquidity – expressed as the aggregate share of capital of each pair held by ETFs - when a stock becomes more held by an exchange-traded funds. This relation is evident regardless of market conditions and stock capitalization, and strictly linked to ETFs rather than to the broad indexing industry. Moreover, when exploiting a measure for common ownership at the stock-pair level, expressed either as the number of ETFs jointly holding both the pair members or as the share of overall capitalization of the pair held by exchange-traded funds, the researchers keep getting consistent results. The driver behind this externality is the arbitrage mechanism at the base of ETFs' liquidity.

2.5. Consequences for market stability: a vast topic.

One may argue that if a core part of the market starts moving in the same direction in terms of some characteristics such as liquidity or returns, any investor will face more difficulties to limit the risks undertaken with their portfolio. If comovement is caused by ETFs at the underlying asset-level, the growth of this industry may have compromising effects for the market.

Indeed, ETFs undermining stability is a claim made by a large share of the academia. Besides Da, Shive (2017), also Bhattacharya and O'Hara (2016), Agarwal et al. (2019), Dannhauser and Hoseinzade (2017) and Ben-David, Franzoni and Moussawi (2018) contribute to this view.

Firstly, Agarwal, Hanouna, Moussawi and Stahel (2019) demonstrate that the increasing commonalities caused by ETFs reduce investors' ability to diversify liquidity risk.

Bhattacharya and O'Hara (2016) argue that despite exchange-traded products do not account for a large share of the most liquid financial markets yet compared to the underlying, they dominate trading in less liquid ones, and sometimes provide access to instruments which would be inaccessible to investors otherwise. Without ETFs, market maker learning is more focused on own market order flow, but when basket securities are introduces the market makers start extracting information from the ETF price too, meaning that both own market and ETF market information affects prices.

This may be a worrisome problem for regulators, since the use of ETFs is notably widespread among uninformed, liquidity traders who may fuel the propagation of non-fundamental shocks and herding behavior, especially in markets with a low degree of liquidity and lack of players capable of keeping this noise from being priced in by taking proper positions against it. This can result in greater and excessive volatility in the underlying market prices: there, ETF price and trading contingency affect the underlying prices rather than vice versa and pose threats to the allocative and informational efficiency of the markets.

A need for policy intervention is considered necessary also by Dannhauser and Hoseinzade (2021), who focus on underlying bonds and not equity but still get to similar conclusions. In particular, they report that investors' outflows from corporate bond ETFs are promptly and completely transmitted to the underlying bonds, because exchange traded funds apply minimal liquidity management policies compared to active and even index mutual funds, which instead keep cash in their portfolios as a buffer against spillovers caused by demand fluctuations.

Everything considered, ETFs appear to be a source of fragility for the corporate bond market, catering to high-liquidity demand investors who implement positive feedback trading

strategies. Analyzing the Taper Tantrum period of turmoil in 2013, Dannhauser and Hoseinzade (2021) find that ETFs amplify market movements in bad states. Yield spreads of bonds most owned by ETFs increase more than others from the same issuers. The pattern is reverting, meaning that it is not related to price discovery but, rather, to exacerbation of a negative fundamental shock, and has been more observed by the authors in 2013 rather than during COVID-19 in 2020. The researchers argue that the reason lies in the APs using more discretion in 2020 than in 2013 to ensure ETFs' efficiency, by allowing exchange-traded funds themselves to trade at large discounts (until the Federal Reserve stopped intervening directly in the corporate bond and corporate bond ETF markets). This insight suggests that APs and authorities potentially have instruments to curb negative externalities from these funds.

Related, Lynch, Page, Panariello, Tzitzouris, and Giroux (2020) find that a portfolio strategy long on stocks with a low beta to their ETF performs well after downs of the market. This finding corroborates the views linking exchange-traded funds and market fragility: suddenly increased selling pressure on ETFs pushes the price of every constituent down, at levels which are excessive especially for those stocks with an historically lower correlation with the other stocks held by the fund.

Despite starting from different research questions, Ben-David, Franzoni and Moussawi's (2018) work, which this thesis will mostly refer to, stands on the previous authors' side about market fragility: U.S. equity ETFs increase non-fundamental return volatility at the underlying stock level. The authors find consistent evidence between 2000 and 2015, and also when the sample is divided into three time periods. This volatility may be partially undiversifiable, as ETFs invest in almost the entire universe of North American stocks. Thus, ETF ownership may represent a new source of systematic risk, especially for investors with short horizons, and thus the market may require a return premium as a compensation.

To explain their intuition, the authors lever on the widespread view that ETFs' low trading costs appeal short-term liquidity traders, a potential source of noise in prices. Then, while active mutual funds have discretion in choosing their investees, passive exchange-traded ones are based on more mechanical processes that let the overall market– regardless of their informational endowment – and rule-based indexes determine how much demand for capital eventually goes to each stock. As long as the ETF market offers intraday liquidity which other passive mutual funds lack of, ETFs will be targeted by a clientele pursuing shorter-term goals.

Indeed, Ben-David et al. (2018) succeed in showing that demand shocks in ETFs cause a shock in the underlying stock's intraday return and daily volatility: again, these disturbances on equity returns results as contrasting with any hypothesis of value-discovery function of ETFs on

other assets, since the daily autocorrelation of stock returns becomes more negative as ETF ownership grows, enabling mean-reversion. The same authors fail to detect any similar impact on return volatility by mutual funds, consistently with the argumentations above.

They also find evidence about a risk premium demanded for the stocks with higher ETF ownership: a Fama-Macbeth (1973) regression framework in which stock abnormal returns are regressed on lagged ETF ownership suggests investors price in ex ante this type of information, thus relating it to a real source of undiversifiable risk rather than a pricing anomaly. Accordingly, a portfolio with long (short) positions on stocks with a high (low) level of ETF ownership during the past month delivers a significant alpha equal to up to 56 basis points per month, pre-transaction costs. Further, ETFs seem to cause a decrease in liquidity of the underlying stocks, which is consistent with evidence reported by other academics such as Sushko, Turner (2020) and Dannhauser (2017): liquidity is enhanced on broader, market- or index- levels, and lowered for stocks that are not individually traded anymore by liquidity traders.

A link between exchange-traded products and underlying bonds' returns is found by Sushko and Turner (2020) and Dannhauser (2017). The former report that percentual changes in fixed income ETF trading volume has a significant positive effect on the absolute abnormal return of the related underlying index. Dannhauser paralleled the findings by Ben-David et al (2018) about the contribution of ETF ownership to the performance of their underlying, but found a relation with the opposite sign: fixed income ETFs cause a permanent positive valuation effect on corporate bonds: an increase by one standard deviation in ETF ownership causes a price increase equal to 1.03% and 0.75% for high yield and investment grade bonds. This could be a good externality of these products, if we associate this reduction of yields to an improvement in the informational environment. Indeed, Dannhauser (2017) show that exchange traded funds lower liquidity trader participation and increase institutional ownership in the individual bond market.

Nevertheless, this induces liquidity worsening, especially in the investment grade segment, the most impacted by the reduction of liquidity trading activity since high yield bonds have historically been traded by more informed investors such as institutions. In extreme periods, such lack of liquidity paves the way to the risks highlighted by Dannhauser and Hoseinzade (2021) in their paper cited before.

As the literature about ETFs is still at an early stage, like the industry itself and its related data, unanimous agreements have not been reached yet. With the intention of minimizing endogeneity effects, Box, Davies, Page and Lynch (2020) test the evidence offered by authors such as Ben-David et al. (2018) by making use of panel vector autoregressive models and impulse

response functions, besides OLS methods. They find that the former two methods estimate a negative, rather than positive, coefficient on ETF ownership between 2007 and 2015, in line with the alternative liquidity-buffer hypothesis[2]. Despite this, evidence of increased volatility and mispricing effect is still found when looking at large ETFs owning stocks with low market capitalization.

Regardless of the sign of the impact of ETFs on underlying stock volatility, the implications would be still remarkable because it may influence the underlying stock price development and even the corporate finance decisions of public companies.

2.6. Dissecting spillovers' causes.

In order to delve deeper into characteristic-based drivers behind the effects of ETFs on the underlying assets, Holden and Nam (2017) argue that, conditional on the liquidity of these latter, there is a differential impact of the ETF ownership on the underlying securities. Their hypothesis is that the less (more) accessible the underlying market is, the more its liquidity improves (deteriorates) when basket trading becomes available: they confirm so with their sample of fixed income ETFs.

Krause, Ehsani, Lien (2014) find differences in volatility spillovers from ETFs, which increase in exchange-traded fund liquidity, stock weight in the fund, mispricing, ETF flows and ETF market capitalization. The results are consistent with a positive volume–volatility relation and trading-based explanations of volatility and are generally stronger for smaller stocks.

Marta and Riva (2020) conduct another interesting study: they are among the few researchers who accounted for potential differences in externalities by ETFs due to the replication method adopted, and who make use of a non-U.S. sample for their research. Their paper empirically supports the claim that ETF (ownership) increases the sensitivity of stock return and liquidity to market movements. By using a quasi-natural experiment involving a switch of one of the biggest ETFs tracking the French CAC Index from synthetic to physical replication enables them to show that physical replication, through its peculiar arbitrage mechanism for creation and redemption of shares, have the largest impact on the underlying. After the switch, the estimated coefficients on the key ETF variables significantly increase in magnitude, probably because AP

[2] According to this hypothesis, introducing an asset class correlated with another pre-existing class provides a new layer of market-making power, which acts as a liquidity buffer. Investors who previously would have catered to their demand for liquidity by trading, for example, stocks, now can also target ETFs. Consequently, the likelihood and dimension of liquidity shocks on stocks would be reduced, and so volatility. Such a hypothesis directly contrasts with the *liquidity-trading hypothesis* supported by Ben-David et al.'s (2018) results.

must now mandatorily trade all the 40 constituents, while the swap counterparts involved in the past synthetic replication had more discretion in choosing the assets to hedge themselves with.

A further, last important aspect to mention is that Marta and Riva (2020) find that the sensitivity and comovement caused by ETFs are not excessive but, rather, improve the relation between market fundamentals and stock prices. Despite worthy of consideration, this result is obtained from a sample with quite demanding eligibility criteria: besides limiting it to ETF ownership by exchange-traded funds tracking the only the major Europe-related equity indexes, the authors exclude all the physical ETFs which follow an optimized sampling approach, and all those below € 1.000.000.000 AUM. Therefore, the real ownership situation might not be accurately represented.

Apart from this one, other two thesis works study volatility spillovers from ETFs to European equity: Heinen (2020) reports a negative relation like Marta and Riva's (2020) one, but she focuses on only two indexes, namely the EURO STOXX 50 and 600, and uses yearly observations rather than higher frequency ones. The second study (Tekines, 2020) analyzes possible links between ETFs and 10-day volatility of the returns of some major European indexes themselves, without considering standalone constituents: in this case, no significant link is found.

2.7 Similarities and differences between this thesis and the literature.

This thesis mainly relates to the research by Da, Shive (2017) and Ben-David et al. (2018). The focus is on the influence equity ETFs may have on the return volatility of the underlying instruments, like in Ben-David et al. (2018). In addition, this thesis also exploits the insights provided by Da and Shive (2017), among the others, about how different components of the ETF activity – not limited to ownership – can affect the performance of the benchmark constituents.

As a contribution, this thesis extends the research about ETFs and underlying volatility to European stocks, less represented in the existing literature. The sample for this thesis covers a large part of Europe and is not limited to the constituents of the main regional indexes. Besides these, a large spectrum of other benchmarks ever containing European stocks is included, imposing as only filter the existence of a clear rules-based and discretion-free framework behind index composition.

This thesis also studies the degree of contribution to volatility spillovers by synthetic ETFs, either "plain" or leveraged or inverse. Further, the thesis examines whether clearer or different evidence can be found when considering a stock's free float rather than its market capitalization as a building block to calculate ETF ownership. Structural differences in the European and U.S.

financial markets, respectively more bank-based and market-based historically, and a larger use of synthetic replication methods in European ETFs justify an analysis of free-float. Furthermore, a company's free float capital is the real fraction of equity promptly available to traders and longer-term investors on the stock markets, and thus likely most impacted by ETF activity.

The results of this research could contribute to shed light on how ETFs bring "unintended consequences" to the European stock market and where are the most urgent pain points to address, if any.

3. Hypotheses and underlying theory

Before delving into the more empirical sections, in this section I present and discuss the hypotheses at the base of my empirical research. The aim of assessing these theories is to quantify how ETFs may have changed the European financial market.

Hypothesis 1: *High ETF ownership and activity can alter the stock return distribution of the stocks they invest in. The three main sub-hypotheses about the consequences of high ETF ownership and activity are:*

a. *Liquidity trading hypothesis: by trading ETFs and underlying equities, authorized participants, liquidity traders and arbitrageurs transmit noise to equities, resulting in higher, non-fundamental-driven return volatility for stocks that ETFs own more.*
   According to the literature (e.g., Dannhauser, 2017; Ben-David et al., 2018) liquidity traders who are willing to profit from short-term and intraday aggregate price movements of sets of securities, without possessing valuable stock-specific information, are likely to opt for the cheapest-to-trade securities which enable them to accomplish it. ETFs are a valid candidate. Liquidity traders' uninformed, directional bets produce effects on all the ETF constituents, regardless of whether they are mispriced or not. Other arbitrageurs and even APs can cause further noise when trying to exploit the consequent price deviations by entering in a creation/redemption transaction or implementing a long/short strategy. This will lead to increased volatility for high-ETF-ownership stocks.

b. *Liquidity buffer hypothesis: by offering a new layer of liquidity and improving continuous price discovery, ETF trading curbs the deviations of stock prices from their fundamental and current values. As a result, the return volatility of ETF-owned stocks decreases.*
   According to b), the new layer of liquidity offered by ETFs prevents investors who generally would have satisfied their demand using underlying stocks from generating pronounced liquidity shocks at the stock-level, since now they can make use of ETFs correlated with those stocks (Ben-David et al., 2018). A stock part of an ETF becomes less likely mispriced due to enhanced visibility by traders and investors.

c. *High-frequency information incorporation hypothesis: ETF activity promotes the convergence of the prices of the underlying stocks to their fundamental values. Higher volatility for more ETF-owned stocks is a consequence of new valuable information continuously priced in.*
   Similarly to b), the underlying stocks' visibility increases in ETF ownership and activity. Market participants actively push the price to its fundamental value and this causes higher volatility for stocks that are more held by ETFs, since new valuable information is continuously available.

No position is taken *ex ante* about the sign the effect of ETF on stock return volatility, since opposite results have been reported in U.S.-market ETF research. Indeed, many differences exist in the development of the U.S. and European markets. For example, if European markets were less informationally efficient because of fewer investors participating, ETFs may enhance price discovery, and make equity return volatility decrease thanks to such price discovery improvement. Differently from the U.S., then, APs working with European investors cannot benefit from operational shorting, a form of naked short selling of ETF shares not created yet (Moussawi, 2018), since naked short selling is heavily restricted in the European Union. This also questions the degree of willingness of APs involved in European ETFs to actively trade them if the resulting profitability is somewhat lower.

Hypothesis 2: *Similar to physical ETFs, also synthetic ETFs affect the return distribution of the underlying stocks and they do so in the same direction.*

As long as a swap counterpart needs to hedge themselves or to construct a collateral basket of securities correlated with the underlying index to replicate, there is no reason to think that an effect analogous to the one physical ETFs might not exist. Moreover, it is important to study it

because this replication method is the one that may have the most severe consequences if used excessively, as it allows to take positions that are even larger than companies' market capitalization itself, and thus can neither be perfectly hedged.

Hypothesis 3: *In general, the potential effect of ETFs is inversely related with stock-specific market depth and the amount of publicly tradable stocks. Due to a possibly lower profitability of arbitrage in markets with higher transaction costs, I expect synthetic ownership, where present, to be more responsible for changes in stock return volatility in these more illiquid markets compared to its impact in liquid ones: most of the impact by physical ownership should be observed in more liquid markets, where physical replication methods can be implemented more easily.*

There is contrasting academic evidence about the implications of characteristics such as size and liquidity for the outcome of physical ETFs investing on the underlying.

Box et al. (2020) find evidence of increases in volatility due to ETFs only in subsamples made of small stocks held by large ETFs. Conversely, Ben-David et al. (2018) document that exchange-traded funds have lower impact on small-size stocks. While any relatively large-sized trade can considerably impact the stock quoted price, especially in case of illiquid markets, they argue that the arbitrage opportunities with high relative bid-ask spreads are fewer. Traders and swap counterparties for synthetic ETFs may avoid buying and sell costly-to-trade equity for their replication or hedging portfolios, thus excluding these stocks from one of the direct mechanisms of propagation of shocks from ETFs to the underlying. Whenever an optimized physical replication method is used rather than a full one, also APs could exclude inconvenient stocks from their baskets.

Finally, Dannhauser (2017) empirically shows that the segment of the bond market that is most affected by the positive valuation effect and by a contemporaneous decrease of liquidity caused by ETFs is the investment grade one, rather than the segment of high-yield, more illiquid bonds. Such a finding is consistent with liquidity traders abandoning the former segment in favor of trading ETFs: the U.S. bond market responded positively to this event by reducing the noise risk premium demanded. The same could be possible also in those European stock markets where noise traders are the majority and in which ETFs do manage to act as a liquidity buffer, as it appeared in the U.S. bond market. The consequent implication is that the stocks more likely to be impacted by ETF activity are the ones which were most liquid before ETFs rising in importance.

But by contrast, in illiquid markets replicated by physical ETFs, APs may be responsible for a larger share of the total arbitrage activity. Indeed, differently from other arbitrageurs, they

may be able to bear lower transaction costs since they need to search one less counterpart - the ETF provider - and potentially transact less on the public markets for each arbitrage operation, compared to other arbitrageurs. In this contexts, large trades by APs and other arbitrageurs may have more impactful consequences. Also, the lower diversification of European local market indexes (such as the DAX or CAC, which track just 40 securities) may force APs and arbitrageurs to invest in more of constituent securities in order to keep the tracking error at acceptable levels. This may imply a higher influence of ETFs even on smaller and less liquid instruments.

As for synthetic ETFs, swap counterparts may be forced to take positions on illiquid stocks to hedge themselves and abide by their contractual obligations with the ETF sponsors. These stocks may thus result showing high values of "synthetic" ETF ownership and low or even null values of physical one. ETFs investing in illiquid stocks through synthetic mechanisms rather than physical may be the reason for the lack of consensus among researchers on the role of exchange traded funds on the return volatility of these instruments.

Hypothesis 4: *Any possible ETF effect is likely to grow in magnitude along with the size of the investments by ETFs in a market.*

Many authors, e.g. Sushko and Turner (2020), Ben-David et al. (2018), argue that the impact of ETFs on the underlying securities will increase as those products achieve more importance. Ben David et al. (2018) indeed show that ETFs effects on Russell 3000 stocks become more important in later periods.

4. The variables and the methodology for their construction

4.1. General model and sampling

The empirical analysis will make use of several OLS regression models. Detailed model specifications will be described later, and will all follow the general equation:

$$DependentVariable_i = constant + \boldsymbol{ETFmeasures'_i\beta} + \boldsymbol{ControlVariables'_i\gamma} + \varepsilon_i$$

where i indicates the i-th stock belonging to the relevant sample. In fact, different subsamples will be analyzed, distinguishing between subcontinental regions.

Importantly, I decided to focus only on stocks who are jointly domiciled and listed in the same region, to better isolate the effect ETFs may have on specific markets. Indeed, European

countries show stark differences in their economies and financial markets, despite most of them share common regulations and started a process towards integration. Including in a region sample all the stocks domiciled there may yield misleading results driven by specific cases: for example, a hypothetical company domiciled and operating in a European country but listed on the NYSE may probably show different characteristics in terms of financial performance and trading levels compared to equity shares listed on their domestic exchange, especially when their domicile is in a developing country. Furthermore and relevantly for ETFs, a stock's main exchange determines which local stock market index could track its return. Also, different exchanges set different requirements which their listees must comply to and which are capable of reshaping companies' financial structure and thus performance, e.g. minimum percentage of floating capital.

Similarly, using the region of main listing as only sampling criteria would lead to group together companies running their businesses in various different environments: several Asian and extra-European firms decide to go public in the UK or Germany, but it would be quite hard to argument that they are easily comparable to English or German companies.

Given these reasons, the importance of applying a joint sampling filter at the regional level should be arguable. Such a choice balances the need of "highly local" samples to account for structural differences within the continent against the need for a sufficient number of observations to increase the power of the statistical analyses at a level which would not be achievable with country-level subsamples. Surely, anyway, it would be interesting for future research to evaluate how much non-domestic listing decisions impact companies when they become targets of ETFs tracking those foreign exchange market indexes.

$\boldsymbol{ETFmeasures}$ and $\boldsymbol{ControlVariables}$ are matrices of time-varying values of, respectively, one or more ETF measures and a set of control and fixed-effects variables, as defined later, with respect to each i-th stock. Rather than using just one ETF measure per regression, alternating or combining them through interaction terms may help to better disentangle the source of any possible volatility effect. For example, Da and Shive (2017) show that in overall samples, when used as explanatory variables in panel regressions of portfolio market betas, interacted stock-level measures of ETF ownership and turnover have significantly positive coefficients associated, while the one proxying for the intensity of the creation-redemption process is insignificant. This latter's coefficient is significant only in models where that variable is the only ETF measure used. When interaction terms are used, they have significant loadings in most specifications, suggesting that at least part of the impact of these variables on market betas depends on more than one condition being satisfied at the same time.

4.2. Dependent variables

Since the main research questions address the validity of Ben-David et al.'s liquidity trading hypothesis in a European context, the dependent variable of interest in an OLS regression model should be the daily return volatility of the European stocks held by ETFs, measured over monthly periods.

$$ReturnVolatility_{i,t} = \sqrt{\sum_{d_t=1}^{D_t} \frac{\left(DailyReturn_{i,d,t} - \overline{DailyReturn_{i,t}}\right)^2}{D_t}}$$

where $\overline{DailyReturn_{i,t}}$ is the monthly mean of daily stock returns, calculated as the percentual change in the adjusted close prices of each i-stock between month t and t-1. D_t is the number of days in month t.

The next topic touched is the nature of the possible drivers - either fundamental-driven or noise-driven - between ETF activity and the return distribution of the underlying assets. Such nature will be evaluated through five estimates of stock beta on contemporaneous and lagged market returns, measured through the following time-series regression on i-stock returns:

$$Return_{i,t} = cons + \beta_{i,0} MktRet_t + \beta_{i,1} MktRet_{t-1} + \beta_{i,2} MktRet_{t-2} + \beta_{i,3} MktRet_{t-3} + \beta_{i,4} MktRet_{t-4} + \varepsilon_{i,t}$$

4.3. Independent variables

As for the independent variables, designing a measure capable of linking ETF activity and underlying assets is crucial, as shown in the past literature on this topic.

4.3a Stock-level measures of ETF creation and redemption intensity

In their paper, Da and Shive (2017) propose some stock-level measures of ETF activity intensity. This type of measures is likely to be positively correlated with the degree of availability of arbitrage opportunities for APs and other entities, and thus can be useful to answer my research questions. One of these metrics is based on the intensity of the creation-redemption process of the ETFs holding specific stocks. Stocks with higher values of it should be affected by an ETF externality more evidently. Starting from

$$SDShares_{j,t} = \frac{\sqrt{\sum_{d=1}^{M} E\left[ETFSharesOutstanding_{j,d,t} - E\left[ETFSharesOutstanding_{j,d,t}\right]_{j,t}\right]^2}}{\sqrt{D_t} \times E[ETFSharesOutstanding]_{j,t}},$$

where $SDShares_{j,t}$ is the ratio between the daily standard deviation of the number of shares of the j-th ETF outstanding in month t and the t-monthly average number of shares outstanding of the j-th fund; D_t is the number of days in month t. $WtdSDShares_{i,t}$ is

$$WtdSDShares_{i,t} = \frac{\sum_{j=1}^{N} w_{i,j,t} \times SDShares_{j,t}}{\sum_{j=1}^{N} w_{i,j,t}}$$

and is a weighted average of $SDShares_{j,t}$ where the weights equal the proportion of the i-th company's shares held by the j-th ETF in month t, with respect to the total number of i-shares held by ETFs.

Another measure of ETF generation intensity derived from ETF trading turnover. Starting from

$$ETFTurnover_{j,t} = E\left[\frac{ETFTrades€Volumed,j,t}{ETFClose€Price_{d,j,t} \times ETFSharesOutstanding_{j,d,t}}\right]_{j,t},$$

that is the t-monthly average of the daily turnover of the j-th ETF, a i-th stock level weighted average is computed again as

$$WtdETFTurnover_{i,t} = \frac{\sum_{j=1}^{N} w_{i,j,t} \times ETFTurnover_{j,t}}{\sum_{j=l}^{N} w_{i,j,t}}$$

with weights equal to the proportion of the i-th company's shares held by the j-th ETF in month t, with respect to the total number of i-shares held by ETFs, as before.

Then, to also have a variable proxying the demand or offer for the i-th stock that ETFs provide the market with each month, I start from

$$€Flows_{j,t} = \Delta ETFSharesOutstanding_{j,t} \times ETFNAV_{j,t}$$

where $\Delta ETFSharesOutstanding_{j,t}$ is the change in the number of fund class outstanding over month t, and then I compute

$$WtdFlows_{i,t} = \frac{\sum_{j=1}^{N} w_{i,t} €Flows_{j,t}}{MktCap_{i,t}},$$

where w is the fund portfolio weight of the i-th stock. $WtdFlows_{i,t}$ is divided by the i-stock market capitalization to make it more comparable across stocks, relatively to their size.

4.3b Ownership measures and adjustments to account for synthetic, leveraged and inverse ETFs, and for the use of depositary receipts.

ETF ownership measures are the main independent variables of the regression models run in this thesis, and the most used by many authors in the research articles about this topic. ETF ownership describes the dimension of the aggregate position ETFs have on specific i-stocks relatively to the overall tradable value. These measures are computed starting from calculating

$$ETFposition_{i,j,t} = w_{i,j,t} \times AUM_{j,t} \quad ,$$

which is the product between the last available reported weight of the i-th stock in the j-th fund portfolio, and the AUM of the j-th fund[3]. Then, in

$$ETFOwnership_{i,t} = \frac{\sum_{j=1}^{N} ETFposition_{i,j,t}}{MktCap_{i,t}} \quad ,$$

$MktCap_{i,t}$ is the market capitalization of the i-th company at the end of month t.

Differently from the other ETF variables, the value of ownership to use in the main regression model will be the one from the prior month, as in Ben-David et al. (2018) and Da, Shive's (2017) paper, instead of the same-month one: the reason is that ETF ownership is a *stock* variable which describes the cumulative position ETFs have taken on an i-stock over their whole lives, rather than a quantity specifically referred to one month only, such as turnover or creation/redemption intensity. Especially when used in combination, then, using values of ETF ownership and other ETF variables observed in the same month would overestimate the magnitude of the overall ETF activity, since ETF turnover, creation-redemption activity and flows contribute to the end-of-month level of ownership itself. Indeed, ETF flows are simply the monthly variation of ETF ownership.

Despite in the literature market capitalization is often used as the denominator of ETF ownership, I believe there is a chance that floating capital could improve their capacity to track

[3] Since I have quarterly holdings data, fund portfolio weights which are referred to up to the second past month are kept as valid. I discard all the security-month observations for which I do not have such weight data. When AUM data is not available, I proxy it with the market capitalization of the ETF. In the cases in which even this latter is missing, I drop those observations.

the causal relation I am analyzing, especially with respect to Europe where the difference between total outstanding and floating capital is more marked. Free float is a measure of the quantity of securities of a company that are really promptly available for trading, while market capitalization is the product between a market price and the overall shares outstanding, regardless of whether the holders are willing to participate into the market. If many of them do not, floating capital could be a better alternative for the purposes of this thesis. The adjustment to ownership is simply:

$$FloatETFOwnership_{i,t} = \frac{\sum_{j=1}^{N} ETFposition_{i,j,t}}{FloatingMktCap_{i,t}}$$

In Europe, synthetic ETFs have a larger share of the ETF market than in the US, despite still small. To account also for them in my sample, I assume that institutional investors involved in the ETF creation-redemption process have to trade stocks that are (similar to those) included in the underlying index/universe to hedge themselves. In line with this assumption, the numerators of the ownership measures are adjusted by an amount consistent with the quantity of equity shares virtually needed by every synthetic ETF according to the benchmark index weights. Consistently, also $WtdSDShares$, $WtdTurnover$ and $WtdFlows$ account include synthetic funds in their calculations.

I also apply a further adjustment whose goal is avoiding double-counting of stock holdings, potentially occurring whenever synthetic ETFs hold also other exchange-traded funds which are themselves part of the dataset: indeed, many non-physical products pair derivatives and ready-to-use funds to optimize the replication process. The adjustment consists in subtracting the number of benchmark stocks the fund holds indirectly from the virtual holdings data of each synthetic ETF, whenever the ETF held is part of sample. This process is iterated as needed, until no relevant ETF figures in the adjusted holding data of synthetic funds.

As for ETFs classifiable as pure funds of funds, they are excluded from the sample since no equity is held directly. Lastly as for the definition of holdings, by assuming the validity of the one price law after accounting for transaction costs, I will consider the market value of the depositary receipts some ETFs invest as a direct investment in the subject of the receipt[4].

Eventually, I have 6 ETF ownership variables defined: $PhysicalETFOwnership$, $SyntheticETFOwnership$, these latter's sum $ETFOwnership$, and the analogous $PhysycalETFFloatOwnership$, $SyntheticETFFloatOwnership$, and $ETFFloatOwnership$.

[4] I found that some companies trade on public exchanges only though depositary receipts. In these few cases, I kept the depositary receipt as the "ultimate" security to analyze the volatility of.

4.4. Control variables

Any link found between an ETF measure and stock return volatility may be noisy without a proper model specification. Ben-David et alia (2018) argue that fund's weighting schemes different from value-weighting may bias the estimation results: as for equal-weighted funds, for example, the numerator of ETF ownership may not grow together with the denominator. Due to the negative correlation between stock size and the volatility of returns, the estimated coefficient on ETF Ownership would be negatively biased when regressing stock return volatility. Moreover, shares of established and less volatile firms are more likely to be part of an index, and the trading intensity and return volatility of the underlying may also be affected by drivers such as the popularity of an investing theme or sector, which may also be positively related to ETF ownership. The authors use the natural logarithm of lagged market capitalization as one of the control variables to better quantify the causal effect between ETF ownership and return patterns and to remove noise due to issues like multiple causality and omitted variable bias.

In line with the literature, I include as control variables past month average market capitalization of the stock, past month stock return volatility and lagged relative bid-ask spread and turnover to account for characteristics capable to influence return volatility. To account for trends in return patterns, I use the stock excess return over the five least recent months of a past-12-months window or the one over the five most recent ones, following the findings by Novy-Marx (2012) about the different contribution of the intermediate past formation period on the profitability of a momentum strategy. Since a relation between negative returns and an increase in return volatility has been largely documented (e.g., Black, 1976; Bae, Kim, Nelson, 2007), I also include past month's return as a further variable. As suggested by research on equity return (Novy-Marx, 2012), I would add firm's gross profitability as further control variables.

Measures of ownership by other types of passive investors must be included too[5]. Such a variable can help to isolate the effect on volatility strictly caused by ETFs from the ones due to, e.g., index mutual funds. Lastly, stock-, month- and country-fixed effects are included[6].

[5] This variable is available for a limited part of the sample. I have not found anything analogous available in other databases in time series form.

[6] I consider as country the one in which each stock is jointly traded and domiciled. The ones for which the countries of domicile and main exchange are not the same are grouped into one only cluster when it comes to estimate fixed effects and standard errors. This last approach is not likely to excessively condition the results, since these stocks are only a small part of the sample.

In the specification in which float-adjusted variables are used, free float and other float-adjusted passive ownership will be used in place of market capitalization and other passive ownership – also "OPO" from now on - based on market capitalization. Float-adjusted OPO equals the product between OPO and the ratio between company market capitalization and free float.

5. Data

The dataset for this thesis has been constructed based on a time range from January 2013 to December 2021. Geographically, it aims to cover Europe as much as possible[7].

5.1. ETF data

The sources used for ETF holding information are two. Most of this data comes from Morningstar Direct, a database specialized in funds, but due to daily limits to the amount of data downloadable I had to rely also on the CRSP Survivor-Bias-Free U.S. Mutual Fund Database because of the high number of eligible entries yielded by the search.

That CRSP database[8] collects data almost only on U.S. funds, and I sourced from it information related to North American ETFs tracking indexes containing European stocks. *Ex post*, it could be considered also a lucky choice as this database provided data on about half a thousand eligible ETFs absent from the Morningstar platform[9].

From these databases, I gather quarterly holdings data, fund names, CUSIP and ISIN codes, tickers, replication method, starting and (eventual) end date, benchmark index names. Bloomberg, Refinitv Eikon and residually specialized web sources such as Trackinsight.com served to recover such data when missing from Morningstar and CRSP. This latter, for example, does not record ISIN codes, which are more compatible than CUSIP ones with Refinitv Datastream: thus, I add them.

At this point, the list of ETFs counts a total of 3.044 ETFs, 2.399 of which use physical and 645 synthetical replication methods.

[7] Turkey and Russia are included in the sample as developing countries.
[8] For indications on the methods for identifying ETFs on the CRSP database it is possible to refer to many of the research articles about U.S. exchange-traded funds cited in the literature review (see, for example, Ben-David et al. ,2018; or Da, Shive,2017).
[9] Funds whose data is sourced from CRSP are matched between it and Morningstar through their CUSIP identifiers.

As for the portfolio holdings of synthetic ETFs, the index weights used as proxies are from Bloomberg. For those benchmarks whose data is unavailable, I proxy weights with those of other physical ETFs tracking the same benchmark over at least the same time window. Priority as a proxy is given to ETFs whose physical replication is labelled as "full", and residually to funds following optimized sampling methods. In case no single fund covers the whole life of the synthetic one, I use multiple ETFs in order to cover as much time as possible. The resulting ETF weights are scaled by a multiplier consistently with the type of fund: equal to 1 if "plain", negative if inverse, positive and different from 1 if leveraged. Finally, the adjustment against stock double-counting described in the previous Section is applied.

After these steps, I used Refinitiv Datastream, Refinitiv Eikon and Morningstar to obtain data on daily ETF trading volume, shares outstanding, and end-of-month unadjusted close prices, AUM and NAV. The order of priority between databases to select the data from is determined variable-by-variable[10]. In cases of evident measurement errors and no alternative source left, I applied some minor corrections when the type of error was clear, and dropped the observation at worst[11]. I dropped the observations for which I failed to collect or estimate the ETF AUM or market capitalization values, given their essentiality to compute ETF ownership, which this research is based on. At completion, I have at least one AUM datapoint for 2.907 ETFs and a total of 162.642 fund-month observations.

The final ETF database, after combining all the information, counts 2.107 and 449 physical and synthetical exchange-traded funds. These numbers, evidently lower than the starting ones, reflect the fact that several physically benchmarked funds are still incompletely present on specialized databases, maybe also because of small dimensions or unusual country of domicile. As

[10] About shares outstanding, for example, visually comparing the data available to me and the one by Bloomberg suggested that Eikon was the best solution compared to Datastream, second, and Morningstar. Despite previous literature suggested Bloomberg as the best option overall, I have not found systematical differences during the checks, while using Bloomberg would have been highly problematical due to limits to monthly amounts of retrievable data. Generally, Datastream resulted the best option as for AUM; Morningstar for NAV and close price; Eikon for the remainder.

[11] Although more accurate overall in terms of matching with Bloomberg, the volume data by Eikon occasionally shown clear measurement errors, as highlighted by Bloomberg itself and/or by Datastream and Morningstar reporting values which largely differed from Eikon. I opted for the datapoint by Eikon whenever these deviations were not large enough to suggest such an error. For the observations for which Eikon was the sole provider, I kept its value, not rejecting the possibility of unusually large trades occurring on some days.
A similar approach was used with the net asset values provided by Morningstar, but in this case I decided to drop the observation when neither NAV, nor AUM and nor NAV were available from any source. In fact, NAV was functional to estimate AUM when this was missing. AUM was a far more important variable than ETF turnover because it was fundamental to calculate ETF ownership. Had I kept the reported NAV regardless an unlikely value, I would have risked biasing more the results. Moreover, my analysis is at a monthly frequency, as AUM also is: an error in month-end AUM is more impacting than one in few *days* of volume data, still to be averaged at the month-level to calculate WtdETFTurnover.

for derivative-based ETFs, both the use of "house-made" indexes by ETF sponsors and restrictions to the licensed contents by Bloomberg limited a larger coverage.

Anyway, Figure A1 in the Appendix shows that the percentage of lifetime of the funds in sample for which I manage to get or proxy portfolio holdings data equals 81,5% or 89,8%, depending on whether the unit of measure is the number of months or the monthly AUM of the whole ETF industry, and the trend it's increasing in time.

5.2. Stocks data

For the remaining data collection, I start from the ETF holding dataset to get a list of identifiers to gather information on, but firstly I make sure of limiting the retrieval really to equity. Even before doing it, I had to obtain the ISIN numbers of the fund constituents reported by CRSP. In fact, this database uses CUSIP and CINS codes rather than ISIN ones[12]. While most of the CUSIP codes were "readable" by Eikon, there was no compatibility with CINS. I retrieve a list of as many as possible CINS of Europe-domiciled or mainly traded stocks and of these latter's depositary receipts, together with their ISINs. Then, I merge these lists of identifiers to finally have an extended list ISINs of ETF holding. Finally, I complete the check mentioned above through Refinitv Eikon, Refinitiv Datastream, and residually Bloomberg. I substitute the ISINs of eligible depositary receipts with their underlying stock's one whenever possible.

Then, to calculate the stock return and the values of other stock-related variables, I source data on daily adjusted and unadjusted close prices and bid and ask prices, monthly trading turnover, month-end shares outstanding, percentage of free float on overall capital, overall passive ownership from Refinitv Eikon and Datastream[13]. One only source – Datastream – provides the latter datatype, and it does so by aggregating ownership values from various types of investors. Besides passive funds, including mutual funds and exchange-traded ones – also any other entities are filtered with the only criteria of being "*benchmarking their assets against stock indices and allowing external factors to determine in which sectors and regions they make investments*", as reported in the datatype description. Thus, also pension funds, investment banks, governments, and some individual persons or even large block holders may fall in this category. Despite some

[12] CINS are the equivalent of CUSIP codes, for non-U.S. assets. These identifiers, developed by the same provider, are an alternative to ISINs that has been adopted mostly in the U.S..

[13] In this thesis, the values of other passive ownership will capture only the physical holdings, being the one from derivatives not available and unfeasible to calculate from zero. OPO can be even higher than the value of free float itself, since also the ownership by some blockholders may be included in the computation.

possible noise caused by this, I keep this data for OPO as it is the only available. I subtract the ETF ownership values calculated by myself from the raw OPO data to avoid double-counting.

I use Eikon and Datastream plus Orbis to gather as much information as possible on yearly company revenues, cost of goods sold, total assets, which I need to calculate Novy-Marx's (2012a) gross profitability ratio. For financial firms such as banks, I consider interest margin rather than gross profit, as the former should be more representative of the core business performance of those companies.

I collect also accounting reporting dates to avoid the look-ahead bias I would incur into if I considered fiscal year end dates as the day in which accounting information became publicly known. For those companies lacking this data but for which the fiscal year end date is known, I assume the balance sheet is published 9 months later; instead, I adopt a 12-months lag with respect to the fiscal year if neither the period end date is available.

I download the monthly time series of the European market factor and risk-free rate from Kenneth French's data library.

Lastly, I conclude data collection getting information about companies' country of domicile and of main exchange, sector, eventual last previous exchange and date of change of bourse of listing, so that I know where to "locate" each company at any time. I use the classification by FTSE to identify developed countries, and I consider the remainder as developing. According to it, the developed group consists of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland and UK, while the remainder countries are classified as Rest of Europe.

The last step I take as for dataset construction is to trim all the ownership and ETF variables: the values below (above) the relevant 0,5%- (99,5%-)quantile are turned to missing. Few authors have taken similar steps in this specific research topic: for example, Israeli et al. (2017) and Ben-David et al. (2018) do not adopt any winsorization or trimming, while Da, Shive (2017) winsorize their dependent variables at the 1% level. Assuming that most outliers were due to measurement errors, in order to reduce their impact, I decided to trim, rather than to winsorize, the variables above at the same level used by Da and Shive[14]. Compared to winsorizing, this allowed to avoid having some observations' values replaced by other numbers which may have not been truly representative of the real unobserved values. Visual checking helped to verify that the cuts chosen have been sufficient to remove the majority of probable measurement errors. At

[14] Indeed, in the case of outliers in the ownership variables, most of them where due to market capitalization or free float values suddenly varying by e.g. 100 or 1000 times with respect to the values they had in adjacent months.

the same time, the relatively small number of trimmed values – around 2000 – should make the choice between trimming and winsorizing not excessively influential on the estimation results. The final sample counts around 210.000 stock-months observations, referring to 3.270 different securities.

