

# Financial Instrument with High Investment Risk on the Warsaw Stock Exchange

Piotr Prewysz-Kwinto

**Abstract**—The market of financial instruments with high risk is developing very dynamically in recent years and attracts more and more interest of investors. It consists essentially of two groups of instruments, i.e. derivatives and exchange traded product (ETP), and each year new types are introduced and offered to investors. The aim of this paper is to present the principles concerning financial instruments with high investment risk available on the Warsaw Stock Exchange (WSE), because they have quite complex constructions, and to evaluate the development of this market. In order to achieve this aim, statistical data from 2014-2016 was analyzed. The results confirm that the financial instruments with high investment risk available on the WSE constitute a diversified and the most numerous group of financial instruments and attract the most interest of investors. Responsible investing requires, however, a good knowledge of how they work and how they can generate profit to not expose oneself to unexpected losses.

**Keywords**—Derivatives, exchange traded products, financial instruments, financial market, risk, stock exchange.

## I. INTRODUCTION

THE market of stock exchange financial instruments with high investment risk is developing very dynamically. It is currently composed of two groups of instruments, i.e. high risk derivative instruments and high risk ETPs. Although their specific trading rules differ, they can be defined as instruments whose value depends on the value of another instrument (called the underlying instrument) on which they are based [1], [2].

They are high risk instruments, as they are instruments with leverage. It means that one derivative or one structured product is based on more than one underlying instrument. What is more, investment in such products is possible by engaging capital that represents only a small portion of the total value of the underlying instrument [3]. Thus, potential profit or loss is significantly higher than when investing only in the underlying instrument. Moreover, the structure of the presented instruments gives an opportunity to make a profit based on investor's expectations about the value of the underlying instrument in the future. That means making a profit both in the case of increase or decrease in the value of underlying instruments on which they are based.

The underlying instruments of high risk products can be shares, commodities, foreign currencies, interest rates or indices, that is all instruments whose values change over time [4], [5]. However, it is important that high risk stock exchange instruments are settled in cash, i.e. they give a possibility of

making a profit (incurring a loss) that results from changes in the underlying instrument without having to buy it. The profit (loss) results from the difference between the actual value of the underlying and the value (or the formula of determining the value) determined in the derivative or structured product itself.

The aim of this paper is to present high-risk financial instruments available on the WSE and to analyze the development of this market. The objective was achieved based on the analysis of available subject literature and of statistical data on high risk financial instruments offered on the WSE.

## II. BASIC DERIVATIVE INSTRUMENTS

Basic types of stock exchange derivative instruments include futures contracts and options.

### A. Futures Contracts

Futures contracts are unconditional derivatives, i.e. they impose obligations on both participants. A purchaser of a contract who takes a *long position* has an obligation to buy, while a writer of a contract who takes a *short position* has an obligation to sell the underlying instrument in the future at a price determined on the transaction date [6]. The price is called a base value or exercise price, and it remains unchanged until the contract clearing date. It is determined on such a level that the contract value on the transaction date equals zero [7]. The investor takes a long position (buys a contract) if an increase in the underlying instrument value is expected. The investor will then make a profit equal to the difference between the higher market value and the lower base value. Otherwise, the investor will incur a loss. On the other hand, the investor takes a short position (writes a contract) if a decrease in the underlying instrument value is expected in the future as in such a situation the investor will make a profit equal to the difference between the higher base value and the lower market value. Investors' profit and loss areas based on the position taken are presented in Fig. 1.

First futures contracts were introduced to the WSE on January 16, 1998. They were futures on WIG20 index. Next instruments were futures on USD (1998) and EUR (1999). Currently, the WSE offers futures contracts on:

- WIG 20 and mWIG40 indices,
- shares of 33 companies listed on the WSE,
- foreign currencies (USD, EUR, CHF, GBP),
- WIBOR rates,
- Treasury bonds.

