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ARE ANALYSTS REALLY OVERLY OPTIMISTIC WHEN PREPARING RECOMMENDATIONS?[2]

The main aim of this research was to estimate the level and distribution of optimism among analysts preparing stock market recommendations. A secondary goal was to analyze the relationship between optimism and socio-demographic variables such as age, education, and professional experience. The author used the Received Life Orientation Test (LOT-R) to test optimism. At the same time, the paper attempted to compare the results of optimism research using the psychological tests carried out by the author with previous research that perceived optimism as the difference between forecast and reality. According to the survey, individual investors in Poland are characterized by an average level of optimism of 14.38 points according to the LOT-R test, where the average level of optimism ranges from 14 to 18 points. The research did not find that the level of optimism was influenced by such socio--demographic characteristics as age, experience, or education.

Keywords: optimism, LOT-R, stock market analysts.

1. INTRODUCTION

Psychology emerged in finance at a time when scientists could not explain all financial phenomena using the theory of classical economics. It turned out that the decision-making process, apart from financial factors, is also influenced by individual feelings and beliefs. One of the most important areas in this regard is the sphere of emotions and on that background the excessive optimism which people demonstrate (Pastusiak, 2016). One of phenomena most exactly described in the decision-making literature is that individuals are overly optimistic about future outcomes (Weinstein, 1983).

Optimism can most simply be defined as the difference between expectations and reality. If expectations are higher than reality, we speak of optimistic cognitive bias, if reality is better than expectations, then we speak of pessimism. The intensity of optimism can therefore be measured empirically by comparing expectations with reality (Sharot, 2011). Optimism is a feature that one may possess to a varying degree. Perhaps the nature

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has endowed us with a basic level of optimism, and people may, for various reasons, reveal a higher or lower intensity of this feature in their lives. Another issue may be differences between people in terms of specific, partial manifestations of optimism in some issues and its lack in others (Czerw, 2009).

In the literature of the subject, excessive optimism consists in an unrealistic belief of an observer about positive course of events concerning him/her (Zielonka, 2017), or unrealistic optimism can be defined as an expectation of results that are better than reasonably probable (Shepperd, Pogge, Howell, 2017). People show a remarkable tendency to be overly optimistic, often predicting future quite unrealistically positively (Shepperd, Waters, Weinstein, Klein, 2016). In case of unrealistic optimism, the forecast is unrealistically positive compared to the objective probability of an event (Jefferson, Bortolotti, Kuzmanovic, 2017). Martin Seligman, former president of the American Psychological Association and a legendary researcher in the field of optimism, has discovered that optimism or pessimism lies in the way you explain events that happen to you. Such "automatic thoughts" often incline us to judge events inaccurately and leap to wrong conclusions (Collingwood, 2018).

Scientists have been studying unrealistic optimism for over 30 years. The Web of Knowledge database contains five most commonly used related terms, such as: unrealistic optimism, comparative optimism, optimistic attitude, biased optimism, and the illusion of insensitivity. Additionally, we can associate terms such as "planning error" and "positive delusions" with optimism (Shepperd, Waters, Weinstein, Klein, 2013). So unrealistic optimism is a general bias of most people. Everyone estimates these probabilities according to certain rules resulting from characteristics of events. However, those who have a significant influence on others' decision-making are statistically optimistic and overconfident, and are more likely to take risks than they realize. As a rule, risk takers underestimate the risk of failure and put too little effort into determining the actual state of affairs (Kahneman, 2012).

Optimism can also be understood as a source of many economic phenomena. It is important for financial intermediation (Coval, Thakor, 2005, may influence financial decisions and accounting of enterprises (Heaton, 2002), may raise security prices in the face of short selling restrictions (Chen, Hong, Stein, 2002), be an important element of utility (Brunnermeier Parker, 2005) and lead to excessive or insufficient return on investment (Barberis, Shleifer, Vishny, 1998). However, in financial economics, there is relatively little direct evidence about the role that optimism plays in individual economic decision-making (Puri, Robinson, 2007).