5.3. Summary statistics

Table A1 in the Appendix summarizes the repartition of stocks, observations and AUM invested by country, considering only securities jointly domiciled and traded in the same nation. Table 1 provides a first summary measurement of the main variables, tabulated by region, and jointly by region and terciles based on ETF ownership in Table 2[15]. These Tables suggest that ETFs control a higher share of the capital of companies from developed countries, and that most of this control comes from real, physical ownership of the underlying stocks. Indeed, Graph A1 in the Appendix breaks the AUM of ETFs down into a physical and a derivative-based components, and by region: the very large majority of funds is invested into developed countries, but synthetic ETFs focus more on developing areas compared to physical exchange-traded funds.

Table 1 shows that, as a rule, stocks from developed countries are less volatile and more liquid, with a larger size. ETFs control a larger share of them while other passive holders a lower one, compared to developing countries. Other passive ownership is lower in developed countries, where probably the public company-model is more widespread than concentrated ownership. The float-adjusted values of OPO can be higher than 100%, as in Rest of Europe, since they represent the company capitalization held by passive owners relative to the free float. Shareholders owning a portion of shares not deemed as floating – i.e. "block owners" – do contribute to the numerator, making possible to floating OPO to exceed 100%.

[15] In the Appendix, an analogous table – Table A2 - based on ETF float ownership is presented. Evidence is unchanged. In both tables, the magnitude of some values is exaggeratedly high: this is due to few, likely outliers or measurement errors. However, high values of standard deviation such as the one for ETF Ownership in Developed Europe (63,27%) may be due also to ETFs controlling the majority of some – small - companies because of the need to track several country, thematic or sectors indices.

In Table 2, the numbers suggest an inverse relation between ETF ownership and stock return volatility or liquidity: nevertheless, these apparent patterns may be due to causal relations between those metrics and the size of a company, rather than ETFs themselves, since most passive funds invest more in larger firms. Also, Table 1 indirectly reports the number of observations lacking overall passive ownership data: Refinitiv Datatsream was the only provider of such information, which aggregates holdings data about several types of entities and institutions, but the coverage resulted limited overall after data collection. In the next session I delve deeper into the empirical analyses and results and, thus, into how such a problem has been addressed.

Table 1: Summary statistics

Variables:	***Median***		***Mean***		***Standard deviation***	
	Developed Europe	*Rest of Europe*	*Developed Europe*	*Rest of Europe*	*Developed Europe*	*Rest of Europe*
ETF ownership	0,88%	0,54%	2,99%	1,17%	5,85%	1,79%
ETF float ownership	1,40%	1,61%	4,05%	2,79%	7,41%	3,56%
Physical ETF ownership	0,84%	0,50%	2,92%	1,08%	5,78%	1,70%
Physical ETF float ownership	1,34%	1,49%	3,96%	2,60%	7,32%	3,41%
Synthetic ETF ownership	0,01%	0,00%	0,06%	0,06%	0,10%	0,11%
Synthetic ETF float ownership	0,01%	0,00%	0,08%	0,11%	0,13%	0,22%
Other passive ownership	26,23%	57,00%	31,44%	54,10%	23,29%	23,48%
Other floating passive ownership	45,08%	136,25%	86,93%	196,12%	114,95%	178,92%
Wtd. SD ETF Shares	1,33%	1,08%	2,16%	1,63%	3,04%	2,43%
Wtd. ETF Turnover	0,30%	0,43%	16,58%	10,47%	159,25%	83,74%
Wtd. ETF Flows	0,00%	0,00%	-0,05%	-0,06%	0,33%	0,40%
Wtd. ETF Floating Flows	0,00%	0,00%	-0,08%	-0,13%	0,57%	0,76%
lg(Market Cap)	21,11	20,63	21,22	20,72	1,64	1,58
lg(Free Float)	20,65	19,59	20,76	19,71	1,78	1,7
Average daily bid-ask spread	0,24%	0,29%	0,53%	0,73%	12,24%	6,20%
Trading turnover	3,89%	3,65%	29,01%	17,09%	987,07%	100,59%
Return volatility (t+1)	1,67%	2,01%	1,89%	2,25%	0,98%	1,16%
Fama&French5 alpha (t+1)	0,02%	0,00%	0,03%	0,02%	0,47%	0,59%

#nonmissing values	*Developed Europe*	*Rest of Europe*
ETF ownership	183.838	23.345
Other passive ownership	87.692	17.341

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
ETF ownership (1)	1																			
ETF float ownership (2)	**1**	1																		
Physical ETF ownership (3)	**1**	**0,929**	1																	
Physical ETF float ownership (4)	**0,929**	**0,999**	**0,93**	1																
Synthetic ETF ownership (5)	**0,61**	**0,559**	**0,599**	**0,547**	1															
Synthetic ETF float ownership (6)	**0,486**	**0,512**	**0,476**	**0,498**	**0,903**	1														
Other passive ownership (7)	**-0,209**	**-0,031**	**-0,207**	**-0,031**	**-0,16**	**-0,018**	1													
Other floating passive ownership (8)	**-0,17**	**0,009**	**-0,169**	**0,009**	**-0,134**	**-0,016**	**0,799**	1												
Wtd. SD ETF Shares (9)	**0,168**	**0,167**	**0,169**	**0,168**	**0,112**	**0,1**	**-0,011**	**-0,011**	1											
Wtd. ETF Turnover (10)	**-0,005**	**-0,008**	**-0,007**	**-0,011**	**0,054**	**0,049**	**-0,023**	**-0,017**	**-0,011**	1										
Wtd. ETF Flows (11)	**0,013**	**0,011**	**0,012**	**0,011**	**0,019**	**0,018**	0,001	0,002	**0,008**	**0,009**	1									
Wtd. ETF Floating Flows (12)	**0,019**	**0,011**	**0,019**	**0,011**	**0,026**	**0,02**	**-0,024**	**-0,023**	**0,007**	**0,01**	**0,906**	1								
lg(Market Cap) (13)	**0,463**	**0,473**	**0,457**	**0,467**	**0,539**	**0,513**	**-0,053**	**-0,01**	**0,051**	**0,102**	**0,023**	**0,026**	1							
lg(Free Float) (14)	**0,492**	**0,457**	**0,486**	**0,452**	**0,56**	**0,487**	**-0,28**	**-0,265**	**0,053**	**0,098**	**0,019**	**0,032**	**0,951**	1						
Average daily bid-ask spread (15)	**-0,016**	**-0,017**	**-0,016**	**-0,017**	**-0,017**	**-0,017**	**0,045**	**0,052**	-0,001	-0,003	0,002	0,002	**-0,043**	**-0,041**	1					
Trading turnover (16)	-0,003	**-0,005**	-0,003	**-0,005**	**-0,004**	**-0,005**	**-0,024**	**-0,021**	0	-0,001	0,001	0,002	**-0,011**	**-0,006**	0	1				
Return volatility (t+1) (17)	**-0,095**	**-0,092**	**-0,093**	**-0,091**	**-0,108**	**-0,095**	**-0,006**	**-0,005**	**-0,008**	**-0,013**	**-0,017**	**-0,017**	**-0,247**	**-0,23**	**0,013**	**0,031**	1			
Fama&French5 alpha (18)	**-0,008**	**-0,009**	**-0,008**	**-0,009**	**-0,007**	**-0,009**	0,001	0,005	**0,011**	0	0,001	0,001	-0,002	-0,003	**0,004**	**-0,008**	**0,028**	1		
Book-to-market ratio (19)	**-0,009**	**-0,009**	**-0,009**	**-0,009**	**-0,005**	**-0,005**	**-0,02**	**-0,015**	0,001	0,002	0,002	0,001	**-0,038**	**-0,034**	0,003	0,001	0,002	0,002	1	
Gross profitability ratio (20)	**-0,004**	-0,002	-0,003	-0,002	**-0,011**	**-0,01**	**-0,01**	**-0,011**	**0,007**	-0,002	-0,003	-0,003	-0,001	-0,001	-0,001	-0,001	**0,011**	-0,001	-0,001	1

Note: numbers in bolds indicate significance at least at the 10% level.

From the correlation matrix, it is possible to confirm the insight also available from the previous tables about an inverse relationship between ETF ownership and other passive ones: when the level of one type of ownership increases, the other decreases and vice versa. This negative relation may arise because ETFs tend to follow float-adjusted market-cap weighted indexes, therefore having lower weights in stocks with large blockholders.

Table 2: Summary statistics by terciles

	Terciles by: ETF ownership					
	Developed Europe			*Rest of Europe*		
	1	2	3	1	2	3
Median						
ETF ownership	0,07%	0,90%	4,11%	0,04%	0,54%	2,21%
ETF float ownership	0,13%	1,49%	5,13%	0,14%	1,71%	5,02%
Physical ETF ownership	0,06%	0,88%	3,99%	0,04%	0,52%	2,06%
Physical ETF float ownership	0,12%	1,45%	4,97%	0,11%	1,64%	4,69%
Synthetic ETF ownership	0,00%	0,00%	0,10%	0,00%	0,00%	0,10%
Synthetic ETF float ownership	0,00%	0,01%	0,13%	0,00%	0,00%	0,22%
Other passive ownership	32,97%	29,38%	16,62%	64,00%	63,19%	48,56%
Other floating passive ownership	65,29%	47,16%	28,25%	187,63%	176,21%	93,98%
Wtd. SD ETF Shares	1,13%	1,24%	1,51%	0,60%	1,18%	1,33%
Wtd. ETF Turnover	0,24%	0,21%	0,49%	0,24%	0,43%	0,57%
Wtd. ETF Flows	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Wtd. ETF Floating Flows	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
lg(Market Cap)	20,01	21,00	22,57	19,80	20,46	21,80
lg(Free Float)	19,45	20,52	22,28	18,59	19,39	21,08
Average daily bid-ask spread	0,62%	0,24%	0,09%	0,42%	0,28%	0,20%
Trading turnover	2,16%	3,60%	5,30%	2,13%	3,66%	4,58%
Return volatility (t+1)	1,79%	1,74%	1,52%	2,04%	2,01%	1,98%
Fama&French5 alpha (t+1)	0,02%	0,02%	0,03%	0,00%	0,00%	0,01%
Mean						
ETF ownership	0,11%	1,10%	7,76%	0,08%	0,65%	2,79%
ETF float ownership	0,26%	1,90%	9,75%	0,34%	2,28%	5,78%
Physical ETF ownership	0,10%	1,07%	7,60%	0,07%	0,62%	2,62%
Physical ETF float ownership	0,25%	1,86%	9,56%	0,33%	2,18%	5,43%
Synthetic ETF ownership	0,01%	0,02%	0,14%	0,00%	0,03%	0,14%
Synthetic ETF float ownership	0,01%	0,04%	0,18%	0,01%	0,07%	0,28%
Other passive ownership	37,20%	33,00%	21,81%	58,83%	58,34%	45,69%
Other floating passive ownership	115,91%	80,01%	49,99%	241,66%	233,13%	118,00%
Wtd. SD ETF Shares	2,19%	1,79%	2,47%	1,54%	1,73%	1,70%
Wtd. ETF Turnover	4,13%	10,24%	34,93%	20,44%	5,43%	3,74%
Wtd. ETF Flows	-0,03%	-0,07%	-0,04%	-0,04%	-0,08%	-0,07%
Wtd. ETF Floating Flows	-0,05%	-0,12%	-0,06%	-0,08%	-0,18%	-0,14%
lg(Market Cap)	20,01	21,06	22,56	19,90	20,66	21,74
lg(Free Float)	19,36	20,58	22,31	18,71	19,56	21,01
Average daily bid-ask spread	1,06%	0,38%	0,15%	1,17%	0,51%	0,42%
Trading turnover	38,86%	31,63%	16,56%	17,98%	17,88%	16,03%
Return volatility (t+1)	2,01%	1,95%	1,72%	2,29%	2,25%	2,20%
Fama&French5 alpha (t+1)	0,04%	0,02%	0,02%	0,02%	0,02%	0,02%
Standard deviation						
ETF ownership	0,11%	0,68%	8,23%	0,08%	0,37%	2,32%
ETF float ownership	0,86%	1,64%	9,88%	0,74%	2,03%	4,28%
Physical ETF ownership	0,11%	0,68%	8,15%	0,08%	0,35%	2,25%
Physical ETF float ownership	0,81%	1,60%	9,81%	0,73%	1,95%	4,17%
Synthetic ETF ownership	0,02%	0,04%	0,13%	0,01%	0,08%	0,15%
Synthetic ETF float ownership	0,04%	0,08%	0,17%	0,04%	0,17%	0,27%
Other passive ownership	25,00%	22,34%	18,79%	24,90%	22,26%	20,67%
Other floating passive ownership	148,41%	89,96%	65,07%	209,19%	185,73%	98,86%
Wtd. SD ETF Shares	3,40%	2,33%	3,21%	3,19%	2,03%	1,89%
Wtd. ETF Turnover	60,37%	128,90%	235,31%	133,54%	42,35%	30,68%
Wtd. ETF Flows	0,24%	0,41%	0,32%	0,32%	0,45%	0,42%
Wtd. ETF Floating Flows	0,46%	0,71%	0,51%	0,62%	0,90%	0,76%
lg(Market Cap)	1,32	1,11	1,33	1,39	1,33	1,30
lg(Free Float)	1,42	1,10	1,35	1,42	1,33	1,35
Average daily bid-ask spread	21,33%	0,51%	0,21%	9,30%	5,08%	1,95%
Trading turnover	1646,67%	492,13%	90,27%	90,04%	143,32%	45,37%
Return volatility (t+1)	1,07%	0,96%	0,86%	1,27%	1,13%	1,05%
Fama&French5 alpha (t+1)	0,53%	0,48%	0,39%	0,62%	0,60%	0,54%

6. Analyses and results

This section is organized in sub-sections, according to the hypotheses tested.

6.1. Overall ETF activity and stock return volatility (Hypotheses 1 and 3)

Hypothesis 1 – the existence of a link between ETF ownership and stock return volatility - is firstly assessed. The following tables in this paragraph present the evidence obtained using various combinations of ETF variables, one combination each. This general type of OLS regression model

$$ReturnVolatility_{\boldsymbol{i}} = constant + \boldsymbol{ETFmeasures'_i\beta} + \boldsymbol{ControlVariables'_i\gamma} + \varepsilon_i \quad [16]$$

is always used.

In each table more than one estimation per region is run: besides gradually including more control variables to better identify any possible contribution to stock return volatility by ETFs, multiple specifications help to detect potential sample selection biases due to shortage of data on OPO. In fact, overcoming such lack of information by simply omitting that variable may make any result easer to question: indeed, as Ben-David, Franzoni, Moussawi (2018), Sushko, Turner (2020) and several other authors note, it is important to distinguish any impact by ETFs from eventual externalites possibly due to other indexed sources. On the other hand, limiting my research to observations for which this metric was retrievable could increase the risk of incurring into unsought sample selection. Thus, a stepwise approach is applied to account for all these considerations.

"Model"-rows 1 and 2, and 3 and 4 share the same model specifications, but the sets of observations used for estimation in rows 2 and 4 are limited to those observations for which all the values necessary for the model specifications used respectively in rows 3 and 5 are available. More precisely, the set of control variables used in rows 5 is complete – making this model the baseline for this thesis -, while the lags of volatility are absent in all the previous rows, and other passive ownership in the first two. Finally, lagged volatility is entered into the model in row 6, while OPO is not. Doubts regarding sample biases may be clarified by comparing the results between rows 1 and 2, where the differences in sample sizes are starker: if the estimations yield similar coefficients in terms of sign, significance and, lastly, magnitude, these biases can be considered less likely. Row 6 serves as a last check against sample selection biases, since it allows for a larger sample

[16] The subscript "i" refers to any observation belonging to the i-th subsample used, which can be either regional or country-level.

size by considering past volatility and not OPO. Analyzing estimations which consider past recent volatility is important because it helps to exclude concerns about reverse causality, possible due to the persistence of volatility itself over time: liquidity traders, who have benefitted from the relative cheapness of ETFs since these latter's introduction - usually have more chances to profit in periods of high price instability, so it would be possible to observe a high (absolute) value of correlation between past ETF ownership and volatility, especially in those moments. The persistence of volatility may get past ETF ownership seem responsible for current price instability, despite not being the real cause.

Table 3 summarizes the results for a set of regression model in which the dependent variable is daily return volatility, measured over a month, and the only ETF variable considered is ETF (floating) ownership lagged by one month, as done in Ben-David, Franzoni, Moussawi's (2018) paper. For a better space management, models 3, 4, 6 and the estimated coefficients for the control variables present in all the specifications are omitted here and reported in the Appendix.

The first Panel ("Overall") contains the estimates from the use of all the observation available for each model specification. From it, it is not possible to detect with certainty any decisive role of ETF ownership, as for stock return volatility most of the coefficients are insignificant at the 10% level, in contrast with the results by Ben-David et al. (2018) regarding North American stocks. The presence of exchange-traded funds in the European equity markets as a whole may not be at sufficient levels to generate such widespread influence on return volatility yet. On the other hand, in general, both OPO and past volatility show coefficients with signs consistent to those already found by past research. The same applies also for the other control variables.

In line with the suggestions by the existing literature, according to which some characteristics of a security can affect their interaction with the rest of the market (e.g. Dannhauser, 2017; Holden and Nam, 2017; Israeli et al., 2017), I divide the sample into two subgroups based on the degree of liquidity observed for each stock at t-1. Liquidity is measured by the average daily relative bid-ask spread over each month. The same regression models are run again while considering these resulting subsamples separately, and the results are shown in the last two panels of Table 2. The outcome will also relate to Hypothesis 3, which claims that some differences in may exist in the way easier- and harder-to-trade securities are impacted.

In Panel Illiquid, the statistical evidence in favor of a positive contribution of ETFs to volatility is stark regarding Developed Europe. This is not the case as for Rest of Europe and, rather, the large differences between the estimates from models 1 and 2 suggest some risk of sample selection bias.

Table 3: overall ETF ownership and stock return volatility

The table reports estimates from OLS regressions of daily stock return volatility, averaged by month, on measures of ETF ownership and sets of control variables. For each one of 6 models, I use subspecifications in which the values of some variables are calculated based on either *a)* the market capitalization of a stock or *b)* its free float. Those variables, eventually labelled as "float" of "float-adjusted", are the ownership ones and those related to a stock capitalisation. Estimations by models 1, 3, 5 and 6 make use of all the observations for which the data required by the relevant models is completely available. Model specifications 2 and 4 are equal to those of, respectively, model 1 and 3, but the sample is limited to those observations fullfilling the requirements for, respectively, models 3 and 5. Models 1, 2 and 5 are tabulated here, the remainder in Table A3 in the Appendix. The ownership and volatility variables are standardised by subtracting the mean and dividing by the standard deviation over the relevant Region. Standard errors are clustered at the country-, month- and stock-level. Absolute values of t-statistics are presented in italics. Parentheses and ***, **, * indicate statistical significance at the 10%, 5% and 1% level. The sample covers the period January 2013-December 2021. The set of control variables ("Control Vars") contains lagged values of stock capitalisation, average daily inverse price ratio and daily bid-ask spread, monthly trading turnover, gross-profitability ratio, company book-to-market ratio, and past month return together with the cumulative 12-to-7th and 6th-to-2nd returns. Country, month and stock fixed effects enter into the models too. The regional samples in the first panel ("Panel Overall") include all the eligible observations according to the criteria described above. "Panel Illiquid (Liquid)" considers only the observations belonging to the last (first) 50 percentiles based on the absolute values of the average daily bid-ask spread measured for a stock over the previous month.

Panel Overall. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	1	*a.*	0 *0,01*							6,651 *(4,29)***	YES	0,54	163.608
		b.		-0,01 *1,05*						4,215 *(2,69)***	YES	0,54	163.631
	2	*a.*	0,005 *0,23*							5,793 *(4,16)***	YES	0,56	77.111
		b.		0,002 *0,11*						3,798 *(2,97)***	YES	0,55	71.902
	5	*a.*	-0,01 *0,67*		-0,03 *(2,46)***		0,195 *(14,31)***	0,118 *(12,77)***	0,123 *(11,61)***	2,957 *(4,05)***	YES	0,59	74.238
		b.		-0,01 *0,50*		-0,06 *(5,14)***	0,194 *(14,22)***	0,119 *(13,56)***	0,122 *(11,09)***	2,418 *(3,64)***	YES	0,59	69.096
Rest of Europe	1	*a.*	-0,05 *0,76*							5,068 *(4,80)***	YES	0,43	18.917
		b.		-0,06 *(2,00)***						2,76 *(2,14)***	YES	0,42	18.956
	2	*a.*	0,003 *0,10*							6,323 *(5,00)***	YES	0,46	14.120
		b.		-0,01 *0,81*						4,165 *(3,20)***	YES	0,46	13.811
	5	*a.*	-0 *0,05*		0,034 *1,48*		0,266 *(9,32)***	0,078 *(2,61)***	0,127 *(8,45)***	2,694 *(2,58)***	YES	0,52	13.450
		b.		-0,02 *0,99*		-0,03 *(2,04)***	0,261 *(9,18)***	0,077 *(2,72)***	0,129 *(8,24)***	2,159 *(2,36)***	YES	0,52	13.128

Panel Illiquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	1	*a.*	0,043 *(3,37)****							6,1 *(4,23)****	YES	0,52	82.808
		b.		0,002 *0,12*						3,351 *(2,71)****	YES	0,51	82.811
	2	*a.*	0,083 *(2,68)****							5,55 *(3,77)****	YES	0,54	42.150
		b.		0,051 *(1,65)**						3,53 *(3,02)****	YES	0,54	41.486
	5	*a.*	0,054 *(2,87)****		-0,01 *1,12*		0,18 *(16,36)****	0,101 *(12,39)****	0,098 *(9,51)****	3,46 *(4,06)****	YES	0,56	40.044
		b.		0,029 *1,61*		-0,06 *(3,52)****	0,18 *(16,06)****	0,102 *(12,87)****	0,097 *(9,37)****	2,744 *(3,71)****	YES	0,56	39.408
Rest of Europe	1	*a.*	-0,16 *(2,48)***							7,068 *(6,13)****	YES	0,44	8.519
		b.		-0,14 *(3,00)****						3,852 *(1,87)**	YES	0,43	8.559
	2	*a.*	-0,06 *0,80*							7,649 *(3,68)****	YES	0,48	6.082
		b.		-0,02 *0,74*						5,948 *(3,57)****	YES	0,48	5.960
	5	*a.*	-0,05 *0,80*		0,106 *(5,12)****		0,242 *(8,58)****	0,109 *(4,25)****	0,107 *(5,30)****	2,772 *1,51*	YES	0,53	5.692
		b.		-0,04 *1,34*		-0,02 *0,32*	0,231 *(8,69)****	0,112 *(4,84)****	0,109 *(5,44)****	2,665 *(2,18)***	YES	0,52	5.550

Panel Liquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	1	*a.*	0,003 *0,42*							5,366 *(4,44)****	YES	0,59	80.618
		b.		0 *0,02*						3,096 *(2,33)***	YES	0,59	80.637
	2	*a.*	0,004 *0,32*							4,327 *(3,87)****	YES	0,61	34.841
		b.		0,004 *0,35*						2,071 *(1,73)**	YES	0,60	30.303
	5	*a.*	-0,02 *(3,01)****		-0,06 *(3,02)****		0,182 *(9,29)****	0,123 *(9,27)****	0,153 *(13,38)****	1,696 *(2,78)****	YES	0,64	34.077
		b.		-0,01 *0,95*		-0,06 *(4,93)****	0,181 *(9,19)****	0,125 *(10,25)****	0,155 *(12,97)****	1,172 *(2,01)***	YES	0,64	29.580
Rest of Europe	1	*a.*	-0 *0,13*							3,081 *(3,14)****	YES	0,45	10.372
		b.		-0,03 *1,55*						1,045 *0,75*	YES	0,45	10.371
	2	*a.*	0,016 *0,69*							4,088 *(2,79)****	YES	0,48	8.014
		b.		-0,01 *0,37*						1,654 *1,07*	YES	0,47	7.828
	5	*a.*	0,008 *0,53*		-0,02 *0,36*		0,283 *(10,40)****	0,049 *(1,65)**	0,137 *(8,10)****	2,545 *(2,42)***	YES	0,53	7.738
		b.		-0,01 *0,41*		-0,04 *(2,42)***	0,283 *(10,83)****	0,047 *1,60*	0,139 *(7,67)****	1,608 *1,56*	YES	0,53	7.559

For the former region, anyway, all the six coefficients referring to $ETFOwnership$ across the six model specifications are significantly positive, consistently to the findings of authors such as Ben-David et al. (2018) in North America. The economic magnitude results small though: a one-standard-deviation change in $ETFOwnership$, equal to a change of 585 basis points, causes an increase in daily stock return volatility by to 2,7-to-8,1 bps. In other terms, a 1% variation in $ETFOwnership$ would make volatility vary by 0,46-to-1,38 bps. Considering model specification 5, the most complete, volatility would increase by 0,91 bps: such an economic magnitude is limited when compared to the documented by Ben-David et al. (2018) for their Russel 3000 sample – a 4,05 basis points change per p.p. of ETF ownership, based on estimation 8 of their Table IV. Regarding the same region but Panel Liquid, $ETFOwnership$ relates to volatility more ambiguously: the coefficients in estimation 1 and 2 share the same sign and similar magnitude, but they are insignificant. Instead, significance at least at the 5%-level can be found in specification 3, 4 and 5, with lower economic magnitude than those measured before and opposite sign. This should suggest ETFs curb the volatility of more liquid securities rather than exacerbating it, and would mean that exchange traded funds have different externalities depending on some qualities of the assets they invest in.

Overall, no signal of externalities to stocks from developing areas can be found from these first regressions.

The next Table aims to elaborate on the insights by Da, Shive (2017) on the different impact various aspects of the ETF existence can have on their underlying assets. Besides ownership,measures of stock-level ETF share creation-redemption intensity, ETF turnover and flows are introduced. At the stock-level, they quantify respectively the arbitrage activity by APs, the activity on ETFs by traders more in general and the monthly changes in ETF ownership.

Each of these three variables is also interacted with ownership to look for possible nonlinearity in the potential relations.

The results from Table 4 confirm both the results from Table 3 and the evidence anticipated by Da and Shive as for American stocks: European equity is influenced in its performance by aspects of the ETF life cycle such as creation/redemption, trading and flows, and not only by ETF ownership. According to the estimations in Panel Overall, the daily return volatility of the stocks from Developed Europe is positively affected by increases in the trading turnover of the ETFs they are investees of. The creation-redemption process intensity, measured by $WtdSDShares$, has a positive and direct relation with return volatility, especially for Rest of Europe and illiquid assets, despite statistical significance is achieved also in the developed overall sample.

Table 4: overall ETF activity and stock return volatility

The table reports estimates from OLS regressions of daily stock return volatility, averaged by month, on measures of ETF activity (stock ownership, share creation and redemption, trading turnover and flows) and sets of control variables. For each one of the 6 models, I use subspecifications in which the values of some variables are calculated based on either a) the market capitalization of a stock or b) its free float. Those variables, eventually labelled as "float" of "float-adjusted", are the ownership and flows ones and those related to a stock capitalisation. Estimations by models 1, 3, 5 and 6 make use of all the observations for which the data required by the relevant models is completely available. Model specifications 2 and 4 are equal to those of, respectively, model 1 and 3, but the sample is limited to those observations fullfilling the requirements for, respectively, models 3 and 5. Models 1, 2 and 5 are tabulated here, the remainder in Table A4 in the Appendix. The activity and volatility variables are standardised by subtracting the mean and dividing by the standard deviation over the relevant Region. In the interaction terms, the ownership variables are always lagged by one month. Standard errors are clustered at the country-, month- and stock-level. Absolute values of t-statistics are presented in italics. Parentheses and ***, **, * indicate statistical significance at the 10%, 5% and 1% level. The sample covers the period January 2013-December 2021. The set of control variables ("Control Vars") contains lagged values of stock capitalisation, average daily inverse price ratio and daily bid-ask spread, monthly trading turnover, gross-profitability ratio, company book-to-market ratio, and past month return together with the cumulative 12-to-7th and 6th-to-2nd returns. Country, month and stock fixed effects enter into the models too. The regional samples in the first panel ("Panel Overall") include all the eligible observations according to the criteria described above. "Panel Illiquid (Liquid)" considers only the observations belonging to the last (first) 50 percentiles based on the absolute values of the average daily bid-ask spread measured for a stock over the previous month.

Panel Overall. *Dependent variable: Stock return volatility*

		ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1 a.	0,001 *0,20*		0,016 *(2,48)***	0,024 *(5,42)****	0,001 *0,41*		-0 *(1,66)**		-0 *0,11*		-0 *1,14*							6,709 *(4,30)****	YES	0,54	#####
	b.		-0,01 *0,86*	0,017 *(2,42)***	0,021 *(6,06)****		0,002 *1,24*		-0 *(1,82)**		-0,01 *(2,49)***		0,004 *1,22*						4,425 *(2,82)****	YES	0,54	#####
	2 a.	0,009 *0,44*		0,014 *(1,85)**	0,022 *(5,55)****	-0 *0,74*		-0,01 *1,07*		0,011 *1,11*		-0,01 *1,33*							5,791 *(4,06)****	YES	0,55	75.289
	b.		0,004 *0,22*	0,015 *(1,88)**	0,018 *(9,71)****		-0 *0,37*		-0,01 *1,52*		-0 *0,57*		0 *0,03*						3,822 *(2,91)****	YES	0,55	70.148
	5 a.	-0,01 *0,54*		0,016 *(2,26)***	0,011 *(3,78)****	-0 *0,66*		-0,01 *1,03*		0,007 *0,92*		-0 *0,89*		-0,03 *(2,47)***		0,194 *(14,21)****	0,117 *(13,15)****	0,124 *(11,31)****	3,027 *(4,00)****	YES	0,59	72.524
	b.		-0,01 *0,51*	0,016 *(2,29)***	0,01 *(5,96)****		0 *0,11*		-0,01 *1,44*		-0 *0,20*		0 *0,00*		-0,06 *(4,83)****	0,194 *(14,26)****	0,117 *(13,71)****	0,122 *(10,81)****	2,491 *(3,62)****	YES	0,59	67.449
Rest of Europe	1 a.	-0,07 *0,94*		0,079 *(2,96)****	0,025 *0,80*	-0,01 *1,31*		0,01 *0,61*		-0,01 *0,23*		0,004 *0,67*							4,89 *(4,53)****	YES	0,43	18.440
	b.		-0,08 *(2,22)***	0,079 *(3,06)****	0,016 *0,44*		-0,01 *(2,26)***		0,009 *0,76*		-0,01 *0,25*		0,002 *0,31*						2,59 *(2,00)***	YES	0,43	18.191
	2 a.	-0,01 *0,32*		0,077 *(3,08)****	0,014 *0,50*	-0,01 *1,55*		0,004 *0,32*		-0,03 *0,58*		-0,01 *1,15*							6,134 *(4,98)****	YES	0,47	13.765
	b.		-0,03 *1,39*	0,077 *(3,16)****	0,005 *0,16*		-0,01 *(3,18)****		0,006 *0,53*		-0,02 *0,41*		-0 *0,35*						4,032 *(3,07)****	YES	0,46	13.249
	5 a.	-0,02 *0,61*		0,075 *(3,42)****	0,015 *0,58*	-0,01 *(1,73)**		0,003 *0,31*		-0,02 *0,50*		-0,01 *1,16*		0,024 *1,02*		0,263 *(9,23)****	0,082 *(2,94)****	0,123 *(9,04)****	2,456 *(2,56)***	YES	0,52	13.108
	b.		-0,03 *1,53*	0,075 *(3,41)****	0,011 *0,33*		-0,01 *(2,61)****		0,005 *0,44*		-0,02 *0,42*		0 *0,03*		-0,04 *(2,09)***	0,256 *(8,98)****	0,084 *(3,10)****	0,123 *(8,12)****	2,045 *(2,25)***	YES	0,52	12.585

Panel Illiquid. *Dependent variable: Stock return volatility*

		ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1 a.	0,05 *(3,91)****		0,014 *(2,44)***	0,034 *1,10*	-0 *0,21*		-0,01 *(2,68)****		-0 *0,08*		-0,01 *0,49*							6,156 *(4,12)****	YES	0,52	81.004
	b.		0,007 *0,48*	0,018 *(3,05)****	0,03 *1,62*		0,007 *(2,01)***		-0 *0,51*		-0,01 *0,82*		0,011 *1,27*						3,466 *(2,73)****	YES	0,51	81.074
	2 a.	0,094 *(2,60)****		0,009 *0,88*	0,017 *0,29*	-0,01 *1,50*		-0,01 *0,71*		0,043 *0,39*		-0,02 *0,80*							5,595 *(3,62)****	YES	0,54	41.266
	b.		0,056 *(1,75)**	0,01 *1,38*	-0 *0,02*		-0,01 *1,24*		-0,01 *1,41*		0,005 *0,14*		-0,01 *0,85*						3,601 *(2,96)****	YES	0,53	40.562
	5 a.	0,057 *(2,70)****		0,014 *1,51*	-0,04 *0,55*	-0,01 *(2,16)***		-0,01 *0,26*		-0 *0,04*		-0,01 *1,06*		-0,02 *(1,66)**		0,181 *(16,31)****	0,1 *(13,19)****	0,1 *(9,36)****	3,553 *(3,94)****	YES	0,56	39.220
	b.		0,031 *(1,78)**	0,015 *(2,16)***	-0,04 *0,41*		-0,01 *1,17*		-0 *0,41*		0,017 *0,57*		-0,01 *0,96*		-0,06 *(3,39)****	0,181 *(15,82)****	0,101 *(13,28)****	0,097 *(9,18)****	2,861 *(3,69)****	YES	0,56	38.546
Rest of Europe	1 a.	-0,16 *(2,39)***		0,131 *(4,21)****	-0,07 *(1,65)**	-0,01 *1,35*		0,149 *(3,00)****		-0,15 *(2,29)***		0,001 *0,22*							7,097 *(6,72)****	YES	0,45	8.276
	b.		-0,15 *(3,08)****	0,112 *(2,83)****	-0,03 *0,61*		-0,02 *(2,06)***		0,096 *(2,13)***		-0,07 *0,97*		-0,02 *(2,13)***						3,805 *(1,86)**	YES	0,43	8.213
	2 a.	-0,07 *0,97*		0,122 *(3,95)****	-0,08 *(1,94)**	-0 *0,08*		0,131 *(3,13)****		-0,16 *(2,53)***		-0,01 *1,60*							7,658 *(3,82)****	YES	0,49	5.915
	b.		-0,03 *1,20*	0,107 *(3,63)****	-0,05 *1,49*		-0,01 *1,37*		0,089 *(3,25)****		-0,09 *(1,90)**		-0,01 *1,35*						6,003 *(3,71)****	YES	0,48	5.724
	5 a.	-0,06 *1,08*		0,109 *(4,32)****	-0,06 *1,51*	0,001 *0,25*		0,104 *(2,93)****		-0,13 *(2,24)***		-0,01 *(2,44)***		0,096 *(4,07)****		0,234 *(8,46)****	0,112 *(4,43)****	0,103 *(5,32)****	2,75 *1,54*	YES	0,53	5.529
	b.		-0,05 *(1,70)**	0,113 *(4,60)****	-0,07 *(1,65)**		-0,01 *1,33*		0,098 *(3,20)****		-0,12 *(2,19)***		-0,01 *0,78*		-0,03 *0,41*	0,222 *(9,10)****	0,118 *(5,19)****	0,101 *(5,16)****	2,724 *(2,15)***	YES	0,53	5.318

Table 4 continues…

Panel Liquid. *Dependent variable: Stock return volatility*

		ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1 a.	0,004 *0,63*		0,014 *1,39*	0,021 *(3,67)***	0,001 *0,61*		-0 *(1,66)**		0,001 *0,17*		-0 *0,99*							5,154 *(4,40)****	YES	0,59	78.176
	b.		0,003 *0,48*	0,015 *1,29*	0,019 *(4,21)****		0 *0,07*		-0 *1,53*		-0,01 *(1,66)**		0,002 *1,21*						3,249 *(2,54)***	YES	0,59	78.431
	2 a.	0,01 *0,76*		0,016 *1,38*	0,019 *(4,88)****	0,005 *1,57*		-0,01 *1,11*		0,009 *1,19*		-0,01 *(1,86)**							4,352 *(4,16)****	YES	0,60	33.903
	b.		0,004 *0,42*	0,02 *1,50*	0,015 *(8,92)****		0,003 *1,00*		-0,01 *1,57*		-0,01 *0,96*		-0 *0,19*						2,073 *(1,78)**	YES	0,60	29.471
	5 a.	-0,02 *(2,34)***		0,019 *(1,67)**	0,009 *(3,72)****	0,005 *1,58*		-0,01 *1,35*		0,006 *0,89*		-0,01 *1,44*		-0,06 *(3,27)****		0,179 *(9,11)****	0,123 *(9,35)****	0,153 *(13,20)****	1,72 *(3,00)****	YES	0,64	33.187
	b.		-0,01 *0,96*	0,024 *(1,87)**	0,008 *(4,14)****		0,004 *1,51*		-0,01 *(1,88)**		-0,01 *0,69*		0 *0,02*		-0,06 *(4,87)****	0,18 *(9,25)****	0,124 *(10,39)****	0,156 *(12,73)****	1,194 *(2,15)***	YES	0,64	28.793
Rest of Europe	1 a.	-0,02 *0,54*		0,073 *(3,35)****	0,088 *1,62*	-0,01 *0,88*		0,001 *0,07*		-0,05 *0,89*		0,003 *0,40*							2,712 *(2,91)****	YES	0,45	10.138
	b.		-0,05 *(2,02)***	0,077 *(3,60)****	0,082 *1,61*		-0 *0,56*		0,001 *0,19*		-0,06 *1,11*		0,005 *1,19*						0,877 *0,62*	YES	0,45	9.951
	2 a.	-0 *0,08*		0,072 *(2,87)****	0,106 *1,22*	-0,01 *1,63*		0 *0,04*		-0,07 *1,07*		-0 *0,48*							3,753 *(2,61)****	YES	0,48	7.826
	b.		-0,02 *1,28*	0,075 *(3,05)****	0,106 *1,40*		-0,01 *1,45*		0,001 *0,17*		-0,07 *1,16*		0,002 *0,31*						1,454 *0,97*	YES	0,47	7.501
	5 a.	-0,01 *0,36*		0,063 *(2,68)****	0,044 *0,71*	-0,01 *0,78*		0,001 *0,08*		-0,03 *0,64*		-0,01 *0,79*		-0,03 *0,48*		0,281 *(10,83)****	0,054 *(1,83)**	0,133 *(7,83)****	2,218 *(2,20)***	YES	0,53	7.559
	b.		-0,02 *1,04*	0,06 *(2,67)****	0,046 *0,85*		-0,01 *0,93*		0,003 *0,30*		-0,03 *0,62*		0,001 *0,20*		-0,04 *(2,59)****	0,282 *(10,73)****	0,051 *(1,77)**	0,133 *(7,52)****	1,513 *1,50*	YES	0,53	7.246

Looking at it, when $WtdSDShares$ changes by one standard deviation, equal to a generation/deletion of 3,04% of the monthly average overall NOSH of the ETFs owning a security, stock return volatility changes by 1,37-to-1,76 bps – a 0,45-to-0,58 bps delta per p.p. of change in $WtdSDShares$.

The economical magnitude is far higher when restricting the analyses to the least liquid assets from developing areas of Europe: in few words, when the creation or redemption intensity varies by 1%, stock prices fluctuate by 4,92-to-6,25 bps.

Always from Table 4, it is possible to observe that the degree at which ETFs are traded – tracked by $WtdETFTurnover$ - affects the instability of the underlying assets too. Most of this evidence stems from the developed sample showing a positive direct relation, which is especially present among the most liquid stocks, consistent with the view that traders seek arbitrage between equity and basket securities whenever viable. Notably, on the other hand, a marginally significant negative link results regarding the stocks from developing countries and for which the transaction costs are higher.