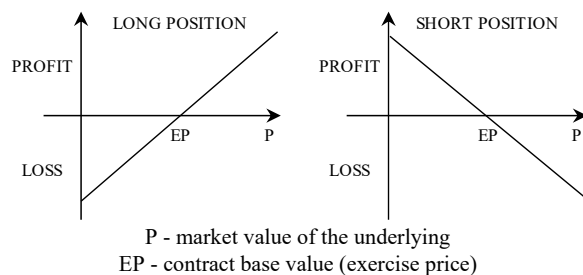


Fig. 1 Profit and loss area depending on the position in a futures contract Source: Author's own compilation based on [8]

### B. Options

Options, contrary to futures contracts, are a conditional derivative as one participant has a right and the other has an obligation. An option buyer (who takes a long position) has the right to buy or sell the underlying instrument in the future at the transaction date price, while a participant who takes a short position has an obligation to follow the buyer's decision [9]. Since the buyer has the right to buy or sell the underlying instrument, there are two basic types of options: *call option*, which gives the buyer the right to buy, and *put option*, which gives the buyer the right to sell the underlying instrument [5].

Options belong to derivative instruments with asymmetric risk as an investor who takes a long position obtains the right (makes a decision) while a writer has to follow that decision. That is why on the transaction date the buyer pays the writer a specific amount called a premium.

Investors who expect an increase in the underlying value should take a long position on a call option as they will be able to buy the underlying instrument at a base value lower than its actual market price. Otherwise, if a decrease in the value of the underlying instrument is expected, they should take a long position on a put option. Potential profit and loss profiles depending on the position and option type are presented in Fig. 2.

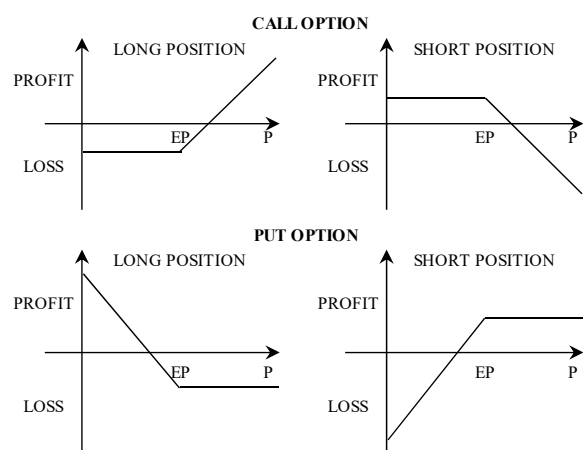


Fig. 2 Profit and loss area depending on the position and option type. Source: Author's own compilation based on [8]

Options were introduced to the WSE on September 23, 2003 and so far they have been offered on only one underlying

instrument - WIG20 index.

### III. ETPs WITH HIGH INVESTMENT RISK

Exchange traded structured products constitute a diversified group of financial instruments, but they are usually divided into three groups, based on the risk level, i.e. low, moderate and high investment risk instruments. Products with low or moderate investment risk are defined as investment products, while those with high risk as instruments with leverage [10]. Because of the subject matter of this paper only the last group will be described in detail. This group of products includes Turbo certificates, which were introduced to trading on the WSE on December 15, 2011, and Factor certificates, which were introduced to trading on September 12, 2012. They are thus much younger financial instruments than derivatives.

#### A. Turbo Certificates

Turbo certificate is the first type of high-risk structured products which is issued for an indefinite period (open-end). For each issued turbo certificate two parameters are defined. The first one is the financing level (strike). It determines the part of the price of the underlying which is financed by the issuer of the certificate. At the time of purchase the investor pays for the certificate only part of the price of underlying, i.e. the difference between its full price and the strike level. Hence, the turbo certificate allows investment in the underlying, but without a necessity of paying its total price [11]. In this way investors can buy more certificates than underlying instruments for the same amount of money and thus they can achieve higher profit (or loss) on investment (leverage effect).

The second parameter is the barrier level (knock-out). It is defined as the price of underlying instrument beyond which the turbo certificate expires. The knock-out is determined not to expose the investors to excessive losses when the value of the underlying instrument changes in the opposite direction to the investor's expectations. When the barrier level is reached, the certificate expires and the investor receives a payout including the incurred loss.

Due to investor expectations about the future price of the underlying instrument, there are two types of turbo certificates: long – allowing to make a profit on rising prices of underlying, and short – allowing to benefits from falling price.

