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Development of innovative financial products in Europe: Case of exchange-traded products in Germany

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Development of innovative financial products in Europe: Case of exchange-traded products in Germany

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Development of innovative financial products in Europe: Case of exchange-traded products in Germany

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Abstract

Research background: Exchange-traded products (ETPs) are one of the most rapidly growing categories of financial products. Their fast development has been boosted by innovative features. Three main categories of ETPs are exchange-traded funds (ETFs), exchange-traded commodities (ETCs) and exchange-traded notes (ETNs). ETCs and ETNs remain least known, even though their number on some stock exchanges is high. In Europe, Germany is one of the largest and most active ETPs markets. ETCs and ETNs are debt instruments, in contrast with the most popular ETFs, which are equity securities. Therefore, they offer investors different advantages but also expose them to other types of risks.

Purpose of the article: The key aim of the article is to present the features of ETPs and to provide in-depth insight into the issues linked with the development of ETPs market in Germany, with the special emphasis on the ETCs and ETNs.

Methodology/methods: German ETPs market is analyzed using descriptive statistics and technological substitution framework (employed for the analysis of innovations in order to evaluate the changing market shares of ETFs, ETCs and ETNs). Main period of the analysis is 2010-2016 and monthly data are used.

Findings: Share of ETPs other than ETFs in the total market in Germany remains low. Even though market position of the leading products, i.e. ETFs, is still very strong, some substitution has been observed, especially after 2015. Predictions made using technological substitution model indicate that this trend (growing market share of ETCs and ETNs) will continue in the upcoming years.

Introduction

Exchange-traded products (ETPs) are one of the most rapidly growing categories of innovative financial products. Three main categories of ETPs

are the most popular exchange-traded funds (ETFs), exchange-traded commodities (ETCs) and exchange-traded notes (ETNs). ETCs and ETNs remain relatively least known among participants of financial markets, even though their number on some stock exchanges is high. In Europe, German Xetra trading system (part of the Deutsche Börse group) is one of the largest and most active ETPs trading venues, where a significant share of European ETCs and ETNs transactions is conducted. **The key purpose of the article is to present the most important features of three main categories of ETPs and to provide the in-depth insight into the issues linked with the development of ETPs market in Germany, with the special emphasis on the role of ETCs and ETNs.** To the best of our knowledge, it is one of the few articles to address the issue of transforming ETPs market structure and the first one in which the structure of the ETPs market has been analyzed using not only descriptive statistics but also with the technological substitution model, adapted to analysis of the financial markets.

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Method of the Research

German ETPs market is analyzed preliminarily using descriptive statistics. In order to more accurately and reliably evaluate the occurrence and degree of substitution between the three types of ETPs on the German market, the technological substitution framework is applied.

The technological substitution model is used to explain the changing market shares of technologies (Kucharavy & De Guio, 2011, pp. 408-413; Lechman, 2015, p. 46) but it may be also applied to financial products. It is based on the assumption that the total sum of market participants using two competing products is fixed. In this research, a three-parameter logistic substitution model has been applied, following the methodology of Marchetti & Nakicenovic (1979, pp. 1-8). In case of two different products, which replace each other, N_i represents the number of users of each product. Share of market participants using certain product i at time t can be stated as (Lechman, 2015, p. 47):

$$f_i(t) = \frac{N_i(t)}{N} \quad (1)$$

Diffusion of the innovative products is expected to follow three stages: a logistic growth stage, (growth rate is initially slow); an exponential growth stage (of rapid diffusion); and the saturation stage (product reaches maximum market share). Therefore, as Kwaśnicki (2013, pp. 50-60) shows, innovative products follow a logistic growth trajectory. It is very important to identify the times when substitution stages start and finish. According to

Meyer et al. (1999, pp. 247-257), the estimate of the time when the saturation stage stops is given by:

$$\frac{y_i''(t)}{y_i'(t)} \rightarrow \min. \quad (2)$$

where $y_i(t)$ is the market share of product i according to Fisher-Pry transformation (Fisher & Pry, 1972, pp. 75-88):

$$y_i(t) = \ln \left[\frac{f_i(t)}{1-f_i(t)} \right] \quad (3)$$

After estimating y_i and y_i' , it is thus possible to estimate the two crucial parameters of the logistic curve for product i , which can be expressed as (Meyer et al., 1999, pp. 247-257):

$$\Delta t_i = \frac{\ln(81)}{y_i'(t)} \quad (4)$$

and

$$T_{m_i} = \ln \left[\frac{\left(y_i(t) - \frac{\ln(81)}{\Delta t} \right)}{\frac{\ln(81)}{\Delta t}} \right]. \quad (5)$$

Δt_i shows the time needed for product i to increase its share in the combined market for two products from 0.1 to 0.9 (i.e. from 10% to 90%) and T_{m_i} represents the mid-point, i.e. point in time when the substitution process is half complete (market shares of both products are equal to 50%).