Interestingly, also contemporary changes in ETF ownership as measured by $WtdFloatingETFFlows$ negatively impact volatility of the equity from Rest of Europe, as show in Panel Overall. Despite not reflected in the estimates from market capitalization-based regressions, such results are somewhat in line with the research by Glosten, Nallareddy, Zou (2021) about short-term informational efficiency driven by exchange-traded funds in favor of stocks with starting weak informational environments, provided that this inverse relation really enables a more fundamentals-oriented pricing[17].

The illiquid, "developing" stocks are those among whom also a nonlinear component of the externalities commented above can be detected: this is positive as for creation-redemption intensity, regardless of the type of stock capitalization used in the estimations, and negative as resulting from the coefficients on the interaction terms between $ETF\ Float\ Ownership$ and $WtdETFTurnover$.

To summarize, in this sub-section some evidence has been provided in favor of the existence of a relation between ETF activity and stock return volatility, and of a role of characteristics such as liquidity in determining the magnitude and direction of that link. Both positive and negative contributions by ETF metrics have been found in some samples, too,

[17] In a following paragraph the nature of externalities by ETFs on equity – either fundamental or non-fundamental, will be tested.

differently from Ben-David et al. (2018) and Da, Shive (2017) who report only positive significant estimates for both ETF ownership and other ETF variables. After having started validating Hypotheses 1 and 4, further analyses of these and other hypotheses are conducted below.

6.2. Different outcomes from physical- and synthetic-replication-based ETFs (Hypotheses 1, 2 and 3).

The second Hypothesis states that physical and synthetic ETFs affect the return distribution of the underlying assets in a similar manner. The set of regression models used to evaluate it is the same of Table 3, apart from the split of the ETF ownership variables into their physical and synthetic, "virtual" component.

Table 5 presents the results. The subsamples for which statistical significance was present in Table 3 confirm the same results even after these estimations: here, the responsibility of the impact of the generic ETF ownership analyzed before is assigned to physical exchange-traded funds. The only major difference comes from the set of illiquid stocks from the less developed European countries: the coefficients on synthetic ETF ownership are significantly negative regardless of whether normal or float-adjusted variables are used. Referring to the "a"-specifications, a one-standard-deviation change in $SyntheticETFOwnership$ – equal to 0,11% - causes a variation in volatility in the opposite direction and by 4,6-to-12,3 bps.

No further strong evidence of contribution by synthetic ownership is found from these estimations. Still, the significance detected in that particular cluster of the overall dataset confirms that such derivative-based products may have a relevant role especially in segments of the financial markets with lower coverage and liquidity, as assumed by Hypothesis 3. The entities responsible for the provision of the benchmark return have more leeway in choosing which stocks to take positions on, time to time, to hedge themselves at best. Although this, the second part of Hypothesis 3 can be considered as rejected, as the signs and significance of the coefficients on physical and synthetic ETF ownership differ.

With the aim of addressing the possibility that some of the results of Table 5 may be due to multicollinearity – the coefficients of correlation between the two classes of ETF ownership arehigher than 0,45 as it can be seen in the Correlation Matrix, although the variance inflation factor is lower than 2 – I run again the same set of models. The synthetic ownership variables are replaced by their orthogonalized versions, obtained by regressing each one of these metrics on their contemporary physical complement.

Table 5: Physical and synthetic ETF ownership and stock return volatility

The table reports estimates from OLS regressions of daily stock return volatility, averaged by month, on measures of ETF ownership and sets of control variables. For each one of 6 models, I use subspecifications in which the values of some variables are calculated based on either *a)* the market capitalization of a stock or *b)* its free float. Those variables, eventually labelled as "float" of "float-adjusted", are the ownership ones and those related to a stock capitalisation. Estimations by models 1, 3, 5 and 6 make use of all the observations for which the data required by the relevant models is completely available. Model specifications 2 and 4 are equal to those of, respectively, model 1 and 3, but the sample is limited to those observations fullfilling the requirements for, respectively, models 3 and 5. Models 1, 2 and 5 are tabulated here, the remainder in Table A5 in the Appendix. The ownership and volatility variables are standardised by subtracting the mean and dividing by the standard deviation over the relevant Region. Standard errors are clustered at the country-, month- and stock-level. Absolute values of t-statistics are presented in italics. Parentheses and ***, **, * indicate statistical significance at the 10%, 5% and 1% level. The sample covers the period January 2013-December 2021. The set of control variables ("Control Vars") contains lagged values of stock capitalisation, average daily inverse price ratio and daily bid-ask spread, monthly trading turnover, gross-profitability ratio, company book-to-market ratio, and past month return together with the cumulative 12-to-7th and 6th-to-2nd returns. Country, month and stock fixed effects enter into the models too. The regional samples in the first panel ("Panel Overall") include all the eligible observations according to the criteria described above. "Panel Illiquid (Liquid)" considers only the observations belonging to the last (first) 50 percentiles based on the absolute values of the average daily bid-ask spread measured for a stock over the previous month.

Panel Overall. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	1	*a.*	0,001 *0,18*		-0,002 *0,25*							6,629 *(4,29)***	YES	0,54	162.741
		b.		-0,001 *0,10*		-0,012 *(1,92)**						4,347 *(2,79)***	YES	0,54	162.997
	2	*a.*	0,007 *0,36*		-0,005 *0,59*							5,757 *(4,08)***	YES	0,55	76.663
		b.		0,006 *0,34*		-0,008 *1,02*						3,844 *(2,97)***	YES	0,55	71.489
	5	*a.*	-0,01 *0,45*		-0,003 *0,45*		-0,031 *(2,38)***		0,196 *(14,46)***	0,118 *(12,83)***	0,125 *(11,66)***	2,934 *(3,92)***	YES	0,59	73.788
		b.		-0,005 *0,55*		-0,002 *0,54*		-0,062 *(5,12)***	0,195 *(14,37)***	0,119 *(13,67)***	0,123 *(11,11)***	2,423 *(3,58)***	YES	0,59	68.679
Rest of Europe	1	*a.*	-0,02 *0,43*		-0,063 *1,58*							4,783 *(4,01)***	YES	0,43	18.504
		b.		-0,044 *1,40*		-0,068 *1,46*						2,369 *(2,24)***	YES	0,43	18.220
	2	*a.*	0,016 *0,59*		-0,038 *1,20*							6,203 *(4,66)***	YES	0,47	13.893
		b.		-0,008 *0,40*		-0,042 *1,28*						3,897 *(3,22)***	YES	0,46	13.229
	5	*a.*	0,002 *0,10*		-0,016 *0,85*		0,025 *1,07*		0,258 *(9,18)***	0,078 *(2,71)***	0,126 *(7,92)***	2,609 *(2,54)***	YES	0,52	13.168
		b.		-0,017 *0,82*		-0,022 *0,98*		-0,034 *(1,65)**	0,253 *(8,95)***	0,081 *(3,09)***	0,13 *(7,44)***	2,01 *(2,13)***	YES	0,51	12.528

Panel Illiquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	1	*a.*	0,039 *(3,17)****		0,036 *(2,06)***							6,151 *(4,25)***	YES	0,52	82.722
		b.		0,004 *0,24*		0,005 *0,33*						3,479 *(2,76)***	YES	0,51	82.711
	2	*a.*	0,081 *(2,50)***		0,006 *0,36*							5,539 *(3,76)***	YES	0,54	42.077
		b.		0,056 *1,56*		-0,009 *0,67*						3,641 *(3,09)***	YES	0,54	41.415
	5	*a.*	0,052 *(2,71)****		0,005 *0,41*		-0,009 *0,96*		0,181 *(16,49)***	0,101 *(12,45)***	0,098 *(9,44)***	3,446 *(4,02)***	YES	0,56	39.969
		b.		0,029 *1,40*		-0,004 *0,45*		-0,059 *(3,46)****	0,18 *(16,17)****	0,102 *(12,84)****	0,098 *(9,22)****	2,759 *(3,66)****	YES	0,56	39.333
Rest of Europe	1	*a.*	-0,01 *0,28*		-0,106 *(3,36)****							6,993 *(6,28)****	YES	0,45	8.374
		b.		-0,063 *(2,04)***		-0,124 *(5,08)****						3,008 *1,60*	YES	0,44	8.180
	2	*a.*	0,091 *(2,60)****		-0,076 *(3,65)****							7,786 *(3,93)****	YES	0,49	6.060
		b.		0,034 *1,04*		-0,078 *(4,43)****						5,438 *(3,54)****	YES	0,48	5.660
	5	*a.*	0,038 *1,14*		-0,04 *(2,20)***		0,105 *(5,09)****		0,232 *(8,78)****	0,108 *(4,21)****	0,106 *(5,62)****	2,908 *1,63*	YES	0,53	5.610
		b.		-0,001 *0,04*		-0,049 *(2,76)****		-0,013 *0,18*	0,224 *(8,32)****	0,111 *(4,76)****	0,105 *(5,57)****	2,437 *(1,88)**	YES	0,52	5.226

Panel Liquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	1	*a.*	0,002 *0,32*		0,006 *0,92*							5,321 *(4,51)****	YES	0,59	79.838
		b.		0,004 *0,74*		-0,001 *0,21*						3,375 *(2,66)****	YES	0,59	80.102
	2	*a.*	0,004 *0,34*		0,006 *0,56*							4,338 *(3,87)****	YES	0,6	34.466
		b.		0,001 *0,11*		0,008 *0,92*						2,116 *(1,74)**	YES	0,6	29.958
	5	*a.*	-0,02 *(2,40)***		0,004 *0,57*		-0,061 *(2,97)****		0,183 *(9,32)****	0,123 *(9,58)****	0,157 *(14,15)****	1,701 *(2,73)****	YES	0,64	33.701
		b.		-0,011 *(1,74)**		0,008 *1,45*		-0,065 *(6,09)****	0,182 *(9,28)****	0,125 *(10,60)****	0,158 *(13,66)****	1,196 *(2,01)***	YES	0,64	29.236
Rest of Europe	1	*a.*	-0,02 *0,51*		0,005 *0,21*							2,543 *(2,91)****	YES	0,44	10.104
		b.		-0,035 *1,51*		-0,003 *0,14*						0,906 *0,70*	YES	0,44	10.013
	2	*a.*	0,002 *0,09*		0,005 *0,20*							3,624 *(2,75)****	YES	0,47	7.808
		b.		-0,015 *0,98*		-0,003 *0,14*						1,453 *0,97*	YES	0,47	7.545
	5	*a.*	-0 *0,17*		0,005 *0,36*		-0,026 *0,51*		0,277 *(10,37)****	0,047 *1,57*	0,137 *(8,04)****	2,233 *(2,12)***	YES	0,52	7.537
		b.		-0,017 *0,83*		0 *0,01*		-0,046 *(2,12)***	0,274 *(9,92)****	0,047 *(1,75)**	0,144 *(7,95)****	1,466 *1,43*	YES	0,52	7.282

$$SyntheticOwnVariable_{i,t} = constant + relevantPhysicalOwnVariable_{i,t} + \varepsilon_{i,t}$$

The regressions are run by i-security and by regional sample. The orthogonalized variables obtained are simply the resulting time series of residuals which, for construction, have null correlation with the physical ETF ownership variables they have been estimating through and thus isolate the contribution to stock return volatility directly caused by derivative-based products rather than to physical ones.

In the Appendix, Table A6 presents the results, whose relevant differences with the ones in Table 5 relate to the sample of illiquid stocks from developing Europe. Indeed, $Physical\ ETF\ Ownership$ loses its significance even in models 3, 4 and 5, while also $Synthetic\ ETF\ Ownership$, represented by $Ort.Synthetic\ ETF\ Ownership$, has not significant coefficients anymore in model 5 and 6. Still, the estimates on $Ort.Synthetic\ ETF\ Float\ Ownership$ remain statistically different from zero[18].

Overall, thus, despite their magnitude does not have an economical meaning, the orthogonalized variables helped to confirm the validity of the results from Table 5 and of the suggestion by Hypothesis 2 that volatility spillovers occur also from synthetic products.

So far, the analyses conducted aimed at testing whether there is a link or not between ETF activity and stock return volatility. In the next two paragraphs the evolution over time and the nature of these relations will be put under the lens.

6.3. Trends in the magnitude of ETF externalities (Hypothesis 4)

In terms of trends, Graph A1 in the Appendix proves that the assets managed by exchange-traded funds are growing also in Europe. It could be of interest to quantify how the impact of these baskets on underlying stocks is changing over time, whether it is going in a monotonic direction – as Hypothesis 4 states - and the kind of difference – if any - in these trends between easily and hardly marketable assets.

To this aim, Figure 1 presents graphs describing how estimates on ETF variables vary over the sample period when rolling regression are used[19]. The window covers 48 months and the model specification used are the fifth ones of Tables 3 and 5 when ETF ownership is analyzed, and

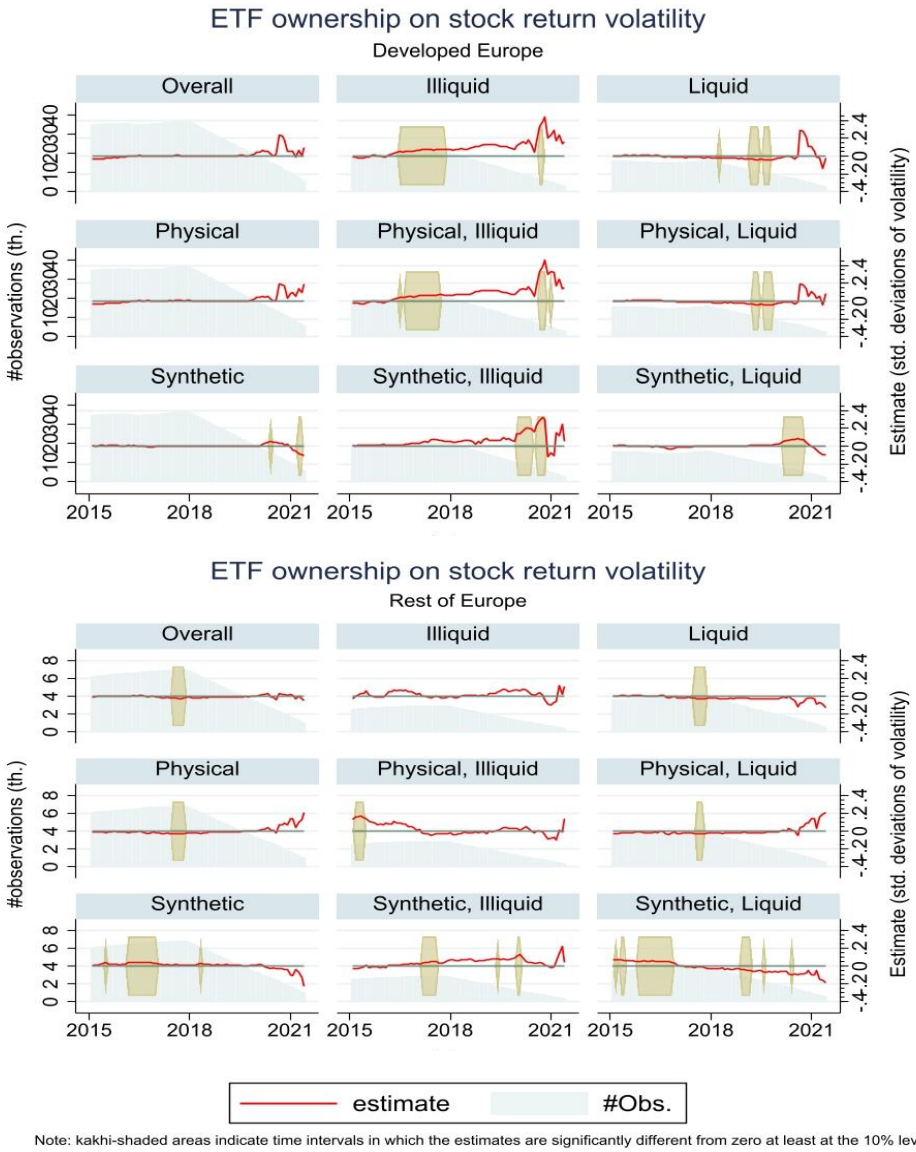
[18] The coefficient in model 5 is only marginally insignificant at the 10% level.
[19] The instability of the latest time intervals in the graph may be caused by the estimations being performed over excessively decreasing samples. In Figure 2, some graphs about *WtdSDShares* omit a time range due to the estimate being excessively high over that period, and thus due to misleading outliers.

$$ReturnVolatility_{i,t}$$
$$= cons. + ETF\ ownership_{i,t-1} + WtdSDShares_{i,t} + WtdETFTurnover_{i,t} + ETF\ flows_{i,t}$$
$$+ CommonControls_{i,t-1} + Other\ passive\ ownership_{i,t-1} + \sum_{x=1}^{3} ReturnVolatility_{i,t-x} + \varepsilon_{i,t}$$

when $WtdETFTurnover$ and $WtdSDShares$ are. $CommonControls$ is the set of common control variables already used in the previous regressions. The results for float-adjusted ownership are available in the Appendix in Figure A2 and, besides being consistent with those below, are even more significant.

As for developed countries, the graphs are consistent with the related significant estimates in the previous tables and highlight a generally positive link between ETF ownership and equity return volatility. Significance is not very widespread though, a fact which could mean that either

Figure 1

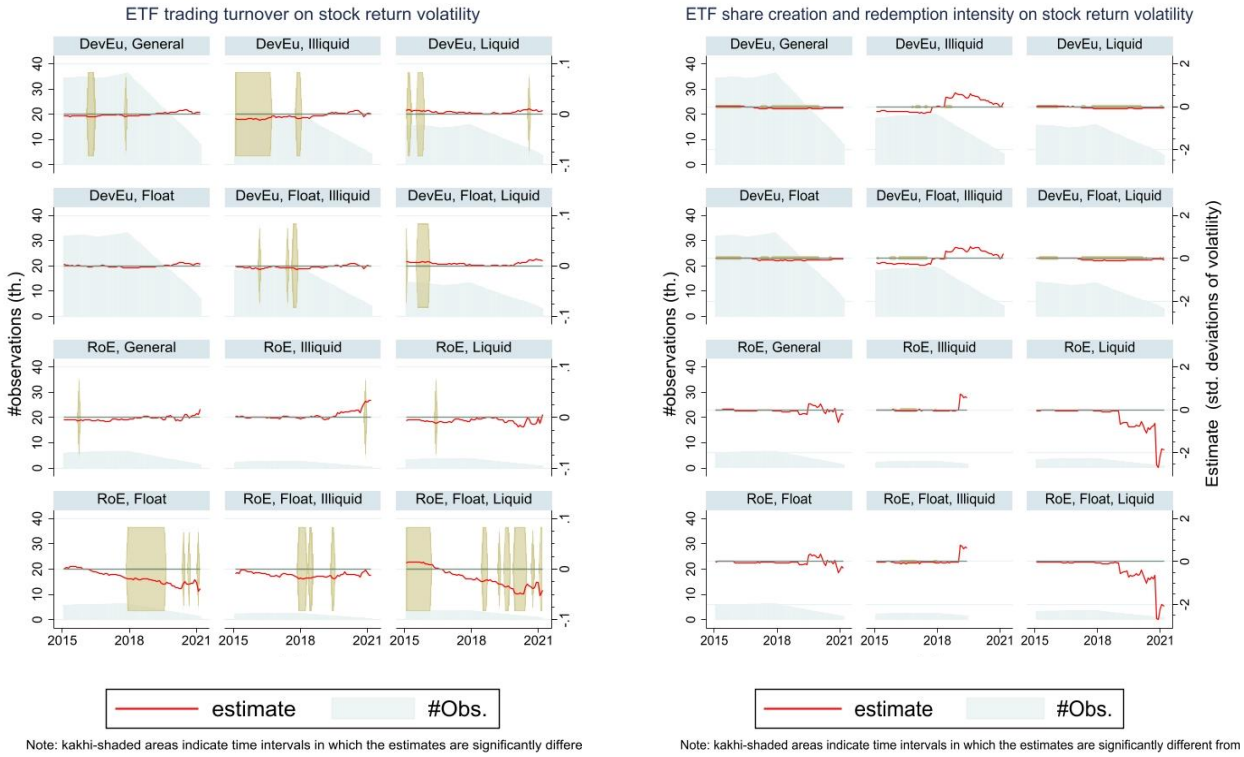


Note: kakhi-shaded areas indicate time intervals in which the estimates are significantly different from zero at least at the 10% level.

volatility spillovers occur only occasionally, the market being able to absorb them, or simply that the power of the estimation is not high enough due to insufficient sample size. Regarding Rest of Europe, the figure seems almost to contradict some of the results: the most striking example is related to the coefficients on synthetic ownership of illiquid assets, significantly negative and with an opposite sign to the significant ones in the sample. Again, the reason may be due to regressions over the whole period being prevalently influenced by some effect present in the earlier part of the sample, before 2015, the earliest year possible to have rolling estimates based on enough observations. Across the regions, as a rule, the coefficients are higher for illiquid clusters.

When looking at $WtdETFTurnover$ and $WtdSDShares$, in Figure 2, the earlier significant ranges of the panels of illiquid and liquid stocks from developed countries are consistent with the sign of the estimations in Table 5. The patterns are robust to the type of capitalization used. The estimates confirm that, with their transactions, traders in ETFs can also influence the return distribution of the underlying. The same cannot be said with the same level of certainty regarding Rest of Europe: the coefficients starkly differ between type of capitalization, as they are often insignificant when free float is not used, and often strongly negative otherwise. Interestingly, Figure 2 unveils that $WtdSDShares$ seems not to have any influence, at least after 2015. The estimates, moreover, are also quite unstable. Overall, $WtdETFTurnover$ subsumes $WtdSDShares$ as for relevance over that period: the creation-redemption process itself is not found as relevant as described by the literature and as expected.

Figure 2



6.4. Nature of the volatility spillovers from ETFs (Hypotheses 1, 2, 3)

Against Hypothesis 4, no clear direct relation is found between the growth of the ETF market and the impact of stock volatility, partially except for ETF ownership in Developed Europe.

As for the last part of this analysis, the second part of Hypothesis 1 lists three possible descriptions of the consequences of the externalities by ETFs on the underlying assets, and by doing so it basically splits these possible outcomes into fundamental-driven and noise-driven ones. Ben-David et al. (2018) and Da, Shive (2017) found that the consequences of ETFs on U.S. stocks are classifiable into the former category.

The latter authors implement a simple way to come to this conclusion: firstly, they run time-series regression, by security, of monthly stock returns over the market return of the same months and the 4 values of monthly market returns from the past 4 months. Then, the resulting market betas from each period are averaged across terciles based on an ETF measure. Da and Shive (2017) find that the returns of securities involved in the ETF cycle at a higher degree tend to revert more as the time passes: for these stocks, the coefficients on lagged betas are more negative than those linked to other stocks. Such a reversion is interpreted as a higher presence of noise in the information incorporated time-to-time into these securities' prices. Gradually, the market recognizes the irrelevance of it and revises its expectations. The authors do not detect significance in the differences of betas beyond the second lag, meaning that the reversion may occur in no more than two months. In this thesis, this method has been applied with terciles based on ETF activity variables lagged by five or four months, depending on whether they are ownership or other variables. I formed clusters resulting from such terciles and also from the intersections of these latter and two equally-sized quantiles based on a stock's average relative daily bid-ask spread over the fourth past month, in line with the split by degree of liquidity already done for the previous regressions in this work. The lags by up to five months are necessary to properly seek a causal relation between a characteristic *observable* at the start of the measurement period of the betas and these latter. The results are shown in Table 6.

A common trend across the whole Table is that the more a stock is held by ETFs, the more they comove with the market: indeed, the not-lagged market beta increases in terciles. Despite this, it is possible to notice differences between region, too. In Panel Overall, securities in the top terciles by ownership from Developed Europe visually seem more affected by noise since the lagged betas are overall lower than those of bottom-tercile assets. This applies in an analogous manner regardless of the type of ETF ownership. On the other hand, the opposite can be said regarding Rest of Europe: the estimates increase in quantile, and sometimes they all turn to positive

Table 6: ETF activity and excessive comovement of underlying stocks - A

The Table is divided in two regional sub-panels. The first column of each subpanel considers the whole regional sample, while this latter, in the other two columns, is splitted into two equally- sized quantiles based on the absolute values of the average relative daily bid-ask spread measured for a stock over the previous month. The variables of interest are the market betas estimated from time-series regressions in which the stock return in month *t+4* is regressed over its contemporary and the last five monthly market returns. The estimates from each period are averaged by terciles based on a measure of ETF activity and within the clusters by volatility described above. Numbers in bold indicate statistical significance at least at the 10% level. The sample covers the period January 2013-December 2021.

ETF ownership

	Developed Europe									*Rest of Europe*								
	Overall			**Illiquid**			**Liquid**			**Overall**			**Illiquid**			**Liquid**		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Market Beta	**0,5488**	**0,7587**	**0,8274**	**0,5164**	**0,6959**	**0,7331**	**0,7876**	**0,8242**	**0,842**	**0,4996**	**0,6265**	**0,7023**	**0,4459**	**0,6049**	**0,6909**	**0,6078**	**0,6488**	**0,7095**
Market Beta, lag #1	**0,103**	**0,0981**	**0,0431**	**0,1064**	**0,1249**	**0,1335**	**0,0863**	**0,0705**	**0,0294**	**0,0751**	**0,1092**	**0,1296**	**0,0764**	**0,1223**	**0,1591**	**0,0737**	**0,0957**	**0,113**
Market Beta, lag #2	**0,0152**	-0,0061	-0,0206	**0,0189**	0,0006	-0,0196	-0,0101	-0,0129	-0,0208	-0,0035	-0,0185	0,0016	-0,0105	-0,0217	-0,0149	0,0073	-0,0166	0,0096
Market Beta, lag #3	**0,0281**	0,0025	-0,0002	**0,03**	0,0039	**0,0054**	**0,0158**	0,001	-0,001	-0,0356	-0,0036	0,0077	-0,0487	-0,0096	-0,0058	-0,0077	0,0027	0,0148
Market Beta, lag #4	-0,0035	-0,015	-0,0175	-0,0001	-0,0067	-0,0036	-0,0282	-0,0237	-0,0196	-0,0348	0,0007	-0,0057	-0,0461	-0,0115	-0,0415	-0,0125	0,0117	0,0128
	Float, Overall			**Float, Illiquid**			**Liquid**			**Float, Overall**			**Float, Illiquid**			**Liquid**		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Market Beta	**0,5566**	**0,7628**	**0,8176**	**0,5196**	**0,6879**	**0,723**	**0,7916**	**0,8363**	**0,8358**	**0,5127**	**0,6368**	**0,6804**	**0,4679**	**0,6109**	**0,6599**	**0,6235**	**0,661**	**0,6909**
Market Beta, lag #1	**0,105**	**0,0945**	**0,0447**	**0,1084**	**0,1196**	**0,1375**	**0,0905**	**0,0704**	**0,0272**	**0,0831**	**0,108**	**0,1229**	**0,0851**	**0,1228**	**0,1444**	**0,0779**	**0,0937**	**0,1115**
Market Beta, lag #2	**0,0131**	-0,0055	-0,0196	**0,0176**	0,0028	-0,0134	-0,0137	-0,0133	-0,0207	-0,0005	-0,0315	0,0104	-0,0108	-0,0296	-0,0092	0,017	-0,0342	0,0194
Market Beta, lag #3	**0,0262**	**0,0064**	-0,0021	**0,0288**	**0,0074**	0,0027	**0,0114**	0,0054	-0,003	-0,0264	-0,0097	0,0099	-0,0384	-0,0156	-0,0006	0,0026	-0,0032	0,0146
Market Beta, lag #4	-0,0011	-0,0189	-0,0158	0,002	-0,0092	-0,006	-0,0209	-0,0282	-0,0176	-0,0317	-0,0131	0,0072	-0,0434	-0,033	-0,01	-0,0077	0,0045	0,0155

Others - Overall

	Wtd. ETF Turnover			**Wtd. SD ETF Shares**			**Wtd. ETF Turnover**			**Wtd. SD ETF Shares**		
	1	2	3	1	2	3	1	2	3	1	2	3
Market Beta	**0,6809**	**0,6873**	**0,7695**	**0,6561**	**0,7554**	**0,7288**	**0,5861**	**0,6329**	**0,6142**	**0,5463**	**0,6369**	**0,6383**
Market Beta, lag #1	**0,1155**	**0,0818**	**0,0481**	**0,0955**	**0,0746**	**0,0733**	**0,0952**	**0,1099**	**0,1181**	**0,0916**	**0,1232**	**0,1085**
Market Beta, lag #2	0,0014	-0,0079	-0,0103	0,0007	-0,0141	-0,0037	-0,0074	-0,0208	0,0087	**0,0219**	-0,018	-0,0216
Market Beta, lag #3	**0,0106**	**0,0096**	**0,0046**	**0,0207**	**0,0056**	0,001	0,0131	-0,0111	-0,0244	-0,0118	-0,0119	-0,0012
Market Beta, lag #4	-0,0104	-0,0113	-0,0134	-0,0119	-0,0146	-0,009	-0,0008	-0,033	0,0133	**0,018**	0,0035	-0,0433

values. In both the regional samples, the patterns from the tables by stock-level creation-redemption intensity and ETF turnover are more ambiguous.

Although simple, Da and Shive (2017) themselves note that such first approach may be misleading, since other variables could be responsible for the patterns highlighted. Through regressions, they try to better disentangle such relation between ETFs and stock market betas. Again, similarly to these authors, the market betas are regressed in the following way:

$$Beta_{i,t-l} = cons. + PhysicalETFOwnership_{i,t-5} + OrthoSyntheticETFOwnership_{i,t-5} + WtdSDShares_{i,t-4} + WtdETFTurnover_{i,t-4} + PhysicalETFFlows_{i,t-4} + OrthoSyntheticETFFlows_{i,t-4} + CommonControls + Controls + \varepsilon_{i,t} \quad ,$$

where l is the relevant lag of the market beta. The regressions are run by lag of beta. $CommonControls$ refers to the set of control variables shared by every model used in the previous paragraphs, lagged as usual by one month with respect to *t-l*. Country and month fixed effects and standard error clusters refer to *t-l*, too. In the first two models, $Controls$ means the three immediately past lags of stock return volatility, with respect to *t-l*, and both lagged volatility and passive ownership in model 3. As in the previous paragraph, using three models stepwise aims to detect possible sample selection biases. Using orthogonalized terms for synthetic ownership and

$$\begin{aligned} Beta_{i,t-l} = cons. + PhysicalETFOwnership_{i,t-5} + OrthoSyntheticETFOwnership_{i,t-5} + WtdSDShares_{i,t-4} \\ + WtdETFTurnover_{i,t-4} + PhysicalETFFlows_{i,t-4} + OrthoSyntheticETFFlows_{i,t-4} \\ + CommonControls + Controls + \varepsilon_{i,t} \end{aligned}$$

flows reduce interpretability of the magnitude of their coefficients but also lowers multicollinearity concerns.

The purpose of these specifications is to test whether, prospectively, a certain level of ETF activity at certain time do influence how stock prices react to such conditions immediately and in the following months, with an eye to their informational efficiency. Table 7 provides the results, which should be read lag-wise.

As for Developed Europe, looking at coefficients for which there is significance for each of the three models withing group of estimations, the only insight from Panel Overall is that, *caeteris paribus*, the more the ETFs holding a stock are traded, created or redeemed, the more that security is sensitive to current market fluctuations, as shown by the coefficients in the lag-0 group. In other words, the portion of systemic risk in stocks belonging to highly traded ETFs is generally

greater than that present in other stocks, similarly to the findings by Lynch et al. (2020). Apart from the consequent lower share of specific risk, essential for diversification, whether a higher sensitivity to the market is a good or bad news depends on the quality of the information the market is vehicle of. Any evidence of reversion would suggest that the underlying assets excessively react to the market and/or that the market a driver for noise at worst. The only occasional significance of the coefficients on $WtdETFTurnover$ for this subsample does not allow to validate the possible reversion implied by the other estimates for $WtdETFTurnover$ in the lag-1 group.

Always in Panel Overall, more evidence is found for Rest of Europe. While, in line with the insights from Table 6, two ETF ownership variables show a significantly positive relation with lag-0 market beta, this influence seems countered by $WtdETFTurnover$. Regardless whether the market information is valuable or not, stock prices appear to recover from the slowest incorporation of information due to $WtdETFTurnover$ in lag-0 in the subsequent two periods, as shown by the coefficients in lag-1 and 2. The extent, nevertheless, seems excessive according to the negative coefficients related to the following lag implying a reversion to less exaggerated levels. *Caeteris paribus,* the stocks with higher $SyntheticETFOwnership$ start earlier to revert, in lag-1, but no further remarkable results are found about ETF ownership in this Panel.

Even when focusing on the most illiquid stocks, ETF ownership does not result as being highly relevant for equity market betas when compared with $WtdETFTurnover$. Again, some significance is found in some lag-groups for ETF ownership and sparse, but it is quite sparse and thus possibly due to Type 1 errors (some tests being significant merely due to sampling errors, without real relations between dependent and independent variables)[20].

Panel Liquid reveals that the positive link noticed between $WtdETFTurnover$ and lag-0 beta in Developed Europe was mainly attributable to the assets easer to trade. Despite such liquidity, some signals by ETF flows about slow information incorporation persists between the second and fourth lag.

The estimations over liquid securities from Rest of Europe are harder to interpretate: synthetic ownership between lag-2 and lag-3 has negative coefficients associated, and several flow metrics

[20] Save this, differences even in the sign of the estimates from regression that use either market capitalization or floating capital are reasonably possible and do not invalidate the results automatically. Indeed, the level of free float is a matter of internal and external drivers: except in the cases of lock-up restrictions, any public equity share is promptly tradable as soon as the owner decides so. Subjective utility maximization functions drive this type of decisions (Zingales, 1995), together with needs of better corporate governance, value-adding fellow shareholder retention and other external needs (Klasa, 2007). Moreover, while free float can vary upon a single-person's decision, the growth of the market capitalization is only possible through good performances or a shared agreement between shareholders about a capital increase, a type of decisions that usually requires much more time than the sale of stocks on a secondary market. Thus, market capitalization and floating capital may substantially differ in their trends in some cases. This difference, finally, may be marked depending on the local financial market development and regulation.

do too[21]. On the other hand, no positive significant coefficients are found: overreaction to market is not visible, thus, but reversion is not excluded. Despite this, the fact that the many significant coefficients on $WtdETFTurnover$ in Panel Overall are not found in none of the other two panels suggest that some insignificant estimates over the sample of developing countries may be just due to problem of limited subsample size. Mainly according to Panel Overall, thus, the stocks from Rest of Europe appear more vulnerable to ETFs in terms of possible noise transmitted by them.

Combined with the results from the previous Tables, the consequent evidence is that even the lower volatility which ETFs allow stocks from developing countries to achieve at least in the short term is not due to a decrease in noise, but rather to slower incorporation of new information. Such a case was not considered in the second part of Hypothesis 1 but remains consistent with the theory by Da, Shive (2017), Ben-David et al. (2018), Glosten et al. (2021) except that for the very short term, Israeli et al. (2017) and others which affirms that exchange traded funds can deteriorate the price informativeness and efficiency of their underlying instruments.

As far as securities from developed countries are concerned, noise by ETFs seems a minor problem as fewer results point into that direction. The *high-frequency information incorporation hypothesis* could be more appropriate for the stocks of this region since exchange-traded funds resulted to cause an increase in stock return volatility there.

Overall, this thesis has not detected any widely confirmed and important impact on the return patterns of the underlying assets by the ETF share creation-redemption intensity and the consequent arbitrage by APs, while the opposite can be said for broader ETF ownership and trading turnover.

[21] Importantly, this is the only subsample in which ETF share creation-redemption intensity seems to play a relevant role – noticeable from the negative estimates in the lag-4 group – but, given such a uniqueness – even this last result may be due to a type 1 error.

Table 7: ETF activity and excessive comovement of underlying stocks - B

The Table is divided in three Panels: "Panel Overall" include all the eligible observations according to the criteria described above. "Panel Illiquid (Liquid)" considers only the observations belonging to the last (first) 50 percentiles based on the absolute values of the average relative daily bid-ask spread measured for a stock over the previous month. The variables of interest are the market betas from regressions in which the stock return in month *t+4* is regressed over its contemporary and the last five monthly market returns. The Table reports estimates from OLS regressions of such betas on measures of ETF activity (share creation and redemption, trading turnover, flows and lagged stock ownership) and sets of control variables. Three different models are used per each subsample used: the first and the second share the same specification and, besides the aforementioned variables, include lags of stock return volatility and the whole set of common control variables (see previous Tables for reference) used in the previous estimations. Model 2, nevertheless, restricts the underlying samples to observations fullfilling the requirements to be eligible for Model 3. In model three, OPO variables are added. For each one of the models, I use subspecifications in which the values of the ownership and flows variables are calculated based on either *a)* the market capitalization of a stock or *b)* its free float. The activity and volatility variables are standardised by subtracting the mean and dividing by the standard deviation over the relevant Region. Standard errors are clustered at the country-, month- and stock-level. Absolute values of t-statistics are presented in italics. Parentheses and ***, **, * indicate statistical significance at the 10%, 5% and 1% level. The sample covers the period January 2013-December 2021.

