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## COMPARATIVE ANALYSIS OF EXCHANGE TRADED PRODUCTS MARKETS IN THE CZECH REPUBLIC, HUNGARY AND POLAND

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**Summary:** Structured products as a form of alternative investments can be widely used to diversify portfolio. Profile of the payment of such instruments depends on a fixed formula for the base index. In the article, structured products from the Budapest, Prague and Warsaw Stock Exchange were described. In summary a comparative analysis of trading statistics from the years 2007–2013 was presented as well as the description of investors' profiles and other statistics. The Polish ETP market is the biggest, offering the widest range of products; however, the most active investors in the field of the ETP instruments trading are the ones from Hungary. On the Prague Stock Exchange, in spite of ETPs being available since 2006, certificates have not enjoyed much popularity among the actors of the market.

**Keywords:** Structured products, alternative investment, portfolio diversification, capital market.

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### 1. Introduction

A lingering sense of uncertainty on the markets since the last financial crisis discourages employing funds in equity investments on the one hand and, on the other, sharpens the incentive to look for alternative forms of investment. Investors can choose from an ever wider range of alternative investments. Although these instruments should not present the only kind of investment, yet, they have been extensively analyzed and described in the worldwide literature in terms of their diversifying properties as well as better effectiveness, perceived as a way of expanding one's portfolio. The results of a wide-range study are included in the article *How Many Alternative Eggs You Should Put into Your Investment Basket*, in which the authors suggest that about eight out of various alternative asset classes can reduce the risk by 40% [Clare, Motson 2008]. However, any further increase in the number of different products reduces the risk significantly slower. Among alternative investments, precious metals prove to be very successful, as including them in the

portfolio can protect its value during the stock exchange decline [Baur, Lucey 2010] as well as protect against inflation [McCown, Zimmerman 2010]. Considering the variety of available kinds of assets and this article's limited scope of analysis, only exchange traded structured products will be discussed here. Despite the fact that the history of many categories of alternative instruments spans several decades, some of them have been gaining interest only very recently. So far, the structured products markets, especially European, have neither been broadly analyzed nor compared in literature on the subject. The authors of one of the few studies concerned with these products admit that they had to abandon their initial idea of a comparative analysis of the EU markets because of the lack of publicly available data and low trading liquidity. In the article *The Financial Crisis and Trading in Structured Products* Mokrička and Červinek included the study of the biggest European markets: a German stock exchange in Stuttgart, Stuttgart Stock Exchange (EUWAX) and Frankfurt Stock Exchange (Scoach Europa AG) during the years 2005–2011 [Mokrička, Červinek 2011]. The collected data shows that in the years of the crisis 2007–2008 the trading in structured products fell even stronger than the trade in other instruments. The entire period, however, saw the growth in the number of new series introduced, with this growth being very dynamic especially since the middle of 2010.

Apart from lack in available data there is another thing which can make analysis of structured products difficult. According to the results shown in the paper *Valuation of Structured Products* authors discuss four different approaches to fair value estimation [Deng, Husson, McCann 2014]. They are numerically advanced and are not free from limitations but while the complexity of structured products payoffs increases, the methods must keep up. So the investors will be able to estimate value and measure the effectiveness of structured products investments.

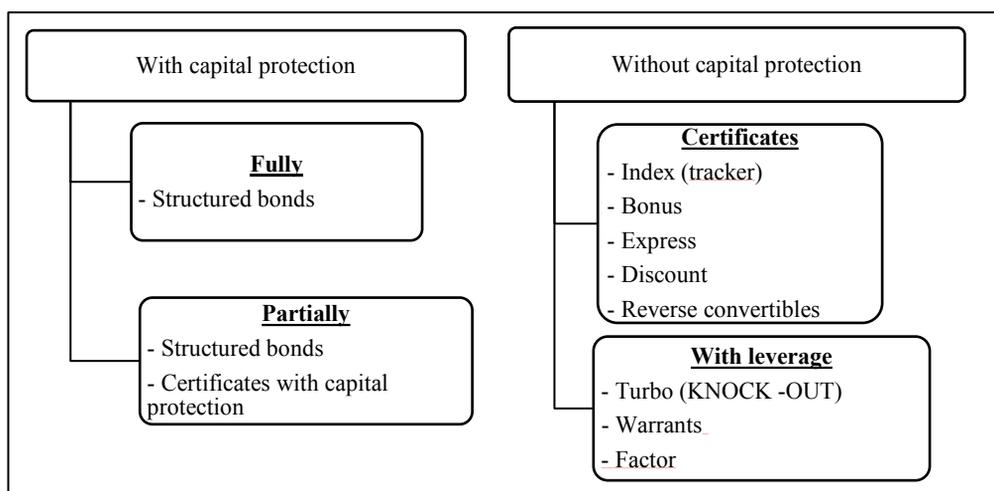
The goal of this study is to compare the markets of exchange traded structured products in the Czech Republic, Hungary and Poland in terms of their total offer and share in exchange trading. The scope of analysis covers the years 2007–2013, although it is not the same for all of the three markets.