Monthly Xetra transaction reports have been used to construct unique database which contains data on the German ETPs. Indicators used to reach the stated aim are the values of turnover of ETFs, ETCs and ETNs (in EUR millions), and, additionally, the values of assets under management (in EUR millions). Structure of the ETPs market is evaluated through the analysis of market shares.

Exchange-traded products: features, comparisons, advantages and disadvantages of various categories

Exchange-traded products are one of the most significant groups of financial innovations introduced in the recent decades, with quickly growing size of the market and increasing impact on the financial system (Lechman & Marszk, 2015). Three major groups of ETPs are ETFs, ETCs and ETNs. ETFs are the oldest (first ETFs had been launched in the late 1980s) and largest category of ETPs. ETFs are equity instruments, parallel in their trading mechanisms to stocks of listed companies. ETCs are a group of ETPs which offer users rates of return linked to commodities (single or baskets of such assets) or, much less frequently, to currencies (Deutsche Bank, 2015, p. 71). ETCs are debt instruments, similar to bonds issued by banks, backed by the issuer's credit. Despite some initial differences in the details of their construction (e.g. legal structures or status of the debt holder

(Deutsche Bank, 2010, pp. 19-30)), currently structures of ETNs are very similar to ETCs - they are both debt instruments (very similar to undated zero-coupon bonds). One of the very few remaining technical differences is the method of replication: ETCs use both physical and synthetic replication (first is based on the purchase of tracked assets, second on swaps or other derivatives) while ETNs use synthetic only. The biggest difference refers to the covered type of assets: ETNs track returns of indices other than commodities markets, for instance, volatility indices, stock indices (short or long, with or without leverage), interest rate futures. and currencies (last category depends on the exchange – in some countries such products are categorized as ETCs). Distinction between ETNs and ETCs based on the tracked asset classes has also been applied on the German market, including Xetra platform, which will be analyzed in the empirical section. In some publications these two names (ETCs and ETNs) are used interchangeably and describe debt ETPs tracking all types of assets.

Table 1. Types of exchange-traded products: comparison of key features

	ETFs	ETCs and ETNs
type of instrument	equity	debt
similarity of assets in the portfolio to the benchmark	high (physical) or none (synthetic)	high (physical ETCs) or none (synthetic ETCs and ETNs)
replication method	physical or synthetic	physical (ETCs) or synthetic (ETCs and ETNs)
tracking error	low	very low or none
credit risk of issuer	no	yes
counterparty risk	very low or none	usually low but may be substantial in some rare cases

Source: own elaboration based on Deutsche Bank (2010, p. 20).

In order to understand the reasons why market participants may switch from ETFs to ETCs or ETNs, the advantages and disadvantages of all three categories should be discussed in comparative perspective (see table 1). Relative benefits of ETCs or ETNs include (Ferri, 2009, p. 54; Hill et al., 2015, pp. 39-40):

- lower tracking error;
- broader and more flexible access to unique markets or strategies;
- cheaper hedging applications;
- favorable taxation in some countries.

Using ETC or ETNs exposes investors to some types of risks which are very uncommon or even not present in case of ETFs:

- credit risk of the issuer;
- counterparty risk.

It should be stressed that occurrence of the above-mentioned events is very improbable and in most cases they should not be treated as substantial threats of using ETCs or ETNs.

Evaluation of the benefits and risks of ETCs and ETNs compared to ETFs shows that both broad categories offer certain relative advantages. It seems, though, the strengths of ETCs and ETNs have not yet been fully appreciated by market participants. In relation to their, mostly negligible, relative weaknesses they seem more advantageous and flexible products than ETFs. Consequently, their share in the total ETPs market could be expected to grow at the expense of ETFs.