Panel Overall. *Dependent variable: market betas lagged by (#) months*

(#)				Physical ETF Ownership (t-5)	Physical ETF Float Ownership (t-5)	Ort. Synthetic ETF Ownership (t-5)	Ort. Synthetic ETF Float Ownership (t-5)	Wtd. SD ETF Shares (t-4)	Wtd. ETF Turnover (t-4)	Wtd. ETF Physical Flows (t-4)	Wtd. Fl. ETF Physical Flows (t-4)	Ort. wtd. ETF Synthetic Flows (t-4)	Ort. Wtd. Fl. ETF Synthetic Flows (t-4)	constant	Control Vars	Adj. R2	N
0	*Developed Europe*	1	*a.*	-0,009 *1,07*		-0,01 *1,37*		0,011 *(1,71)**	0,015 *(2,60)****	-0,002 *0,88*		-0,001 *0,56*		-0,983 *(1,77)**	YES	0,23	#####
			b.		-0,008 *1,00*		-0,011 *1,61*	0,01 *1,50*	0,016 *(2,58)****		0,001 *0,45*		-0,001 *0,87*	-0,914 *(2,33)***	YES	0,23	#####
		2	*a.*	-0,012 *0,87*		-0,015 *(1,84)**		0,006 *1,34*	0,015 *(4,71)****	-0,002 *1,47*		0,004 *1,31*		-1,317 *(2,23)***	YES	0,24	69.641
			b.		-0,01 *1,08*		-0,014 *1,52*	0,004 *0,92*	0,017 *(5,50)****		0,003 *(2,17)***		0,001 *0,51*	-1,126 *(2,83)****	YES	0,24	66.173
		3	*a.*	-0,022 *(1,65)**		-0,016 *(1,97)***		0,006 *1,34*	0,014 *(4,65)****	-0,002 *1,46*		0,004 *1,31*		-1,323 *(2,22)***	YES	0,24	69.641
			b.		-0,008 *0,94*		-0,014 *1,52*	0,004 *0,93*	0,017 *(5,46)****		0,003 *(1,84)**		0,001 *0,57*	-1,198 *(2,83)****	YES	0,24	66.173
		1	*a.*	0,007 *1,48*		0,001 *0,17*		-0,001 *0,24*	-0,005 *0,99*	0 *0,13*		0 *0,18*		0,356 *1,12*	YES	0,06	#####
			b.		0,006 *1,21*		0 *0,05*	-0,001 *0,19*	-0,005 *1,04*		-0,002 *1,46*		-0,001 *0,31*	0,298 *1,20*	YES	0,06	#####
		2	*a.*	0,002 *0,25*		0,008 *0,88*		0,001 *0,18*	-0,009 *(2,36)***	0 *0,14*		-0,002 *0,84*		0,249 *0,67*	YES	0,05	69.484
			b.		-0,003 *0,36*		0,004 *0,65*	-0,001 *0,19*	-0,01 *(3,06)****		-0,001 *0,42*		-0,001 *0,37*	0,162 *0,63*	YES	0,05	66.012
		3	*a.*	0,002 *0,15*		0,008 *0,88*		0,001 *0,18*	-0,009 *(2,34)***	0 *0,14*		-0,002 *0,81*		0,249 *0,67*	YES	0,05	69.484
			b.		-0,004 *0,49*		0,004 *0,65*	-0,001 *0,19*	-0,01 *(3,03)****		-0,001 *0,41*		-0,001 *0,37*	0,206 *0,75*	YES	0,05	66.012
		1	*a.*	0 *0,11*		0,001 *0,14*		0,008 *(1,77)**	0,005 *1,28*	0 *0,15*		0,002 *1,34*		-0,226 *0,68*	YES	0,05	#####
			b.		-0,001 *0,12*		-0,002 *0,28*	0,008 *(1,87)**	0,006 *1,37*		0,001 *0,68*		-0,002 *1,46*	-0,105 *0,44*	YES	0,05	#####
		2	*a.*	-0,004 *0,50*		-0,008 *0,83*		0,006 *1,27*	0,006 *(2,51)***	0,002 *0,62*		0,005 *1,52*		-0,324 *0,99*	YES	0,04	69.285
			b.		0,003 *0,44*		-0,009 *1,11*	0,004 *1,15*	0,006 *(3,30)****		0,004 *1,56*		0,001 *0,41*	-0,079 *0,34*	YES	0,04	65.811
		3	*a.*	-0,002 *0,23*		-0,007 *0,81*		0,006 *1,27*	0,006 *(2,49)***	0,002 *0,61*		0,005 *1,51*		-0,322 *0,98*	YES	0,04	69.285
			b.		0,003 *0,48*		-0,009 *1,11*	0,004 *1,15*	0,006 *(2,90)****		0,004 *1,56*		0,001 *0,40*	-0,093 *0,38*	YES	0,04	65.811
		1	*a.*	0 *0,12*		0,002 *0,58*		-0,002 *0,45*	0 *0,06*	0,002 *0,63*		0 *0,21*		-0,174 *0,62*	YES	0,03	#####
			b.		0,001 *0,22*		0 *0,03*	-0,002 *0,47*	0 *0,09*		0 *0,10*		-0,001 *1,22*	-0,164 *0,84*	YES	0,03	#####
		2	*a.*	-0,004 *0,50*		0,001 *0,12*		-0,004 *0,82*	0,004 *(1,66)**	0,003 *0,93*		-0,001 *0,59*		-0,015 *0,04*	YES	0,03	68.048
			b.		0 *0,03*		-0,006 *1,05*	-0,006 *1,20*	0,005 *(2,97)****		0,002 *0,58*		-0,001 *0,49*	-0,103 *0,43*	YES	0,03	64.567
		3	*a.*	-0,008 *0,93*		0 *0,07*		-0,004 *0,82*	0,004 *(1,65)**	0,003 *0,91*		-0,001 *0,58*		-0,017 *0,05*	YES	0,03	68.048
			b.		-0,001 *0,10*		-0,006 *1,04*	-0,006 *1,21*	0,005 *(2,72)****		0,002 *0,57*		-0,001 *0,49*	-0,069 *0,25*	YES	0,03	64.567
		1	*a.*	0,003 *0,67*		0,004 *0,78*		0,003 *1,42*	0 *0,19*	0 *0,24*		0,002 *1,21*		0,403 *0,98*	YES	0,03	#####
			b.		0,002 *0,47*		0,003 *0,51*	0,003 *1,47*	-0,001 *0,33*		-0,001 *0,60*		0 *0,27*	0,314 *1,03*	YES	0,03	#####
		2	*a.*	0,006 *0,80*		0,014 *(2,18)***		0,003 *1,23*	0,002 *0,86*	0,001 *0,36*		0,003 *1,53*		0,120 *0,25*	YES	0,03	66.832
			b.		0,002 *0,29*		0,009 *1,50*	0,004 *1,10*	0 *0,05*		0,001 *0,43*		0,001 *0,27*	0,000 *0,00*	YES	0,03	63.354
		3	*a.*	0,009 *1,18*		0,014 *(2,27)***		0,003 *1,23*	0,002 *0,92*	0,001 *0,34*		0,003 *1,57*		0,122 *0,26*	YES	0,03	66.832
			b.		0,002 *0,19*		0,009 *1,51*	0,004 *1,08*	0 *0,03*		0,001 *0,43*		0,001 *0,26*	0,059 *0,15*	YES	0,03	63.354
1	*Rest of Europe*	1	*a.*	0,027 *1,63*		0,027 *(1,69)**		-0,002 *0,22*	-0,045 *(2,12)***	-0,006 *1,18*		0 *0,05*		0,960 *1,48*	YES	0,26	16.122
			b.		0,017 *(1,66)**		0,01 *0,71*	0 *0,02*	-0,046 *(2,21)***		0,005 *0,48*		-0,003 *0,30*	0,505 *0,91*	YES	0,26	16.362
		2	*a.*	0,027 *1,43*		0,046 *(2,51)***		0,001 *0,09*	-0,047 *(1,93)**	-0,003 *0,38*		0,002 *0,15*		1,502 *1,48*	YES	0,26	12.193
			b.		0,025 *(2,33)***		0,023 *1,10*	0,002 *0,22*	-0,049 *(1,96)***		-0,002 *0,13*		-0,008 *0,63*	0,801 *0,96*	YES	0,26	11.977
		3	*a.*	0,028 *1,34*		0,046 *(2,49)***		0,001 *0,08*	-0,047 *(1,91)**	-0,003 *0,40*		0,002 *0,15*		1,503 *1,48*	YES	0,26	12.193
			b.		0,025 *(2,25)***		0,023 *1,08*	0,002 *0,21*	-0,049 *(1,97)***		-0,002 *0,13*		-0,008 *0,62*	0,836 *0,92*	YES	0,26	11.977
		1	*a.*	0,013 *0,69*		-0,027 *(2,28)***		0,006 *0,47*	0,039 *(3,69)****	-0,004 *0,50*		0,008 *0,85*		-0,412 *0,62*	YES	0,2	16.104
			b.		0,005 *0,33*		-0,022 *(2,06)***	0,004 *0,41*	0,04 *(3,97)****		-0,016 *(3,32)****		0,005 *0,40*	-0,061 *0,18*	YES	0,2	16.345
		2	*a.*	0,01 *0,52*		-0,03 *(2,02)***		0,011 *0,85*	0,033 *(3,11)****	-0,001 *0,17*		0,01 *1,16*		-0,680 *0,72*	YES	0,2	12.189
			b.		0,012 *0,85*		-0,023 *1,53*	0,008 *0,75*	0,034 *(3,26)****		-0,015 *(2,01)***		0,01 *0,70*	-0,518 *1,43*	YES	0,2	11.973
		3	*a.*	0,012 *0,61*		-0,031 *(1,98)***		0,011 *0,85*	0,032 *(3,01)****	-0,001 *0,17*		0,01 *1,15*		-0,675 *0,73*	YES	0,2	12.189
			b.		0,012 *0,74*		-0,022 *1,48*	0,008 *0,75*	0,033 *(3,08)****		-0,015 *(2,06)***		0,01 *0,71*	-0,688 *1,41*	YES	0,2	11.973
		1	*a.*	0,018 *1,10*		-0,025 *0,85*		-0,013 *1,49*	0,017 *(3,70)****	-0,013 *(3,41)****		0,014 $^{(3,13)**}_{*}$		-0,901 *1,64*	YES	0,17	16.053
			b.		0,026 *1,35*		-0,024 *0,83*	-0,015 *1,61*	0,019 *(3,02)****		-0,01 *(1,77)**		0,005 *0,48*	-0,324 *1,29*	YES	0,16	16.287
		2	*a.*	0,023 *1,17*		-0,015 *0,46*		-0,02 *(2,21)***	0,016 *(2,04)***	-0,012 *(2,65)****		0,013 $^{(2,99)**}_{*}$		-1,422 *(2,82)****	YES	0,17	12.153
			b.		0,034 *(1,82)**		-0,021 *0,76*	-0,02 *(2,12)***	0,017 *(1,96)***		-0,006 *0,74*		0 *0,01*	-0,187 *0,56*	YES	0,17	11.933
		3	*a.*	0,031 *1,49*		-0,016 *0,51*		-0,02 *(2,26)***	0,015 *(1,76)**	-0,012 *(2,71)****		0,012 $^{(2,91)**}_{*}$		-1,402 *(2,71)****	YES	0,17	12.153
			b.		0,032 *(1,77)**		-0,021 *0,77*	-0,02 *(2,07)***	0,016 *(1,81)**		-0,006 *0,72*		0 *0,01*	-0,689 *(1,99)***	YES	0,17	11.933
		1	*a.*	0,023 *(1,78)**		-0,011 *0,64*		-0,006 *0,52*	-0,029 *(2,19)***	0,007 *1,59*		0,013 *(2,13)***		-0,299 *0,69*	YES	0,17	15.678
			b.		0,024 *(2,10)***		-0,001 *0,07*	-0,004 *0,36*	-0,029 *(2,54)***		-0,016 *(2,10)***		0 *0,07*	-0,053 *0,21*	YES	0,17	15.912
		2	*a.*	0,01 *0,74*		-0,011 *0,52*		-0,016 *1,01*	-0,027 *(1,97)***	0,006 *1,03*		0,017 *(2,47)***		-0,348 *0,60*	YES	0,16	11.919
			b.		0,009 *0,55*		0,003 *0,18*	-0,009 *0,68*	-0,027 *(1,99)***		-0,021 *(2,81)****		0 *0,03*	-0,190 *0,52*	YES	0,16	11.703
		3	*a.*	0,01 *0,77*		-0,011 *0,53*		-0,016 *1,01*	-0,027 *(1,86)**	0,006 *0,97*		0,017 *(2,43)***		-0,348 *0,60*	YES	0,16	11.919
			b.		0,009 *0,50*		0,003 *0,18*	-0,009 *0,67*	-0,027 *(2,04)***		-0,021 *(3,00)****		0 *0,02*	-0,363 *0,86*	YES	0,16	11.703
		1	*a.*	0,004 *0,18*		0,004 *0,23*		-0,017 *1,12*	-0,016 *(1,68)**	-0,002 *0,38*		0,005 *0,59*		-1,066 *(1,99)***	YES	0,14	15.335
			b.		0,015 *0,87*		-0,001 *0,10*	-0,016 *1,10*	-0,014 *1,53*		-0,012 *1,21*		0,008 *1,25*	-0,484 *1,58*	YES	0,14	15.567
		2	*a.*	-0,001 *0,04*		-0,007 *0,48*		-0,021 *1,32*	-0,018 *1,31*	-0,004 *0,77*		0,006 *0,66*		-1,187 *(1,91)**	YES	0,14	11.707
			b.		0,018 *0,78*		-0,004 *0,30*	-0,021 *1,31*	-0,019 *1,34*		-0,003 *0,19*		0,01 *1,17*	-0,540 *1,17*	YES	0,15	11.492
		3	*a.*	-0,001 *0,04*		-0,007 *0,48*		-0,021 *1,31*	-0,018 *1,30*	-0,004 *0,76*		0,006 *0,66*		-1,187 *(1,91)**	YES	0,14	11.707
			b.		0,018 *0,77*		-0,004 *0,32*	-0,021 *1,30*	-0,019 *1,34*		-0,003 *0,20*		0,01 *1,14*	-0,789 *1,21*	YES	0,15	11.492

Table 7 continues…

Panel Illiquid. *Dependent variable: market betas lagged by (#) months*

(#)			Physical ETF Ownership (t-5)	Physical ETF Float Ownership (t-5)	Ort. Synthetic ETF Ownership (t-5)	Ort. Synthetic ETF Float Ownership (t-5)	Wtd. SD ETF Shares (t-4)	Wtd. ETF Turnover (t-4)	Wtd. ETF Physical Flows (t-4)	Wtd. Fl. ETF Physical Flows (t-4)	Ort. wtd. ETF Synthetic Flows (t-4)	Ort. Wtd. Fl. ETF Synthetic Flows (t-4)	constant	Control Vars	Adj. R2	N
0	Developed Europe	1 a.	0,022 *(1,79)**		0,011 *0,64*		0,013 *(1,71)**	0,03 *(2,03)***	-0,003 *0,93*		0 *0,14*		-1,347 *(3,04)****	YES	0,2	68.476
		1 b.		0,006 *0,76*		0,001 *0,09*	0,013 *1,64*	0,03 *(2,03)***		0 *0,12*		0,002 *0,63*	-1,128 *(3,80)****	YES	0,2	69.801
		2 a.	0,009 *0,28*		-0,003 *0,15*		0,007 *1,00*	0,025 *0,30*	-0,001 *0,50*		0,01 *(2,10)***		-1,614 *(2,52)***	YES	0,2	35.247
		2 b.		-0,005 *0,33*		-0,001 *0,07*	0,006 *0,90*	0,027 *0,30*		0,002 *0,63*		0,005 *1,56*	-1,007 *(2,30)***	YES	0,2	35.431
		3 a.	-0,003 *0,09*		-0,003 *0,19*		0,007 *1,00*	0,025 *0,29*	-0,001 *0,50*		0,01 *(2,04)***		-1,628 *(2,52)***	YES	0,2	35.247
		3 b.		-0,003 *0,21*		-0,002 *0,11*	0,006 *0,91*	0,026 *0,29*		0,002 *0,61*		0,005 *(1,67)**	-1,122 *(2,49)***	YES	0,2	35.431
1		1 a.	0,016 *0,91*		0,013 *0,87*		-0,008 *1,40*	-0,013 *0,86*	0 *0,11*		0 *0,00*		0,163 *0,50*	YES	0,04	68.294
		1 b.		0,012 *1,30*		0,003 *0,20*	-0,007 *1,46*	-0,01 *0,64*		-0,004 *(2,19)***		-0,003 *1,05*	0,172 *0,79*	YES	0,04	69.619
		2 a.	0,021 *0,85*		0,012 *0,71*		-0,006 *1,08*	-0,028 *0,38*	-0,002 *0,45*		-0,003 *0,58*		0,090 *0,25*	YES	0,04	35.131
		2 b.		-0,013 *1,08*		0,004 *0,33*	-0,007 *1,15*	-0,006 *0,08*		-0,004 *1,08*		-0,004 *0,92*	0,064 *0,24*	YES	0,04	35.314
		3 a.	0,018 *0,76*		0,012 *0,69*		-0,006 *1,07*	-0,028 *0,37*	-0,002 *0,44*		-0,003 *0,58*		0,087 *0,23*	YES	0,04	35.131
		3 b.		-0,014 *1,31*		0,005 *0,37*	-0,007 *1,15*	-0,005 *0,07*		-0,004 *1,06*		-0,004 *0,95*	0,174 *0,62*	YES	0,04	35.314
2		1 a.	0,014 *1,19*		-0,024 *(2,53)***		-0,001 *0,35*	-0,022 *1,09*	0,001 *0,44*		0,003 *0,87*		0,200 *0,62*	YES	0,03	68.098
		1 b.		0,008 *0,78*		-0,023 *(3,43)****	0 *0,08*	-0,021 *1,06*		-0,002 *1,44*		-0,004 *1,38*	0,192 *0,97*	YES	0,03	69.418
		2 a.	-0,008 *0,35*		-0,023 *(1,86)**		0 *0,07*	0,034 *0,83*	-0,002 *0,35*		0,007 *(2,69)****		-0,366 *1,00*	YES	0,03	35.017
		2 b.		0,004 *0,23*		-0,024 *(2,70)****	0,001 *0,27*	0,032 *0,66*		-0,001 *0,31*		-0,001 *0,68*	-0,068 *0,25*	YES	0,03	35.198
		3 a.	-0,002 *0,09*		-0,022 *(1,77)**		0 *0,07*	0,034 *0,75*	-0,002 *0,34*		0,007 *(2,64)****		-0,359 *0,98*	YES	0,03	35.017
		3 b.		0,005 *0,25*		-0,024 *(2,70)****	0,001 *0,28*	0,031 *0,66*		-0,001 *0,31*		-0,001 *0,67*	-0,100 *0,34*	YES	0,03	35.198
3		1 a.	0,023 *(1,69)**		-0,013 *1,11*		-0,007 *1,15*	-0,002 *0,09*	-0,001 *0,26*		-0,002 *0,78*		0,197 *0,78*	YES	0,02	67.868
		1 b.		0,012 *1,63*		-0,011 *1,46*	-0,007 *1,18*	-0,002 *0,08*		0,001 *0,23*		0 *0,11*	-0,007 *0,05*	YES	0,02	69.192
		2 a.	0,019 *1,24*		-0,019 *1,32*		-0,008 *1,07*	0,017 *0,18*	0,002 *0,38*		-0,003 *0,75*		0,455 *1,04*	YES	0,02	34.877
		2 b.		-0,009 *0,74*		-0,015 *(1,72)**	-0,009 *1,24*	0,018 *0,18*		0,001 *0,39*		-0,002 *0,47*	0,091 *0,33*	YES	0,02	35.063
		3 a.	0,011 *0,65*		-0,019 *1,33*		-0,008 *1,06*	0,017 *0,17*	0,002 *0,37*		-0,003 *0,74*		0,446 *1,03*	YES	0,02	34.877
		3 b.		-0,01 *0,79*		-0,015 *1,62*	-0,009 *1,25*	0,018 *0,19*		0,001 *0,39*		-0,002 *0,49*	0,173 *0,55*	YES	0,02	35.063
4		1 a.	0,033 *(2,58)****		-0,007 *1,23*		0,008 *(1,74)**	0,006 *0,71*	0,001 *0,29*		0,001 *0,31*		0,320 *1,17*	YES	0,02	66.160
		1 b.		0,02 *(1,65)**		-0,01 *1,51*	0,009 *(2,08)***	0,012 *1,12*		-0,002 *1,04*		-0,001 *0,47*	0,137 *0,77*	YES	0,02	67.474
		2 a.	0,031 *1,54*		-0,005 *0,61*		0,005 *0,96*	0,014 *0,28*	-0,001 *0,29*		0,005 *1,56*		0,178 *0,42*	YES	0,02	34.028
		2 b.		0,01 *0,65*		0 *0,04*	0,005 *1,05*	0,015 *0,32*		-0,003 *0,74*		-0,002 *0,48*	-0,006 *0,02*	YES	0,02	34.215
		3 a.	0,036 *(1,86)**		-0,005 *0,59*		0,005 *0,97*	0,014 *0,28*	-0,001 *0,29*		0,005 *1,52*		0,182 *0,43*	YES	0,02	34.028
		3 b.		0,009 *0,60*		0,001 *0,13*	0,005 *1,04*	0,015 *0,33*		-0,003 *0,74*		-0,002 *0,50*	0,114 *0,28*	YES	0,02	34.215
0	Rest of Europe	1 a.	0,02 *0,42*		0,004 *0,16*		0,007 *0,52*	-0,03 *1,33*	0,003 *0,23*		-0,016 *(1,76)**		0,542 *0,54*	YES	0,23	5.756
		1 b.		0,011 *0,28*		-0,019 *0,86*	0,005 *0,34*	-0,032 *1,35*		0,015 *(2,15)***		0,037 *(4,84)****	0,403 *0,79*	YES	0,23	5.787
		2 a.	-0,014 *0,20*		0,02 *0,83*		0,009 *0,81*	-0,026 *1,09*	0,008 *1,15*		-0,026 *(2,98)****		0,863 *0,68*	YES	0,25	4.241
		2 b.		-0,015 *0,26*		-0,014 *0,59*	0,007 *0,61*	-0,028 *1,12*		-0,011 *0,34*		0,034 *(3,41)****	0,773 *1,04*	YES	0,25	4.080
		3 a.	-0,01 *0,13*		0,02 *0,80*		0,009 *0,89*	-0,026 *1,08*	0,008 *1,14*		-0,026 *(3,02)****		0,887 *0,68*	YES	0,25	4.241
		3 b.		-0,015 *0,26*		-0,015 *0,60*	0,007 *0,57*	-0,028 *1,12*		-0,011 *0,34*		0,034 *(3,53)****	0,744 *0,96*	YES	0,25	4.080
1		1 a.	0,038 *0,75*		-0,022 *0,97*		0,003 *0,27*	0,031 *(1,94)**	-0,006 *0,99*		0,005 *0,31*		-1,193 *1,08*	YES	0,2	5.747
		1 b.		0,045 *1,44*		-0,023 *1,12*	-0,001 *0,12*	0,031 *(1,87)**		-0,015 *(2,54)***		-0,003 *0,24*	0,011 *0,02*	YES	0,2	5.780
		2 a.	-0,008 *0,16*		-0,033 *1,28*		0,007 *0,75*	0,016 *1,08*	-0,003 *0,32*		0,007 *0,48*		-1,250 *1,03*	YES	0,21	4.236
		2 b.		0,038 *1,09*		-0,031 *1,22*	0,003 *0,38*	0,017 *1,12*		-0,012 *1,02*		-0,002 *0,26*	-0,232 *0,28*	YES	0,21	4.075
		3 a.	0,001 *0,03*		-0,034 *1,33*		0,007 *0,75*	0,015 *1,05*	-0,003 *0,30*		0,007 *0,46*		-1,186 *0,97*	YES	0,21	4.236
		3 b.		0,034 *0,94*		-0,033 *1,36*	0,003 *0,37*	0,016 *1,04*		-0,011 *0,93*		-0,002 *0,27*	-0,558 *0,49*	YES	0,21	4.075
2		1 a.	0,003 *0,10*		0,018 *0,97*		-0,002 *0,13*	0,024 *(4,87)****	-0,01 *(1,70)**		0,011 *(1,92)**		-1,315 *(2,64)****	YES	0,13	5.739
		1 b.		-0,007 *0,37*		0,019 *0,97*	-0,004 *0,24*	0,025 *(4,30)****		-0,015 *(2,03)***		0,059 *(8,86)****	-0,583 *1,38*	YES	0,13	5.774
		2 a.	0,023 *0,52*		0,027 *0,96*		-0,009 *0,48*	0,027 *(6,05)****	-0,006 *0,80*		0,001 *0,13*		-1,760 *(2,40)***	YES	0,15	4.230
		2 b.		-0,002 *0,05*		0,019 *0,85*	-0,01 *0,53*	0,027 *(4,88)****		-0,001 *0,06*		0,061 *(8,31)****	-0,392 *0,90*	YES	0,15	4.075
		3 a.	0,041 *0,94*		0,025 *0,86*		-0,009 *0,48*	0,026 *(5,58)****	-0,006 *0,80*		0,001 *0,12*		-1,626 *(2,21)***	YES	0,15	4.230
		3 b.		-0,008 *0,28*		0,016 *0,68*	-0,01 *0,52*	0,026 *(4,93)****		-0,001 *0,03*		0,061 *(8,13)****	-0,988 *(1,97)***	YES	0,15	4.075
3		1 a.	0,061 *(2,26)***		0,013 *0,60*		0,005 *0,58*	-0,025 *1,61*	0,019 *(2,55)***		0,001 *0,10*		-0,003 *0,00*	YES	0,16	5.724
		1 b.		0,059 *(2,11)***		0,015 *0,97*	0,005 *0,53*	-0,026 *1,54*		-0,003 *0,52*		0,006 *1,33*	0,313 *0,78*	YES	0,16	5.761
		2 a.	-0,065 *1,55*		0,023 *1,07*		-0,005 *0,51*	-0,02 *1,45*	0,012 *1,22*		0,003 *0,21*		0,194 *0,16*	YES	0,15	4.218
		2 b.		-0,034 *0,88*		0,034 *1,52*	0,002 *0,13*	-0,02 *1,18*		-0,007 *0,67*		0,011 *1,43*	0,074 *0,22*	YES	0,15	4.063
		3 a.	-0,072 *(1,73)**		0,024 *1,11*		-0,005 *0,52*	-0,02 *1,19*	0,012 *1,17*		0,003 *0,22*		0,137 *0,12*	YES	0,15	4.218
		3 b.		-0,037 *1,14*		0,033 *1,62*	0,002 *0,14*	-0,02 *1,38*		-0,007 *0,69*		0,011 *1,51*	-0,207 *0,27*	YES	0,15	4.063
4		1 a.	-0,03 *0,68*		0,007 *0,36*		-0,011 *0,53*	-0,009 *0,90*	-0,001 *0,13*		-0,013 *(2,30)***		-0,828 *1,34*	YES	0,13	5.557
		1 b.		0,004 *0,14*		-0,004 *0,22*	-0,01 *0,39*	-0,008 *0,78*		-0,012 *(3,97)****		0,014 *(1,69)**	-0,159 *0,43*	YES	0,13	5.592
		2 a.	-0,094 *(2,30)***		-0,004 *0,24*		-0,013 *0,79*	-0,015 *0,93*	0,001 *0,15*		-0,019 *(2,25)***		-1,164 *1,45*	YES	0,14	4.123
		2 b.		-0,022 *0,86*		-0,012 *0,75*	-0,016 *0,89*	-0,016 *1,02*		-0,025 *(1,86)**		0,011 *1,27*	-0,338 *0,40*	YES	0,14	3.966
		3 a.	-0,097 *(2,37)***		-0,004 *0,21*		-0,013 *0,79*	-0,014 *0,91*	0,001 *0,14*		-0,019 *(2,22)***		-1,198 *1,52*	YES	0,14	4.123
		3 b.		-0,029 *1,18*		-0,016 *0,96*	-0,016 *0,89*	-0,017 *1,08*		-0,025 *(1,83)**		0,011 *1,3*	-1,034 *1,08*	YES	0,14	3.966

Table 7 continues…

Panel Liquid. *Dependent variable: market betas lagged by (#) months*

(#)			Physical ETF Ownership (t-5)	Physical ETF Float Ownership (t-5)	Ort. Synthetic ETF Ownership (t-5)	Ort. Synthetic ETF Float Ownership (t-5)	Wtd. SD ETF Shares (t-4)	Wtd. ETF Turnover (t-4)	Wtd. ETF Physical Flows (t-4)	Wtd. Fl. ETF Physical Flows (t-4)	Ort. wtd. ETF Synthetic Flows (t-4)	Ort. Wtd. Fl. ETF Synthetic Flows (t-4)	constant	Control Vars	Adj. R2	N
0	*Developed Europe*	1 *a.*	-0,008 *1,33*		-0,001 *0,24*		0,01 *1,24*	0,012 *(2,06)***	0,002 *0,93*		-0,001 *0,45*		0,047 *0,06*	YES	0,26	67.484
		b.		-0,006 *0,98*		-0,002 *0,33*	0,008 *0,93*	0,012 *(2,03)***		0,003 *(1,95)**		-0,001 *0,87*	-0,177 *0,29*	YES	0,26	69.070
		2 *a.*	-0,009 *0,72*		-0,004 *0,46*		0,007 *1,05*	0,01 *(4,81)****	-0,001 *0,27*		0 *0,03*		-0,522 *0,73*	YES	0,28	28.960
		b.		-0,002 *0,24*		-0,004 *0,37*	0,002 *0,35*	0,012 *(6,46)****		0,003 *1,53*		-0,002 *0,75*	-0,921 *(1,73)**	YES	0,27	25.447
		3 *a.*	-0,02 *(1,71)**		-0,005 *0,57*		0,007 *1,04*	0,01 *(4,70)****	-0,001 *0,23*		0 *0,01*		-0,536 *0,75*	YES	0,28	28.960
		b.		-0,004 *0,41*		-0,004 *0,36*	0,002 *0,35*	0,012 *(5,88)****		0,003 *1,60*		-0,002 *0,76*	-0,857 *(1,65)**	YES	0,27	25.447
1		1 *a.*	0,004 *1,08*		-0,001 *0,28*		0 *0,16*	-0,005 *0,95*	0,001 *0,56*		0,001 *0,41*		0,815 *(1,76)**	YES	0,09	67.456
		b.		0,004 *0,91*		-0,002 *0,43*	0,001 *0,19*	-0,005 *1,03*		0,001 *0,62*		0 *0,23*	0,657 *(1,81)**	YES	0,09	69.047
		2 *a.*	-0,003 *0,22*		0,004 *0,43*		0,004 *1,02*	-0,01 *(3,16)****	0,005 *1,24*		0 *0,07*		0,687 *1,34*	YES	0,08	28.935
		b.		0,003 *0,35*		0,001 *0,10*	0,001 *0,17*	-0,011 *(4,73)****		-0,001 *0,24*		0,001 *0,33*	0,455 *1,16*	YES	0,08	25.419
		3 *a.*	-0,004 *0,36*		0,004 *0,42*		0,004 *1,00*	-0,01 *(3,08)****	0,005 *1,25*		0 *0,06*		0,684 *1,33*	YES	0,08	28.935
		b.		0,004 *0,50*		0,001 *0,09*	0,001 *0,17*	-0,011 *(4,79)****		-0,001 *0,23*		0,001 *0,33*	0,404 *0,97*	YES	0,08	25.419
2		1 *a.*	-0,003 *0,85*		0,002 *0,49*		0,012 *1,41*	0,006 *1,37*	-0,001 *0,37*		0 *0,17*		-0,698 *1,62*	YES	0,08	67.422
		b.		-0,003 *0,73*		0,001 *0,17*	0,012 *1,39*	0,006 *1,47*		0,007 *(2,26)**		-0,002 *0,93*	-0,408 *1,22*	YES	0,08	69.015
		2 *a.*	-0,007 *1,05*		-0,001 *0,07*		0,009 *1,06*	0,007 *(3,27)****	0,008 *(2,57)**		0,001 *0,27*		-0,581 *1,46*	YES	0,08	28.905
		b.		-0,001 *0,11*		0 *0,00*	0,01 *1,18*	0,008 *(4,59)****		0,008 *(5,10)****		0,002 *0,68*	-0,073 *0,22*	YES	0,07	25.386
		3 *a.*	-0,002 *0,21*		0 *0,02*		0,01 *1,07*	0,007 *(2,76)****	0,008 *(2,41)**		0,001 *0,28*		-0,569 *1,44*	YES	0,08	28.905
		b.		0 *0,05*		0 *0,02*	0,01 *1,18*	0,008 *(4,52)****		0,008 *(5,07)****		0,002 *0,68*	-0,132 *0,38*	YES	0,07	25.386
3		1 *a.*	-0,002 *0,54*		0,005 *1,34*		0,002 *0,43*	0 *0,16*	0,006 *(2,81)****		0,001 *0,44*		-0,405 *0,90*	YES	0,06	67.372
		b.		-0,001 *0,49*		0,002 *0,63*	0,002 *0,38*	0 *0,06*		0 *0,13*		-0,001 *0,60*	-0,297 *0,78*	YES	0,06	68.964
		2 *a.*	-0,009 *1,15*		0,006 *0,90*		-0,001 *0,14*	0,004 *1,62*	0,007 *(1,90)**		0,001 *0,29*		-0,350 *0,55*	YES	0,06	28.867
		b.		-0,002 *0,35*		-0,002 *0,38*	-0,005 *1,40*	0,005 *(3,53)****		0,002 *0,46*		0,001 *0,64*	-0,407 *0,77*	YES	0,06	25.342
		3 *a.*	-0,011 *1,43*		0,006 *0,83*		-0,001 *0,15*	0,004 *1,54*	0,007 *(1,83)**		0,001 *0,30*		-0,354 *0,56*	YES	0,06	28.867
		b.		-0,001 *0,19*		-0,002 *0,39*	-0,005 *1,41*	0,005 *(3,53)****		0,002 *0,45*		0,001 *0,68*	-0,458 *0,78*	YES	0,06	25.342
4		1 *a.*	-0,001 *0,37*		0,006 *1,15*		-0,001 *0,27*	-0,001 *0,36*	0,003 *(1,96)**		0,002 *1,04*		0,351 *0,63*	YES	0,06	66.781
		b.		-0,002 *0,58*		0,006 *1,15*	-0,001 *0,38*	-0,001 *0,53*		0,002 *(4,42)****		0,002 *1,14*	0,340 *0,73*	YES	0,06	68.375
		2 *a.*	-0,005 *0,63*		0,016 *(1,80)**		0,002 *0,58*	0,001 *0,59*	0,004 *1,19*		0,001 *0,25*		0,045 *0,07*	YES	0,04	28.574
		b.		-0,006 *0,59*		0,01 *1,19*	0,003 *0,81*	-0,001 *0,46*		0,003 *(3,84)****		0,003 *1,26*	-0,169 *0,34*	YES	0,04	25.048
		3 *a.*	-0,003 *0,33*		0,016 *(1,83)**		0,002 *0,61*	0,001 *0,56*	0,004 *1,18*		0,001 *0,25*		0,051 *0,08*	YES	0,04	28.574
		b.		-0,004 *0,46*		0,01 *1,18*	0,003 *0,81*	-0,001 *0,51*		0,003 *(3,97)****		0,003 *1,27*	-0,255 *0,46*	YES	0,04	25.048
0	*Rest of Europe*	1 *a.*	0,023 *1,38*		0,021 *0,59*		-0,007 *0,43*	-0,093 *1,32*	-0,018 *(2,04)**		0,006 *0,93*		2,114 *(3,81)****	YES	0,32	8.110
		b.		0,017 *1,00*		-0,004 *0,12*	-0,002 *0,12*	-0,1 *1,39*		-0,014 *1,47*		-0,005 *0,60*	1,302 *(2,54)**	YES	0,32	8.280
		2 *a.*	0,032 *1,47*		0,03 *0,78*		-0,006 *0,38*	-0,094 *1,35*	-0,014 *(2,08)**		0,01 *1,61*		1,858 *1,46*	YES	0,32	6.321
		b.		0,042 *(2,13)**		0,002 *0,05*	-0,004 *0,25*	-0,105 *1,49*		0,004 *0,55*		-0,014 *(2,05)**	0,980 *0,86*	YES	0,32	6.300
		3 *a.*	0,035 *(1,77)**		0,03 *0,78*		-0,006 *0,40*	-0,094 *1,36*	-0,014 *(1,92)**		0,01 *1,61*		1,879 *1,51*	YES	0,32	6.321
		b.		0,042 *(2,07)**		0,001 *0,03*	-0,004 *0,25*	-0,105 *1,49*		0,004 *0,56*		-0,014 *(2,04)**	1,052 *0,85*	YES	0,32	6.300
1		1 *a.*	0,02 *0,69*		-0,019 *0,76*		0,005 *0,28*	-0,053 *1,00*	-0,002 *0,20*		0,004 *0,48*		-0,285 *1,43*	YES	0,25	8.099
		b.		0,006 *0,21*		-0,01 *0,44*	0,005 *0,30*	-0,045 *1,05*		-0,012 *(2,46)**		0,006 *0,52*	-0,263 *0,53*	YES	0,25	8.269
		2 *a.*	0,026 *1,23*		0,002 *0,07*		0,002 *0,14*	-0,066 *(2,06)**	0,004 *0,81*		0,005 *0,69*		-0,482 *0,69*	YES	0,25	6.318
		b.		0,016 *0,69*		0,005 *0,19*	-0,001 *0,09*	-0,056 *(2,31)**		-0,008 *1,24*		0,014 *0,99*	-0,746 *1,46*	YES	0,25	6.296
		3 *a.*	0,025 *1,14*		0,002 *0,07*		0,002 *0,14*	-0,066 *(2,08)**	0,004 *0,72*		0,005 *0,68*		-0,490 *0,70*	YES	0,25	6.318
		b.		0,016 *0,65*		0,006 *0,25*	-0,001 *0,10*	-0,056 *(2,04)**		-0,008 *1,23*		0,014 *0,96*	-0,920 *(2,05)**	YES	0,25	6.296
2		1 *a.*	0,033 *1,21*		-0,06 *(2,28)**		-0,019 *1,01*	-0,08 *1,16*	-0,013 *(3,08)****		0,012 *(2,39)**		-0,656 *0,49*	YES	0,2	8.097
		b.		0,035 *1,24*		-0,065 $_{*}^{(3,75)**}$	-0,017 *0,95*	-0,085 *1,18*		-0,012 *1,19*		0,002 *0,25*	-0,195 *0,33*	YES	0,2	8.261
		2 *a.*	0,036 *1,23*		-0,065 $_{*}^{(2,63)**}$		-0,027 *1,54*	-0,057 *0,66*	-0,013 *(2,28)**		0,011 *1,55*		-0,792 *0,89*	YES	0,21	6.322
		b.		0,045 *1,58*		-0,067 $_{*}^{(3,40)**}$	-0,027 *(1,82)**	-0,052 *0,59*		-0,02 *(3,07)****		-0,008 *0,77*	0,365 *0,74*	YES	0,21	6.296
		3 *a.*	0,048 *1,60*		-0,064 *(2,57)**		-0,028 *(1,65)**	-0,057 *0,65*	-0,013 *(2,21)**		0,011 *1,48*		-0,719 *0,78*	YES	0,21	6.322
		b.		0,044 *1,60*		-0,064 $_{*}^{(3,06)**}$	-0,027 *(1,85)**	-0,054 *0,61*		-0,019 *(3,04)****		-0,009 *0,78*	-0,162 *0,29*	YES	0,21	6.296
3		1 *a.*	0,001 *0,08*		-0,031 $_{*}^{(2,59)**}$		-0,011 *0,41*	-0,029 *0,43*	-0,001 *0,11*		0,016 $_{*}^{(3,62)**}$		-0,760 *1,51*	YES	0,2	8.057
		b.		0,006 *0,33*		-0,015 *1,02*	-0,007 *0,26*	-0,028 *0,41*		-0,023 *(4,87)****		-0,003 *0,70*	-0,035 *0,12*	YES	0,2	8.223
		2 *a.*	0 *0,01*		-0,039 $_{*}^{(2,65)**}$		-0,007 *0,24*	-0,071 *0,86*	-0,003 *0,35*		0,019 $_{*}^{(4,42)**}$		-0,633 *(1,69)**	YES	0,19	6.292
		b.		-0,006 *0,25*		-0,024 *1,35*	0 *0,01*	-0,064 *0,77*		-0,023 *(2,42)**		-0,004 *0,64*	0,303 *0,66*	YES	0,19	6.269
		3 *a.*	0,002 *0,14*		-0,039 $_{*}^{(2,61)**}$		-0,008 *0,25*	-0,071 *0,86*	-0,002 *0,33*		0,019 $_{*}^{(4,37)**}$		-0,623 *1,62*	YES	0,19	6.292
		b.		-0,006 *0,25*		-0,023 *1,31*	0 *0,01*	-0,064 *0,76*		-0,023 *(2,40)**		-0,004 *0,65*	0,164 *0,37*	YES	0,19	6.269
4		1 *a.*	0,013 *0,60*		-0,008 *0,46*		-0,026 *(1,89)**	-0,065 *1,01*	-0,008 *1,58*		0,005 *0,87*		-1,034 *(2,05)**	YES	0,15	7.931
		b.		0,025 *1,28*		0,006 *0,34*	-0,028 *(2,07)**	-0,064 *1,01*		-0,023 *(2,65)****		0,008 *0,92*	-0,354 *(3,26)****	YES	0,15	8.097
		2 *a.*	0,01 *0,51*		-0,012 *0,67*		-0,036 *(2,11)**	-0,04 *0,56*	-0,012 *1,41*		0,009 *1,29*		-1,223 *1,62*	YES	0,15	6.210
		b.		0,029 *1,17*		0,004 *0,32*	-0,037 *(1,99)**	-0,032 *0,50*		-0,015 *1,34*		0,006 *0,51*	-0,534 *(1,69)**	YES	0,15	6.188
		3 *a.*	0,009 *0,43*		-0,012 *0,68*		-0,035 *(2,07)**	-0,04 *0,56*	-0,012 *1,43*		0,009 *1,27*		-1,228 *(1,65)**	YES	0,15	6.210
		b.		0,029 *1,18*		0,005 *0,34*	-0,037 *(2,00)**	-0,033 *0,50*		-0,015 *1,33*		0,006 *0,49*	-0,698 *1,18*	YES	0,15	6.188

7. Limitations and conclusions

Exchange-traded funds are certainly a smart way for market participants to bet or invest on their views on a larger than ever spectrum of countries and companies in a cheap, quick, quite transparent and often tax-friendly way.

This thesis tried to gather evidence on negative aspects that, on the other hand, ETFs may be the origin of, but these analyses have been certainly subject to some limitations: first of all, the scarcity of data on overall passive ownership conditioned the sample size and the power of the most complete regressions. Indeed, the fact that blockownership is considered in the computation alongside with the ownership by passive funds – the relevant information to us – may add some noise to it. Secondly, no omitted variable bias tests have been possible: Ben-David et al.'s (2018) version was impossible to implement here due to the inexistence of a pair benchmark indexes covering two adjacent segments of the European equity market. The Stoxx Europe 50 and 600 indices were not good candidates because their constituent lists partially overlap (not being complimentary benchmarks), and because the index constituent data is not available from the university library databases.

Furthermore, possible changes in replication methods occurred over the life of an ETF are not considered here and, lastly and more importantly, the research is based not on individual countries, but regional groups. This latter has been done to overcome the problem of limited number of observations, especially present for some countries, also due to ETFs having been so present in Europe for a relatively brief time. In the next years it will be possible to conduct estimations at a more granular level.