Optimism is examined on many levels. Most often, in the literature on economics or finance, optimism is perceived as unrealistic prediction of the future, i.e. a difference between forecast and reality. However, there is little research on dispositional optimism among capital market participants, understood as a character trait surveyed by psychological tests. Similar conclusions were reached by Puri and Robinson (2007), who stated that the main obstacle in collecting large-scale economic evidence on optimism is measurements: direct psychometric tests of optimism are not carried out in large-scale economic research. The author noticed a research gap concerning research with psychological tests on optimism among capital market participants, including stock market analysts.

2. EARLIER RESEARCH ON OPTIMISM AMONG ANALYSTS WHO ISSUE STOCK MARKET RECOMMENDATIONS

The interest in optimism goes beyond psychology. This concept is ubiquitous in many communities of science (including law, economics, and decision science) and medicine. For example, economists study the occurrence of unrealistic optimism among managers (Malmendier, Tate, 2008; Lin, Hu, Chen, 2005; Hilary, Hsu, Segal, Wang, 2016), individual investors (De Bond, 1993; Iqbal. 2015; Riaz, Iqbal, 2015; Gakhar, 2019) and among stock market analysts.

Tyszka and Macko (2005) conducted a study on three professional groups, such as lawyers, entrepreneurs and financial analysts, in order to check the level of their optimism. Their research shows that financial analysts were characterized by the highest level of optimism.

Cowen, Groysberg, and Healy (2006) found that analysts from companies that financed research through underwriting and trading actually produced less optimistic forecasts and recommendations than broker analysts who did not use underwriting. Optimism was especially low among analysts from large investment firms, suggesting that the firm's reputation diminishes the analyst's optimism. Analysts serving retail investors are more optimistic than those serving only institutional investors. Agrawal and Chen (2008) examined whether conflicts of interest with investment banking and brokerage firms prompted sell-side analysts to issue optimistic stock recommendations, and if so, whether investors were misled by such prejudices. Using quantitative measures of potential conflicts constructed on the basis of a new data set containing a breakdown of the income of employers employing analysts, the authors found that sentiment levels in the recommendation are indeed positively related to a size of conflict.

Kicia (2008) measured the dependence of the market situation and changes in analysts' sentiment (optimism). In the period from 2000 to 2003, he compared the value of the WOA index (analysts' optimism index) and the WIG20 index. As a result of the research, the author stated that on the Polish market there is no significant relationship between the sentiment (optimism) of analysts and the stock market situation.

Mola and Guidolin (2009) conducted a study on analyst optimism related to investment funds. It shows that analysts issuing recommendations for companies included in investment funds' portfolios show excessive optimism in their recommendations compared to recommendations issued for companies that do not belong to any investment portfolios.

Ertimur, Muslu and Zhang (2010) noted in their research that recommendations issued for the first time are less optimistic than the "corrective" recommendations issued again for a given company.

Drake and Myers (2011) examined whether an analyst's experience and size of a brokerage house moderate the relationship between overly optimistic forecasts and high growth. The authors found that over-optimism is lower for analysts with more experience and analysts tracking fewer companies, but we find only limited evidence of a lower level of over-optimism for analysts from larger brokerages and analysts tracking fewer industries.

Dąbrowski (2013) examined the accuracy of recommendations in the period from 2007 to 2012 for 5 Blue Chip companies, i.e. TPS, PKN Orlen, PKO BP, Pekao S.A., KGHM. In the analysed period, very optimistic forecasts of analysts were observed. 70% of

recommendations related to purchase of instruments, while 30% related to their sale. The survey shows that only 44.63% of recommendations reached the target price within the planned time horizon. The above research shows that the accuracy is low, which suggests the optimism of analysts.