#### B. Factor Certificates

Factor certificates have a quite simple construction that means they track the price of the underlying instrument on which they are based. As they are instruments with leverage, a change in the value of this certificate is faster than a change in the value of the underlying. The leverage is fixed in a factor certificate and it is usually 2 or 3, which means that the value of the certificate changes two or three times faster than the value of the underlying [12]. Potential profit and loss from investment in factor certificates and depending on the value of the underlying are presented in Fig. 3.

Factor certificates as well as turbo certificates are issued for an indefinite period (open-end) and in two variants: long and

short, allowing investors to benefit from rising or falling price of underlying [11].

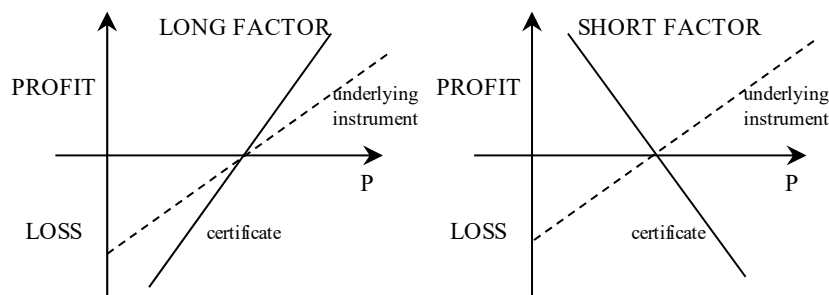


Fig. 3 Profit and loss from investment in factor certificate or underlying instrument and depending on the value of the underlying. Source: Author's own compilation based on [10]

#### IV. THE ANALYSIS OF HIGH RISK FINANCIAL INSTRUMENT OFFERED ON THE WSE

The market of high risk financial instruments is still developing. It has thus been evaluated using available statistical data. First, the author specified which high risk instruments from the ones described above are currently offered on the WSE. The results for derivatives are presented in Table I and for structured products in Table II. Additionally, for the purpose of comparison, Table II includes consolidated data on structured products with low and moderate investment risks.

TABLE I  
DERIVATIVES OFFERED ON THE WSE

Type of derivatives	10th May 2016		10th May 2017	
	Number	Share (%)	Number	Share (%)
Options	338	68.8%	362	63.0%
Futures contracts, on:	153	31.2%	213	37.0%
indices	7	1.4%	9	1.6%
shares	84	17.1%	132	23.0%
foreign currencies	21	4.3%	28	4.9%
WIBOR rates	32	6.5%	32	5.6%
treasury bonds	9	1.8%	12	2.1%
<b>Total</b>	<b>491</b>	<b>100.0%</b>	<b>575</b>	<b>100.0%</b>

Source: Author's own compilation based on the WSE statistical data [13], [14]

The analysis of the data in Table I shows that the WSE offers a wide range of derivatives. In May 2017, there were 575 items offered, and within the last twelve months, the number had increased by 17.1%. Such a big number of instruments results mainly from the fact that futures contracts and options on the same underlying instrument are issued in several variants with different expiry dates. Based on the number of instruments, options are a dominant group and in May 2017 they constituted two thirds of all derivatives, and in the analysed period their number had insignificantly increased by 7%. All options are issued on only one underlying instrument - WIG-20 index and their large number results from the fact that they are issued in two versions, i.e. call options and put options, and they have several different settlement values. Regarding futures contracts, in May 2017,

they constituted 37% of all available derivatives, and their number had increased by 39%. The main reason was a 50% increase in the number of futures contracts on shares, and these are the instruments which constitute the largest group of futures contracts offered on the WSE.