Despite this, these analyses managed to shed some light on the spillovers exchange-traded funds are responsible for also in Europe. These products can alter underlying stock return volatility, although in multiple different ways: upward (downward) for the liquid (illiquid) stocks from the most developed countries, and in a less precise direction for equity from the rest of Europe. The evidence based on the securities from this latter region also confirms the findings by Ben-David et al. (2018), Da, Shive (2017), Israeli et al. (2017) amongst others about the deterioration in informativeness of the underlying prices after an increase in participation of ETFs in the marketfor a specific stock. The decrease in volatility observed for equity from developing countries and more held by synthetic funds does not appear to coincide with a reduction of noise in prices, but rather with a slower and later excessive responsiveness to market fluctuations.

On the other hand, the evidence for Developed Europe on this last point is more limited, since results consistent with those found for the Rest of Europe are significant only in two out of three specifications.

Future research could investigate these findings and expand them at a country-level with a more complete dataset in terms of overall ownership, besides delving deeper into the asset pricing and risk-adjusted return implications of ETF spillovers. Other topics of interest may be the way in which other European asset classes, or stocks not listed and domiciled in the same region, are affected by ETFs, and the identification of the specific conditions under which the sign of the ETF impact on stock return volatility and informational efficiency changes.

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Appendix

Figure A1.

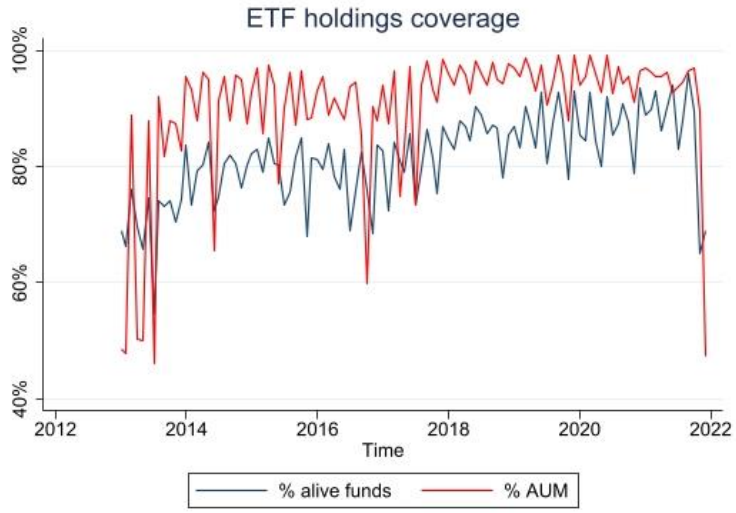


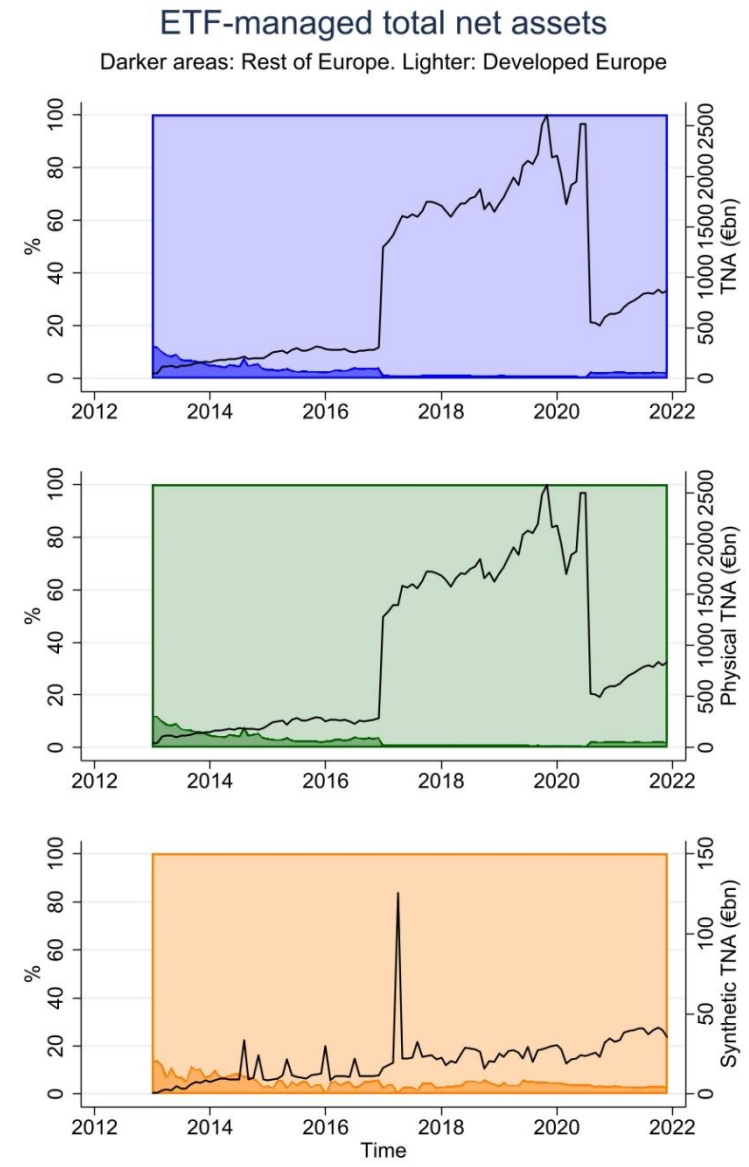
Table A1. Sample breakdown into countries

Country	#stocks	#observations	Average ETF assets invested in	assets%
Austria	39	3.274	3.733.666.521	0,41%
Belgium	76	5.636	15.152.480.345	1,66%
Bulgaria	2	6	97	0,00%
Croatia	9	69	1.077.585	0,00%
Cyprus	4	129	710.766	0,00%
Czech Republic	10	639	405.861.251	0,04%
Denmark	64	4.792	25.124.468.274	2,75%
Estonia	3	91	2.029.995	0,00%
Finland	93	5.449	15.631.747.234	1,71%
France	297	18.691	143.479.719.767	15,73%
Germany	287	19.594	141.586.333.079	15,52%
Greece	79	3.672	602.650.243	0,07%
Hungary	18	797	498.975.303	0,05%
Iceland	2	23	229.377	0,00%
Ireland	28	1.948	7.191.721.532	0,79%
Italy	295	16.749	34.890.507.892	3,82%
Lithuania	2	23	1.183.868	0,00%
Luxembourg	2	151	653.686.356	0,07%
Netherlands	84	5.952	57.682.736.786	6,32%
Norway	123	6.059	8.938.173.318	0,98%
Poland	95	5.228	2.269.078.819	0,25%
Portugal	26	1.917	2.508.941.255	0,28%
Romania	13	640	33.543.411	0,00%
Russia	81	5.434	7.918.302.820	0,87%
Serbia	3	14	127.405	0,00%
Slovenia	7	135	1.299.198	0,00%
Spain	107	7.808	43.845.148.407	4,81%
Sweden	300	15.207	32.905.233.404	3,61%
Switzerland	240	19.308	126.629.207.832	13,88%
Turkey	170	9.878	2.434.714.106	0,27%
United Kingdom	673	44.385	238.090.812.027	26,10%

Table A2: Summary statistics by terciles

	Terciles by: ETF float ownership					
	Developed Europe			*Rest of Europe*		
	1	2	3	1	2	3
Median						
ETF ownership	0,08%	0,99%	4,03%	0,05%	0,58%	2,07%
ETF float ownership	0,14%	1,50%	5,48%	0,15%	1,68%	5,36%
Physical ETF ownership	0,07%	0,96%	3,91%	0,04%	0,56%	1,93%
Physical ETF float ownership	0,12%	1,46%	5,31%	0,14%	1,61%	5,03%
Synthetic ETF ownership	0,00%	0,00%	0,09%	0,00%	0,00%	0,09%
Synthetic ETF float ownership	0,00%	0,01%	0,14%	0,00%	0,00%	0,25%
Other passive ownership	27,68%	26,64%	24,56%	60,00%	58,77%	53,05%
Other floating passive ownership	47,88%	43,51%	44,92%	141,16%	146,98%	125,70%
Wtd. SD ETF Shares	1,14%	1,23%	1,53%	0,66%	1,19%	1,29%
Wtd. ETF Turnover	0,24%	0,21%	0,50%	0,23%	0,45%	0,55%
Wtd. ETF Flows	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
Wtd. ETF Floating Flows	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%
lg(Market Cap)	19,99	21,01	22,62	19,76	20,48	21,84
lg(Free Float)	19,53	20,57	22,26	18,81	19,40	20,84
Average daily bid-ask spread	0,60%	0,23%	0,10%	0,44%	0,27%	0,20%
Trading turnover	2,45%	3,76%	5,02%	2,40%	4,06%	4,17%
Return volatility (t+1)	1,80%	1,73%	1,51%	2,04%	2,03%	1,96%
Fama&French5 alpha (t+1)	0,02%	0,02%	0,02%	0,00%	0,00%	0,01%
Mean						
ETF ownership	0,15%	1,27%	7,54%	0,12%	0,83%	2,60%
ETF float ownership	0,23%	1,84%	10,16%	0,25%	2,00%	6,21%
Physical ETF ownership	0,14%	1,24%	7,39%	0,11%	0,78%	2,44%
Physical ETF float ownership	0,22%	1,80%	9,96%	0,24%	1,91%	5,86%
Synthetic ETF ownership	0,01%	0,03%	0,14%	0,00%	0,04%	0,13%
Synthetic ETF float ownership	0,01%	0,04%	0,19%	0,01%	0,07%	0,28%
Other passive ownership	33,59%	31,51%	28,96%	55,54%	54,87%	52,70%
Other floating passive ownership	94,84%	81,95%	82,36%	208,20%	202,49%	182,48%
Wtd. SD ETF Shares	2,15%	1,80%	2,48%	1,59%	1,74%	1,65%
Wtd. ETF Turnover	4,00%	10,39%	35,20%	19,41%	5,33%	2,75%
Wtd. ETF Flows	-0,03%	-0,07%	-0,04%	-0,04%	-0,08%	-0,07%
Wtd. ETF Floating Flows	-0,05%	-0,12%	-0,07%	-0,08%	-0,17%	-0,16%
lg(Market Cap)	19,99	21,06	22,61	19,87	20,70	21,77
lg(Free Float)	19,44	20,61	22,23	18,88	19,66	20,75
Average daily bid-ask spread	1,05%	0,37%	0,17%	1,31%	0,47%	0,31%
Trading turnover	45,11%	27,16%	14,51%	18,80%	16,03%	15,92%
Return volatility (t+1)	2,03%	1,94%	1,71%	2,29%	2,29%	2,17%
Fama&French5 alpha (t+1)	0,03%	0,03%	0,02%	0,02%	0,01%	0,02%
Standard deviation						
ETF ownership	0,44%	1,13%	8,16%	0,17%	0,71%	2,41%
ETF float ownership	0,67%	1,52%	10,19%	0,37%	1,48%	4,17%
Physical ETF ownership	0,44%	1,12%	8,09%	0,17%	0,66%	2,33%
Physical ETF float ownership	0,66%	1,48%	10,11%	0,36%	1,40%	4,07%
Synthetic ETF ownership	0,02%	0,05%	0,13%	0,02%	0,09%	0,15%
Synthetic ETF float ownership	0,03%	0,07%	0,17%	0,04%	0,17%	0,27%
Other passive ownership	24,00%	23,13%	22,38%	24,90%	23,67%	21,62%
Other floating passive ownership	127,30%	108,52%	103,35%	195,07%	173,97%	168,87%
Wtd. SD ETF Shares	3,25%	2,36%	3,17%	3,20%	2,04%	1,83%
Wtd. ETF Turnover	58,16%	132,09%	235,58%	127,32%	43,36%	25,02%
Wtd. ETF Flows	0,24%	0,41%	0,32%	0,33%	0,45%	0,42%
Wtd. ETF Floating Flows	0,44%	0,70%	0,55%	0,62%	0,87%	0,82%
lg(Market Cap)	1,29	1,06	1,33	1,38	1,29	1,27
lg(Free Float)	1,41	1,16	1,49	1,44	1,51	1,46
Average daily bid-ask spread	21,63%	0,44%	0,28%	10,48%	1,83%	0,83%
Trading turnover	1713,55%	222,20%	85,81%	113,01%	63,57%	101,24%
Return volatility (t+1)	1,08%	0,95%	0,86%	1,27%	1,14%	1,02%
Fama&French5 alpha (t+1)	0,53%	0,48%	0,39%	0,62%	0,60%	0,53%

Graph A1.



Left axis relates to areas. Right axis to lines. The black lines measure total TNA in-sample over time.

Table A3: overall ETF ownership and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	3	*a.*	-0,01 *0,68*		-0,05 *(2,39)***					5,785 *(4,12)****	YES	0,56	77.111
		b.		-0,01 *0,46*		-0,11 *(5,40)****				4,69 *(3,69)****	YES	0,55	71.902
	4	*a.*	-0,02 *0,88*		-0,06 *(2,89)****					5,155 *(3,96)****	YES	0,55	74.238
		b.		-0,01 *0,61*		-0,11 *(5,19)****				4,19 *(3,56)****	YES	0,54	69.096
	6	*a.*	-0 *0,18*				0,199 *(16,23)****	0,125 *(14,37)****	0,122 *(12,90)****	3,323 *(4,31)****	YES	0,58	157.531
		b.		-0,01 *1,05*			0,203 *(16,47)****	0,129 *(14,02)****	0,125 *(12,96)****	1,937 *(2,56)***	YES	0,58	157.560
Rest of Europe	3	*a.*	0,008 *0,25*		0,033 *0,89*					6,337 *(4,89)****	YES	0,46	14.120
		b.		-0,01 *0,65*		-0,11 *(5,97)****				5,187 *(3,85)****	YES	0,46	13.811
	4	*a.*	0,001 *0,04*		0,033 *0,95*					4,827 *(3,41)****	YES	0,46	13.450
		b.		-0,02 *0,96*		-0,08 *(4,88)****				3,895 *(2,81)****	YES	0,46	13.128
	6	*a.*	-0,03 *0,74*				0,271 *(10,57)****	0,099 *(3,34)****	0,122 *(8,18)****	2,181 *(3,18)****	YES	0,50	17.897
		b.		-0,04 *(1,74)**			0,271 *(10,40)****	0,102 *(3,53)****	0,123 *(7,96)****	1,052 *1,48*	YES	0,50	17.915

Panel Illiquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	3	*a.*	0,071 *(2,50)***		-0,03 *(2,16)***					5,535 *(3,75)****	YES	0,54	42.150
		b.		0,047 *(1,67)**		-0,09 *(3,36)****				4,369 *(3,37)****	YES	0,54	41.486
	4	*a.*	0,067 *(2,75)****		-0,03 *(2,64)****					5,008 *(3,70)****	YES	0,53	40.044
		b.		0,04 *1,55*		-0,09 *(3,33)****				3,959 *(3,37)****	YES	0,53	39.408
	6	*a.*	0,028 *(3,30)****				0,191 *(17,68)****	0,1 *(11,91)****	0,097 *(9,61)****	3,601 *(4,46)****	YES	0,54	78.427
		b.		0,001 *0,07*			0,195 *(18,24)****	0,104 *(11,86)****	0,1 *(9,58)****	1,834 *(2,74)****	YES	0,54	78.433
Rest of Europe	3	*a.*	-0,04 *0,52*		0,118 *(4,34)****					7,826 *(3,69)****	YES	0,48	6.082
		b.		-0,01 *0,28*		-0,12 *(2,34)***				7,005 *(4,29)****	YES	0,48	5.960
	4	*a.*	-0,06 *0,65*		0,128 *(4,71)****					5,699 *(2,31)***	YES	0,47	5.692
		b.		-0,03 *0,76*		-0,09 *1,34*				5,402 *(3,07)****	YES	0,47	5.550
	6	*a.*	-0,09 *(2,05)***				0,25 *(9,65)****	0,133 *(6,76)****	0,099 *(5,27)****	2,787 *(1,97)***	YES	0,50	7.898
		b.		-0,09 *(2,95)****			0,25 *(9,88)****	0,139 *(7,80)****	0,102 *(5,51)****	1,346 *1,43*	YES	0,50	7.917

Panel Liquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	**Floating ETF Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj, R2**	**N**
Developed Europe	3	*a.*	-0,03 *(2,51)***		-0,12 *(3,28)****					4,254 *(3,71)****	YES	0,61	34.841
		b.		-0,01 *0,58*		-0,13 *(5,84)****				3,186 *(3,00)****	YES	0,60	30.303
	4	*a.*	-0,03 *(2,47)***		-0,11 *(2,93)****					3,664 *(3,55)****	YES	0,60	34.077
		b.		-0,01 *0,68*		-0,12 *(5,50)****				2,682 *(2,78)****	YES	0,60	29.580
	6	*a.*	0 *0,08*				0,178 *(11,51)****	0,141 *(13,18)****	0,146 *(14,00)****	2,429 *(3,63)****	YES	0,63	78.914
		b.		-0 *0,33*			0,181 *(11,35)****	0,143 *(13,27)****	0,149 *(14,29)****	1,217 *(1,72)**	YES	0,63	78.936
Rest of Europe	3	*a.*	0,012 *0,55*		-0,04 *0,48*					4,084 *(2,76)****	YES	0,48	8.014
		b.		-0 *0,23*		-0,07 *(3,42)****				2,634 *(1,88)**	YES	0,47	7.828
	4	*a.*	0,01 *0,46*		-0,04 *0,50*					4,195 *(2,95)****	YES	0,47	7.738
		b.		-0,01 *0,49*		-0,07 *(2,98)****				2,58 *(1,75)**	YES	0,47	7.559
	6	*a.*	0,001 *0,03*				0,279 *(10,99)****	0,06 *(2,02)***	0,135 *(7,31)****	2,001 *(2,43)***	YES	0,51	9.976
		b.		-0,02 *1,17*			0,279 *(10,93)****	0,061 *(2,07)***	0,136 *(7,43)****	0,68 *0,68*	YES	0,51	9.975

Control Vars Table 3: overall ETF ownership and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,31 *(4,25)***		-0,005 *(4,66)***	0,003 *(1,83)**	0,018 *(2,10)***	0 *(1,85)**	0,025 *0,41*	-0,242 *(2,26)***	-0,343	(3,01)	0 *(4,93)***
		b.		-0,198 *(2,64)***	-0,005 *(3,77)***	0,003 *(2,39)***	0,019 *(1,92)**	0 *0,58*	-0,022 *0,36*	-0,303 *(2,71)***	-0,412	(3,47)	0 *(5,31)***
	2	*a.*	-0,272 *(4,14)***		-0,002 *0,93*	0 *0,08*	5,333 *(3,74)***	0 *(4,17)***	0,03 *0,37*	-0,217 *(1,91)**	-0,279	(2,26)	0 *(3,11)***
		b.		-0,184 *(2,94)***	-0,002 *0,77*	0,001 *0,22*	6,029 *(3,94)***	0 *(2,97)***	0,005 *0,07*	-0,243 *(2,14)***	-0,306	(2,54)	0 *(3,10)***
	3	*a.*	-0,272 *(4,10)***		-0,002 *0,95*	0 *0,08*	5,532 *(3,86)***	0 *(3,94)***	0,031 *0,38*	-0,216 *(1,91)**	-0,278	(2,26)	0 *(3,08)***
		b.		-0,228 *(3,65)***	-0,002 *0,99*	0,001 *0,15*	6,146 *(4,00)***	0 *(3,68)***	0,027 *0,35*	-0,221 *(1,97)***	-0,283	(2,36)	0 *(3,04)***
	4	*a.*	-0,244 *(3,97)***		0,005 *1,02*	0,003 *0,61*	8,332 *(3,46)***	0 *(4,12)***	0,037 *0,46*	-0,229 *(2,23)***	-0,284	(2,45)	0 *(2,78)***
		b.		-0,205 *(3,56)***	0,005 *0,94*	0,003 *0,75*	9,057 *(3,75)***	0 *(3,84)***	0,037 *0,47*	-0,232 *(2,26)***	-0,293	(2,50)	0 *(2,89)***
	5	*a.*	-0,14 *(4,07)***		0,004 *1,24*	0 *0,01*	4,352 *(2,80)***	0 *(2,07)***	0,089 *1,62*	-0,305 *(3,69)***	-0,53	(5,09)	0 *(2,91)***
		b.		-0,118 *(3,65)***	0,004 *1,15*	0 *0,04*	4,812 *(3,21)***	0 *(1,82)**	0,087 *1,58*	-0,308 *(3,83)***	-0,534	(4,96)	0 *(3,12)***
	6	*a.*	-0,155 *(4,29)***		-0,003 *(6,62)***	0 *0,02*	0,01 *(2,68)***	0 *0,97*	0,062 *1,61*	-0,3 *(4,09)***	-0,598	(6,46)	0 *(3,73)***
		b.		-0,091 *(2,53)***	-0,002 *(4,64)***	0 *0,00*	0,01 *(2,51)***	0 *0,05*	0,037 *0,97*	-0,335 *(4,43)***	-0,642	(6,75)	0 *(3,99)***
Rest of Europe	1	*a.*	-0,241 *(4,75)***		0 *0,89*	0,209 *(1,98)***	-0,27 *0,37*	0,002 *(1,93)**	0,161 *1,09*	0,011 *0,06*	0,063	0,21	0 *1,41*
		b.		-0,137 *(2,12)***	0 *0,53*	0,213 *(1,97)***	-0,047 *0,05*	0,003 *(1,79)**	0,119 *0,86*	-0,04 *0,22*	0,015	0,05	0 *1,40*
	2	*a.*	-0,299 *(5,02)***		0 *(3,41)***	0,246 *(2,58)***	5,293 *0,94*	0,002 *(2,18)***	0,16 *1,07*	0,053 *0,31*	0,153	0,49	0 *(1,92)**
		b.		-0,207 *(3,21)***	0 *(3,01)***	0,248 *(2,67)***	5,893 *1,15*	0,002 *(1,94)**	0,11 *0,80*	0,007 *0,05*	0,103	0,32	0 *1,60*
	3	*a.*	-0,3 *(4,91)***		0 *(3,34)***	0,246 *(2,59)***	5,178 *0,92*	0,002 *(2,13)***	0,159 *1,04*	0,053 *0,31*	0,154	0,49	0 *(1,90)**
		b.		-0,258 *(3,86)***	0 *(3,16)***	0,24 *(2,57)***	5,85 *1,21*	0,002 *(1,86)**	0,133 *0,97*	0,033 *0,21*	0,128	0,39	0 *1,56*
	4	*a.*	-0,232 *(3,48)***		0 *(3,56)***	0,248 *(2,49)***	17,204 *(2,39)***	0,007 *(2,51)***	0,175 *1,06*	0,112 *0,75*	0,12	0,38	0 *(4,06)***
		b.		-0,197 *(2,90)***	0 *(3,37)***	0,241 *(2,46)***	15,919 *(2,47)***	0,008 *(2,29)***	0,153 *1,02*	0,088 *0,65*	0,095	0,29	0 *(3,85)***
	5	*a.*	-0,129 *(2,60)***		0 *(2,56)***	0,092 *1,21*	5,971 *1,01*	0,005 *(2,70)***	0,078 *0,55*	-0,01 *0,07*	-0,119	0,43	0 *(2,53)***
		b.		-0,108 *(2,39)***	0 *(2,49)***	0,09 *1,20*	6,311 *1,41*	0,005 *(2,55)***	0,07 *0,53*	-0,019 *0,15*	-0,128	0,44	0 *(2,38)***
	6	*a.*	-0,104 *(3,18)***		0 *1,08*	0,058 *0,78*	-0,286 *0,39*	0,005 *(2,51)***	0,091 *0,70*	-0,049 *0,38*	-0,188	0,71	0 *(1,91)**
		b.		-0,053 *1,50*	0 *0,88*	0,059 *0,79*	-0,097 *0,11*	0,006 *(2,37)***	0,082 *0,67*	-0,071 *0,57*	-0,216	0,80	0 *(2,02)***

Panel Illiquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,292 *(4,09)***		-0,006 *(5,11)***	0,003 *(2,24)***	0,019 *(2,10)***	0 *(3,31)***	0,056 *1,17*	-0,173 *(1,71)**	-0,197	(1,69)	0 *(2,80)***
		b.		-0,161 *(2,54)***	-0,005 *(4,43)***	0,003 *(2,62)***	0,02 *(1,92)**	0 *1,38*	0,003 *0,05*	-0,25 *(2,33)***	-0,288	(2,38)	0 *(3,49)***
	2	*a.*	-0,269 *(3,70)***		-0,003 *(1,80)**	0 *0,08*	5,726 *(4,34)***	0 *(4,62)***	0,071 *0,92*	-0,137 *1,23*	-0,14	1,00	0 *(2,00)***
		b.		-0,176 *(2,94)***	-0,002 *1,51*	0,001 *0,17*	6,204 *(4,28)***	0 *(3,95)***	0,04 *0,54*	-0,186 *1,63*	-0,203	1,45	0 *(2,64)***
	3	*a.*	-0,268 *(3,68)***		-0,003 *(1,82)**	0 *0,08*	5,803 *(4,30)***	0 *(4,58)***	0,071 *0,91*	-0,137 *1,22*	-0,14	1,00	0 *(1,84)**
		b.		-0,218 *(3,29)***	-0,003 *(1,75)**	0,001 *0,13*	6,179 *(4,41)***	0 *(4,27)***	0,06 *0,80*	-0,165 *1,48*	-0,179	1,30	0 *(2,39)***
	4	*a.*	-0,245 *(3,68)***		0,004 *1,08*	0,004 *(1,81)**	8,72 *(3,58)***	0 *(4,15)***	0,076 *0,89*	-0,16 *1,57*	-0,135	0,97	0 *0,92*
		b.		-0,2 *(3,34)***	0,004 *0,97*	0,004 *(1,95)**	9,095 *(3,67)***	0 *(4,01)***	0,07 *0,84*	-0,182 *(1,78)**	-0,175	1,26	0 *1,50*
	5	*a.*	-0,169 *(4,04)***		0,003 *1,37*	0,003 *0,84*	4,772 *(2,77)***	0 *(2,57)***	0,106 *1,59*	-0,259 *(3,51)***	-0,391	(3,07)	0 *1,05*
		b.		-0,139 *(3,68)***	0,003 *1,24*	0,003 *0,89*	5,094 *(2,92)***	0 *(2,56)***	0,103 *1,58*	-0,273 *(3,72)***	-0,42	(3,28)	0 *1,63*
	6	*a.*	-0,173 *(4,37)***		-0,003 *(8,00)***	0,002 *0,94*	0,011 *(2,81)***	0 *(2,26)***	0,077 *(2,07)***	-0,254 *(3,93)***	-0,489	(4,85)	0 *1,12*
		b.		-0,088 *(2,61)***	-0,003 *(6,30)***	0,002 *0,97*	0,011 *(2,21)***	0 *0,60*	0,043 *1,22*	-0,304 *(4,39)***	-0,55	(5,26)	0 *(1,65)**
Rest of Europe	1	*a.*	-0,345 *(5,99)***		0 *(4,49)***	0,155 *(1,90)**	-0,324 *0,59*	0,001 *(1,94)**	-0,006 *0,03*	-0,102 *0,41*	0,169	0,57	0 *1,30*
		b.		-0,195 *(1,80)**	0 *(3,74)***	0,151 *(1,90)**	-0,066 *0,10*	0,002 *(1,65)**	-0,053 *0,30*	-0,147 *0,69*	0,095	0,33	0 *0,90*
	2	*a.*	-0,37 *(3,60)***		0 *(6,36)***	0,182 *(2,54)***	4,26 *0,80*	0,001 *(2,32)***	-0,061 *0,32*	-0,024 *0,10*	0,204	0,67	0 *(1,69)**
		b.		-0,301 *(3,51)***	0 *(5,42)***	0,171 *(2,61)***	5,033 *1,07*	0,001 *(1,75)**	-0,086 *0,50*	-0,027 *0,14*	0,185	0,63	0 *1,34*
	3	*a.*	-0,378 *(3,61)***		0 *(6,34)***	0,181 *(2,55)***	3,775 *0,70*	0,001 *(2,09)***	-0,062 *0,32*	-0,021 *0,09*	0,211	0,70	0 *(1,78)**
		b.		-0,356 *(4,21)***	0 *(6,05)***	0,17 *(2,46)***	5,214 *1,15*	0,001 *(1,76)**	-0,06 *0,35*	-0,007 *0,03*	0,213	0,70	0 *1,59*
	4	*a.*	-0,279 *(2,30)***		0 *(6,37)***	0,181 *(2,39)***	14,431 *(1,77)**	0,006 *(2,36)***	-0,044 *0,20*	0,049 *0,27*	0,152	0,52	0 *(4,99)***
		b.		-0,279 *(3,07)***	0 *(5,90)***	0,171 *(2,34)***	14,098 *(2,17)***	0,006 *(2,27)***	-0,034 *0,17*	0,059 *0,36*	0,158	0,55	0 *(4,64)***
	5	*a.*	-0,135 *1,49*		0 *(5,35)***	0,073 *1,29*	5,762 *0,92*	0,005 *(3,10)***	-0,038 *0,20*	-0,086 *0,56*	-0,098	0,36	0 *(5,65)***
		b.		-0,137 *(2,15)***	0 *(5,28)***	0,069 *1,22*	6,302 *1,37*	0,005 *(2,87)***	-0,029 *0,16*	-0,072 *0,51*	-0,087	0,31	0 *(5,09)***
	6	*a.*	-0,136 *(1,94)**		0 *(3,68)***	0,054 *0,91*	-0,141 *0,27*	0,004 *(2,03)***	0,015 *0,09*	-0,161 *0,97*	-0,101	0,36	0 *(4,30)***
		b.		-0,069 *1,40*	0 *(3,15)***	0,05 *0,87*	0,05 *0,07*	0,006 *(1,79)**	0,018 *0,13*	-0,191 *1,33*	-0,147	0,55	0 *(4,11)***

Panel Liquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,25 *(4,64)***		0,294 *(2,42)***	-0,004 *0,55*	60,601 *(3,67)***	0,01 *(2,05)***	-0,002 *0,03*	-0,324 *(2,99)***	-0,616	(4,71)	0 *(3,53)***
		b.		-0,151 *(2,51)***	0,341 *(2,67)***	-0,002 *0,27*	76,556 *(4,08)***	0,012 *(2,41)***	-0,032 *0,46*	-0,361 *(3,18)***	-0,668	(4,90)	0 *(3,45)***
	2	*a.*	-0,205 *(4,08)***		0,345 *(2,18)***	0 *0,01*	66,202 *(3,38)***	0,013 *(3,96)***	0,03 *0,41*	-0,292 *(2,74)***	-0,517	(4,09)	0 *(2,97)***
		b.		-0,108 *(1,97)***	0,366 *(2,29)***	0,002 *0,11*	84 *(4,86)***	0,017 *(3,72)***	0,024 *0,38*	-0,289 *(2,76)***	-0,519	(4,23)	0 *(2,11)***
	3	*a.*	-0,203 *(3,95)***		0,349 *(2,17)***	0 *0,00*	74,03 *(3,54)***	0,013 *(3,99)***	0,034 *0,49*	-0,29 *(2,74)***	-0,52	(4,14)	0 *(3,20)***
		b.		-0,16 *(3,25)***	0,35 *(2,22)***	0,001 *0,06*	81,072 *(4,80)***	0,015 *(3,61)***	0,039 *0,60*	-0,273 *(2,62)***	-0,495	(4,07)	0 *(2,39)***
	4	*a.*	-0,177 *(3,81)***		0,351 *(1,98)***	-0,004 *0,27*	81,555 *(3,98)***	0,013 *(3,50)***	0,032 *0,45*	-0,311 *(2,89)***	-0,543	(4,70)	0 *(3,43)***
		b.		-0,138 *(3,06)***	0,355 *(2,04)***	-0,003 *0,17*	91,148 *(5,09)***	0,015 *(3,54)***	0,037 *0,57*	-0,295 *(2,81)***	-0,534	(4,46)	0 *(2,73)***
	5	*a.*	-0,082 *(2,99)***		0,21 *(2,24)***	-0,027 *(2,97)***	27,245 *(1,93)**	0,007 *(2,55)***	0,093 *(1,86)**	-0,344 *(3,25)***	-0,725	(6,92)	0 *(2,64)***
		b.		-0,06 *(2,25)***	0,212 *(2,35)***	-0,026 *(2,77)***	32,086 *(2,45)***	0,009 *(2,84)***	0,089 *(1,78)**	-0,34 *(3,28)***	-0,715	(6,53)	0 *(2,17)***
	6	*a.*	-0,113 *(3,78)***		0,171 *(2,21)***	-0,026 *(7,19)***	15,92 *1,39*	0,005 *(1,70)**	0,05 *1,01*	-0,338 *(3,98)***	-0,759	(7,38)	0 *(3,30)***
		b.		-0,06 *(1,86)**	0,197 *(2,47)***	-0,025 *(6,59)***	22,868 *(1,85)**	0,007 *(2,00)***	0,035 *0,71*	-0,359 *(4,17)***	-0,792	(7,54)	0 *(3,17)***
Rest of Europe	1	*a.*	-0,154 *(3,66)***		0 *(1,72)**	0,366 *(1,92)**	75,555 *1,15*	0,007 *1,60*	0,259 *(1,88)**	0,095 *0,61*	-0,015	0,05	0 *(1,95)**
		b.		-0,063 *1,04*	0 *(2,26)***	0,377 *(1,98)***	82,777 *1,25*	0,012 *(1,79)**	0,233 *(1,65)**	0,055 *0,34*	-0,05	0,17	0 *(2,58)***
	2	*a.*	-0,198 *(3,13)***		0 *0,78*	0,387 *(2,32)***	69,981 *1,12*	0,007 *1,44*	0,251 *(1,67)**	0,082 *0,53*	0,123	0,43	0 *(2,68)***
		b.		-0,09 *1,29*	0 *0,45*	0,404 *(2,47)***	71,321 *1,27*	0,01 *(1,78)**	0,212 *1,42*	0,032 *0,21*	0,081	0,28	0 *(2,75)***
	3	*a.*	-0,197 *(3,09)***		0 *0,74*	0,386 *(2,33)***	70,949 *1,12*	0,007 *1,44*	0,251 *(1,67)**	0,083 *0,55*	0,124	0,43	0 *(2,64)***
		b.		-0,137 *(2,15)***	0 *0,47*	0,39 *(2,44)***	68,686 *1,21*	0,009 *(1,65)**	0,225 *1,50*	0,051 *0,34*	0,101	0,35	0 *(2,89)***
	4	*a.*	-0,202 *(3,27)***		0 *1,11*	0,392 *(2,19)***	69,242 *1,13*	0,004 *0,90*	0,256 *1,57*	0,109 *0,69*	0,09	0,29	0 *(2,87)***
		b.		-0,134 *(1,99)***	0 *0,89*	0,394 *(2,28)***	66,647 *1,20*	0,007 *1,34*	0,217 *1,32*	0,069 *0,44*	0,059	0,18	0 *(3,16)***
	5	*a.*	-0,12 *(2,53)***		0 *0,63*	0,126 *1,04*	22,104 *0,59*	0,003 *0,81*	0,089 *0,69*	0,004 *0,03*	-0,121	0,48	0 *(2,22)***
		b.		-0,081 *(1,67)**	0 *0,44*	0,128 *1,10*	21,483 *0,65*	0,005 *1,19*	0,068 *0,52*	-0,017 *0,11*	-0,137	0,54	0 *(2,33)***
	6	*a.*	-0,096 *(2,60)***		0 *0,87*	0,088 *0,69*	20,465 *0,51*	0,003 *0,85*	0,111 *0,90*	0,02 *0,16*	-0,226	0,93	0 *(1,68)**
		b.		-0,037 *0,81*	0 *1,21*	0,094 *0,74*	25,502 *0,65*	0,006 *1,21*	0,093 *0,75*	-0,006 *0,05*	-0,253	1,03	0 *(1,87)**

Table A4: overall ETF activity and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	3	a.	-0,01 *0,42*		0,014 *(1,83)**	0,022 *(5,12)****	-0 *0,70*		-0,01 *1,01*		0,011 *1,11*		-0,01 *1,37*		-0,06 *(2,35)***					5,782 *(4,02)****	YES	0,55	75.289
		b.		-0,01 *0,34*	0,015 *(1,77)**	0,019 *(10,66)***		-0 *0,45*		-0,01 *1,48*		-0 *0,20*		0 *0,05*		-0,11 *(5,12)****				4,712 *(3,59)****	YES	0,55	70.148
	4	a.	-0,01 *0,55*		0,014 *(1,84)**	0,023 *(6,22)****	0 *0,07*		-0,01 *1,11*		0,015 *1,59*		-0,01 *1,43*		-0,06 *(2,81)****					5,226 *(3,87)****	YES	0,55	72.524
		b.		-0,01 *0,47*	0,014 *(1,79)**	0,02 *(11,14)****		0 *0,08*		-0,01 *1,50*		0,002 *0,23*		-0 *0,49*		-0,11 *(4,93)****				4,273 *(3,49)****	YES	0,54	67.449
	6	a.	-0 *0,59*		0,018 *(2,94)****	0,012 *(4,85)****	0 *0,16*		-0 *1,01*		-0,01 *0,93*		-0 *0,47*				0,198 *(16,43)****	0,123 *(13,73)****	0,122 *(12,17)****	3,408 *(4,40)****	YES	0,58	######
		b.		-0,01 *1,51*	0,018 *(2,89)****	0,011 *(5,36)****		0,002 *1,28*		-0 *1,17*		-0,01 *(3,31)****		0,002 *1,52*			0,201 *(16,63)****	0,127 *(13,23)****	0,125 *(12,15)****	2,101 *(2,77)****	YES	0,58	######
Rest of Europe	3	a.	-0,01 *0,27*		0,077 *(3,08)****	0,014 *0,48*	-0,01 *1,60*		0,004 *0,32*		-0,03 *0,58*		-0,01 *1,07*		0,022 *0,58*					6,143 *(4,88)****	YES	0,47	13.765
		b.		-0,03 *1,37*	0,077 *(3,16)****	0,007 *0,19*		-0,01 *(3,32)****		0,006 *0,48*		-0,02 *0,44*		-0 *0,49*		-0,11 *(5,96)****				5,112 *(3,75)****	YES	0,46	13.249
	4	a.	-0,02 *0,45*		0,082 *(3,10)****	0,016 *0,51*	-0,01 *1,22*		0,003 *0,29*		-0,03 *0,74*		-0,01 *1,54*		0,021 *0,58*					4,594 *(3,46)****	YES	0,46	13.108
		b.		-0,04 *1,47*	0,081 *(3,09)****	0,01 *0,26*		-0,01 *(2,70)****		0,006 *0,46*		-0,03 *0,60*		-0,01 *0,69*		-0,09 *(4,82)****				3,8 *(2,75)****	YES	0,46	12.585
	6	a.	-0,04 *1,01*		0,076 *(3,75)****	0,022 *0,82*	-0 *1,23*		0,006 *0,47*		-0,01 *0,12*		0,002 *0,49*				0,267 *(10,58)****	0,103 *(3,66)****	0,119 *(8,76)****	1,989 *(3,22)****	YES	0,50	17.437
		b.		-0,05 *(2,01)***	0,076 *(3,80)****	0,017 *0,52*		-0,01 *(1,82)**		0,006 *0,55*		-0,01 *0,17*		0 *0,06*			0,266 *(10,40)****	0,108 *(3,86)****	0,119 *(8,26)****	0,934 *1,29*	YES	0,50	17.174