## 2. Exchange Traded Products (ETPs) – idea and properties

In view of the article's topic the discussion will pertain only to Exchange Traded Products (ETPs) as “financial instruments whose price depends on the value of a specific market parameter (the underlying) [GPW 2014]:

- indices,
- shares,
- commodities (crude oil, gold, silver, natural gas, etc.),
- agricultural products (wheat, maize, cocoa, coffee, etc.),
- baskets of stocks, commodities, indices,
- FX rates, interest rates, etc.”

Banks and brokerage houses are most frequent issuers of these instruments. We can distinguish exchange and over the counter (OTC) products (those offered, for example, by banks) on the basis of the way they are purchased. Only instruments listed on the stock exchange will be considered in the further part of this article. They constitute, however, a heterogeneous group which varies in terms of ensuring capital protection, the structure of a particular instrument, the type of the elementary index or payoff profile in the case of decrease or increase forecasts of the value of the underlying [Mikita, Pełka 2009]. Given the protection over capital, we will distinguish instruments which are fully or partially protected or have no capital protection at all.



**Figure 1.** The types of structured products listed on the stock exchange through the prism of capital protection

Source: own study on basis of WSE educational materials *Structured products* [<http://www.gpw.pl>].

Structured bonds issued for a definite term are instruments providing full or partial protection of the invested capital at the moment of the product expiry. During its lifetime its price can change below the invested amount.

Trackers are instruments which are undated with an indefinite lifespan, replicating underlying price moves on a 1:1 basis. Most frequently, however, by using appropriate multiplier, one can purchase only a part of the underlying, e.g. 0.1, which requires much less capital investment. Short trackers are another form of trackers which bring gains when the price of the underlying falls.

Bonus certificates are issued for a definite term making it possible to bring additional gains if during the defined term the price of the underlying instrument will remain above the predetermined level. Otherwise the products act as index

certificates. The level to which profit can rise sometimes has an upper limit, the so called CAP.

Discount certificates are akin in their structure to bonus certificates, in their case, however, the gain cap is always fixed, but the instruments are sold at a certain discount to the actual underlying price. The investor draws greatest benefits when the underlying price is not subject to significant fluctuations, trading sideways.

Express certificates are issued for the maximum term of three to six years, in each year of their lifespan there is a specified observation date on which the value of the underlying is recorded. Should the underlying trade at or above the barrier, the so called STRIKE, then investors receive their payment in the form of a coupon on the face value of the certificate resulting in its early redemption. If the price on the observation day is below the defined level, the certificate “continues” into the next year with investors receiving no coupons.

Turbo (KNOCK-OUT) certificates are the so called open end instruments, that is undated. Their name is connected with the structure within which the certificate expires immediately when the underlying price reaches the KNOCK-OUT level. These instruments feature built-in leverage and are issued in two versions: short if the underlying decreases and long if it increases.

Warrants are securities similar in their structure to options. Nevertheless, some differences can be distinguished. First of all, unlike options warrants can be only purchased (and not purchased and issued) and losses are limited. In order to purchase these instruments a securities account is required instead of a derivatives trading account. The warrant gives the right to buy and sell a specified underlying in the future at a fixed price. It also features the leverage so investors can win or lose much more than the value of the underlying. Given the multiplier, it is possible to employ less funds than when buying a unit of the underlying asset.