TABLE II  
ETPs ON THE WSE

Type of structured products	10th May 2016		10th May 2017	
	Number	Share (%)	Number	Share (%)
High risk structured products	560	79.43%	768	84.21%
Turbo certificates	473	67.09%	595	65.24%
Factor certificates	87	12.34%	173	18.97%
Low risk structured products	35	4.96%	51	5.59%
Moderate risk structured products	110	15.60%	93	10.20%
<b>Total</b>	<b>705</b>	<b>100.00%</b>	<b>912</b>	<b>100.00%</b>

Source: Author's own compilation based on the WSE statistical data [10]

Regarding the number of ETPs with high investment risk, they constitute even a bigger group than derivatives. In May 2017, the number of those products was higher by 33.5%. Moreover, they are the most numerous group of structured instruments available. They constituted 84%, and within twelve months their number had increased by 37%. In the group of high risk products Turbo certificates are dominant - in May 2017 they constituted two thirds of all structured products and 77.5% of high risk products, and within 12 months their number had increased by one fourth. Factor certificates constitute a significantly smaller group, but within 12 months their number had increased by 99%. Moreover, other ETPs, i.e. those with low and moderate investment risks constituted 15.8%, but in the analysed period their number had remained the same. Hence, ETPs with high investment risk are the most numerous and the most dynamically developing group of structured products on the WSE.

ETPs with high investment risk were also analysed against their underlying instrument and five groups were specified, i.e. commodities, indices or baskets of indices, shares or baskets of stocks, foreign currencies and bonds. The results are presented in Table III. At this moment, the most numerous structured products on the WSE are those whose underlying

instruments are shares or baskets of stocks. It is congruent with information on derivatives presented before. As of May 10, 2017, they constituted over 51% of all high risk products, while their share in comparison to May 2016 had increased by 3.7 pp and their number by 47%. Products issued on commodities as well as indices and baskets of indices also offered a wide choice. In the last 12 months, the share of the former had remained on the same level while the later decreased from 21.1% to 18%. The products whose underlying instruments were foreign currencies and bonds held the smallest share.

TABLE III  
HIGH RISK ETPs BASED ON THE UNDERLYING INSTRUMENT

Type of underlying instruments	10th May 2016		10th May 2017	
	Number	Share (%)	Number	Share (%)
commodities	122	21.8%	164	21.4%
indices	118	21.1%	138	18.0%
shares or basket of stocks	266	47.5%	393	51.2%
FX rates	49	8.8%	69	9.0%
bonds	5	0.9%	4	0.5%
<b>Total</b>	<b>560</b>	<b>100.0%</b>	<b>768</b>	<b>100.0%</b>

Source: Author's own compilation based on the WSE statistical data [10]

Regarding products issued on shares or baskets of stocks, the underlying instruments are shares of the largest Polish companies such as: KGHM, PZU, PKN, ORLEN, PKOBP, as well as foreign companies such as: Apple, Facebook, Google or Deutsche Bank. Regarding products based on indices, the underlying is the value of indices of the world's biggest stock exchanges such as: Dow Jones, S&P 500, Nikkei225, Nasdaq100, DAX or WIG20. The underlying instruments for commodity-based structured products include: agricultural produce such as sugar, cocoa, coffee, maize, wheat, soy; precious metals such as gold, silver, copper or iron, and energy products such as natural gas, crude oil or gas oil.

As the data in Tables I and II show the range of derivative and structured products offered on the WSE is very wide. The question is whether all products offered to investors attract their attention. To answer that question, a ratio was calculated to show a share of instruments which were traded at least once in a year against all instruments in a given group which were offered in the same year. The results are presented in Tables IV and V.

TABLE IV  
SHARE OF TRADED DERIVATIVES, DATA FROM 2014-2016

Type of derivatives	2014	2015	2016
Options	67.2%	58.5%	57.0%
Futures contracts, on:	77.1%	67.4%	72.3%
Indices	100.0%	93.3%	100.0%
Shares	83.5%	77.8%	81.8%
foreign currencies	98.1%	100.0%	98.4%
WIBOR rates	41.5%	21.5%	16.9%
treasury bonds	66.7%	19.0%	52.4%
<b>Total</b>	<b>70.4%</b>	<b>60.3%</b>	<b>60.4%</b>

Source: Author's own compilation based on the WSE statistical data [14]-[16]

The values presented in Table IV show that a share of

derivatives which were not traded at all in 2016 was 39.6% and had increased in comparison to 2014 by 10 pp. A share of options had steadily increased while the popularity of futures contracts, after the decrease in 2015, had insignificantly increased in the following year. Nevertheless, a share of "dead" futures contracts was bigger in comparison to 2014 by 4.8 pp. In the case of futures contracts, a share of instruments which were not traded at all differed based on their underlying instrument. Regarding futures contracts on indices and foreign currencies, a share of instruments which were traded at least once was about 100%, but the share was significantly lower in the case of interest rates (it had decreased from 41.5% in 2014 to 16.9% in 2016) and bonds.