Bosquet, de Goeij, and Smedts (2014) examined analysts' recommendations in the period 1996–2006. They proved that female analysts' chances of giving optimistic advice are 40% lower than that of male analysts. In case of employment in leading financial institutions, the proportions are decreasing and chances of issuing optimistic recommendations are 16% lower for female analysts than for male analysts. They also found that the observed gender heterogeneity could not be attributed to differences in the risk characteristics of the recommended instruments, experience, or task complexity.

Keller and Pastusiak (2015) conducted a study on 786 stock exchange recommendations of WIG20 companies in years 2009–2012. These studies show that the hypothesis about occurrence of behavioural effects in a form of excessive optimism and the anchoring effect in the process of making recommendations has been confirmed.

Pastusiak (2016) conducted a study of stock exchange recommendations for a group of 10 companies listed on the Warsaw Stock Exchange (WSE). The aim was to present whether there is an excessive optimism among analysts when issuing stock market recommendations. These studies covered the period from 2000 to 2013. The maturity date of the recommendation was 250 session days from the date of issue. The study of stock market recommendations shows that the valuations are overstated by a value oscillating around 30%. These studies confirmed the previously adopted hypothesis about overestimation of value by analysts, which may be a symptom of an excessive analyst optimism. In another study, Pastusiak (2017) analysed 1,558 recommendations from years 2000–2014. As a result, he found that the most numerous groups of cumulative errors in case of positive recommendations is the one in the range from -29 to -4%, while in case of negative recommendations, the most numerous group is in the range of errors from 3 to 33%. This allows to conclude that the direction of the mistakes made is not identical in case of positive and negative recommendations. The results suggest that the phenomenon of over-optimism may rather be observed in case of positive recommendations. Summing up, it should be noted that the phenomenon of excessive optimism in the context of the adopted method of research is not unequivocal, but it can be stated that this heuristic is present and very visible in case of positive forecasts.

Kowalski and Prażników (2017) analysed the optimism of brokerage recommendations on the Polish capital market. They examined 170 brokerage recommendations for years 2014 and 2015. Their research shows that analysts more often forecast a higher valuation than suggested by a historical driving force and a model of constant growth. They observed the most optimistic perception among companies with low historical financial results. The greatest optimism was observed in case of companies with a buy recommendation and companies in a downward trend in valuation.

Pastusiak (2018a) in his next article points to a significant problem of a notorious overestimation of forecasting values in stock market recommendations, which may cause potential incorrect investment decisions among recipients of these recommendations. The research also shows excessive optimism among analysts, as the discount for analysts' optimism in recommendations was -19.35% for positive (buy), and for negative (sell) 5.32%. As a result, buy recommendations were overestimated and sell recommendations

were underestimated, which suggests excessive optimism among analysts. In another study, Pastusiak (2018b) analysed over 10,500 stock market recommendations in years 2000––2014, as a result of the research carried out, in case of buy recommendations, an average overestimation by analysts was 29%, while in case of sell recommendation, an underestimation by analysts was 12%, which proves the occurrence of optimism in issued recommendations. The researcher also determined how often we deal with optimistic recommendations in case of positive and negative recommendations, in line with the understanding of optimism as price overestimation in case of positive recommendations and underestimation in case of negative recommendations. In case of positive recommendations, an optimistic reaction appeared in over 5,000 cases out of 8,500 observations, while in case of negative recommendations, it is about 700 observations in a sample of 2,000 records. One may notice that the phenomenon of excessive optimism is not identical in case of positive forecasts, it occurs twice as often as in case of negative forecasts, i.e. it intensifies when the analyst describes a given company as having growth potential.

In separate studies, Pastusiak and Keller (2019) conducted a study on excessive optimism in valuations among stock market analysts. The research sample included 10,000 brokerage recommendations from 40 brokerage houses published on the WSE in years 2000–2014. Their research shows that 70% of the recommendations showed excessive optimism.

Brycz, Dudycz and Włodarczyk (2021) analysed the relationship between quality of forecasts and type of analysts' stock market recommendations. Their analyses were based on stock exchange recommendations for companies listed on the WSE in years 2005–2012. The authors did not see a clear difference in the level of analysts' optimism (pessimism) in their forecasts between different types of stock market recommendations, but found that analysts' optimism was visible in the amount of overestimation of their forecasts.