Panel Illiquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	3	a.	0,079 *(2,41)***		0,009 *0,90*	0,017 *0,29*	-0,01 *1,51*		-0,01 *0,68*		0,046 *0,41*		-0,02 *0,80*		-0,04 *(2,34)***					5,576 *(3,60)****	YES	0,54	41.266
		b.		0,05 *(1,74)**	0,01 *1,37*	0,003 *0,05*		-0,01 *1,26*		-0,01 *1,33*		0,01 *0,31*		-0,01 *0,89*		-0,09 *(3,28)****				4,437 *(3,27)****	YES	0,54	40.562
	4	a.	0,078 *(2,60)****		0,008 *0,80*	-0,01 *0,16*	-0,01 *(1,69)**		-0,01 *0,74*		0,067 *0,53*		-0,02 *1,16*		-0,04 *(2,80)****					5,111 *(3,58)****	YES	0,53	39.220
		b.		0,044 *(1,74)**	0,009 *1,27*	-0,03 *0,36*		-0,01 *1,43*		-0,01 *1,43*		0,022 *0,61*		-0,02 *1,41*		-0,09 *(3,25)****				4,09 *(3,33)****	YES	0,53	38.546
	6	a.	0,028 *(3,79)****		0,016 *(3,20)****	-0 *0,17*	-0 *0,63*		-0,01 *1,28*		-0,04 *1,29*		-0 *0,37*				0,191 *(17,82)****	0,099 *(12,46)****	0,098 *(9,40)****	3,685 *(4,44)****	YES	0,54	76.736
		b.		0,003 *0,35*	0,02 *(3,68)****	0,012 *0,66*		0,005 *(1,98)**		0,002 *0,29*		-0,01 *0,63*		0,006 *1,44*			0,194 *(18,36)****	0,102 *(12,33)****	0,099 *(9,26)****	1,945 *(2,84)****	YES	0,54	76.811
Rest of Europe	3	a.	-0,05 *0,73*		0,121 *(3,91)****	-0,08 *(1,93)**	-0 *0,10*		0,13 *(3,07)****		-0,15 *(2,47)***		-0,01 *1,55*		0,106 *(3,45)****					7,816 *(3,80)****	YES	0,49	5.915
		b.		-0,02 *0,74*	0,108 *(3,70)****	-0,06 *1,58*		-0,01 *1,37*		0,09 *(3,38)****		-0,09 *(2,06)***		-0,01 *1,46*		-0,13 *(2,26)***				7,143 *(4,47)****	YES	0,48	5.724
	4	a.	-0,07 *0,82*		0,127 *(3,85)****	-0,08 *(1,66)**	0,003 *0,49*		0,129 *(2,60)****		-0,18 *(2,45)***		-0,02 *(2,46)***		0,111 *(3,55)****					5,718 *(2,40)***	YES	0,48	5.529
		b.		-0,06 *1,24*	0,127 *(3,65)****	-0,08 *1,59*		-0,01 *1,22*		0,117 *(2,49)***		-0,15 *(2,10)***		-0,02 *(2,37)***		-0,1 *1,47*				5,486 *(3,17)****	YES	0,48	5.318
	6	a.	-0,1 *(2,00)***		0,112 *(3,97)****	-0,04 *1,07*	-0,01 *1,27*		0,104 *(2,53)***		-0,11 *(1,77)**		0,002 *0,61*				0,24 *(9,82)****	0,133 *(7,00)****	0,096 *(5,44)****	2,823 *(2,10)***	YES	0,50	7.661
		b.		-0,1 *(2,93)****	0,103 *(3,32)****	-0,03 *0,53*		-0,01 *(2,20)***		0,08 *(1,81)**		-0,06 *1,01*		-0,01 *1,34*			0,239 *(10,34)****	0,142 *(8,28)****	0,099 *(5,51)****	1,294 *1,39*	YES	0,50	7.579

Table A4 continues…

Panel Liquid. *Dependent variable: Stock return volatility*

			ETF Ownership (t-1)	ETF Float Ownership (t-1)	Wtd. SD ETF Shares	Wtd. ETF Turnover	Wtd. ETF Flows	Wtd. Floating ETF Flows	ETF Ownership X Wtd. SD ETF Shares	ETF Float Ownership X Wtd. SD ETF Shares	ETF Ownership X Wtd. ETF Turnover	ETF Float Ownership X Wtd. ETF Turnover	ETF Ownership X Wtd. ETF Flows	ETF Float Ownership X Wtd. ETF Float Flows	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	3	*a.*	-0,02 *(2,02)***		0,015 *1,35*	0,019 *(4,85)****	0,005 *1,64*		-0,01 *1,06*		0,009 *1,10*		-0,01 *(1,74)**		-0,12 *(3,46)****					4,261 *(3,97)****	YES	0,61	33.903
		b.		-0,01 *0,55*	0,02 *1,43*	0,016 *(8,77)****		0,003 *1,11*		-0,01 *1,53*		-0,01 *0,68*		-0 *0,30*		-0,14 *(5,73)****				3,217 *(3,16)****	YES	0,60	29.471
	4	*a.*	-0,02 *(1,92)**		0,015 *1,28*	0,02 *(5,55)****	0,006 *(2,04)***		-0,01 *1,15*		0,014 *(1,84)**		-0,01 *1,56*		-0,11 *(3,14)****					3,643 *(3,90)****	YES	0,60	33.187
		b.		-0,01 *0,60*	0,02 *1,42*	0,017 *(9,64)****		0,005 *(1,99)***		-0,01 *1,61*		-0 *0,21*		-0 *0,74*		-0,12 *(5,52)****				2,681 *(3,02)****	YES	0,60	28.793
	6	*a.*	-0 *0,37*		0,02 *(1,95)**	0,011 *(3,71)****	0,002 *0,78*		-0 *(2,02)***		-0 *0,53*		-0 *0,88*				0,175 *(11,38)****	0,138 *(13,32)****	0,145 *(13,65)****	2,309 *(3,56)****	YES	0,63	76.572
		b.		-0 *0,16*	0,022 *(1,92)**	0,01 *(4,44)****		0 *0,14*		-0 *(2,01)***		-0,01 *(2,13)***		0,002 *1,07*			0,177 *(11,28)****	0,14 *(13,12)****	0,147 *(13,72)****	1,311 *(1,91)**	YES	0,63	76.824
Rest of Europe	3	*a.*	-0,01 *0,29*		0,072 *(2,84)****	0,109 *1,21*	-0,01 *(1,68)**		0 *0,04*		-0,07 *1,08*		-0 *0,47*		-0,04 *0,58*					3,75 *(2,59)****	YES	0,48	7.826
		b.		-0,02 *1,26*	0,074 *(2,96)****	0,111 *1,45*		-0,01 *1,34*		0,001 *0,13*		-0,08 *1,19*		0,002 *0,21*		-0,08 *(4,42)****				2,582 *(1,85)**	YES	0,47	7.501
	4	*a.*	-0,01 *0,32*		0,073 *(2,55)***	0,079 *0,93*	-0,01 *1,17*		0 *0,03*		-0,06 *1,03*		-0,01 *0,77*		-0,05 *0,59*					3,802 *(2,76)****	YES	0,47	7.559
		b.		-0,02 *1,24*	0,073 *(2,61)****	0,081 *1,10*		-0,01 *1,40*		0,002 *0,20*		-0,06 *1,06*		0,001 *0,11*		-0,08 *(3,62)****				2,475 *(1,71)**	YES	0,47	7.246
	6	*a.*	-0,01 *0,46*		0,067 *(3,95)****	0,043 *1,12*	0 *0,10*		0 *0,05*		-0,02 *0,40*		0,001 *0,08*				0,276 *(11,40)****	0,064 *(2,20)***	0,132 *(6,98)****	1,659 *(2,12)***	YES	0,51	9.753
		b.		-0,03 *1,56*	0,068 *(4,34)****	0,038 *1,00*		0,001 *0,12*		0,001 *0,20*		-0,02 *0,58*		0,001 *0,29*			0,278 *(11,43)****	0,064 *(2,22)***	0,132 *(7,26)****	0,568 *0,55*	YES	0,51	9.571

Control Vars Table 4: ETF activity and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,313 *(4,27)****		-0,005 *(4,23)****	0,003 *1,57*	0,017 *(2,03)***	0 *(1,99)***	0,02 *0,32*	-0,237 *(2,20)***	-0,338	(2,94)	0 *(4,69)****
		b.		-0,209 *(2,77)****	-0,005 *(4,02)****	0,003 *(2,05)***	0,018 *(1,87)**	0 *0,74*	-0,028 *0,45*	-0,296 *(2,63)****	-0,408	(3,40)	0 *(5,10)****
	2	*a.*	-0,273 *(4,05)****		-0,002 *0,68*	-0,001 *0,11*	5,875 *(3,74)****	0 *(4,22)****	0,014 *0,17*	-0,212 *(1,83)**	-0,279	(2,25)	0 *(3,05)****
		b.		-0,186 *(2,89)****	-0,001 *0,61*	0 *0,01*	6,596 *(3,86)****	0 *(3,06)****	-0,015 *0,20*	-0,244 *(2,13)***	-0,311	(2,53)	0 *(3,04)****
	3	*a.*	-0,272 *(4,01)****		-0,002 *0,69*	-0,001 *0,10*	6,094 *(3,84)****	0 *(4,01)****	0,015 *0,18*	-0,212 *(1,83)**	-0,279	(2,25)	0 *(3,00)****
		b.		-0,23 *(3,56)****	-0,002 *0,77*	0 *0,04*	6,732 *(3,90)****	0 *(3,75)****	0,007 *0,09*	-0,222 *(1,97)***	-0,287	(2,34)	0 *(2,96)****
	4	*a.*	-0,247 *(3,88)****		0,006 *1,11*	0,002 *0,42*	8,34 *(3,45)****	0 *(4,16)****	0,026 *0,31*	-0,221 *(2,08)***	-0,282	(2,41)	0 *(2,76)****
		b.		-0,209 *(3,49)****	0,005 *1,01*	0,003 *0,55*	9,104 *(3,73)****	0 *(3,89)****	0,021 *0,25*	-0,228 *(2,20)***	-0,294	(2,46)	0 *(2,83)****
	5	*a.*	-0,143 *(4,02)****		0,004 *1,38*	0 *0,06*	4,416 *(2,81)****	0 *(2,27)***	0,078 *1,34*	-0,301 *(3,47)****	-0,532	(5,05)	0 *(2,96)****
		b.		-0,122 *(3,63)****	0,004 *1,29*	0 *0,01*	4,87 *(3,18)****	0 *(2,01)***	0,071 *1,20*	-0,307 *(3,73)****	-0,539	(4,89)	0 *(3,10)****
	6	*a.*	-0,159 *(4,39)****		-0,003 *(4,10)****	0 *0,02*	0,009 *(2,19)***	0 *1,10*	0,056 *1,39*	-0,294 *(3,94)****	-0,593	(6,38)	0 *(3,61)****
		b.		-0,099 *(2,74)****	-0,002 *(5,66)****	0 *0,01*	0,01 *(2,31)***	0 *0,14*	0,03 *0,74*	-0,328 *(4,27)****	-0,637	(6,68)	0 *(3,94)****
Rest of Europe	1	*a.*	-0,233 *(4,48)****		0 *1,43*	0,216 *(2,01)***	-0,333 *0,42*	0,002 *(2,04)***	0,129 *0,90*	0,013 *0,07*	0,102	0,35	0 *1,33*
		b.		-0,129 *(1,99)***	0 *1,08*	0,216 *(1,96)***	-0,123 *0,13*	0,003 *(1,88)**	0,091 *0,67*	-0,027 *0,14*	0,018	0,06	0 *1,35*
	2	*a.*	-0,29 *(5,01)****		0 *(4,42)****	0,242 *(2,51)***	5,278 *0,92*	0,002 *(2,30)***	0,135 *0,93*	0,059 *0,33*	0,192	0,61	0 *(1,87)**
		b.		-0,2 *(3,08)****	0 *(4,13)****	0,241 *(2,57)***	5,552 *1,07*	0,002 *(2,05)***	0,083 *0,62*	0,017 *0,10*	0,104	0,32	0 *1,61*
	3	*a.*	-0,29 *(4,91)****		0 *(4,42)****	0,243 *(2,50)***	5,199 *0,91*	0,002 *(2,25)***	0,135 *0,91*	0,059 *0,32*	0,193	0,61	0 *(1,83)**
		b.		-0,254 *(3,77)****	0 *(4,31)****	0,233 *(2,46)***	5,539 *1,14*	0,002 *(1,97)***	0,107 *0,80*	0,044 *0,26*	0,13	0,39	0 *1,61*
	4	*a.*	-0,221 *(3,54)****		0 *(4,72)****	0,245 *(2,45)***	17,484 *(2,41)***	0,007 *(2,57)***	0,15 *0,97*	0,12 *0,77*	0,157	0,49	0 *(4,31)****
		b.		-0,192 *(2,84)****	0 *(4,52)****	0,234 *(2,39)***	15,893 *(2,53)***	0,008 *(2,30)***	0,132 *0,93*	0,101 *0,70*	0,111	0,35	0 *(4,06)****
	5	*a.*	-0,117 *(2,59)****		0 *(4,02)****	0,092 *1,19*	6,44 *1,08*	0,005 *(2,80)****	0,061 *0,48*	-0,007 *0,06*	-0,079	0,29	0 *(2,51)***
		b.		-0,103 *(2,29)***	0 *(3,86)****	0,087 *1,16*	6,43 *1,46*	0,005 *(2,61)****	0,056 *0,46*	-0,011 *0,09*	-0,102	0,37	0 *(2,46)***
	6	*a.*	-0,095 *(3,22)****		0 *(2,09)***	0,063 *0,83*	-0,444 *0,51*	0,005 *(2,71)****	0,066 *0,55*	-0,047 *0,35*	-0,145	0,56	0 *(2,02)***
		b.		-0,047 *1,32*	0 *(1,70)**	0,062 *0,80*	-0,26 *0,25*	0,006 *(2,50)***	0,064 *0,57*	-0,062 *0,49*	-0,189	0,73	0 *(2,20)***

Panel Illiquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,295 *(3,99)****		-0,005 *(4,65)****	0,003 *(2,01)***	0,018 *(2,11)***	0 *(3,51)****	0,049 *1,01*	-0,171 *(1,70)**	-0,194	(1,66)	0 *(2,24)***
		b.		-0,166 *(2,58)****	-0,005 *(4,57)****	0,003 *(2,32)***	0,019 *(1,93)**	0 *1,63*	-0,007 *0,14*	-0,247 *(2,32)***	-0,29	(2,37)	0 *(2,86)****
	2	*a.*	-0,271 *(3,56)****		-0,002 *1,25*	0 *0,01*	6,306 *(4,21)****	0 *(4,48)****	0,056 *0,73*	-0,13 *1,14*	-0,144	1,03	0 *(1,69)**
		b.		-0,18 *(2,88)****	-0,002 *1,08*	0 *0,07*	6,775 *(4,12)****	0 *(4,06)****	0,017 *0,23*	-0,186 *1,61*	-0,209	1,46	0 *(2,32)***
	3	*a.*	-0,271 *(3,53)****		-0,002 *1,27*	0 *0,01*	6,41 *(4,21)****	0 *(4,46)****	0,056 *0,72*	-0,131 *1,14*	-0,144	1,03	0 *1,55*
		b.		-0,222 *(3,20)****	-0,002 *1,26*	0 *0,03*	6,76 *(4,22)****	0 *(4,34)****	0,037 *0,51*	-0,164 *1,46*	-0,184	1,30	0 *(2,08)***
	4	*a.*	-0,25 *(3,56)****		0,005 *1,27*	0,004 *1,62*	8,817 *(3,57)****	0 *(4,17)****	0,069 *0,76*	-0,15 *1,44*	-0,138	0,99	0 *0,77*
		b.		-0,208 *(3,30)****	0,004 *1,14*	0,004 *(1,75)**	9,141 *(3,60)****	0 *(4,11)****	0,054 *0,63*	-0,177 *(1,72)**	-0,178	1,26	0 *1,28*
	5	*a.*	-0,174 *(3,90)****		0,004 *(1,66)**	0,003 *0,83*	4,889 *(2,80)****	0 *(2,73)****	0,097 *1,36*	-0,253 *(3,23)****	-0,398	(3,12)	0 *0,87*
		b.		-0,145 *(3,66)****	0,004 *1,50*	0,003 *0,88*	5,144 *(2,87)****	0 *(2,66)****	0,084 *1,23*	-0,269 *(3,52)****	-0,429	(3,27)	0 *1,29*
	6	*a.*	-0,178 *(4,34)****		-0,003 *(5,34)****	0,002 *0,96*	0,01 *(2,36)***	0 *(2,40)***	0,069 *(1,68)**	-0,249 *(3,80)****	-0,482	(4,82)	0 *0,89*
		b.		-0,094 *(2,71)****	-0,003 *(6,65)****	0,002 *1,01*	0,011 *(2,39)***	0 *0,86*	0,032 *0,82*	-0,299 *(4,34)****	-0,55	(5,29)	0 *1,42*
Rest of Europe	1	*a.*	-0,347 *(6,56)****		0 *(4,04)****	0,166 *(1,99)***	-0,412 *0,71*	0,001 *(1,88)**	-0,061 *0,33*	-0,091 *0,36*	0,207	0,69	0 *1,30*
		b.		-0,192 *(1,79)**	0 *(3,60)****	0,156 *(1,91)**	-0,146 *0,21*	0,002 *1,63*	-0,097 *0,57*	-0,122 *0,59*	0,122	0,44	0 *0,87*
	2	*a.*	-0,371 *(3,74)****		0 *(6,23)****	0,178 *(2,46)***	4,03 *0,76*	0,001 *(2,21)***	-0,114 *0,66*	-0,012 *0,05*	0,245	0,81	0 *1,60*
		b.		-0,304 *(3,65)****	0 *(5,31)****	0,165 *(2,50)***	4,684 *1,00*	0,001 *(1,75)**	-0,134 *0,82*	-0,013 *0,07*	0,221	0,78	0 *1,24*
	3	*a.*	-0,378 *(3,73)****		0 *(6,15)****	0,177 *(2,47)***	3,588 *0,67*	0,001 *(2,05)***	-0,114 *0,66*	-0,009 *0,04*	0,252	0,83	0 *1,63*
		b.		-0,364 *(4,39)****	0 *(6,12)****	0,163 *(2,36)***	4,908 *1,09*	0,001 *(1,80)**	-0,105 *0,65*	0,006 *0,03*	0,249	0,84	0 *1,44*
	4	*a.*	-0,281 *(2,38)***		0 *(5,83)****	0,178 *(2,34)***	14,021 *(1,70)**	0,006 *(2,29)***	-0,095 *0,48*	0,062 *0,32*	0,202	0,71	0 *(4,74)****
		b.		-0,284 *(3,16)****	0 *(5,86)****	0,166 *(2,23)***	13,859 *(2,19)***	0,006 *(2,22)***	-0,079 *0,43*	0,077 *0,47*	0,208	0,74	0 *(4,32)****
	5	*a.*	-0,135 *1,54*		0 *(4,56)****	0,073 *1,25*	5,777 *0,90*	0,005 *(2,95)****	-0,072 *0,41*	-0,079 *0,50*	-0,04	0,15	0 *(5,48)****
		b.		-0,141 *(2,13)***	0 *(4,67)****	0,067 *1,17*	6,435 *1,40*	0,005 *(2,78)****	-0,06 *0,37*	-0,057 *0,41*	-0,019	0,07	0 *(4,56)****
	6	*a.*	-0,138 *(2,08)***		0 *(3,12)****	0,065 *1,03*	-0,293 *0,46*	0,004 *(2,03)***	-0,024 *0,17*	-0,155 *0,93*	-0,044	0,16	0 *(4,43)****
		b.		-0,067 *1,37*	0 *(2,85)****	0,055 *0,91*	-0,063 *0,08*	0,006 *(1,81)**	-0,009 *0,07*	-0,172 *1,21*	-0,099	0,39	0 *(4,30)****

Panel Liquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,241 *(4,63)****		0,343 *(2,86)****	-0,006 *1,10*	60,29 *(3,28)****	0,013 *(3,58)****	-0,003 *0,04*	-0,309 *(2,83)****	-0,604	(4,63)	0 *(3,52)****
		b.		-0,159 *(2,76)****	0,388 *(3,10)****	-0,004 *0,61*	70,42 *(3,51)****	0,015 *(3,95)****	-0,03 *0,44*	-0,341 *(3,00)****	-0,649	(4,79)	0 *(3,47)****
	2	*a.*	-0,206 *(4,37)****		0,393 *(2,11)***	-0,009 *1,38*	63,415 *(3,02)****	0,012 *(3,40)****	0,02 *0,28*	-0,28 *(2,58)****	-0,499	(3,82)	0 *(2,92)****
		b.		-0,109 *(2,03)***	0,419 *(2,19)***	-0,007 *1,21*	81,516 *(3,95)****	0,016 *(3,35)****	0,02 *0,31*	-0,282 *(2,67)****	-0,512	(3,93)	0 *(1,96)***
	3	*a.*	-0,203 *(4,21)****		0,406 *(2,16)***	-0,008 *1,34*	71,175 *(3,25)****	0,012 *(3,35)****	0,026 *0,35*	-0,277 *(2,59)****	-0,502	(3,88)	0 *(3,12)****
		b.		-0,162 *(3,43)****	0,406 *(2,16)***	-0,008 *1,39*	78,381 *(3,87)****	0,014 *(3,17)****	0,035 *0,54*	-0,264 *(2,51)***	-0,487	(3,80)	0 *(2,26)***
	4	*a.*	-0,176 *(4,18)****		0,438 *(2,04)***	-0,013 *(2,08)***	77,601 *(3,66)****	0,012 *(3,09)****	0,024 *0,33*	-0,293 *(2,67)****	-0,528	(4,49)	0 *(3,21)****
		b.		-0,138 *(3,35)****	0,442 *(2,05)***	-0,012 *(2,07)***	88,085 *(4,35)****	0,014 *(3,16)****	0,032 *0,48*	-0,28 *(2,63)****	-0,528	(4,26)	0 *(2,48)***
	5	*a.*	-0,083 *(3,23)****		0,261 *(2,28)***	-0,033 *(9,58)****	25,892 *(1,79)**	0,007 *(2,38)***	0,089 *(1,66)**	-0,334 *(3,08)****	-0,716	(6,69)	0 *(2,68)****
		b.		-0,062 *(2,41)***	0,262 *(2,35)***	-0,033 *(10,35)****	31,555 *(2,11)***	0,008 *(2,67)****	0,088 *1,59*	-0,334 *(3,13)****	-0,713	(6,30)	0 *(2,07)***
	6	*a.*	-0,108 *(3,75)****		0,213 *(2,78)****	-0,028 *(17,51)****	17,629 *1,36*	0,007 *(2,90)****	0,05 *0,99*	-0,324 *(3,79)****	-0,756	(7,30)	0 *(3,22)****
		b.		-0,065 *(2,09)***	0,238 *(3,09)****	-0,027 *(16,30)****	21,215 *1,52*	0,008 *(3,11)****	0,037 *0,73*	-0,344 *(3,91)****	-0,781	(7,44)	0 *(3,12)****
Rest of Europe	1	*a.*	-0,137 *(3,43)****		0 *1,21*	0,363 *(1,91)**	74,535 *1,13*	0,008 *1,52*	0,248 *(1,86)**	0,099 *0,61*	0,008	0,03	0 *(1,84)**
		b.		-0,055 *0,88*	0 *1,55*	0,373 *(1,97)***	82,654 *1,27*	0,01 *1,53*	0,216 *1,52*	0,077 *0,45*	-0,086	0,28	0 *(2,45)***
	2	*a.*	-0,182 *(2,96)****		0 *1,45*	0,385 *(2,25)***	68,386 *1,08*	0,007 *1,36*	0,243 *1,61*	0,089 *0,54*	0,153	0,51	0 *(2,56)***
		b.		-0,08 *1,18*	0 *1,36*	0,399 *(2,42)***	70,333 *1,27*	0,01 *(1,69)**	0,188 *1,23*	0,056 *0,33*	0,059	0,19	0 *(3,13)****
	3	*a.*	-0,181 *(2,92)****		0 *1,40*	0,384 *(2,26)***	69,588 *1,08*	0,008 *1,36*	0,243 *1,61*	0,09 *0,56*	0,154	0,52	0 *(2,56)***
		b.		-0,134 *(2,13)***	0 *1,36*	0,382 *(2,36)***	67,571 *1,19*	0,008 *1,49*	0,202 *1,32*	0,08 *0,48*	0,083	0,26	0 *(3,09)****
	4	*a.*	-0,184 *(3,08)****		0 *(1,85)**	0,393 *(2,17)***	69,005 *1,09*	0,005 *0,97*	0,239 *1,50*	0,117 *0,73*	0,108	0,34	0 *(2,66)****
		b.		-0,128 *(1,95)**	0 *(1,74)**	0,388 *(2,25)***	65,092 *1,17*	0,007 *1,33*	0,193 *1,20*	0,094 *0,57*	0,067	0,21	0 *(3,37)****
	5	*a.*	-0,105 *(2,32)****		0 *1,59*	0,129 *1,06*	25,008 *0,64*	0,003 *0,83*	0,074 *0,61*	0,003 *0,02*	-0,098	0,38	0 *(1,99)***
		b.		-0,076 *1,60*	0 *1,53*	0,127 *1,09*	22,551 *0,64*	0,005 *1,17*	0,047 *0,38*	-0,001 *0,01*	-0,12	0,48	0 *(2,39)***
	6	*a.*	-0,08 *(2,28)****		0 *0,01*	0,085 *0,70*	23,94 *0,58*	0,003 *0,93*	0,095 *0,84*	0,023 *0,18*	-0,205	0,83	0 *1,58*
		b.		-0,031 *0,67*	0 *0,38*	0,093 *0,74*	27,087 *0,66*	0,006 *1,17*	0,077 *0,66*	0,008 *0,07*	-0,251	1,02	0 *(1,89)**

Table A5: Physical and synthetic ETF ownership and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	3	*a.*	-0,01 *0,47*		-0,006 *0,82*		-0,053 *(2,33)***					5,745 *(4,03)****	YES	0,55	76.663
		b.		-0,006 *0,36*		-0,007 *0,97*		-0,108 *(5,39)****				4,696 *(3,66)****	YES	0,55	71.489
	4	*a.*	-0,01 *0,65*		-0,007 *0,85*		-0,057 *(2,80)****					5,115 *(3,86)****	YES	0,55	73.788
		b.		-0,008 *0,53*		-0,007 *0,97*		-0,106 *(5,16)****				4,201 *(3,51)****	YES	0,54	68.679
	6	*a.*	0 *0,06*		0 *0,07*				0,199 *(16,26)****	0,125 *(14,26)****	0,123 *(12,89)****	3,314 *(4,30)****	YES	0,58	156.622
		b.		-0,001 *0,28*		-0,006 *(1,70)**			0,203 *(16,48)****	0,128 *(13,96)****	0,126 *(12,92)****	2,024 *(2,68)****	YES	0,58	156.878
Rest of Europe	3	*a.*	0,019 *0,73*		-0,037 *1,19*		0,021 *0,57*					6,212 *(4,57)****	YES	0,47	13.893
		b.		-0,005 *0,26*		-0,039 *1,29*		-0,1 *(6,13)****				4,894 *(3,95)****	YES	0,46	13.229
	4	*a.*	0,011 *0,44*		-0,036 *1,19*		0,021 *0,60*					4,683 *(3,37)****	YES	0,46	13.168
		b.		-0,015 *0,65*		-0,038 *1,16*		-0,075 *(4,34)****				3,599 *(2,79)****	YES	0,46	12.528
	6	*a.*	-0,02 *0,59*		-0,029 *1,25*				0,261 *(10,50)****	0,1 *(3,63)****	0,122 *(7,62)****	2,044 *(3,09)****	YES	0,5	17.417
		b.		-0,037 *1,46*		-0,032 *1,18*			0,263 *(10,35)****	0,104 *(4,07)****	0,123 *(7,15)****	0,852 *1,27*	YES	0,49	17.140

Panel Illiquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	3	*a.*	0,07 *(2,34)***		0,004 *0,28*		-0,027 *(2,03)***					5,524 *(3,74)****	YES	0,54	42.077
		b.		0,049 *1,51*		-0,005 *0,47*		-0,089 *(3,35)****				4,415 *(3,39)****	YES	0,54	41.415
	4	*a.*	0,066 *(2,58)****		0,005 *0,30*		-0,032 *(2,50)***					5,003 *(3,68)****	YES	0,53	39.969
		b.		0,041 *1,38*		-0,003 *0,29*		-0,088 *(3,27)****				4,014 *(3,35)****	YES	0,53	39.333
	6	*a.*	0,026 *(3,00)****		0,021 *(2,06)***				0,191 *(17,68)****	0,1 *(11,97)****	0,097 *(9,62)****	3,627 *(4,50)****	YES	0,54	78.321
		b.		0,002 *0,20*		-0,001 *0,07*			0,195 *(18,31)****	0,104 *(11,90)****	0,1 *(9,53)****	1,922 *(2,81)****	YES	0,54	78.309
Rest of Europe	3	*a.*	0,116 *(3,11)****		-0,075 *(3,99)****		0,118 *(4,50)****					7,969 *(3,87)****	YES	0,49	6.060
		b.		0,043 *(1,66)**		-0,072 *(4,18)****		-0,107 *(2,02)***				6,47 *(4,34)****	YES	0,48	5.660
	4	*a.*	0,087 *(1,89)**		-0,075 *(3,42)****		0,124 *(5,84)****					5,78 *(2,37)***	YES	0,48	5.610
		b.		0,027 *0,79*		-0,075 *(3,98)****		-0,066 *0,95*				4,769 *(2,90)****	YES	0,47	5.226
	6	*a.*	-0,03 *0,64*		-0,058 *(2,49)***				0,238 *(9,83)****	0,13 *(7,08)****	0,097 *(5,20)****	2,809 *(2,19)***	YES	0,5	7.681
		b.		-0,056 *(2,37)***		-0,068 *(3,92)****			0,244 *(9,88)****	0,136 *(8,28)****	0,098 *(5,27)****	0,978 *1,10*	YES	0,49	7.493

Panel Liquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	**Physical ETF Float Ownership** (t-1)	**Synthetic ETF Ownership** (t-1)	**Synthetic ETF Float Ownership** (t-1)	**OPO (t-1)**	**Float OPO (t-1)**	**Volatility** (t-1)	**Volatility** (t-2)	**Volatility** (t-3)	**constant**	**Control Vars**	**Adj. R2**	**N**
Developed Europe	3	*a.*	-0,03 *(2,12)***		0,003 *0,29*		-0,114 *(3,27)****					4,252 *(3,67)****	YES	0,6	34.466
		b.		-0,013 *1,35*		0,01 *1,06*		-0,144 *(6,39)****				3,224 *(3,00)****	YES	0,6	29.958
	4	*a.*	-0,03 *(2,05)***		0,001 *0,12*		-0,104 *(2,88)****					3,662 *(3,50)****	YES	0,6	33.701
		b.		-0,013 *1,38*		0,008 *0,89*		-0,13 *(6,15)****				2,729 *(2,80)****	YES	0,6	29.236
	6	*a.*	-0 *0,26*		0,005 *1,49*				0,178 *(11,36)****	0,141 *(13,22)****	0,147 *(13,54)****	2,404 *(3,67)****	YES	0,63	78.111
		b.		0,001 *0,18*		0,001 *0,33*			0,179 *(11,24)****	0,142 *(13,36)****	0,149 *(13,65)****	1,369 *(1,99)***	YES	0,63	78.378
Rest of Europe	3	*a.*	-0 *0,09*		0,003 *0,13*		-0,044 *0,58*					3,623 *(2,73)****	YES	0,47	7.808
		b.		-0,013 *0,96*		-0,003 *0,18*		-0,072 *(2,69)****				2,451 *(1,90)**	YES	0,47	7.545
	4	*a.*	-0,01 *0,21*		0,005 *0,22*		-0,047 *0,60*					3,706 *(2,90)****	YES	0,46	7.537
		b.		-0,021 *1,04*		0 *0,00*		-0,073 *(2,41)***				2,381 *(1,73)**	YES	0,46	7.282
	6	*a.*	-0,01 *0,42*		0,011 *0,80*				0,269 *(10,88)****	0,058 *(2,01)***	0,136 *(7,51)****	1,668 *(2,07)***	YES	0,5	9.713
		b.		-0,032 *1,26*		0,004 *0,27*			0,268 *(10,45)****	0,061 *(2,30)***	0,14 *(8,05)****	0,568 *0,57*	YES	0,51	9.623

Control Vars Table 5: physical and synthetic ownership and stock return volatility

Panel Overall. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,309 *(4,25)****		-0,005 *(4,61)****	0,003 *(1,84)**	0,018 *(2,10)***	0 *(1,90)**	0,025 *0,40*	-0,237 *(2,23)***	-0,342	(3,00)	0 *(4,79)****
		b.		-0,205 *(2,74)****	-0,005 *(3,83)****	0,003 *(2,33)***	0,019 *(1,94)**	0 *0,66*	-0,017 *0,28*	-0,298 *(2,68)****	-0,409	(3,46)	0 *(5,11)****
	2	*a.*	-0,271 *(4,06)****		-0,002 *0,92*	0 *0,06*	5,344 *(3,74)****	0 *(4,21)****	0,029 *0,37*	-0,216 *(1,90)**	-0,276	(2,24)	0 *(3,12)****
		b.		-0,187 *(2,95)****	-0,002 *0,80*	0,001 *0,19*	6,037 *(3,94)****	0 *(3,08)****	0,008 *0,11*	-0,241 *(2,14)***	-0,298	(2,49)	0 *(3,05)****
	3	*a.*	-0,271 *(4,01)****		-0,002 *0,94*	0 *0,06*	5,544 *(3,86)****	0 *(4,00)****	0,03 *0,38*	-0,215 *(1,90)**	-0,277	(2,25)	0 *(3,09)****
		b.		-0,229 *(3,63)****	-0,002 *1,01*	0,001 *0,13*	6,17 *(4,02)****	0 *(3,78)****	0,029 *0,37*	-0,22 *(1,97)***	-0,275	(2,31)	0 *(3,00)****
	4	*a.*	-0,242 *(3,88)****		0,005 *1,02*	0,003 *0,59*	8,33 *(3,46)****	0 *(4,13)****	0,037 *0,46*	-0,229 *(2,22)***	-0,284	(2,46)	0 *(2,84)****
		b.		-0,206 *(3,51)****	0,005 *0,93*	0,003 *0,72*	9,075 *(3,74)****	0 *(3,90)****	0,039 *0,48*	-0,231 *(2,27)***	-0,288	(2,48)	0 *(2,90)****
	5	*a.*	-0,139 *(3,95)****		0,004 *1,24*	0 *0,01*	4,311 *(2,78)****	0 *(2,10)***	0,088 *1,63*	-0,303 *(3,66)****	-0,529	(5,12)	0 *(3,03)****
		b.		-0,119 *(3,59)****	0,004 *1,15*	0 *0,02*	4,806 *(3,20)****	0 *(1,91)**	0,089 *1,60*	-0,307 *(3,83)****	-0,527	(4,98)	0 *(3,18)****
	6	*a.*	-0,154 *(4,28)****		-0,003 *(6,46)****	0 *0,02*	0,01 *(2,77)****	0 *1,01*	0,062 *1,61*	-0,296 *(4,03)****	-0,596	(6,46)	0 *(3,70)****
		b.		-0,096 *(2,65)****	-0,002 *(4,74)****	0 *0,00*	0,01 *(2,65)****	0 *0,01*	0,04 *1,06*	-0,331 *(4,39)****	-0,637	(6,73)	0 *(3,85)****
Rest of Europe	1	*a.*	-0,228 *(3,95)****		0 *(3,52)****	0,192 *(1,86)**	-0,156 *0,17*	0,002 *(2,04)***	0,143 *0,99*	0,028 *0,13*	0,092	0,31	0 *1,20*
		b.		-0,118 *(2,21)***	0 *(2,21)***	0,197 *(1,89)**	-0,025 *0,03*	0,003 *(2,00)***	0,098 *0,70*	-0,035 *0,15*	0,034	0,11	0 *1,06*
	2	*a.*	-0,294 *(4,68)****		0 *(7,48)****	0,234 *(2,50)***	6,142 *1,36*	0,002 *(2,09)***	0,156 *1,10*	0,066 *0,32*	0,193	0,62	0 *(1,65)**
		b.		-0,193 *(3,23)****	0 *(6,28)****	0,239 *(2,68)****	6 *1,19*	0,002 *(2,10)***	0,101 *0,71*	0,008 *0,04*	0,136	0,41	0 *1,30*
	3	*a.*	-0,294 *(4,59)****		0 *(7,12)****	0,234 *(2,51)***	6,074 *1,34*	0,002 *(2,08)***	0,156 *1,09*	0,066 *0,32*	0,194	0,62	0 *1,64*
		b.		-0,243 *(3,96)****	0 *(6,66)****	0,231 *(2,58)****	5,985 *1,25*	0,002 *(2,06)***	0,124 *0,87*	0,033 *0,15*	0,162	0,48	0 *1,35*
	4	*a.*	-0,225 *(3,45)****		0 *(10,26)****	0,235 *(2,39)***	15,421 *(2,62)****	0,007 *(2,46)***	0,167 *1,01*	0,138 *0,77*	0,165	0,52	0 *(3,56)****
		b.		-0,182 *(2,87)****	0 *(10,03)****	0,232 *(2,43)***	15,822 *(2,51)***	0,007 *(2,35)***	0,142 *0,87*	0,109 *0,60*	0,139	0,41	0 *(3,72)****
	5	*a.*	-0,125 *(2,57)****		0 *(8,02)****	0,088 *1,18*	6,54 *1,46*	0,005 *(2,69)****	0,074 *0,56*	0,002 *0,02*	-0,082	0,29	0 *(2,24)***
		b.		-0,101 *(2,16)***	0 *(8,27)****	0,086 *1,20*	6,701 *1,43*	0,005 *(2,50)***	0,056 *0,42*	-0,02 *0,13*	-0,092	0,31	0 *(2,16)***
	6	*a.*	-0,098 *(3,09)****		0 *(3,14)****	0,053 *0,73*	-0,153 *0,18*	0,005 *(2,61)****	0,076 *0,62*	-0,032 *0,21*	-0,153	0,56	0 *(1,70)**
		b.		-0,043 *1,28*	0 *(2,46)***	0,053 *0,74*	-0,036 *0,04*	0,006 *(2,31)***	0,056 *0,47*	-0,067 *0,45*	-0,185	0,66	0 *(1,84)**

Panel Illiquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,294 *(4,11)****		-0,006 *(5,03)****	0,003 *(2,26)***	0,019 *(2,09)***	0 *(3,30)****	0,055 *1,17*	-0,163 *1,64*	-0,19	1,63	0 *(2,73)****
		b.		-0,167 *(2,60)****	-0,005 *(4,46)****	0,003 *(2,58)****	0,02 *(1,92)**	0 *1,46*	0,005 *0,10*	-0,241 *(2,28)***	-0,278	(2,30)	0 *(3,26)****
	2	*a.*	-0,268 *(3,69)****		-0,003 *(1,76)**	0,001 *0,10*	5,744 *(4,32)****	0 *(4,66)****	0,068 *0,89*	-0,133 *1,18*	-0,134	0,96	0 *(1,96)***
		b.		-0,182 *(3,01)****	-0,003 *1,55*	0,001 *0,17*	6,187 *(4,27)****	0 *(4,13)****	0,041 *0,54*	-0,181 *1,60*	-0,193	1,39	0 *(2,51)***
	3	*a.*	-0,268 *(3,66)****		-0,003 *(1,78)**	0,001 *0,10*	5,816 *(4,28)****	0 *(4,61)****	0,068 *0,88*	-0,133 *1,18*	-0,134	0,96	0 *(1,81)**
		b.		-0,221 *(3,32)****	-0,003 *(1,77)**	0,001 *0,13*	6,17 *(4,39)****	0 *(4,36)****	0,06 *0,79*	-0,161 *1,45*	-0,171	1,24	0 *(2,28)***
	4	*a.*	-0,245 *(3,66)****		0,004 *1,08*	0,004 *(1,90)**	8,727 *(3,58)****	0 *(4,16)****	0,074 *0,88*	-0,156 *1,53*	-0,131	0,94	0 *0,90*
		b.		-0,203 *(3,33)****	0,004 *0,96*	0,005 *(2,01)***	9,08 *(3,66)****	0 *(4,06)****	0,07 *0,84*	-0,179 *(1,77)**	-0,168	1,22	0 *1,32*
	5	*a.*	-0,168 *(4,00)****		0,003 *1,38*	0,003 *0,88*	4,754 *(2,75)****	0 *(2,59)****	0,102 *1,58*	-0,256 *(3,43)****	-0,387	(3,05)	0 *1,04*
		b.		-0,139 *(3,65)****	0,003 *1,25*	0,003 *0,91*	5,071 *(2,90)****	0 *(2,61)****	0,101 *1,57*	-0,27 *(3,72)****	-0,413	(3,25)	0 *1,41*
	6	*a.*	-0,174 *(4,41)****		-0,003 *(7,48)****	0,002 *0,95*	0,011 *(2,83)****	0 *(2,29)***	0,074 *(2,03)***	-0,248 *(3,85)****	-0,485	(4,79)	0 *1,09*
		b.		-0,093 *(2,69)****	-0,003 *(6,44)****	0,002 *0,97*	0,011 *(2,09)***	0 *0,67*	0,045 *1,25*	-0,298 *(4,34)****	-0,542	(5,19)	0 *1,49*
Rest of Europe	1	*a.*	-0,34 *(6,11)****		0 *(4,31)****	0,126 *1,61*	-0,2 *0,28*	0,001 *(1,78)**	-0,006 *0,03*	-0,093 *0,35*	0,213	0,71	0 *1,10*
		b.		-0,15 *1,52*	0 *(3,74)****	0,133 *(1,70)**	-0,028 *0,04*	0,002 *(1,87)**	-0,066 *0,38*	-0,189 *0,70*	0,102	0,33	0 *0,54*
	2	*a.*	-0,376 *(3,84)****		0 *(5,82)****	0,172 *(2,42)***	5,682 *1,45*	0,001 *(2,02)***	-0,051 *0,33*	-0,019 *0,07*	0,271	0,93	0 *1,53*
		b.		-0,274 *(3,46)****	0 *(5,26)****	0,167 *(2,46)***	5,23 *1,20*	0,001 *(1,96)***	-0,103 *0,67*	-0,071 *0,26*	0,211	0,68	0 *1,14*
	3	*a.*	-0,385 *(3,79)****		0 *(5,63)****	0,171 *(2,44)***	5,246 *1,31*	0,001 *(1,80)**	-0,052 *0,34*	-0,016 *0,06*	0,277	0,95	0 *1,64*
		b.		-0,328 *(4,23)****	0 *(6,07)****	0,166 *(2,36)***	5,378 *1,27*	0,001 *(2,07)***	-0,08 *0,51*	-0,052 *0,18*	0,235	0,72	0 *1,32*
	4	*a.*	-0,282 *(2,35)****		0 *(5,77)****	0,172 *(2,35)***	13,511 *(2,76)****	0,006 *(2,14)***	-0,054 *0,29*	0,067 *0,33*	0,206	0,74	0 *(5,03)****
		b.		-0,245 *(2,86)****	0 *(5,92)****	0,167 *(2,29)***	13,951 *(2,56)***	0,006 *(2,38)***	-0,065 *0,34*	0,048 *0,21*	0,186	0,61	0 *(4,15)****
	5	*a.*	-0,142 *1,61*		0 *(5,18)****	0,071 *1,26*	6,445 *(1,71)**	0,005 *(2,88)****	-0,036 *0,23*	-0,066 *0,38*	-0,044	0,17	0 *(5,02)****
		b.		-0,125 *(1,84)**	0 *(5,00)****	0,069 *1,20*	6,55 *1,57*	0,005 *(2,87)****	-0,054 *0,34*	-0,094 *0,48*	-0,06	0,20	0 *(4,33)****
	6	*a.*	-0,137 *(2,15)****		0 *(3,72)****	0,043 *0,72*	-0,011 *0,02*	0,004 *(1,93)**	0,009 *0,06*	-0,135 *0,75*	-0,065	0,22	0 *(4,18)****
		b.		-0,049 *1,05*	0 *(3,15)****	0,043 *0,76*	0,084 *0,12*	0,006 *(1,68)**	-0,009 *0,07*	-0,199 *1,15*	-0,135	0,48	0 *(3,93)****