Factor certificate is a relatively new instrument offered to investors on Warsaw trading floors. It is intended for active traders who monitor the state of the market on a daily basis. The payoff profile depends on one-day changes of underlying asset prices. The certificate is offered with the so called factor (positive at a long position and negative at a short position) which provides the leverage effect. Owing to its special structure, the cumulative effect of the rate of return can be observed if the assumed scenario has been implemented or there is a buffer against losses if the underlying asset price is different from the one projected by the investor.

Reverse convertibles were first listed on the WSE on 26.07.2013. This is an instrument with a set term of redemption guaranteeing an interest coupon which is not affected by the price of the underlying and there are two possible settlement scenarios during the redemption period. If during the redemption period the price of the underlying asset is higher than the price determined the day preceding the first day of trading, 100% of the nominal value of the certificate will be paid. If the price is lower, there is physical delivery of the underlying asset.

The aforementioned structured products are the basic types which are traded; however, the structures of individually listed instruments can differ from one another thus creating some sort of hybrids.

The obvious advantage of the structured products is the fact that the issuer is responsible for the liquidity of the trading and thus it is always possible to buy or re-sell the instrument. The cost one has to take into account is the cost of spread at the offered prices. The exchange-traded products can be traded using a brokerage account and paying the standard commission for the transaction. There is no need to have a derivatives trading account.

### 3. Markets examination

Currently there are 696 products listed on the Warsaw Stock Exchange.<sup>1</sup> The first instrument of this type was structured bonds issued in August 2006. The structured products market has significantly developed since then. The biggest issuer on WSE is Raiffeisen Centrobank AG, then other banks like UniCredit Bank AG, Deutsche Bank, BNP Paribas Arbitrage S.N.C., Barclays Bank PLC and Royal Bank of Scotland. Some of the instruments are also issue by Secur Asset SA Ltd., which is the company from Luxemburg.

**Table 1.** Statistics on structured products available on the WSE in years 2007–2013<sup>2</sup>

Structured products	2007	2008	2009	2010	2011	2012	2013
Number of listed series at the year-end	12	46	70	148	206	343	557
Total turnover value for the year (EUR Mln)	6.80	44	72.7	141.9	84.5	39.3	66.8
Average turnover value per session (EUR '000)	27.3	175	288	561	337	158	270
Number of transactions per session	3	33	66	93	127	77	135
Average value of transaction (EUR)	4 000	2 651	2 190	3 022	2 647	2 051	2 001

Source: own study on basis of [*Statystyki roczne GPW... 2007–2013*].

The table shows a dynamic increase of the ETP series offered and thus the growing popularity of this kind of instruments. The post-crisis euphoria of 2010 lifted their trading to unprecedented levels. Greater offer diversity in 2011 could have a potential to reduce the average transaction value. On the other hand, it could suggest that less wealthy investors became more active. In 2012 the trading slowed

<sup>1</sup> Source: <http://www.gpw.pl> (retrieved: 30.06.2014).

<sup>2</sup> For the comparative analysis all the monetary values were given in the euro currency at the conversion rates provided in the stock exchange data and information.

down visibly and despite the larger variety of offers the number of transactions was down by half. The year 2013 was a record year in terms of the offer and attracting interests from investors. It was largely due to the introduction of TURBO certificates which accounted for approximately half of all the offered certificates.

On the Budapest Stock Exchange structured products did not appear until February 2008. Investors can use certificates of the tracker type named investment certificates as well as TURBO and warrants whose statistics are given jointly. The instruments are issued by Raiffeisen Centrobank AG and Erste Group Bank AG.

**Table 2.** Statistics on structured products available on the BSE in years 2008–2013

Structured products		2008	2009	2010	2011	2012	2013
No of listed series at the year-end	Invest certific.	9	26	18	16	13	14
	Turbo	36	82	121	144	128	185
Total turnover value for the year (EUR Mln)		85.74	134.09	205.39	282.80	250.99	202.01
Average turnover value per session (EUR '000)		342	539	815	1 127	1 033	828
Number of transactions per session		137	455	660	1 047	845	710
Average value of transaction (EUR)		2 500	1 184	1 235	1 076	1 222	1 167

Source: own study on basis of [*Annual Statistics BSE 2008–2013*].