TABLE V  
SHARE OF ETPs WITH HIGH INVESTMENT RISK, DATA FROM 2014-2016

Type of structured products	2014	2015	2016
Turbo certificates	64.9%	73.3%	78.1%
Factor certificates	79.4%	71.1%	73.0%
<b>Total</b>	<b>66.5%</b>	<b>73.1%</b>	<b>77.4%</b>

Source: Author's own compilation based on the WSE statistical data [13]

The values presented in Table V show that in 2016 high risk structured products, which were not traded at all, constituted 27% of all products. A positive fact is that this percentage had decreased in comparison to 2014 when "dead" structured products constituted one third, with a simultaneous significant increase in their number. What is more, a share of high risk traded products was higher than a share of moderate risk products. It was however, lower than a share of low risk products, for which the analysed ratio in 2014-2016 was about 90%. It was probably the result of a small number of those products available on the market.

Considering the type of ETPs, the share of traded Turbo certificates increased from 64.9% in 2014 to 78.1% in 2016. A reverse tendency was the case for Factor certificates, as a share of traded certificates decreased from 79.4% in 2014 to 73% in 2016. It could be related to a significant increase in the number of those instruments in the last twelve months.

Finally, the popularity of individual derivatives and high risk ETPs was analysed and measured by the number of trades and turnover value. Data from 2014-2016 are presented in Tables VI and VII. Additionally, for the purpose of comparison, in the case of ETPs information on low risk and moderate risk instruments was included.

The analysis of data in Table VII shows that investors' interest in derivative instruments is high. In 2016, the turnover value constituted 95.7% of the turnover of shares traded on the WSE. Nevertheless, a gradual decrease in the popularity can be observed as both parameters analysed in Table VII had decreased in the analysed period. The turnover value had decreased by 18.7% in comparison to 2014, while the number of trades decreased by 21.2%. Futures contracts on shares were the only instrument for which the turnover and number of trades had increased.

Futures contracts remain the most popular instruments - their turnover value constituted 99.5% of the total turnover of all derivatives (the remaining 0.5% were options). Similarly,

the number of trades in 2016 was 95.5% while in the case of options it was 4.5%, and it remained on a similar level throughout the whole analysed period.

TABLE VI  
TURNOVER VALUE AND NUMBER OF DERIVATIVES TRADES

Type of derivatives	Turnover value [PLN million]			Number of trades [thousand instruments]		
	2014	2015	2016	2014	2015	2016
Futures contracts, on:	222,703.0	210,744.7	181,040.2	8714.2	7623.4	7400.9
Indices	208,641.7	194,592.5	166,391.2	5951.2	4422.7	4597.1
Shares	5328.5	7372.0	8315.8	580.2	1033.3	1537.1
foreign currencies	7123.4	8292.4	5106.3	2175.9	2165.0	1259.3
WIBOR rates	1312.4	422.5	741.0	4.1	1.7	3.0
treasury bonds	297.0	65.3	485.9	2.8	0.6	4.3
Options	129.4	109.0	83.8	469.7	410.6	358.4
<b>Total</b>	<b>222,832.4</b>	<b>210,853.7</b>	<b>181,124.0</b>	<b>9183.9</b>	<b>8034.0</b>	<b>77592</b>

Source: Author's own compilation based on the WSE statistical data [14]-[16].

Among futures contracts offered on the WSE, the most popular are futures on indices. The turnover share of those instruments constituted 91.9% in 2016, but the turnover value had decreased by 20% in comparison to 2014.

As for the number of trades, it was the highest for futures on indices. In 2016, it constituted 62.2%, but that share had decreased by 13.7 pp in comparison to 2014. On the other hand, the number of trades in futures on shares had increased by 165%, with a simultaneous increase in the share of trades in those instruments from 6.7% in 2014 to 20.8% in 2016.