Development and structure of the German ETPs market

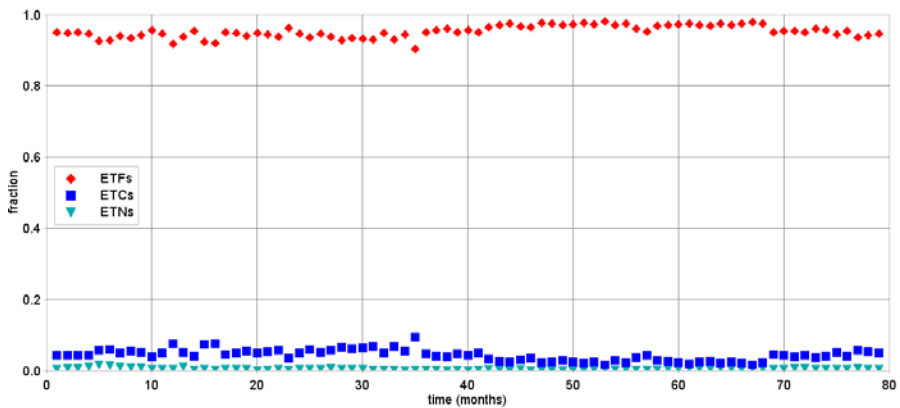
Total assets under management of the ETPs listed in Germany reached at the end of 2016 the record-high level of almost 430 bln EUR (all data in the remaining part of this section have been extracted from the monthly cash market reports published by Deutsche Börse on the exchange's website (Xetra, 2017)). In comparison with the end of first half of 2010 it meant an increase of more than 200%. ETFs were the largest category over the whole period, with ca. 94.5% share of total ETPs' assets at the 2016 year-end (share of ETCs amounted to ca. 5.4% and share of ETNs was extremely low, below 0.1%). However, assets of ETNs have grown most significantly, by 700%. First ETFs had been launched on Deutsche Börse in the early 2000s, ETCs in 2006 and ETNs in 2009.

Value of the total monthly ETPs' turnover was very similar at the beginning and end of the analyzed time period – it was at ca. 14 bln EUR, which shows that the market development in this perspective has been almost non-existent (despite the considerable increase in the total assets mentioned above). Lack of development measured using the turnover indicators is also proven by the mean ETPs turnover value which was at ca. 13.26 bln EUR (lower than the initial value). Maximum turnover has been observed in the second half of 2011 which may be regarded as the period of the highest ETPs market development in Germany.

Structure of the German ETPs market has been evolving in the analyzed time period (see figure 1) but it is difficult to determine the exact trends (detailed discussion of substitution will be presented in the next paragraphs). ETFs were the most actively traded category of ETPs in Germany over the whole period, with the maximum share in the total ETPs turnover

of 98.1% which was reached in October, 2014. The minimum market share of ETFs was observed several months earlier, in April, 2013 (90.4%) which shows the high dynamics. Only in case of ETCs the value of turnover has increased which also led to stronger position in the total market. Despite significant growth of the ETNs' assets, their turnover remained at a very low level.

Figure 1. Market shares of exchange-traded funds, exchange-traded commodities and exchange-traded notes in Germany (share in the total turnover of exchange-traded products, monthly data for 2010-2016)



Source: own calculations. Month no. 1 = June, 2010; month no. 79 = December, 2016

In order to more accurately describe changes occurring in the structure of the German ETPs market, and, even more importantly, to evaluate the observed and potential substitution, total market has been divided into two categories: first - ETFs (as more established, equity products), second - ETCs and ETNs (as newer, more innovative, debt products). Substitution between those two categories has been analyzed. It should be added that substitution between ETCs and ETNs may be regarded as negligible because, according to the classification applied by Xetra, they offer different types of exposure (ETCs to commodities markets, ETNs to other types of markets and assets) – they are thus products which may be perceived as complementary.

In the first half of the discussed time period the share of ETFs has been at rather stable level between ca. 93.5 and 94.5%. It started increasing in the second half of 2013, reaching the highest level in the late 2014 and 2015 (at ca. 97.5 %). However, since the end of 2015 it has started to decrease quickly which means that, at the same time, market share of ETCs

and ETNs has begun to grow – at the end of 2016 it amounted to almost 5.3% (the highest level since 2013). Therefore, it seems that over 2010-2016 there were three stages: first – stability between 2010 and 2013; second – strengthening position of ETFs between 2013 and 2015; and, finally, third – growing share of debt ETPs since late 2015.

Substitution model has been used to estimate the parameters T_{m_i} and Δt_i for combined ETCs and ETNs versus ETFs (see table 2). If the full sample period is taken into account, no conclusions can be stated – the process is not definite and the estimated parameters are insignificant. Nevertheless, based on the preliminary analysis discussed in the previous paragraphs, full sample has been divided into sub-sample periods 1, 2 and 3. In the first sub-sample period no substitution has been observed – estimated parameters are negative and insignificant (the insignificance has been caused by lack of clear trends of increasing or decreasing market shares). In the second period values of parameters are still negative (proving growing market share of ETFs) and high (yet much lower than in case of first period) – it has been the sub-sample period of growing ETFs market share but this process was not definite as shown by the reversal in the next period.