Panel Liquid. *Dependent variable: Stock return volatility*

			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return		Gross Profitability Ratio (t-1)
Developed Europe	1	*a.*	-0,248 *(4,73)****		0,33 *(2,80)****	-0,004 *0,54*	59,333 *(3,45)****	0,01 *(2,03)***	0,003 *0,04*	-0,315 *(2,91)****	-0,615	(4,72)	0 *(3,39)****
		b.		-0,164 *(2,86)****	0,368 *(2,98)****	-0,002 *0,20*	69,876 *(3,75)****	0,012 *(2,32)***	-0,022 *0,30*	-0,35 *(3,12)****	-0,662	(4,89)	0 *(3,33)****
	2	*a.*	-0,205 *(4,08)****		0,359 *(2,17)***	-0,003 *0,29*	65,189 *(3,21)****	0,013 *(3,97)****	0,035 *0,47*	-0,283 *(2,65)****	-0,515	(4,11)	0 *(3,10)****
		b.		-0,111 *(1,98)***	0,377 *(2,25)***	-0,001 *0,06*	84,278 *(4,80)****	0,017 *(3,74)****	0,031 *0,47*	-0,281 *(2,69)****	-0,503	(4,18)	0 *(2,16)***
	3	*a.*	-0,203 *(3,91)****		0,364 *(2,16)***	-0,003 *0,26*	72,764 *(3,40)****	0,013 *(3,99)****	0,04 *0,54*	-0,282 *(2,67)****	-0,519	(4,17)	0 *(3,34)****
		b.		-0,163 *(3,26)****	0,36 *(2,18)***	-0,001 *0,13*	82,23 *(4,80)****	0,015 *(3,64)****	0,044 *0,67*	-0,264 *(2,54)***	-0,479	(4,02)	0 *(2,51)***
	4	*a.*	-0,177 *(3,76)****		0,365 *(2,00)***	-0,007 *0,65*	81,134 *(3,81)****	0,013 *(3,50)****	0,035 *0,49*	-0,303 *(2,84)****	-0,544	(4,80)	0 *(3,59)****
		b.		-0,14 *(3,09)****	0,364 *(2,02)***	-0,005 *0,44*	93,008 *(5,07)****	0,015 *(3,59)****	0,04 *0,61*	-0,288 *(2,73)****	-0,521	(4,46)	0 *(2,96)****
	5	*a.*	-0,082 *(2,94)****		0,214 *(2,19)***	-0,029 *(4,79)****	26,886 *(1,90)**	0,007 *(2,55)***	0,098 *(1,89)**	-0,34 *(3,18)****	-0,723	(7,05)	0 *(2,80)****
		b.		-0,062 *(2,25)***	0,217 *(2,32)***	-0,028 *(4,30)****	33,85 *(2,64)****	0,009 *(2,87)****	0,096 *(1,87)**	-0,337 *(3,19)****	-0,702	(6,63)	0 *(2,44)***
	6	*a.*	-0,112 *(3,84)****		0,198 *(2,60)****	-0,027 *(11,74)****	15,185 *1,27*	0,005 *(1,66)**	0,055 *1,08*	-0,33 *(3,87)****	-0,755	(7,37)	0 *(3,23)****
		b.		-0,067 *(2,15)***	0,221 *(2,84)****	-0,026 *(10,01)****	19,762 *1,60*	0,006 *(1,91)**	0,042 *0,85*	-0,351 *(4,06)****	-0,785	(7,49)	0 *(3,05)****
Rest of Europe	1	*a.*	-0,129 *(3,47)****		0 *0,00*	0,348 *(1,86)**	76,349 *1,15*	0,007 *1,36*	0,241 *(1,76)**	0,149 *0,93*	0,001	0,00	0 *(2,04)***
		b.		-0,056 *0,99*	0 *0,16*	0,354 *(1,94)**	79,972 *1,20*	0,01 *1,38*	0,215 *1,57*	0,119 *0,71*	-0,017	0,06	0 *(2,68)****
	2	*a.*	-0,176 *(3,13)****		0 *(1,78)**	0,372 *(2,27)***	71,986 *1,14*	0,007 *1,24*	0,242 *1,59*	0,133 *0,82*	0,145	0,47	0 *(2,68)****
		b.		-0,08 *1,20*	0 *1,44*	0,384 *(2,47)***	74,647 *1,29*	0,009 *1,32*	0,207 *1,40*	0,096 *0,58*	0,117	0,37	0 *(2,80)****
	3	*a.*	-0,176 *(3,10)****		0 *(1,75)**	0,371 *(2,28)***	73,196 *1,13*	0,007 *1,24*	0,242 *1,58*	0,135 *0,84*	0,146	0,47	0 *(2,73)****
		b.		-0,128 *(2,19)***	0 *1,49*	0,369 *(2,45)***	71,908 *1,23*	0,007 *1,18*	0,221 *1,49*	0,116 *0,72*	0,14	0,45	0 *(3,00)****
	4	*a.*	-0,18 *(3,25)****		0 *(2,07)****	0,374 *(2,15)***	73,424 *1,17*	0,003 *0,67*	0,252 *1,53*	0,175 *1,07*	0,129	0,38	0 *(3,05)****
		b.		-0,124 *(1,99)***	0 *(1,90)**	0,37 *(2,29)***	71,76 *1,26*	0,005 *0,86*	0,22 *1,34*	0,151 *0,92*	0,114	0,34	0 *(3,28)****
	5	*a.*	-0,106 *(2,24)***		0 *1,54*	0,121 *1,02*	25,656 *0,66*	0,002 *0,64*	0,081 *0,62*	0,04 *0,28*	-0,088	0,31	0 *(2,12)***
		b.		-0,074 *1,53*	0 *1,29*	0,118 *1,10*	26,236 *0,76*	0,003 *0,78*	0,063 *0,47*	0,025 *0,18*	-0,087	0,31	0 *(2,33)***
	6	*a.*	-0,081 *(2,25)****		0 *0,08*	0,082 *0,66*	23,346 *0,58*	0,002 *0,69*	0,098 *0,81*	0,055 *0,42*	-0,19	0,72	0 *(1,70)**
		b.		-0,031 *0,68*	0 *0,11*	0,083 *0,70*	25,488 *0,66*	0,004 *0,86*	0,076 *0,62*	0,032 *0,26*	-0,199	0,76	0 *(1,87)**

Table A6: Physical and orthogonalized synthetic ETF ownership and stock return volatility

See Paragraph 6.2 and Table 5 for description of the OLS regression analysis conducted below.

Panel Overall. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	Physical ETF Float Ownership (t-1)	Ort. Synthetic ETF Ownership (t-1)	Ort. Synthetic ETF Float Ownership (t-1)	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1	*a.*	0,001 *0,49*		-0,008 *(2,48)***							6,558 *(68,36)***	YES	0,54	167.35
		b.		-0,004 *1,47*		-0,016 *(5,17)***						4,282 *(52,65)***	YES	0,54	167.632
	2	*a.*	0,008 *1,35*		-0,009 *1,63*							5,664 *(37,86)***	YES	0,56	79.129
		b.		0,003 *0,55*		-0,01 *(2,22)***						3,761 *(28,48)***	YES	0,55	73.787
	3	*a.*	-0,006 *0,40*		-0,01 *0,89*		-0,051 *(2,09)***					5,654 *(7,91)***	YES	0,56	79.129
		b.		-0,008 *0,64*		-0,01 *1,07*		-0,11 *(5,38)***				4,624 *(7,53)***	YES	0,55	73.787
	4	*a.*	-0,01 *0,69*		-0,008 *0,72*		-0,053 *(2,21)***					5,034 *(7,21)***	YES	0,55	76.140
		b.		-0,01 *0,89*		-0,007 *0,87*		-0,108 *(5,47)***				4,135 *(6,86)***	YES	0,55	70.868
	5	*a.*	-0,003 *0,33*		-0,003 *0,42*		-0,029 *(1,93)**		0,195 *(18,83)***	0,12 *(15,36)***	0,12 *(15,35)***	2,905 *(6,04)***	YES	0,59	76.140
		b.		-0,006 *0,74*		-0,002 *0,35*		-0,064 *(5,44)***	0,194 *(19,04)***	0,12 *(16,32)***	0,12 *(15,03)***	2,402 *(5,93)***	YES	0,59	70.868
	6	*a.*	0 *0,02*		-0,003 *0,49*				0,199 *(21,80)***	0,13 *(18,02)***	0,12 *(18,76)***	3,279 *(8,39)***	YES	0,58	161.012
		b.		-0,003 *0,54*		-0,007 *1,58*			0,202 *(22,21)***	0,13 *(18,52)***	0,13 *(19,29)***	1,995 *(6,86)***	YES	0,58	161.293
Rest of Europe	1	*a.*	0,003 *0,36*		-0,041 *(3,90)***							5 *(16,85)***	YES	0,45	20.875
		b.		-0,039 *(4,95)***		-0,045 *(4,84)***						2,283 *(10,99)***	YES	0,45	20.556
	2	*a.*	0,003 *0,25*		-0,04 *(3,37)***							6,184 *(17,36)***	YES	0,48	15.476
		b.		-0,019 *(1,92)**		-0,035 *(3,29)***						3,743 *(13,38)***	YES	0,48	14.770
	3	*a.*	0,005 *0,35*		-0,04 *(1,66)**		0,018 *0,45*					6,185 *(4,82)***	YES	0,48	15.476
		b.		-0,016 *1,01*		-0,036 *1,50*		-0,098 *(2,74)***				4,729 *(4,43)***	YES	0,48	14.770
	4	*a.*	-0,001 *0,09*		-0,044 *(1,68)**		0,015 *0,37*					4,931 *(3,75)***	YES	0,48	14.643
		b.		-0,026 *(1,84)**		-0,044 *(1,81)**		-0,075 *(2,05)**				3,569 *(3,33)***	YES	0,48	13.963
	5	*a.*	-0,005 *0,42*		-0,021 *1,04*		0,02 *0,79*		0,273 *(8,57)***	0,08 *(3,26)***	0,12 *(5,65)***	2,561 *(2,90)***	YES	0,54	14.643
		b.		-0,025 *(2,28)**		-0,026 *1,32*		-0,033 *1,45*	0,263 *(8,25)***	0,08 *(3,36)***	0,12 *(5,56)***	1,89 *(2,65)***	YES	0,53	13.963
	6	*a.*	-0,002 *0,09*		-0,021 *1,06*				0,268 *(9,01)***	0,1 *(4,95)***	0,11 *(6,02)***	2,052 *(2,56)**	YES	0,52	19.635
		b.		-0,03 *(2,11)**		-0,027 *1,56*			0,266 *(8,92)***	0,1 *(5,25)***	0,12 *(6,01)***	0,757 *1,60*	YES	0,52	19.323

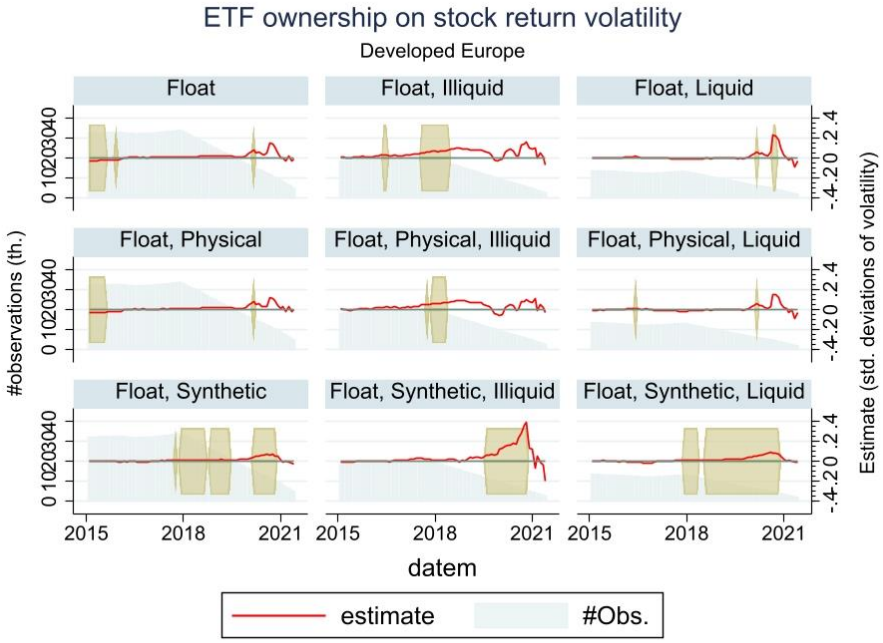
Panel Illiquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	Physical ETF Float Ownership (t-1)	Ort. Synthetic ETF Ownership (t-1)	Ort. Synthetic ETF Float Ownership (t-1)	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1	*a.*	0,045 *(2,38)**		0,02 *1,41*							6,023 *(10,43)***	YES	0,52	84.853
		b.		0,005 *0,36*		0,003 *0,26*						3,38 *(8,01)***	YES	0,51	84.844
	2	*a.*	0,084 *(2,07)**		-0,006 *0,32*							5,492 *(7,34)***	YES	0,54	43.251
		b.		0,054 *(1,71)**		-0,011 *0,89*						3,564 *(6,30)***	YES	0,54	42.588
	3	*a.*	0,071 *(1,75)**		-0,006 *0,36*		-0,031 *1,01*					5,479 *(7,33)***	YES	0,54	43.251
		b.		0,047 *1,52*		-0,009 *0,73*		-0,094 *(3,98)***				4,393 *(7,03)***	YES	0,54	42.588
	4	*a.*	0,067 *(1,77)**		-0,001 *0,03*		-0,035 *1,13*					4,959 *(6,79)***	YES	0,53	41.066
		b.		0,039 *1,35*		-0,003 *0,23*		-0,094 *(4,02)***				3,993 *(6,50)***	YES	0,53	40.429
	5	*a.*	0,055 *(2,05)**		-0,001 *0,04*		-0,011 *0,55*		0,18 *(17,88)***	0,1 *(13,02)***	0,1 *(10,91)***	3,435 *(6,51)***	YES	0,56	41.066
		b.		0,029 *1,42*		-0,004 *0,46*		-0,063 *(4,24)***	0,178 *(17,58)***	0,1 *(13,27)***	0,1 *(10,83)***	2,762 *(6,27)***	YES	0,56	40.429
	6	*a.*	0,03 *(2,39)**		0,012 *1,10*				0,19 *(24,47)***	0,1 *(15,24)***	0,1 *(15,64)***	3,578 *(8,73)***	YES	0,54	80.307
		b.		0,002 *0,26*		0 *0,05*			0,194 *(25,09)***	0,11 *(15,76)***	0,1 *(16,15)***	1,882 *(6,48)***	YES	0,54	80.297
Rest of Europe	1	*a.*	-0,043 *0,80*		-0,079 *(2,54)**							7,386 *(4,82)***	YES	0,48	9.899
		b.		-0,085 *(1,89)**		-0,085 *(2,89)***						3,111 *(2,89)***	YES	0,48	9.688
	2	*a.*	-0,014 *0,19*		-0,068 *(2,24)**							7,782 *(4,54)***	YES	0,52	7.119
		b.		-0,004 *0,12*		-0,062 *(2,02)**						5,321 *(4,25)***	YES	0,52	6.701
	3	*a.*	0,008 *0,11*		-0,071 *(2,32)**		0,104 *1,59*					7,868 *(4,73)***	YES	0,52	7.119
		b.		0,006 *0,17*		-0,058 *(1,96)**		-0,109 *(2,46)**				6,418 *(4,38)***	YES	0,52	6.701
	4	*a.*	-0,021 *0,29*		-0,072 *(2,08)**		0,107 *1,50*					6,13 *(3,28)***	YES	0,51	6.584
		b.		-0,021 *0,54*		-0,068 *(2,16)**		-0,071 *1,41*				4,889 *(3,03)***	YES	0,51	6.184
	5	*a.*	-0,026 *0,54*		-0,035 *1,35*		0,092 *(2,01)**		0,253 *(8,43)***	0,1 *(4,45)***	0,1 *(4,18)***	2,896 *(2,27)**	YES	0,56	6.584
		b.		-0,034 *1,24*		-0,042 *1,64*		-0,018 *0,48*	0,24 *(7,94)***	0,1 *(4,53)***	0,09 *(4,14)***	2,414 *(2,20)**	YES	0,56	6.184
	6	*a.*	-0,037 *1,03*		-0,042 *1,61*				0,248 *(8,49)***	0,12 *(6,37)***	0,09 *(4,53)***	3,051 *(2,74)***	YES	0,53	9.083
		b.		-0,063 *(2,26)**		-0,052 *(2,23)**			0,248 *(8,63)***	0,13 *(6,78)***	0,09 *(4,74)***	1,017 *1,53*	YES	0,53	8.878

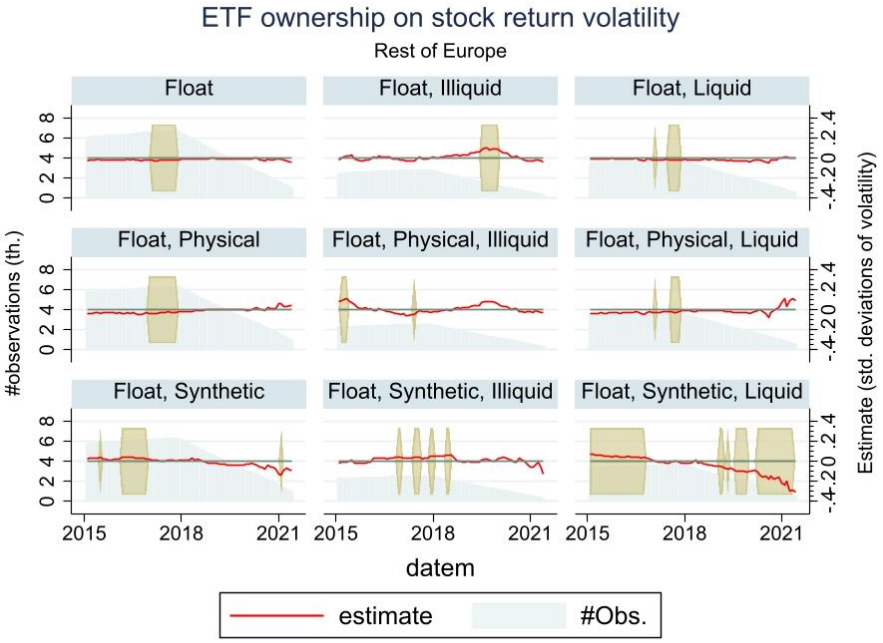
Panel Liquid. *Dependent variable: Stock return volatility*

			Physical ETF Ownership (t-1)	Physical ETF Float Ownership (t-1)	Ort. Synthetic ETF Ownership (t-1)	Ort. Synthetic ETF Float Ownership (t-1)	OPO (t-1)	Float OPO (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	constant	Control Vars	Adj. R2	N
Developed Europe	1	*a.*	0,004 *0,69*		0 *0,01*							5,28 *(6,62)***	YES	0,59	82.31
		b.		0,003 *0,63*		-0,006 *0,93*						3,375 *(5,18)***	YES	0,59	82.598
	2	*a.*	0,009 *0,70*		0,003 *0,28*							4,171 *(3,89)***	YES	0,6	35.756
		b.		0,005 *0,43*		0,006 *0,60*						1,991 *(2,32)**	YES	0,6	31.081
	3	*a.*	-0,02 *1,31*		0,001 *0,07*		-0,104 *(2,97)***					4,092 *(3,84)***	YES	0,6	35.756
		b.		-0,008 *0,73*		0,007 *0,71*		-0,139 *(4,97)***				3,027 *(3,12)***	YES	0,6	31.081
	4	*a.*	-0,02 *1,36*		0,001 *0,12*		-0,094 *(2,72)***					3,484 *(3,48)***	YES	0,6	34.954
		b.		-0,009 *0,80*		0,006 *0,65*		-0,125 *(4,80)***				2,53 *(2,72)***	YES	0,6	30.327
	5	*a.*	-0,013 *1,34*		0,004 *0,46*		-0,056 *(2,65)***		0,181 *(12,54)***	0,12 *(10,22)***	0,16 *(15,33)***	1,587 *(2,58)***	YES	0,64	34.954
		b.		-0,008 *1,04*		0,009 *1,29*		-0,064 *(4,04)***	0,18 *(13,03)***	0,12 *(10,70)***	0,16 *(15,43)***	1,074 *(1,89)**	YES	0,64	30.327
	6	*a.*	0,001 *0,17*		0,003 *0,45*				0,178 *(13,79)***	0,14 *(13,97)***	0,15 *(16,91)***	2,336 *(4,85)***	YES	0,63	80.508
		b.		0,001 *0,15*		0 *0,07*			0,18 *(13,81)***	0,14 *(14,23)***	0,15 *(17,19)***	1,335 *(3,47)***	YES	0,63	80.798
Rest of Europe	1	*a.*	0,019 *0,80*		0,006 *0,20*							2,748 *(1,88)**	YES	0,46	10.945
		b.		-0,017 *0,88*		0,002 *0,07*						0,789 *0,94*	YES	0,46	10.836
	2	*a.*	0,008 *0,61*		-0,007 *0,21*							3,704 *(2,24)**	YES	0,48	8.329
		b.		-0,014 *0,97*		-0,006 *0,19*						1,35 *1,20*	YES	0,48	8.042
	3	*a.*	0,003 *0,20*		-0,008 *0,22*		-0,047 *0,99*					3,708 *(2,24)**	YES	0,48	8.329
		b.		-0,012 *0,87*		-0,008 *0,28*		-0,07 *1,44*				2,307 *(1,76)**	YES	0,48	8.042
	4	*a.*	0 *0,00*		-0,015 *0,46*		-0,051 *1,05*					3,776 *(2,24)**	YES	0,48	8.035
		b.		-0,02 *1,37*		-0,016 *0,55*		-0,072 *1,44*				2,226 *(1,68)**	YES	0,48	7.756
	5	*a.*	-0,001 *0,07*		-0,015 *0,61*		-0,03 *0,94*		0,282 *(7,77)***	0,05 *1,51*	0,14 *(4,66)***	2,112 *(1,82)**	YES	0,54	8.035
		b.		-0,017 *1,45*		-0,013 *0,64*		-0,043 *1,33*	0,274 *(7,35)***	0,05 *1,54*	0,14 *(4,64)***	1,304 *1,50*	YES	0,54	7.756
	6	*a.*	0,011 *0,80*		-0,002 *0,10*				0,273 *(8,32)***	0,06 *(2,14)**	0,14 *(5,12)***	1,579 *1,53*	YES	0,52	10.521
		b.		-0,018 *1,30*		-0,002 *0,12*			0,269 *(8,06)***	0,06 *(2,31)**	0,14 *(5,17)***	0,467 *0,77*	YES	0,52	10.413

Figure A2



Note: kakhi-shaded areas indicate time intervals in which the estimates are significantly different from zero at least at the 10% level.



Note: kakhi-shaded areas indicate time intervals in which the estimates are significantly different from zero at least at the 10% level.

Control Vars Table 7: ETF activity and stock return volatility

Panel Overall. *Dependent variable: market betas lagged by (#) months*

Region	(#)			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return	Gross Profitability Ratio (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	Other Passive Ownership (t-1)	Other Fl. Passive Ownership (t-1)
Developed Europe	0	1	a.	0,08 (3,05)***		0 0,43	-0,002 0,69	-0,034 (5,30)***	0 0,06	0,049 1,03	-0,118 1,46	-0,377 (4,81)***	-0,034 0,91	0,093 (10,46)***	0,052 (5,39)***	0,045 (9,04)***		
			b.		0,079 (4,14)***	0 0,21	-0,002 0,68	-0,034 (5,50)***	0 0,05	0,044 0,89	-0,114 1,36	-0,368 (4,75)***	-0,03 0,81	0,093 (10,46)***	0,052 (5,52)***	0,045 (8,80)***		
		2	a.	0,096 (3,50)***		0 0,22	0,001 0,30	-4,773 (2,54)**	0 0,35	0,054 1,08	-0,158 (2,11)**	-0,417 (5,13)***	-0,036 0,77	0,103 (12,77)***	0,052 (6,05)***	0,036 (5,88)***		
			b.		0,09 (4,71)***	-0,001 0,44	0,001 0,53	-4,17 (2,24)**	0 0,10	0,035 0,64	-0,148 (1,99)**	-0,41 (4,93)***	-0,04 0,77	0,097 (12,83)***	0,05 (6,21)***	0,036 (5,55)***		
		3	a.	0,096 (3,47)***		0 0,24	0,001 0,30	-4,581 (2,48)**	0 0,33	0,054 1,09	-0,159 (2,11)**	-0,418 (5,10)***	-0,038 0,79	0,103 (12,79)***	0,052 (6,05)***	0,036 (5,83)***	-0,034 (1,92)*	
			b.			-0,001 0,43	0,001 0,54	-4,214 (2,33)**	0 0,18	0,033 0,61	-0,15 (2,02)**	-0,412 (4,94)***	-0,039 0,76	0,097 (12,87)***	0,05 (6,24)***	0,036 (5,59)***		0,015 1,17
	1	1	a.	-0,013 0,85		0 0,11	-0,002 (2,13)**	0,001 0,48	0 (2,65)***	0,016 0,27	-0,174 (4,75)***	-0,15 (2,65)***	-0,001 0,02	0,003 0,63	0,007 1,57	0,01 (2,10)**		
			b.		-0,01 0,85	0 0,02	-0,002 (2,11)**	0,001 0,57	0 (2,84)***	0,021 0,34	-0,174 (4,92)***	-0,165 (2,98)***	-0,009 0,27	0,004 0,82	0,007 (1,91)*	0,009 (1,96)**		
		2	a.	-0,008 0,44		0,002 (2,19)**	-0,006 (1,99)**	0,231 0,48	0 (2,58)***	0,027 0,45	-0,177 (4,32)***	-0,201 (3,30)***	0,003 0,08	0,002 0,33	0,008 (2,30)**	0,01 (1,82)*		
			b.		-0,003 0,28	0,002 (1,70)*	-0,006 (1,87)*	0,413 0,96	0 (2,67)***	0,041 0,67	-0,178 (4,31)***	-0,208 (3,45)***	0 0,01	0,004 0,61	0,009 (2,50)**	0,009 (1,78)*		
		3	a.	-0,008 0,44		0,002 (2,03)**	-0,006 (1,99)**	0,25 0,50	0 (2,58)***	0,027 0,44	-0,177 (4,35)***	-0,201 (3,27)***	0,003 0,08	0,002 0,33	0,008 (2,25)**	0,01 (1,80)*	-0,003 0,29	
			b.		-0,006 0,42	0,002 1,61	-0,006 (1,87)*	0,438 1,04	0 (2,73)***	0,042 0,68	-0,177 (4,31)***	-0,207 (3,43)***	-0,001 0,02	0,004 0,59	0,009 (2,45)**	0,009 (1,75)*		-0,008 1,10
	2	1	a.	0,011 0,69		0 0,26	0,001 (2,07)**	0,003 (1,68)*	0 (1,68)*	-0,02 0,51	-0,011 0,17	-0,025 0,47	-0,036 1,34	-0,005 1,04	0,005 1,06	-0,007 0,85		
			b.		0,005 0,45	0 0,04	0,001 (1,94)*	0,003 (1,81)*	0 1,53	-0,015 0,38	-0,008 0,12	-0,019 0,36	-0,035 1,27	-0,005 1,08	0,005 1,03	-0,008 0,95		
		2	a.	0,016 1,03		-0,001 1,10	0,002 (2,19)**	0,134 0,14	0 (1,94)*	-0,044 0,96	-0,062 0,81	-0,055 0,74	-0,067 1,46	-0,01 1,43	0,007 1,07	-0,003 0,43		
			b.		0,005 0,40	-0,001 1,50	0,002 (2,15)**	0,067 0,08	0 (1,68)*	-0,037 0,91	-0,059 0,78	-0,055 0,77	-0,057 1,18	-0,009 1,26	0,007 1,12	-0,004 0,56		
		3	a.	0,016 1,03		-0,001 1,07	0,002 (2,17)**	0,086 0,09	0 (1,93)*	-0,044 0,96	-0,062 0,80	-0,055 0,74	-0,067 1,44	-0,01 1,42	0,007 1,08	-0,003 0,43	0,009 1,35	
			b.		0,005 0,44	-0,001 1,48	0,002 (2,15)**	0,061 0,07	0 (1,68)*	-0,037 0,92	-0,059 0,79	-0,055 0,77	-0,057 1,17	-0,009 1,25	0,007 1,11	-0,004 0,56		0,002 0,41
	3	1	a.	0,009 0,70		0,001 0,77	0,001 0,19	0,013 (3,98)***	0 (3,11)***	-0,038 1,02	-0,058 1,19	-0,044 0,83	-0,042 1,38	-0,009 1,42	-0,002 0,41	-0,011 (2,56)**		
			b.		0,009 0,94	0,001 0,75	0 0,12	0,013 (5,09)***	0 (3,30)***	-0,033 0,89	-0,062 1,20	-0,042 0,78	-0,038 1,30	-0,008 1,31	-0,002 0,40	-0,011 (2,70)***		
		2	a.	0,002 0,09		-0,002 (1,77)*	-0,002 0,83	0,307 0,31	0 (3,46)***	-0,061 1,16	-0,034 0,55	-0,007 0,11	-0,041 0,86	-0,008 1,15	-0,006 1,02	-0,006 1,13		
			b.		0,006 0,52	-0,002 (1,65)*	-0,003 0,97	0,295 0,29	0 (4,02)***	-0,061 1,37	-0,044 0,73	-0,008 0,12	-0,041 0,95	-0,006 0,78	-0,007 1,23	-0,005 1,03		
		3	a.	0,002 0,09		-0,002 (1,77)*	-0,002 0,83	0,384 0,38	0 (2,71)***	-0,061 1,15	-0,034 0,54	-0,007 0,11	-0,042 0,86	-0,008 1,16	-0,006 1,02	-0,006 1,14	-0,013 (2,02)**	
			b.		0,004 0,33	-0,002 (1,65)*	-0,003 0,97	0,309 0,30	0 (3,42)***	-0,06 1,35	-0,043 0,71	-0,007 0,11	-0,041 0,96	-0,006 0,79	-0,007 1,25	-0,006 1,06		-0,005 0,51
	4	1	a.	-0,019 0,99		0,001 (1,66)*	-0,007 1,44	0 0,04	0 1,41	-0,021 0,52	-0,121 (2,24)**	0,028 0,49	-0,028 0,72	0,001 0,28	-0,004 0,69	0,007 0,96		
			b.		-0,015 1,05	0,001 (1,73)*	-0,007 1,39	0 0,04	0 0,95	-0,023 0,59	-0,125 (2,31)**	0,022 0,40	-0,031 0,80	0,003 0,50	-0,003 0,58	0,007 1,02		
		2	a.	-0,006 0,28		0 0,53	-0,009 1,60	2,405 (2,00)**	0 (1,76)*	-0,074 1,43	-0,097 (1,84)*	0,072 1,17	-0,035 0,48	0,002 0,38	-0,014 (1,99)**	0,009 1,28		
			b.		0 0,03	0 0,29	-0,009 1,58	2,683 (2,36)**	0 1,34	-0,071 1,48	-0,104 (2,02)**	0,06 0,97	-0,044 0,66	0,003 0,61	-0,011 (1,70)*	0,007 1,11		
		3	a.	-0,006 0,28		0 0,49	-0,009 1,60	2,339 (1,90)*	0 (1,68)*	-0,074 1,42	-0,097 (1,84)*	0,072 1,17	-0,034 0,47	0,002 0,39	-0,014 (1,98)**	0,009 1,29	0,012 1,15	
			b.		-0,003 0,18	0 0,24	-0,009 1,59	2,697 (2,38)**	0 1,25	-0,07 1,45	-0,102 (1,99)**	0,062 1,01	-0,045 0,66	0,003 0,58	-0,011 (1,72)*	0,007 1,07		-0,008 0,93
Rest of Europe	0	1	a.	-0,015 0,49		0 0,58	0,007 0,25	-1,876 0,96	0,001 0,43	0,095 0,57	-0,161 1,05	-0,289 1,20	0,005 0,84	0,091 (3,02)***	0,024 0,83	0,031 1,29		
			b.		0,007 0,24	0 0,95	0,01 0,35	0,527 0,29	0 0,09	0,091 0,53	-0,201 1,30	-0,312 1,26	0,003 0,66	0,089 (2,76)***	0,023 0,78	0,03 1,17		
		2	a.	-0,04 0,84		0 (1,69)*	-0,001 0,04	-3,082 0,72	0,001 0,19	0,116 0,60	-0,216 1,41	-0,23 0,99	0,002 0,26	0,085 (2,53)**	0,019 0,58	0,034 1,54		
			b.		-0,007 0,17	0 1,47	0,003 0,09	-1,805 0,44	0 0,06	0,091 0,48	-0,277 (1,94)*	-0,302 1,26	0,001 0,25	0,088 (2,49)**	0,021 0,65	0,036 1,54		
		3	a.	-0,04 0,84		0 (1,71)*	-0,001 0,04	-3,088 0,70	0,001 0,19	0,116 0,61	-0,216 1,41	-0,23 0,99	0,002 0,25	0,085 (2,53)**	0,019 0,58	0,034 1,54	0,001 0,05	
			b.			0 1,50	0,003 0,08	-1,828 0,44	0 0,07	0,092 0,49	-0,276 (1,92)*	-0,301 1,25	0,001 0,23	0,088 (2,49)**	0,021 0,65	0,036 1,53		-0,005 0,32
	1	1	a.	0,027 0,84		0 0,07	-0,058 (2,51)**	-7,534 (1,85)*	0,001 0,68	0,099 0,64	-0,029 0,22	-0,047 0,27	-0,013 (1,69)*	-0,016 0,40	0,064 (3,89)***	-0,043 (2,32)**		
			b.		0,01 0,57	0 0,16	-0,063 (2,68)***	-3,378 1,32	0,001 0,46	0,111 0,73	-0,053 0,40	-0,022 0,11	-0,012 (1,66)*	-0,02 0,48	0,064 (3,96)***	-0,045 (2,42)**		
		2	a.	0,039 0,86		0 1,13	-0,039 1,64	-9,028 (2,67)***	0,001 0,70	0,011 0,07	-0,047 0,30	-0,041 0,24	-0,013 (1,81)*	-0,022 0,55	0,059 (2,65)***	-0,039 (1,95)*		
			b.		0,033 (1,76)*	0 1,31	-0,042 (1,76)*	-11,03 (2,54)**	0,001 0,87	0,008 0,05	-0,052 0,35	0,009 0,05	-0,012 (2,03)**	-0,022 0,53	0,059 (2,68)***	-0,038 (1,75)*		
		3	a.	0,038 0,87		0 1,13	-0,039 1,64	-9,093 (2,60)***	0,001 0,70	0,01 0,07	-0,047 0,30	-0,04 0,22	-0,012 (1,82)*	-0,022 0,55	0,059 (2,64)***	-0,039 (1,95)*	0,015 0,54	
			b.		0,041 (1,67)*	0 1,28	-0,041 (1,66)*	-10,91 (2,55)**	0,001 1,01	0,002 0,02	-0,056 0,37	0,005 0,03	-0,013 (2,03)**	-0,021 0,53	0,059 (2,67)***	-0,038 (1,73)*		0,023 0,85
	2	1	a.	0,043 1,63		0 0,89	0,049 (1,72)*	-0,057 0,12	-0,002 (1,97)**	-0,039 0,32	0,085 0,56	-0,041 0,22	0,012 (2,39)**	0,001 0,09	-0,017 0,83	0,004 0,29		
			b.		0,016 1,26	0 1,15	0,053 (1,86)*	-0,508 1,13	-0,002 (2,50)**	-0,05 0,39	0,122 0,78	-0,024 0,14	0,013 (2,41)**	0,001 0,05	-0,024 1,11	0,009 0,63		
		2	a.	0,068 (2,80)***		0 0,49	0,039 0,99	-1,831 0,41	-0,002 (1,70)*	-0,05 0,35	0,037 0,26	-0,054 0,27	0,013 (2,43)**	-0,003 0,16	-0,012 0,63	0,009 0,69		
			b.		0,01 0,59	0 1,04	0,038 0,96	-2,544 0,48	-0,003 (1,91)*	-0,041 0,27	0,081 0,51	-0,032 0,17	0,015 (2,50)**	-0,003 0,14	-0,023 1,12	0,012 1,10		
		3	a.	0,066 (2,70)***		0 0,50	0,039 1,01	-2,182 0,47	-0,002 1,49	-0,053 0,37	0,037 0,26	-0,052 0,26	0,014 (2,49)**	-0,003 0,17	-0,012 0,63	0,009 0,72	0,064 (5,22)***	
			b.		0,035 (1,95)*	0 0,93	0,042 1,05	-2,166 0,42	-0,002 1,50	-0,052 0,33	0,068 0,42	-0,043 0,23	0,014 (2,39)**	-0,002 0,11	-0,022 1,05	0,014 1,24		0,057 (3,92)***
	3	1	a.	0,014 0,66		0 (1,72)*	-0,046 (2,43)**	4,425 1,04	-0,003 (1,68)*	-0,205 1,58	-0,087 0,44	0,02 0,20	-0,012 (2,33)**	0,001 0,03	-0,002 0,09	-0,013 0,57		
			b.		0,003 0,24	0 (1,96)**	-0,046 (2,52)**	0,751 (1,82)*	-0,002 1,50	-0,242 (2,01)**	-0,098 0,51	0,057 0,53	-0,012 (2,35)**	0,006 0,34	-0,002 0,10	-0,019 0,90		
		2	a.	0,015 0,55		0 0,46	-0,035 (2,11)**	7,868 (2,16)**	-0,003 (1,71)*	-0,17 1,37	-0,147 0,90	0,011 0,11	-0,011 (2,12)**	0,001 0,03	0,006 0,31	0,001 0,06		
			b.		0,008 0,42	0 0,56	-0,036 (2,34)**	7,736 (1,84)*	-0,001 0,71	-0,213 (1,96)**	-0,16 1,09	0,031 0,28	-0,01 (1,69)*	0,005 0,23	0,005 0,23	-0,007 0,36		
		3	a.	0,015 0,55		0 0,46	-0,035 (2,07)**	7,87 (2,17)**	-0,003 (1,71)*	-0,17 1,38	-0,147 0,90	0,011 0,11	-0,011 (2,11)**	0,001 0,03	0,006 0,30	0,001 0,06	0 0,01	
			b.		0,016 0,78	0 0,51	-0,035 (2,22)**	7,889 (1,86)*	-0,001 0,61	-0,217 (2,01)**	-0,163 1,13	0,027 0,25	-0,01 (1,72)*	0,005 0,23	0,005 0,25	-0,006 0,34		0,017 (2,04)**
	4	1	a.	0,05 (1,95)*		0 0,07	0,005 0,15	-2,671 0,88	0,004 (3,02)***	-0,087 0,59	-0,094 0,67	0,046 0,40	-0,013 (1,94)*	-0,033 (1,96)**	-0,001 0,04	0,043 (2,64)***		
			b.		0,023 1,52	0 0,20	0,014 0,49	-3,179 1,01	0,004 (1,94)*	-0,046 0,30	-0,087 0,62	0,055 0,52	-0,012 (1,84)*	-0,033 (2,14)**	-0,001 0,06	0,041 (2,44)**		
		2	a.	0,055 (1,89)*		0 1,44	0,009 0,22	-2,772 0,55	0,004 (3,10)***	-0,054 0,30	-0,066 0,44	0,034 0,27	-0,013 (2,22)**	-0,034 1,60	0,001 0,08	0,05 (3,15)***		
			b.		0,026 1,13	0 (1,86)*	0,017 0,41	-2,236 0,52	0,003 (1,81)*	-0,015 0,08	-0,047 0,31	0,053 0,46	-0,012 (2,01)**	-0,032 (1,80)*	-0,004 0,21	0,046 (3,06)***		
		3	a.	0,055 (1,89)*		0 1,42	0,009 0,22	-2,768 0,56	0,004 (3,08)***	-0,054 0,30	-0,066 0,44	0,034 0,27	-0,013 (2,22)**	-0,034 1,61	0,001 0,08	0,05 (3,11)***	-0,001 0,03	
			b.		0,038 1,19	0 1,63	0,019 0,45	-1,972 0,44	0,004 (1,92)*	-0,018 0,10	-0,052 0,34	0,048 0,41	-0,012 (2,03)**	-0,032 (1,79)*	-0,004 0,19	0,047 (3,15)***		0,022 0,92