The analysis of the studies presented earlier shows that they focused on the difference between forecast and reality, and thus a conclusion was reached about the optimism of stock market analysts, however there are no psychological studies that would confirm optimism among analysts.

In addition to examining the level of optimism among an individuals in psychology, economics and finance, the influence of socio-demographic variables on the level of optimism was investigated.

Stach (2006) showed that the level of optimism is influenced by such variables as gender and education, while the level of optimism is not influenced by age. Czerw (2009) recognized in her research that age influences the level of optimism, while optimism does not depend on gender. Glaesmer, Rief, Martin, Mewes, Brahler, Zenger, Hinz (2012) showed the influence of age on the level of optimism: younger people showed a higher level of optimism than older people, they did not notice any gender differences. Hinz, Sander Glaesmer. Brähler. Zenger, Hilbert, Kocalevent (2017) found that gender influences the level of optimism, men are more optimistic than women. However, age differences in the level of optimism were small. Schou-Berdal Heir, Skogstad, Bonsaksen, Lerdal, Grimholt, Ekeberg (2017) found that there was a significant statistical effect for age. They found no differences in the level of gender optimism. However, they confirmed the influence of education on the level of optimism, people with higher education were more optimistic. They also showed that people living in the city were more optimistic than those living in villages and towns. Prosad, Kapoor, and Sengupta (2015) examined whether demographic

characteristics, including age, gender, income, occupation, and experience are related to overconfidence, optimism, disposition, and herd bias. They found that age, occupation, and experience had a stronger relationship with behavioural bias than the other factors they examined. Ates, Coskun, Sahin and Demircan (2016) found that the level of over-optimism, over-confidence and loss aversion among unmarried investors is much higher than among married investors.

3. HYPOTHESES AND METHODOLOGY

3.1. Goals and hypotheses

The main aim of the paper is to investigate the occurrence of excessive (high) optimism among stock analysts who prepare stock market recommendations. In connection with the main goal of the analyses carried out, also partial goals will be fulfilled consisting in characterization of socio-demographic factors, i.e. an answer to the question whether experience, professional licence, age of analysts preparing recommendations have an influence on the occurrence of an excessive level of optimism,. For this purpose, 3 research questions were asked:

1. Does experience differentiate the level of optimism among analysts?
2. Do professional licence differentiate the level of optimism among analysts?
3. Does age differentiate the level of sentiment among analysts?

In connection with the formulated research goals and questions, related hypotheses were formulated. Referring successively to the secondary goal and sub-goals of the research, they were defined as follows:

H1: Stock market analysts who prepare recommendations are overly optimistic.
H2: Experience of stock market analysts differentiates the level of optimism.
H3: Professional licence held by a stock market analyst differentiates the level of optimism.
H4: Age of an analyst differentiates the level of optimism.

3.2. Participants and procedure

The research objective regarding occurrence of excessive optimism among stock market analysts preparing analytical reports using the psychological Life Orientation Test (LOT-R) transformed into a criterion of selecting the research sample, as the research concerned a small group of specialists. The purposeful selection technique was chosen, which consists in indicating population units that should be included in the sample by the researcher. People included in the sample had to meet the following criteria: work in a financial market institution issuing recommendations, participate in the process of preparing recommendations.

The survey was carried out using the CAWI (Computer Assisted Web Interview) method consisting in conducting a computer-supervised Internet survey. The survey was conducted from September 2019 to March 2020. The research sample consisted of 37 analysts. Table 1. presents characteristics of the surveyed group according to the analysed sociodemographic variables in terms of their percentage share in the studied sociodemographic variable and their number.