An interesting feature of the ETP offer in Budapest is a significant share of Turbo certificates and warrants, with around 93% in 2013. As in the case of the Polish stock exchange, we can see the decline in the volume of a single transaction and in addition a lower turnover value in the entire year of 2013. One should, however, notice that despite the fact that the number of listed series of certificates at the year-end is smaller by half, the exchange trading in these instruments is three times higher than in Warsaw (when converted to EUR). The key seems to be investors' considerably higher activity manifested by many more transactions that are being carried out.

On the Prague trading floors structured products have been available since October 2006, when Raiffeisen Centrobank AG launched two series of TURBO certificates. Before the year's end, five other series were introduced, the analysis, however, comprised the years 2007–2013. As at 30 June 2014, 87 various instruments of this type are still being traded.<sup>3</sup>

On the Czech market, the exchange-traded structured products did not enjoy such a boom in popularity as was the case in Poland and Hungary. The highest turnover came in the year before the crisis year of 2007 and after that the trading in these

<sup>3</sup> Source: <http://www.ceeseg.com> (retrieved: 30.06.2014).

instruments has never been as high as then. Considering that in most cases these instruments are open-end, perhaps the investors purchased them and have held them on their accounts hoping for higher profits. In the last year under discussion that is the year 2013, 103 series are available, issued by Raiffeisen Centrobank AG and Erste Group Bank AG. The instruments of Basket, Bonus, Index and Turbo type are quoted, the last one accounting for 75% of the offer. In the years 2007–2013 warrants were also available, yet met with little success among the investors, with transactions executed only in 2007, 2008 and 2012.

**Table 3.** Statistics on structured products available on the PSE in years 2007–2013

Structured products	2007	2008	2009	2010	2011	2012	2013
Number of listed series at the year-end	39	47	65	42	57	30	103
Total turnover value for the year (EUR Mln)	43.15	18.80	9.80	6.80	5.50	1.39	4.71
Average turnover value per session (EUR '000)	172.6	74.6	39.20	27.00	21.70	5.54	18.84
Number of transactions per session	25	11	8	4	2	1	4
Average value of transaction (EUR)	6 904	6 781	4 900	6 750	10 850	5 540	4 710

Source: own study on basis of [*Annual Statistics PSE, 2007–2013*].

### 3.1. Changes in ETPs trading values

We can observe significant changes in trading values noted in the years 2007–2013 on Budapest, Prague and Warsaw Stock Exchanges in every group of listed instruments. Percentage figures are presented in tables below separately for every market.

**Table 4.** Change dynamics of turnover value and transactions numbers on WSE within individual groups of instruments in years 2007–2013 (in %)

Type of instruments		2008/2007	2009/2008	2010/2009	2011/2010	2012/2011	2013/2012
Shares	Turnover value	-30	4	9	-30	-19	17
	No. of trades	-30	34	84	-42	-17	11
Bonds	Turnover value	38	-38	50	-81	29	57
	No. of trades	-3	-12	-10	-23	-9	-3
Investment certificates	Turnover value	28	-34	-59	-33	-57	-16
	No. of trades	-19	-32	-9	18	-48	-14
Structured products	Turnover value	547	165	95	-40	-53	70
	No. of trades	876	97	43	36	-40	74
Warrants	Turnover value					-67	950
	No. of trades					-62	70

Source: own study on basis of [*Statystyki roczne GPW... 2007–2013*].

Warrants were quoted on the Polish Stock Exchange as of 2005 and then were suspended. Their purchase has been possible again since 2010. On the Hungarian market the distinction between warrants and structured certificates does not exist and data on their trading is provided jointly. Based on the table showing the change dynamics calculated year-on-year, one can see the great interest the structured products enjoyed compared to other instruments. Even in 2008 and 2009, when investors had to show nerves of steel, the turnover value of those transactions rose by over 100%. After the slower period of 2010–2012 there has been growing interest in structured products recently. If one were to count the data on warrants trading, the result would be even better.