Panel Illiquid. *Dependent variable: market betas lagged by (#) months*

Region	(#)			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return	Gross Profitability Ratio (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	Other Passive Ownership (t-1)	Other Fl. Passive Ownership (t-1)
Developed Europe	0	1	a.	0,096 (4,32)***		0 0,94	0,004 1,14	-0,032 (7,10)***	0 0,52	0,009 0,27	-0,088 1,33	-0,305 (4,54)***	0,009 0,17	0,077 (8,67)***	0,033 (3,55)***	0,033 (6,01)***		
			b.		0,087 (5,68)***	0 0,44	0,004 1,17	-0,032 (6,77)***	0 0,88	0,006 0,14	-0,08 1,14	-0,292 (4,52)***	0,017 0,34	0,076 (8,68)***	0,033 (3,65)***	0,033 (5,82)***		
		2	a.	0,109 (3,48)***		0 0,26	0,005 (2,86)***	-3,652 (3,25)***	0 0,03	0,009 0,21	-0,108 1,60	-0,309 (3,72)***	0,007 0,15	0,086 (9,70)***	0,037 (5,34)***	0,023 (3,13)***		
			b.		0,082 (3,75)***	0 0,21	0,005 (2,96)***	-3,674 (3,09)***	0 0,62	0,003 0,07	-0,098 1,37	-0,29 (3,59)***	0,015 0,31	0,083 (9,64)***	0,039 (5,68)***	0,024 (3,04)***		
		3	a.	0,11 (3,47)***		0 0,25	0,005 (2,85)***	-3,547 (3,12)***	0 0,04	0,009 0,20	-0,109 1,62	-0,31 (3,70)***	0,008 0,15	0,086 (9,69)***	0,037 (5,30)***	0,023 (3,09)***	-0,027 (1,85)*	
			b.		0,088 (3,89)***	0 0,23	0,005 (3,02)***	-3,676 (3,13)***	0 0,47	0,001 0,02	-0,101 1,41	-0,293 (3,61)***	0,014 0,29	0,083 (9,65)***	0,039 (5,69)***	0,024 (3,05)***		0,021 (1,69)*
	1	1	a.	-0,002 0,10		0 0,65	-0,008 (3,29)***	1E-06 0,32	0 (1,81)*	0,021 0,36	-0,137 (3,38)***	-0,131 (2,26)**	-0,022 0,49	-0,001 0,20	0,004 1,10	0,008 (1,94)*		
			b.		-0,002 0,18	0 0,56	-0,008 (3,29)***	1E-06 0,30	0 (2,30)**	0,024 0,42	-0,139 (3,44)***	-0,15 (2,75)***	-0,028 0,62	-0,001 0,14	0,006 1,42	0,007 (1,72)*		
		2	a.	0,001 0,07		0,002 (1,94)*	-0,009 (5,04)***	0,0006 1,10	0 (1,82)*	0,07 1,11	-0,097 (1,92)*	-0,188 (2,08)**	0,001 0,03	-0,003 0,29	0,003 0,64	0,008 1,51		
			b.		0,002 0,17	0,002 (1,85)*	-0,009 (5,10)***	0,0006 1,18	0 (1,91)*	0,071 1,16	-0,109 (2,37)**	-0,211 (2,28)**	-0,001 0,03	-0,001 0,10	0,006 1,27	0,008 1,54		
		3	a.	0,001 0,08		0,002 (1,94)*	-0,009 (5,00)***	0,0006 1,18	0 (1,75)*	0,07 1,10	-0,097 (1,86)*	-0,188 (2,08)**	0,001 0,03	-0,003 0,29	0,003 0,63	0,008 1,51	-0,006 0,37	
			b.		-0,003 0,24	0,002 (1,84)*	-0,009 (5,16)***	0,0006 1,15	0 (2,04)**	0,073 1,22	-0,106 (2,34)**	-0,208 (2,28)**	0 0,01	-0,001 0,12	0,006 1,21	0,008 1,47		-0,018 1,50
	2	1	a.	-0,009 0,56		0 0,26	0 0,15	3E-06 (1,84)*	0 1,30	-0,015 0,35	-0,005 0,10	-0,052 1,08	-0,034 1,06	-0,003 0,53	0,007 1,54	-0,01 1,37		
			b.		-0,009 0,87	0 0,65	0 0,19	3E-06 (2,80)***	0 1,59	-0,018 0,43	-0,002 0,04	-0,051 1,16	-0,037 1,13	-0,002 0,38	0,007 1,49	-0,009 1,36		
		2	a.	0,019 1,04		0 0,06	0,002 1,57	-3E-04 0,36	0 (1,88)*	-0,031 0,53	-0,076 0,93	-0,05 0,66	-0,025 0,36	-0,007 0,91	0,008 1,16	-0,005 0,68		
			b.		0,005 0,34	-0,001 0,53	0,002 1,61	-5E-04 0,56	0 (1,79)*	-0,032 0,61	-0,061 0,78	-0,051 0,71	-0,022 0,31	-0,006 0,70	0,007 1,03	-0,005 0,68		
		3	a.	0,019 1,03		0 0,05	0,002 1,52	-4E-04 0,42	0 (1,82)*	-0,031 0,53	-0,076 0,92	-0,05 0,66	-0,025 0,36	-0,007 0,91	0,008 1,16	-0,005 0,67	0,014 1,60	
			b.		0,006 0,43	-0,001 0,52	0,002 1,59	-5E-04 0,55	0 (1,77)*	-0,033 0,62	-0,062 0,79	-0,052 0,72	-0,022 0,31	-0,006 0,69	0,007 1,04	-0,005 0,67		0,005 0,53
	3	1	a.	-0,008 0,59		0 0,50	-0,001 (2,21)**	1E-05 (4,32)***	0 (2,80)***	0,011 0,31	-0,015 0,44	-0,026 0,56	-0,049 (1,81)*	-0,007 0,93	-0,005 0,85	-0,008 1,45		
			b.		0,002 0,34	0 0,52	-0,001 (1,93)*	1E-05 (5,23)***	0 (3,46)***	0,016 0,47	-0,02 0,52	-0,034 0,73	-0,043 (1,66)*	-0,006 0,74	-0,004 0,74	-0,008 (1,75)*		
		2	a.	-0,021 0,96		-0,002 (2,21)**	-0,002 (2,23)**	0,0001 0,12	0 (2,92)***	-0,028 0,53	0,033 0,68	0,007 0,11	0,021 0,55	-0,007 0,79	-0,011 1,29	-0,006 1,03		
			b.		-0,004 0,29	-0,002 (2,05)**	-0,002 (2,06)**	0,0002 0,16	0 (4,20)***	-0,023 0,42	0,021 0,48	-0,001 0,02	0,024 0,62	-0,005 0,56	-0,01 1,21	-0,007 1,07		
		3	a.	-0,021 0,96		-0,002 (2,13)**	-0,002 (2,27)**	0,0002 0,19	0 (2,45)**	-0,028 0,52	0,033 0,64	0,006 0,10	0,022 0,57	-0,008 0,80	-0,011 1,28	-0,006 1,05	-0,02 (1,94)*	
			b.		-0,008 0,50	-0,002 (2,07)**	-0,002 (2,07)**	0,0002 0,16	0 (3,75)***	-0,021 0,38	0,023 0,51	0,001 0,02	0,024 0,63	-0,006 0,56	-0,011 1,23	-0,007 1,09		-0,011 0,55
	4	1	a.	-0,014 1,08		0,001 1,63	-0,015 (4,01)***	1E-06 0,44	0 (1,85)*	0 0,01	-0,08 1,45	0,065 1,60	-0,059 1,15	0,004 0,96	-0,002 0,48	0,004 0,89		
			b.		-0,005 0,64	0,001 (1,85)*	-0,015 (4,01)***	1E-06 0,43	0 1,39	-0,009 0,27	-0,081 1,53	0,056 1,48	-0,066 1,28	0,004 1,02	-0,001 0,27	0,005 1,07		
		2	a.	-0,008 0,40		0 0,50	-0,016 (4,41)***	2,201 1,64	0 (2,12)**	-0,038 0,74	-0,063 0,80	0,121 (2,24)**	-0,058 0,58	0,002 0,29	-0,01 1,28	0,007 1,29		
			b.		0,001 0,03	0 0,17	-0,015 (4,46)***	2,575 (2,10)**	0 (1,65)*	-0,044 0,96	-0,065 0,84	0,116 (2,06)**	-0,065 0,68	0,002 0,29	-0,006 0,74	0,006 1,05		
		3	a.	-0,008 0,40		0 0,50	-0,016 (4,41)***	2,163 1,59	0 (1,88)*	-0,038 0,71	-0,063 0,80	0,121 (2,24)**	-0,058 0,58	0,002 0,30	-0,009 1,27	0,007 1,29	0,011 0,70	
			b.		-0,006 0,27	0 0,13	-0,015 (4,45)***	2,554 (2,08)**	0 1,53	-0,042 0,91	-0,062 0,81	0,12 (2,16)**	-0,064 0,68	0,002 0,25	-0,006 0,77	0,005 1,02		-0,014 1,38
Rest of Europe	0	1	a.	0,002 0,03		0 1,42	-0,011 0,42	1,17 0,65	0,001 0,90	-0,08 0,50	-0,065 0,37	-0,398 1,37	-0,003 0,30	0,085 (1,74)*	0,032 0,97	0,047 1,48		
			b.		0,009 0,34	0 1,32	-0,006 0,25	2,036 1,22	0,001 0,87	-0,075 0,53	-0,099 0,58	-0,408 1,28	-0,002 0,24	0,069 1,37	0,033 0,97	0,041 1,30		
		2	a.	-0,014 0,23		0 0,52	-0,006 0,23	4,69 0,94	0,001 0,77	-0,06 0,31	-0,031 0,15	-0,272 1,06	-0,014 1,28	0,054 0,87	0,024 0,68	0,039 1,45		
			b.		-0,01 0,27	0 0,71	0,002 0,08	5,949 1,21	0,001 0,45	-0,089 0,47	-0,135 0,64	-0,349 1,19	-0,011 1,04	0,042 0,65	0,024 0,65	0,038 1,44		
		3	a.	-0,015 0,24		0 0,52	-0,006 0,24	4,623 0,94	0,001 0,80	-0,06 0,31	-0,03 0,13	-0,27 1,06	-0,014 1,25	0,054 0,86	0,024 0,66	0,039 1,44	0,017 0,36	
			b.		-0,009 0,22	0 0,72	0,002 0,08	5,949 1,20	0,001 0,49	-0,089 0,47	-0,135 0,64	-0,349 1,19	-0,011 1,02	0,042 0,65	0,024 0,64	0,038 1,44		0,004 0,16
	1	1	a.	0,068 1,25		0 1,20	-0,053 (3,59)***	-3,816 1,61	0,002 1,00	0,247 1,35	-0,123 0,81	0,08 0,54	0,006 0,42	0,016 0,58	0,07 (4,16)***	-0,033 (1,85)*		
			b.		0,008 0,28	0 0,64	-0,058 (3,55)***	-2,866 (2,69)***	0 0,31	0,249 1,41	-0,157 1,04	0,152 0,95	0,007 0,50	0,006 0,22	0,07 (4,21)***	-0,031 (1,88)*		
		2	a.	0,069 1,16		0 0,50	-0,028 1,23	-4,857 (2,20)**	0,001 0,90	0,098 0,60	-0,185 0,96	0,138 0,85	0,01 0,75	0,013 0,42	0,061 (3,39)***	-0,036 1,52		
			b.		0,021 0,50	0 0,14	-0,029 1,34	-6,474 (2,38)**	0,001 0,50	0,063 0,39	-0,191 0,96	0,251 (1,65)*	0,011 0,75	0,015 0,50	0,056 (3,44)***	-0,035 1,61		
		3	a.	0,066 1,11		0 0,50	-0,028 1,22	-5,037 (2,13)**	0,001 0,96	0,097 0,60	-0,181 0,94	0,143 0,86	0,011 0,77	0,013 0,41	0,061 (3,37)***	-0,036 1,52	0,04 1,47	
			b.		0,038 0,65	0 0,00	-0,03 1,36	-6,383 (2,37)**	0,001 0,69	0,059 0,35	-0,198 0,98	0,245 1,59	0,01 0,70	0,016 0,53	0,056 (3,49)***	-0,035 1,60		0,043 0,87
	2	1	a.	0,065 (2,55)**		0 1,27	0,041 0,93	-1,606 0,45	-0,001 0,72	0,024 0,17	0,117 0,53	0,03 0,20	0,021 1,59	0,009 0,34	0 0,00	-0,019 1,00		
			b.		0,03 1,34	0 1,19	0,044 0,95	-1E-04 0,08	-0,002 0,85	0,013 0,09	0,201 0,81	0,064 0,42	0,022 (1,80)*	-0,001 0,05	-0,012 0,26	-0,01 0,49		
		2	a.	0,087 (2,34)**		0 1,26	0,052 1,03	-3E-04 0,08	-0,002 0,78	-0,02 0,10	0,096 0,51	-0,006 0,03	0,025 (1,65)*	0,001 0,02	-0,01 0,21	-0,014 0,61		
			b.		0,021 0,95	0 0,96	0,05 0,96	-1,95 0,37	-0,002 0,86	-0,024 0,10	0,177 0,80	0,031 0,18	0,026 (2,01)**	-0,008 0,20	-0,019 0,36	-0,004 0,16		
		3	a.	0,081 (2,17)**		0 1,26	0,051 1,02	-6E-04 0,15	-0,001 0,68	-0,022 0,11	0,102 0,53	0,004 0,02	0,026 (1,73)*	0 0,00	-0,011 0,24	-0,015 0,62	0,075 (3,17)***	
			b.		0,052 (1,99)**	0 1,12	0,049 0,95	-1,709 0,34	-0,002 0,71	-0,03 0,13	0,165 0,74	0,016 0,09	0,025 (1,85)*	-0,007 0,18	-0,018 0,36	-0,002 0,10		0,068 (3,28)***
	3	1	a.	0 0,00		0 0,27	-0,043 (2,58)***	2,514 0,74	-0,002 1,28	-0,359 (3,40)***	-0,315 1,35	-0,172 1,25	-0,013 (2,09)**	0,002 0,06	-0,006 0,28	-0,014 0,86		
			b.		-0,016 0,74	0 0,23	-0,038 (2,36)**	0,0007 (2,91)***	-0,002 (1,74)*	-0,379 (3,41)***	-0,312 1,25	-0,123 0,87	-0,012 (1,85)*	0,009 0,31	-0,007 0,30	-0,024 1,49		
		2	a.	-0,013 0,22		0 0,76	-0,031 (1,89)*	5,489 1,02	-0,003 (2,16)**	-0,329 (2,28)**	-0,386 (2,27)**	-0,211 1,54	-0,009 1,50	0,005 0,16	0,014 0,70	0,002 0,08		
			b.		-0,007 0,39	0 0,73	-0,029 (1,77)*	5,494 0,89	-0,003 (2,44)**	-0,317 (2,65)***	-0,399 (2,32)**	-0,184 1,39	-0,009 1,31	0,013 0,43	0,017 0,74	-0,011 0,47		
		3	a.	-0,01 0,18		0 0,72	-0,031 (1,92)*	5,714 1,07	-0,003 (2,09)**	-0,328 (2,25)**	-0,387 (2,21)**	-0,214 1,57	-0,009 (1,77)*	0,006 0,19	0,014 0,69	0,002 0,10	-0,029 0,79	
			b.		0,007 0,19	0 0,90	-0,029 (1,68)*	5,603 0,92	-0,002 (1,73)*	-0,321 (2,66)***	-0,404 (2,48)**	-0,191 1,37	-0,009 1,42	0,013 0,43	0,018 0,79	-0,01 0,45		0,028 0,59
	4	1	a.	0,039 1,29		0 0,13	0,019 0,47	-3,983 1,00	0,004 (2,66)***	-0,142 0,75	-0,003 0,02	-0,111 0,48	0,027 (2,28)**	-0,028 1,10	0,01 0,33	0,012 0,56		
			b.		0,007 0,35	0 0,25	0,029 0,81	-4,429 1,15	0,004 (2,08)**	-0,046 0,22	0,01 0,06	-0,082 0,40	0,03 (2,56)**	-0,027 1,06	0,004 0,12	0,01 0,48		
		2	a.	0,054 1,42		0 0,12	0,052 0,88	-2,904 0,44	0,004 (2,51)**	-0,164 0,73	0,064 0,33	-0,179 0,77	0,027 (3,03)***	-0,031 1,12	0 0,00	0,01 0,45		
			b.		0,014 0,35	0 0,27	0,074 1,17	-1,778 0,30	0,005 (1,80)*	-0,054 0,20	0,085 0,42	-0,097 0,42	0,033 (3,61)***	-0,032 1,33	-0,01 0,50	0,005 0,22		
		3	a.	0,056 1,49		0 0,13	0,052 0,86	-2,816 0,42	0,004 (2,44)**	-0,164 0,72	0,064 0,33	-0,18 0,77	0,027 (2,95)***	-0,031 1,11	0 0,01	0,01 0,46	-0,015 0,54	
			b.		0,05 1,04	0 0,05	0,075 1,17	-1,41 0,23	0,005 (2,14)**	-0,06 0,22	0,074 0,36	-0,112 0,50	0,032 (3,42)***	-0,031 1,28	-0,009 0,46	0,006 0,26		0,061 (1,66)*

Table 7 - Control Vars continues…

Panel Liquid. *Dependent variable: market betas lagged by (#) months*

(#)			Market Cap (t-1)	Free Float (t-1)	Inverse Price Ratio (t-1)	Turnover (t-1)	Bid-ask spread (t-1)	Book-to-market Ratio (t-1)	FH Momentum	SH Momentum	Last Month Return	Gross Profitability Ratio (t-1)	Volatility (t-1)	Volatility (t-2)	Volatility (t-3)	Other Passive Ownership (t-1)	Other Fl. Passive Ownership (t-1)
0	Developed Europe	1	a. 0,039 *1,11*		-0,035 *(2,26)***	-0,022 *(5,82)***	-13,07 *(2,07)***	0,004 *1,33*	0,067 *0,98*	-0,148 *1,29*	-0,451 *(4,18)***	-0,12 *(2,34)***	0,111 *(8,67)***	0,066 *(4,41)***	0,06 *(7,96)****		
			b.	0,049 *(1,78)**	-0,032 *(2,42)***	-0,022 *(5,83)****	-11,53 *(1,65)**	0,004 *1,32*	0,06 *0,88*	-0,146 *1,28*	-0,449 *(4,20)****	-0,111 *(2,23)***	0,11 *(8,75)****	0,066 *(4,56)****	0,062 *(7,93)****		
		2	a. 0,064 *(2,00)***		-0,037 *1,56*	-0,026 *(5,49)****	-18,76 *(2,73)****	0,006 *(1,88)**	0,115 *(1,72)**	-0,2 *(2,12)***	-0,536 *(4,74)****	-0,138 *(2,12)***	0,128 *(9,59)****	0,065 *(4,25)****	0,058 *(6,71)****		
			b.	0,084 *(3,42)****	-0,04 *1,64*	-0,022 *(4,22)****	-15,17 *(2,75)****	0,006 *(1,79)**	0,075 *0,88*	-0,188 *(2,11)***	-0,564 *(5,08)****	-0,169 *(2,34)***	0,119 *(9,64)****	0,06 *(4,58)****	0,063 *(6,63)****		
		3	a. 0,064 *(2,00)***		-0,032 *1,30*	-0,026 *(5,47)****	-17,6 *(2,78)****	0,005 *(1,85)**	0,116 *(1,73)**	-0,2 *(2,12)***	-0,536 *(4,74)****	-0,141 *(2,11)***	0,127 *(9,67)****	0,064 *(4,26)****	0,058 *(6,66)****	-0,042 *(1,67)**	
			b.	0,081 *(3,38)****	-0,04 *1,64*	-0,022 *(4,22)****	-14,93 *(2,74)****	0,006 *(1,74)**	0,076 *0,88*	-0,186 *(2,09)***	-0,563 *(5,06)****	-0,172 *(2,33)***	0,119 *(9,68)****	0,06 *(4,53)****	0,063 *(6,48)****		-0,017 *1,00*
1		1	a. -0,035 *(1,70)**		-0,016 *1,27*	0,001 *0,64*	8,881 *1,56*	0 *0,08*	0,023 *0,30*	-0,197 *(3,89)****	-0,167 *(1,89)**	0,02 *0,43*	-0,002 *0,18*	0,009 *1,05*	0,007 *0,83*		
			b.	-0,028 *(1,72)**	-0,011 *0,93*	0,001 *0,58*	9,856 *(1,69)**	0 *0,15*	0,029 *0,36*	-0,197 *(3,95)****	-0,179 *(1,98)***	0,009 *0,21*	-0,001 *0,09*	0,009 *1,14*	0,008 *0,87*		
		2	a. -0,029 *1,26*		0,007 *0,28*	-0,004 *1,20*	0,0008 *0,13*	0 *0,12*	-0,029 *0,35*	-0,259 *(4,93)****	-0,194 *(2,04)***	0,029 *0,32*	0 *0,03*	0,012 *1,29*	0,005 *0,41*		
			b.	-0,018 *1,03*	-0,003 *0,13*	-0,001 *0,20*	4,392 *0,65*	-0,001 *0,40*	-0,004 *0,05*	-0,271 *(4,08)****	-0,193 *(2,20)***	0,009 *0,10*	0,005 *0,45*	0,011 *1,20*	0,003 *0,21*		
		3	a. -0,029 *1,26*		0,008 *0,31*	-0,004 *1,20*	0,001 *0,16*	0 *0,12*	-0,029 *0,35*	-0,259 *(4,87)****	-0,194 *(2,04)***	0,028 *0,32*	0 *0,02*	0,012 *1,29*	0,005 *0,41*	-0,007 *0,62*	
			b.	-0,016 *0,84*	-0,002 *0,11*	-0,001 *0,19*	4,241 *0,63*	-0,001 *0,35*	-0,005 *0,05*	-0,272 *(4,05)****	-0,195 *(2,21)***	0,011 *0,13*	0,006 *0,46*	0,011 *1,22*	0,003 *0,22*		0,012 *0,99*
2		1	a. 0,031 *1,60*		-0,011 *0,62*	0,007 *(2,80)****	-1,25 *0,28*	-0,002 *0,88*	-0,03 *0,52*	-0,01 *0,11*	0,004 *0,05*	-0,025 *0,77*	-0,002 *0,28*	0,003 *0,37*	0,001 *0,07*		
			b.	0,018 *1,20*	-0,014 *0,97*	0,006 *(2,60)****	-6E-04 *0,13*	-0,002 *0,89*	-0,015 *0,25*	-0,01 *0,12*	0,014 *0,17*	-0,03 *0,91*	-0,004 *0,49*	0,002 *0,21*	-0,001 *0,08*		
		2	a. 0,026 *1,45*		0,05 *1,50*	0 *0,01*	-2,493 *0,32*	0,001 *0,48*	-0,07 *0,97*	-0,021 *0,22*	-0,057 *0,53*	-0,121 *(2,20)***	-0,01 *1,06*	-0,001 *0,10*	0,002 *0,20*		
			b.	0,004 *0,28*	0,038 *1,12*	-0,002 *0,34*	-4,709 *0,52*	0 *0,12*	-0,04 *0,64*	-0,037 *0,42*	-0,067 *0,58*	-0,129 *(2,02)***	-0,009 *0,97*	-0,001 *0,08*	0,003 *0,30*		
		3	a. 0,026 *1,45*		0,047 *1,42*	0 *0,02*	-3,179 *0,39*	0,001 *0,49*	-0,071 *0,97*	-0,02 *0,22*	-0,057 *0,52*	-0,12 *(2,15)***	-0,01 *1,04*	-0,001 *0,09*	0,003 *0,21*	0,02 *(2,01)***	
			b.	0,007 *0,44*	0,038 *1,14*	-0,002 *0,32*	-4,816 *0,52*	0 *0,07*	-0,041 *0,66*	-0,038 *0,44*	-0,069 *0,60*	-0,127 *(1,98)***	-0,009 *0,95*	-0,001 *0,06*	0,004 *0,32*		0,012 *0,92*
3		1	a. 0,019 *0,95*		-0,041 *1,21*	0,01 *(4,29)****	-2,099 *0,47*	0,001 *0,72*	-0,116 *(2,06)***	-0,141 *(1,78)**	-0,051 *0,65*	-0,055 *1,49*	-0,011 *1,52*	0,01 *1,35*	-0,021 *(3,41)****		
			b.	0,014 *0,84*	-0,043 *1,30*	0,008 *(3,81)****	-3,102 *0,64*	0,001 *0,70*	-0,116 *(2,12)***	-0,145 *(1,87)**	-0,042 *0,52*	-0,057 *1,63*	-0,011 *1,57*	0,009 *1,21*	-0,019 *(3,33)****		
		2	a. 0,018 *0,67*		-0,066 *1,13*	-0,006 *1,41*	-6,15 *0,86*	0,001 *0,81*	-0,115 *1,37*	-0,159 *1,37*	-0,014 *0,16*	-0,175 *(2,19)***	-0,006 *0,63*	0,013 *1,25*	-0,014 *(1,87)**		
			b.	0,022 *0,94*	-0,086 *1,40*	-0,009 *(2,18)***	-6,717 *0,93*	0,002 *0,94*	-0,146 *(1,86)**	-0,197 *(1,69)**	-0,017 *0,18*	-0,21 *(2,57)***	-0,003 *0,31*	0,012 *1,20*	-0,011 *1,58*		
		3	a. 0,018 *0,67*		-0,065 *1,13*	-0,006 *1,27*	-5,928 *0,84*	0,001 *0,81*	-0,115 *1,36*	-0,159 *1,37*	-0,014 *0,16*	-0,175 *(2,19)***	-0,006 *0,64*	0,013 *1,25*	-0,014 *(1,87)**	-0,006 *0,52*	
			b.	0,025 *0,94*	-0,086 *1,38*	-0,009 *(2,00)***	-6,774 *0,94*	0,002 *0,94*	-0,147 *(1,86)**	-0,198 *(1,70)**	-0,018 *0,19*	-0,209 *(2,53)***	-0,003 *0,29*	0,012 *1,23*	-0,011 *1,53*		0,009 *0,69*
4		1	a. -0,017 *0,68*		-0,033 *1,32*	0,003 *0,98*	6,332 *0,72*	-0,001 *0,46*	-0,039 *0,50*	-0,188 *(2,51)***	-0,022 *0,30*	0,003 *0,10*	-0,001 *0,17*	-0,007 *0,75*	0,014 *1,32*		
			b.	-0,016 *0,77*	-0,031 *1,22*	0,003 *1,07*	3,663 *0,40*	-0,001 *0,32*	-0,037 *0,47*	-0,193 *(2,60)****	-0,029 *0,39*	0,005 *0,16*	0,001 *0,11*	-0,006 *0,62*	0,012 *1,18*		
		2	a. -0,003 *0,12*		-0,017 *0,52*	0,006 *(1,84)**	7,413 *0,72*	-0,002 *0,83*	-0,082 *0,94*	-0,17 *(2,58)****	-0,025 *0,30*	0,017 *0,34*	0,004 *0,46*	-0,018 *(1,77)**	0,018 *(1,75)**		
			b.	0,007 *0,31*	-0,013 *0,39*	0,006 *(1,70)**	2,6 *0,25*	0 *0,23*	-0,069 *0,79*	-0,172 *(2,66)****	-0,071 *0,86*	0,002 *0,03*	0,009 *0,86*	-0,018 *(1,93)**	0,015 *(1,72)**		
		3	a. -0,003 *0,12*		-0,018 *0,56*	0,006 *(1,80)**	6,984 *0,65*	-0,002 *0,83*	-0,083 *0,94*	-0,17 *(2,58)****	-0,024 *0,30*	0,018 *0,35*	0,005 *0,46*	-0,018 *(1,76)**	0,018 *(1,76)**	0,008 *0,64*	
			b.	0,011 *0,44*	-0,012 *0,36*	0,006 *(1,69)**	2,685 *0,25*	0 *0,17*	-0,07 *0,81*	-0,174 *(2,67)****	-0,073 *0,87*	0,004 *0,07*	0,009 *0,89*	-0,018 *(1,86)**	0,015 *(1,75)**		0,013 *0,76*
0	Rest of Europe	1	a. -0,068 *(2,58)****		0 *1,00*	0,079 *1,37*	-0,072 *0,00*	-0,006 *1,48*	0,133 *0,74*	-0,235 *1,22*	-0,193 *0,83*	0,153 *(2,95)****	0,102 *(3,64)****	0,014 *0,47*	0,03 *1,02*		
			b.	-0,031 *1,23*	0 *1,39*	0,088 *1,48*	2,826 *0,13*	-0,006 *1,13*	0,122 *0,66*	-0,273 *1,44*	-0,24 *1,11*	0,093 *1,22*	0,11 *(4,01)****	0,015 *0,51*	0,034 *1,09*		
		2	a. -0,055 *0,95*		0 *0,36*	0,07 *1,08*	1,54 *0,08*	-0,007 *1,25*	0,165 *0,86*	-0,338 *(1,81)**	-0,116 *0,52*	0,129 *1,36*	0,104 *(3,56)****	0,016 *0,51*	0,044 *1,49*		
			b.	-0,016 *0,29*	0 *0,83*	0,083 *1,22*	2,305 *0,11*	-0,005 *0,90*	0,145 *0,71*	-0,363 *(2,03)***	-0,187 *0,91*	0,086 *0,70*	0,116 *(4,03)****	0,019 *0,62*	0,047 *1,54*		
		3	a. -0,056 *0,99*		0 *0,34*	0,071 *1,08*	1,24 *0,06*	-0,007 *1,34*	0,163 *0,85*	-0,339 *(1,79)**	-0,117 *0,52*	0,132 *1,39*	0,104 *(3,55)****	0,016 *0,52*	0,044 *1,47*	0,027 *0,78*	
			b.	-0,019 *0,32*	0 *0,83*	0,08 *1,14*	2,034 *0,10*	-0,005 *0,90*	0,147 *0,73*	-0,36 *(1,99)***	-0,185 *0,89*	0,084 *0,69*	0,116 *(4,02)****	0,019 *0,62*	0,046 *1,52*		-0,011 *0,51*
1		1	a. 0,019 *(1,73)**		0 *0,51*	-0,071 *(2,15)***	-10,27 *0,73*	0,002 *0,63*	-0,081 *0,49*	-0,032 *0,20*	-0,261 *1,22*	-0,117 *0,97*	-0,023 *0,78*	0,06 *(2,60)****	-0,066 *(2,94)****		
			b.	0,019 *0,78*	0 *0,93*	-0,082 *(2,35)***	-7,974 *0,59*	0,002 *0,50*	-0,05 *0,32*	-0,042 *0,28*	-0,241 *1,08*	-0,067 *0,64*	-0,021 *0,72*	0,062 *(2,63)****	-0,069 *(3,09)****		
		2	a. 0,028 *0,84*		0 *0,80*	-0,097 *(2,80)****	-9,341 *0,70*	0,002 *0,68*	-0,197 *1,21*	-0,01 *0,06*	-0,27 *1,30*	-0,123 *0,92*	-0,011 *0,43*	0,058 *(2,08)***	-0,066 *(3,20)****		
			b.	0,041 *(1,66)**	0 *0,32*	-0,117 *(3,01)****	-5,71 *0,49*	0,003 *0,68*	-0,159 *0,98*	0,004 *0,02*	-0,235 *1,04*	-0,064 *0,58*	-0,009 *0,35*	0,059 *(2,02)***	-0,067 *(3,19)****		
		3	a. 0,028 *0,86*		0 *0,82*	-0,097 *(2,79)****	-9,249 *0,70*	0,002 *0,70*	-0,197 *1,20*	-0,009 *0,06*	-0,269 *1,30*	-0,124 *0,94*	-0,011 *0,43*	0,058 *(2,08)***	-0,066 *(3,19)****	-0,01 *0,48*	
			b.	0,049 *(2,24)***	0 *0,32*	-0,112 *(2,75)****	-5,338 *0,46*	0,003 *0,76*	-0,165 *1,03*	-0,002 *0,01*	-0,241 *1,08*	-0,062 *0,56*	-0,009 *0,36*	0,059 *(2,02)***	-0,067 *(3,16)****		0,022 *1,09*
2		1	a. 0,029 *0,47*		0 *(1,72)**	0,038 *(1,75)**	21,196 *0,87*	-0,002 *0,55*	-0,15 *0,96*	0,041 *0,19*	0,063 *0,29*	-0,05 *0,76*	-0,006 *0,37*	-0,028 *(1,91)**	0,022 *1,39*		
			b.	0,009 *0,28*	0 *(1,72)**	0,049 *(2,13)***	19,352 *0,71*	-0,003 *0,88*	-0,163 *1,14*	0,044 *0,22*	0,079 *0,39*	-0,061 *1,24*	-0,003 *0,18*	-0,031 *(2,00)***	0,024 *1,52*		
		2	a. 0,034 *0,81*		0 *(2,56)***	0,005 *0,08*	23,977 *0,97*	-0,002 *0,39*	-0,143 *0,95*	-0,046 *0,22*	0,124 *0,61*	0,104 *0,93*	-0,009 *0,50*	-0,021 *1,32*	0,015 *0,98*		
			b.	-0,021 *0,83*	0 *(2,47)***	0,016 *0,29*	24,632 *0,79*	-0,004 *0,95*	-0,143 *0,98*	-0,039 *0,17*	0,146 *0,68*	0,132 *(1,67)**	-0,006 *0,32*	-0,029 *1,55*	0,016 *0,97*		
		3	a. 0,03 *0,69*		0 *(2,55)***	0,007 *0,12*	22,536 *0,97*	-0,002 *0,53*	-0,146 *0,98*	-0,053 *0,25*	0,117 *0,58*	0,111 *0,90*	-0,009 *0,50*	-0,021 *1,32*	0,016 *1,05*	0,106 *(6,55)****	
			b.	0,004 *0,14*	0 *(2,36)***	0,029 *0,53*	25,415 *0,86*	-0,003 *0,74*	-0,155 *1,06*	-0,058 *0,25*	0,129 *0,60*	0,133 *(1,97)***	-0,006 *0,34*	-0,028 *1,53*	0,017 *1,09*		0,055 *(3,89)****
3		1	a. 0,035 *1,50*		0 *(2,54)***	-0,025 *0,90*	16,441 *1,49*	0 *0,21*	-0,077 *0,57*	0,021 *0,12*	0,152 *1,15*	-0,028 *1,59*	0,004 *0,15*	-0,005 *0,21*	0,006 *0,20*		
			b.	0,001 *0,07*	0 *(2,81)****	-0,025 *0,79*	17,496 *1,44*	-0,001 *0,32*	-0,122 *0,95*	0,015 *0,08*	0,182 *1,28*	-0,027 *(2,17)***	0,005 *0,20*	-0,005 *0,21*	0,002 *0,08*		
		2	a. 0,028 *1,60*		0 *0,42*	-0,025 *0,65*	17,299 *(2,09)***	-0,001 *0,44*	-0,054 *0,35*	-0,021 *0,11*	0,2 *1,52*	-0,026 *1,46*	0,008 *0,31*	-0,01 *0,50*	0,016 *0,49*		
			b.	-0,016 *0,74*	0 *0,95*	-0,029 *0,85*	16,576 *(1,83)**	-0,001 *0,62*	-0,12 *0,89*	-0,034 *0,16*	0,222 *(1,73)**	-0,025 *(1,77)**	0,01 *0,37*	-0,012 *0,64*	0,012 *0,36*		
		3	a. 0,027 *1,53*		0 *0,44*	-0,024 *0,62*	16,935 *(2,07)***	-0,001 *0,49*	-0,056 *0,36*	-0,021 *0,11*	0,199 *1,50*	-0,026 *1,49*	0,009 *0,32*	-0,01 *0,49*	0,016 *0,49*	0,02 *1,09*	
			b.	-0,009 *0,44*	0 *0,86*	-0,027 *0,75*	16,864 *(1,85)**	-0,001 *0,50*	-0,124 *0,90*	-0,037 *0,18*	0,218 *1,64*	-0,025 *(1,74)**	0,01 *0,37*	-0,012 *0,62*	0,012 *0,37*		0,012 *0,97*
4		1	a. 0,047 *(2,04)***		0 *0,14*	-0,007 *0,20*	0,0002 *0,01*	0,003 *1,44*	-0,052 *0,39*	-0,095 *0,61*	0,065 *0,56*	-0,031 *(4,03)****	-0,037 *(2,84)****	-0,012 *0,57*	0,072 *(3,15)****		
			b.	0,017 *(2,82)****	0 *0,26*	0,004 *0,08*	-2,543 *0,10*	0,002 *0,62*	-0,053 *0,36*	-0,075 *0,41*	0,072 *0,57*	-0,033 *(3,46)****	-0,037 *(2,85)****	-0,008 *0,37*	0,071 *(2,80)****		
		2	a. 0,056 *1,62*		0 *(2,69)****	-0,036 *0,99*	4,533 *0,18*	0,003 *(2,05)***	-0,014 *0,09*	-0,094 *0,61*	0,14 *1,13*	-0,031 *(5,80)****	-0,03 *(1,95)**	-0,003 *0,20*	0,078 *(2,61)****		
			b.	0,025 *1,57*	0 *(2,53)***	-0,027 *0,73*	-1,236 *0,05*	0,002 *1,13*	-0,016 *0,11*	-0,066 *0,43*	0,134 *1,19*	-0,032 *(4,57)****	-0,03 *(2,17)***	-0,004 *0,21*	0,077 *(2,68)****		
		3	a. 0,056 *(1,65)**		0 *(2,66)****	-0,036 *1,00*	4,845 *0,20*	0,003 *(2,10)***	-0,013 *0,09*	-0,093 *0,61*	0,14 *1,13*	-0,031 *(5,34)****	-0,03 *(1,96)***	-0,003 *0,19*	0,078 *(2,59)****	-0,011 *0,42*	
			b.	0,033 *1,16*	0 *(2,61)****	-0,025 *0,69*	-7E-04 *0,03*	0,003 *1,25*	-0,019 *0,13*	-0,07 *0,46*	0,131 *1,13*	-0,032 *(5,17)****	-0,03 *(2,14)***	-0,004 *0,19*	0,077 *(2,66)****		0,012 *0,42*