Table 1. Frequency distribution for a general research sample with split into sociodemographic variables

Variable	Factor	Overall
Age	25–34 years	27.00% (N = 10)
	35–44 years	46.00% (N = 17)
	44 and more years	27% (N = 10)
Licence	lack	13.50% (N = 5)
	1 licence	37.80% (N = 14)
	2 and more licences	48.70% (N = 18)
Experience	5–10 years	51.40% (N = 19)
	11–15 years	29.70% (N = 11)
	16 and more years	18.90% (N = 7)

Source: own study.

3.3. Instrument

The LOT-R test is the most widespread and used optimism measurement tool (Lai, Yue, 2000; Steca, Monzani Greco, Chiesi, Primi. 2015; Schou-Bredal et al., 2017; Hinz et al., 2017), and has become a gold standard to measure disposable optimism (Cano-García, Sanduvete-Chaves, Chacón-Moscoso, Rodríguez-Franco, García-Martínez, Antuña-Bellerín, Pérez-Gil, 2015). The Life Orientation Test (LOT) was developed by Scheier and Carver (1985) to assess dispositional optimism. The authors applied an initial set of 16 items to diverse student samples and obtained two factors by factorial analysis of the main factors with oblique rotation. After several revisions of this tool and application on various trials, the tool eventually consisted of twelve items: four to measure optimism, four to measure pessimism, and four to serve as fillers. Over time, many authors have questioned a predictive accuracy of LOT with regard to constructs such as neuroticism, trait anxiety, self-esteem, and self-control. This led to revision of LOT and ultimately to development of LOT-R (Scherier, Craver, Bridges, 1994). In LOT-R, three items included in the original LOT were eliminated, including two items measuring optimism and one measuring pessimism, and a new item measuring optimism was added (Cano-García et al., 2015). The Revised Life Orientation Test - LOT-R is a self-descriptive test for measuring dispositional optimism as described by Scheier, Craver, and Bridges. LOT-R is a shortened and revised version of the life orientation test - LOT, the revision process of which improved the psychometric features (Ottati, Noronha, 2017).

Currently, there is an ongoing debate on the dimensionality of LOT-R. However, the use of LOT-R as a two-factor scale runs counter to a theoretical definition of the scale that the authors originally described as a continuum in which pessimism and optimism are viewed as polar opposites rather than separate dimensions. In a recent review, the original authors continued to recommend the use of LOT-R as a one-dimensional scale in primary analyses. In addition, recent studies have given strong support for unidimensionality of LOT-R and have shown that the two-factor structure is an artifact of position formulation (Schou-Bredal et al., 2017), therefore, in this study, LOT-R is primarily used as a one-dimensional scale.

LOT-R is characterized by good internal consistency, Cronbach's alpha ranges from 0.70 to 0.80, and their test-retest correlations for the intervals from 4 to 28 months are from 0.68 to 0.79 (Scheier et al., 1994). In the Polish standardization sample consisting of 786 people aged 20–55, the average LOT indicator was 14.55 with a standard deviation of 4.05. The results do not differ from mean results for the American original version (Scheier et al., 1994). In the Polish version of the test, no differentiation of results according to gender, age and environment was found (Jurczyński, 2001).

The LOT-R test consists of 10 items, three of which are about optimism (items 1, 4 and 10), three are pessimism (items 3, 7 and 9) and four are distracting items (items 2, 5, 6 and 8), whose results are not calculated. The respondents respond to statements by indicating a degree of their compliance on a five-point Likert scale, from full disagreement to full consent (Ottati, Noronha, 2017).