**Table 5.** Change dynamics of turnover value and transactions numbers on BSE within individual groups of instruments in years 2008–2013 (in %)

Type of instruments		2009/2008	2010/2009	2011/2010	2012/2011	2013/2012
Shares	Turnover value	-12	8	-31	-39	-6
	No of trades	77	-22	-11	-42	-17
Bonds	Turnover value	-62	22	26	-98	-93
	No of trades	-82	-34	31	-50	-66
Investment certificates	Turnover value	-35	0	-33	-25	30
	No of trades	19	-8	-1	3	5
Structured products	Turnover value	56	53	38	-11	-20
	No of trades	230	47	58	-22	-16

Source: own study on basis of [*Annual Statistics BSE, 2008–2013*].

**Table 6.** Change dynamics of turnover value and transactions numbers on PSE within individual groups of instruments in years 2007–2013 (in %)

Type of instruments		2008/2007	2009/2008	2010/2009	2011/2010	2012/2011	2013/2012
Equities	Turnover value	-6	-49	-12	-2	-34	-32
	No of trades	108	13	-26	12	-25	-38
Bonds	Turnover value	40	-14	-5	21	-7	-97
	No of trades	20	-31	8	-8	21	-82
Structured products	Turnover value	-57	-48	-31	-19	-75	239
	No of trades	-53	-29	-53	-47	-31	188

Source: own study on basis of [*Annual Statistics PSE 2007–2013*].

Given that mortgage bonds are also available on the Budapest Stock Exchange, joint data was used for the calculations presented in the table. After three seasons of the intense increase in popularity of structured instruments, the year 2012 saw a decline in interest in them. On the other hand, the change was less dramatic than the one recorded in equity trading. The recent statistics may be analyzed as smaller

investors becoming more active. They invest lower funds in single ETP transactions, yet, in turn, there is greater trading in investment certificates.

The statistics for equity instruments are provided together with stocks and investment fund units. Analyzing the changes in the turnover amount and the number of concluded transactions, a pattern, similar to that on the WSE or BSE, can be distinguished; a lower turnover at a greater number of transactions in the equities group and substantially smaller popularity of debt instruments in the last year. Percentage-wise, considerable changes in the investors' activity with respect to structured products; however, it should be noted that only four transactions are concluded on average per trading session.

**Table 7.** The share of the value of ETP turnover in exchange trade in the years 2007–2013 (in %)

Stock Exchange	2007	2008	2009	2010	2011	2012	2013
Warsaw	0,01	0,05	0,09	0,14	0,14	0,08	0,11
Prague	0,08	0,03	0,02	0,02	0,01	0,00	0,06
Budapest		0,37	0,68	0,97	1,87	2,89	2,89

Source: own study on basis of [*Annual Statistics PSE 2007–2013*; *Annual Statistics BSE 2007–2013*; *Statystyki roczne GPW... 2007–2013*].

The turnover value in the ETP trading, both in the Czech Republic and Poland, does not represent a significant share in the total exchange trade. However, the statistics pertaining to the Hungarian trading floors should be noted. Since the launch of these instruments, their share in trading has grown and is still growing. This could be due to a smaller offer of other instruments available to investors as compared to the Polish market. Moreover, the Czech investors are either still in the process of getting used to these instruments or are waiting for the offer to be expanded.