TABLE VII  
TURNOVER VALUE AND NUMBER OF STRUCTURED PRODUCTS

Type of structured products	Turnover value [PLN million]			Number of trades [instruments]		
	2014	2015	2016	2014	2015	2016
High risk structured products	420.6	512.5	667.1	50,447	73,167	114,652
Turbo certificates	310.7	341.8	275.6	40,855	48,879	55,030
Factor certificates	109.9	170.7	391.5	9592	24,288	59,622
Low risk structured products	29.6	86.4	81.0	1980	1457	1310
Moderate risk structured products	108.7	113.1	143.0	5913	9107	11,113
<b>Total</b>	<b>558.9</b>	<b>711.9</b>	<b>891.1</b>	<b>58,340</b>	<b>83,731</b>	<b>127,075</b>

Source: Author's own compilation based on the WSE statistical data [14]-[16].

At the beginning of the analysis of ETPs with high investment risk, it should be underlined that they do not belong to particularly popular products in comparison to derivatives. In 2016, the turnover value constituted merely 0.4% of the annual turnover of derivatives, while the number of trades, only 1.6%. Nevertheless, in comparison to 2014 the turnover value of high risk structured products had increased by 58.6%, which proves a steady and gradually growing interest among investors.

A more detailed analysis of data on high risk structured products shows a significant increase of popularity of Factor certificates in the analysed period. In comparison to 2014, the turnover value had increased by 250% and exceeded the turnover value of Turbo certificates by 42%. Similarly, the number of trades had increased by 521% in comparison to 2014.

In the case of Turbo certificates, a reverse relation was

recorded. The number of trades had indeed increased by 34.7%, but the turnover value decreased by 11%. It signifies a greater interest in Factor certificates. What is more, in 2014, the turnover value of Factor certificates constituted merely one third of the Turbo certificates turnover, but in 2016, the turnover value of the former was higher by 42%, with the lower number of available Factor certificates in comparison to Turbo certificates. A similar tendency was recorded for the number of trades. In 2014, in the case of Factor certificates it constituted 23.5% of the number of trades of Turbo certificates, but in 2016 it was already higher by 8%. It shows a shift in investors' interest. Moreover, high risk structured products were the most popular among all available structured products. In 2016, the turnover value constituted 75% of the total turnover of all structured products and the volume 91.7%, and both values remained on the same levels throughout the analysed period. Moderate risk structured products were significantly less popular among investors. In 2016, the turnover value constituted 16.0% of all available certificates, and the number of trades 8.7%.

## V. CONCLUSION

The conducted analysis of statistical data regarding financial instruments with high investment risk offered on the WSE has allowed the following conclusions:

- Among all high risk instruments, derivatives are the most popular - mainly futures contracts. In 2016, the annual turnover value of ETPs constituted merely 0.4% of the turnover value of derivatives, while the number of trades only 1.6%;
- the turnover and number of trades in derivatives in 2014-2016 had decreased by almost 20%, contrary to ETPs, for which both parameters had increased - the turnover value by almost 60% and the number of trades by 127%. It may mean that some investors decided to change their investing strategies, shifting from derivatives to ETPs;
- ETPs with high investment risk constitute the most numerous group among all structured products and are the most popular ones among investors;
- in the analysed period, the popularity of Factor certificates had increased, while the popularity of Turbo certificates

decreased;

- among all futures contracts and ETPs, the most numerous are those issued on company shares;
- a wide range of high risk financial instruments does not make each of them popular among investors - a share of "dead" products, i.e. products which have not been traded once over the last twelve months, had increased in the case of derivatives from 30% in 2014 to 40% in 2016, while for structured products it had decreased in the same period from 34% to 23%, despite a significant increase in their number.

In conclusion, financial instruments with high investment risk presented in this paper constitute a diversified group of financial instruments and attract the wide attention of investors. Responsible investment in such instruments, however, requires a precise knowledge of how they work, especially how specific conditions of generating profit work so as not to expose oneself to unexpected losses.

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