Table 2. Estimated substitution models

ETCs and ETNs versus ETFs			
Full sample			
T_{m_i}	-293.262	Substitution process not definite.	
Δt_i	-474.623		
Sub-samples			
2010m6 to 2013m9 (no. 1)			
T_{m_i}	-1589.961	Substitution process not definite.	
Δt_i	-2524.883		
2013m10 to 2015m11 (no. 2)			
T_{m_i}	-513.199	Substitution process not definite.	
Δt_i	-707.467		
2015m12 to 2016m12 (no. 3)			
T_{m_i}	122.453	Substitution reported.	
Δt_i	70.409		

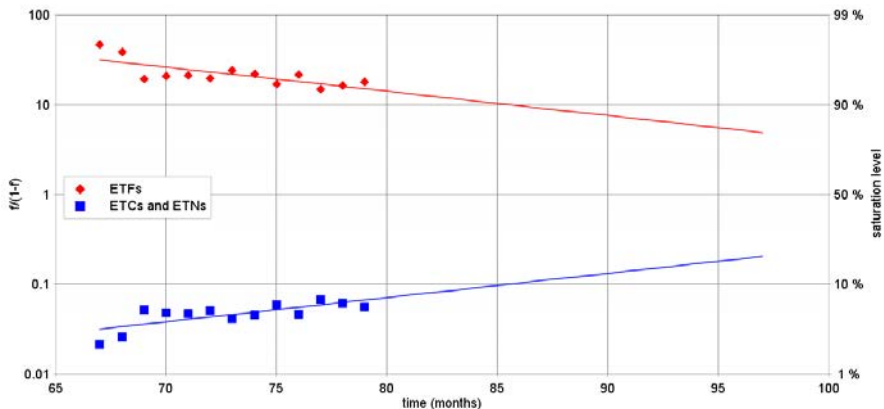
Source: own elaboration in the IIASA software. Italics: misspecifications; T_{m_i} : estimated midpoint (market shares equal to 50%); Δt_i : estimated takeover time (time needed for ETCs and ETNs to increase their share in the combined ETPs market from 10% to 90%)

Period no. 3, December, 2015 – December, 2016 (see table 2 and figure 2; month no. 67 = December, 2015), is the only sub-sample period for which the estimated parameters are statistically significant. From December, 2015 ETCs and ETNs have gradually increased their market position (from ca. 2% to more than 5%) – it proves that they have potential to win

some market share. According to the estimates for the third sub-sample period, $T_{m_i} = 122.453$ months which means that estimated time when ETCs and ETNs will reach 50% market share (in the total ETPs market) is at ca. 122 month, i.e. in July, 2020 (if further market development will follow path predicted by logistic substitution model, typical for innovations, such as financial). Estimated takeover time, Δt_i , time needed for the market share of ETCs and ETNs to grow from 10 to 90% (i.e. in the stage of rapid diffusion), is ca. 70 months. It applies to predicted development as the empirical market share was below 10%. Such market share is expected to be reached at ca. month no. 85, i.e. in June, 2017.

It should be stated, though, that due to various factors (such as much higher awareness of their features among investors) ETFs are expected to remain the dominant ETPs in the upcoming years. ETCs and ETNs are still relatively new products but they may gradually increase their market share due to their innovative features (which, taking into account absolute values means turnover of hundreds of millions EUR). This change will be caused mostly by ETCs as ETNs remain a marginal product. Most factors (including legal and regulatory environment) are rather similar for all types of ETPs, similarly the group of users or applications – the exact determinants of substitution remain to be identified.

Figure 2. Exchange-traded products observed and predicted substitution patterns in Germany. December, 2015 – June, 2018



Source: own elaboration in the IIASA software (logistic-fit, Fisher-Pry transformation)

Conclusions

Empirical findings indicate that share of ETCs and ETNs in the total ETPs market in Germany remains rather low, despite the quickly growing

assets and turnover of some products. Even though market position of ETCs and ETNs is much weaker than the leading products, some substitution (yet still rather weak and of uncertain sustainability) between ETCs and ETNs has been observed, especially since 2015. It proves that diffusion of financial innovations (i.e. development of their markets) is a complicated process and its trajectory is difficult to predict.

Potential future research directions could include the analysis of the factors influencing the development of ETPs markets in various countries or regions, including Germany, particularly the determinants of their structures, explaining why some categories of ETPs, like ETNs, have not diffused in the rate similar to other types.

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