### 3.2. General market overview

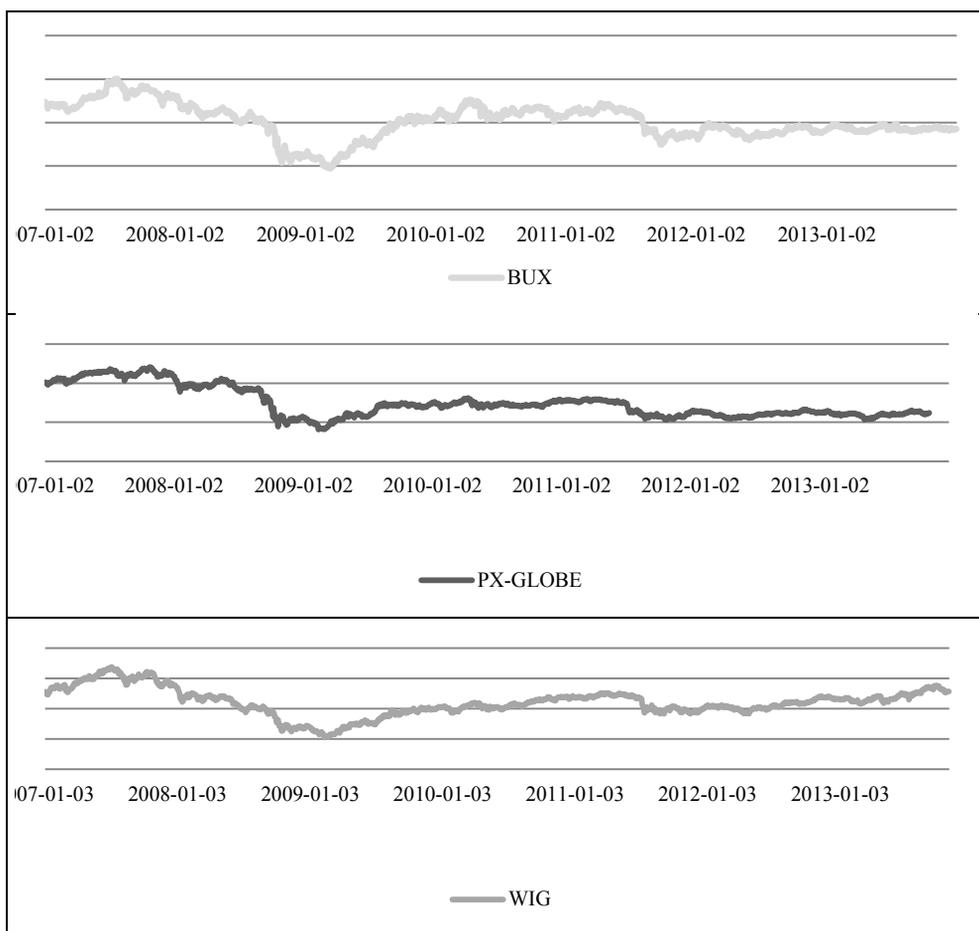
The stock exchange in Warsaw is the biggest from the ones analyzed in the study. Prague Stock Exchange as well as the stock exchange in Budapest belongs to CEESEG (Central and Eastern Europe Stock Exchange Group). If one were to take into account the capitalization of all of the four stock exchanges from the CEESEG group (Vienna Stock Exchange, Ljubljana Stock Exchange, PSE and BSE), their total capitalization would be 133.5 billion euros, which is still considerably less than the WSE. In addition, the total number of all listed companies is 228.

Nevertheless, the main stock exchange indices experienced similar stages related to the global economic situation, although these changes were more dynamic for the BSE.

**Table 8.** Warsaw, Prague and Budapest Stock Exchanges overview (30 of June 2014)

Market capitalization (in EUR mln)		No of listed companies
Warsaw Stock Exchange	217.6	458
Prague Stock Exchange	23.5	25
Budapest Stock Exchange	13.4	49

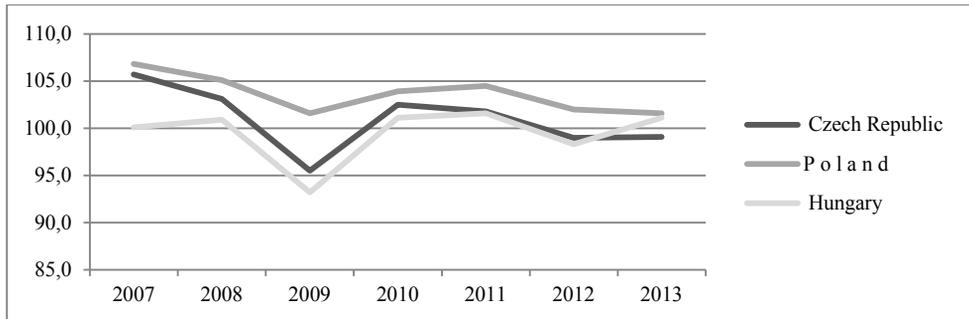
Source: [<http://bse.hu>; <http://www.ceeseg.com>; <http://www.gpw.pl>].



**Figure 2.** Stock exchange main indices on BSE, PSE, WSE in the years 2007–2013

Source: [<http://www.gpw.pl>; <http://www.pse.cz>; <http://bse.hu>].

It is said that the stock exchange indices are the barometer of the economy. In order to better demonstrate the stock exchange market, the chart with indices of Gross Domestic Product in constant prices was given below as well.



**Figure 3.** Indices of Gross Domestic Product (constant prices), GUS statistics

Source: [old.stat.gov.pl/cps/rde/xbr/gus/15.2\_dynamika\_pkb\_r.xls].

On the basis of the GDP development one can see clearly in which years the economic slowdown occurred. Furthermore, we can see a significant improvement of the economic situation in Hungary, although it was not possible to reach the GDP growth before 2013.

## 4. Conclusions

The stock exchanges in Budapest, Prague and Warsaw constitute three different markets which significantly differ from one another; a different scale of operations, diversity of the offered products or finally the macroeconomic conditions affecting the investors' activity. Nonetheless, all the markets which were analyzed are subject to similar global trends from the ineluctable impact of the economic situation of the highly developed markets to foreign capital flows to international issuers of financial instruments. For the comparative analysis all the monetary values were given in the Euro currency at the conversion rates provided in the stock exchange data and information. In consequence, the noted and discussed changes in the value with respect to transactions may not only be the result of the market behavior but also the country's currency exchange rates to Euro. Therefore, the Polish currency is one of the more stable currencies in the region.

In summary, the structured products markets also differ from one another. On the Polish trading floor the offer of the products is the widest, yet investors have a moderate interest in them and their share in trading is low. On the Czech market, investors are still waiting for the offer to be expanded, showing no particular activity with respect to their trading. The most interesting findings pertain to

Hungary where the ETP market is developing most dynamically, accounting for 3% of the stock exchange trading in total. Despite their 7-8-year long presence on the stock exchanges the structured products have not enjoyed much popularity among investors. It may, perhaps, be due to a wide range of instruments whose profile of profit payment and loss is not easy to grasp owing to its structure.

On all of the stock exchanges under discussion, between 50 and 75% of the ETPs offered are instruments with the leverage with equities or equity indices as the underlying, bringing high gains at a corresponding high risk. Thus, investors who purchase them look for additional possibilities of increasing the rates of return rather than diversifying portfolio risk. While considering this type of instruments, one should note the issuer's risk, since on the Czech and Hungarian markets the instruments are introduced only by two entities, which, on top of that, are the same banks on both of the stock exchanges. Moreover, Raiffeisen is also the main issuer of the instruments on the Polish market.

The results obtained do not provide all the answers to this issue, yet they encourage one to carry out other studies in this field. What would seem of particular interest is conducting an analysis complemented by the data on the Austrian and Slovenian markets, so as to obtain a complete picture of the stock exchanges which are members of the CEESEG. The author would like to conduct further studies taking into account the possibility of introducing ETPs onto the Slovak market.

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## **GIEŁDOWE PRODUKTY STRUKTURYZOWANE – ANALIZA PORÓWNAWCZA RYNKÓW W CZECHACH, POLSCE I NA WĘGRZECH**

**Streszczenie:** Produkty strukturyzowane jako forma inwestycji alternatywnych mogą być stosowane w celu dywersyfikacji portfela. Profil wypłaty z tych instrumentów zależy od zawartej w konstrukcji formuły obliczeniowej i indeksu bazowego. W artykule opisane zostały produkty strukturyzowane dostępne na giełdach w Budapeszcie, Pradze i Warszawie. W pracy przedstawione zostały analizy porównawcze statystyk handlowych z lat 2007-2013, a także opis profili inwestorów. Polski rynek ETP jest, spośród omawianych, największym, oferującym szeroką gamę produktów; jednak najbardziej aktywnymi w zakresie obrotu instrumentami ETP są inwestorzy z Węgier. Na praskiej Giełdzie Papierów Wartościowych, mimo tego, że produkty strukturyzowane dostępne są od 2006 roku, nie cieszą się dużą popularnością wśród uczestników rynku.

**Słowa kluczowe:** produkty strukturyzowane, inwestycje alternatywne, dywersyfikacji portfela, rynek kapitałowy.