The overall score ranges from 0 to 24 points and the higher it is, the higher the level of optimism (Schou-Bredal et al., 2017; Jurczyński, 2001). Walsh, McCartney, Van Der Pol, Buchanan, and Jones (2015) have proposed that a minimum score that can be computed is 0 (representing extreme pessimism) and the maximum being 24 (representing extreme optimism). Kreis, Molto, Bailly, Dodoun, Fabre, Rein, Hundry, Zenasni, Rozenberg, Pertuiset, Fautrel, Gossec (2015); Chakraborty (2016); Marotta, Sarno, Del Casale, Pane, Mogna, Amoruso, Felis, Fiorio (2019) proposed a sub-scale that converts the points obtained from the LOT-R test into the level of optimism. The scale is as follows from 0 to 13 points – low level of optimism, from 14 to 18 points - medium level of optimism, from 19 to 24 points – high level of optimism. Another scale was proposed by Jurczyński (2001), where a low level of optimism ranges from 0 to 12 points, an average level of optimism ranges from 13 to 16 points, and a high level of optimism ranges from 17 to 24 points. The article uses the scale proposed by Kreis et al. (2015); Chakraborty (2016); Marotta et al. (2019).

3.4. Statistical methods

In order to achieve the main goal and verify the main hypothesis, hypotheses about single means were tested using the Student's t-test. Student's t-distribution is the theoretical distribution of relative frequencies of all values of $\bar{X}$ transformed into t values, which we would get randomly if we were to extract an infinite number of samples from a population of a certain size. Formula to derive a mean from the sample (King, Minium, 2020):

$$t = \frac{\bar{X} - \mu_x}{s_{\bar{x}}} \tag{1}$$

$\bar{X}$ – mean obtained in the sample,
μ_x – hypothetical population mean,
$s_{\bar{x}}$ – estimation of a standard error of the mean.

The significance test for the mean (average) value is used to verify a hypothesis that the average value of a feature in the general population is equal to the so-called hypothetical value (specific number). We do verification using a simple n-element test. The null hypothesis takes the form H_0: μ = μ_x, where μ_x is a hypothetical value. The alternative hypothesis can take one of three forms of H_1: (I) $\mu \neq \mu_x$; (II) $\mu > \mu_x$; (III) $\mu < \mu_x$ (Malska, Koziorowska, 2015).

Fischer's exact test was performed to investigate a relationship between the level of sentiment and sociodemographic variables. One of the conditions for applicability of the Chi-square test of independence is the expected number, which in each cell of the contingency table should be greater than 5. If the expected number is lower than 5 in at least one of the contingency table cells, the Chi-square test should be used instead Fischer's exact test, which has now been generalized to any two-dimensional table (Szymczak, 2018).

4. EXISTENCE OF EXCESSIVE OPTIMISM AMONG STOCK MARKET ANALYSTS PREPARING RECOMMENDATIONS

As a result of the survey research, the following results were obtained for the LOT-R test. The overall results of the mood for the entire study sample (N = 37) are presented in Table 2.

Table 2. Scores for the entire sample Life Orientation Test (LOT-R)

Results	Points	N	Percentage
Low level of optimism	0–13	14	37.80%
Medium level of optimism	14–18	14	37.80%
High level of optimism	19–24	9	24.40%

Source: own study.

As the table shows, 24.40% of the surveyed analysts are characterized by a high level of optimism (excessive optimism), 37.80% of the surveyed analysts have an average level of optimism, and 37.80% of the respondents have a low level of optimism, which can be identified with a tendency to pessimism. Table 3. presents descriptive statistics for the entire study group.

Table 3. Descriptive measures for the interval dividing series of the results of the Life Orientation Test (LOT-R)

Statistics		LOT-R points	Standard error
Mean		14.38	0.849
95% confidence interval for the mean	lower limit	12.66	
	upper limit	16.10	
5% trimmed mean		14.53	
Median		15	
Variance		26.686	
Standard deviation		5.166	
Minimum		3	
Maximum		24	
Gap		21	
Quarter gap		7	
Skewness		-0.607	0.388
Kurtosis		-0.252	0.759

Source: own study.

As shown in Table 3., the average score obtained by analysts was 14.38[3], the standard deviation is 5.166 points, the median is 15 points, which indicates that half of the analysts had moderate and high levels of optimism, while the other half had moderate and low levels of optimism. The variance is 26,686, which proves that this group is moderately diversified in terms of the intensity of optimism, and thus it is homogeneous. The variation area between the maximum and minimum score is 21 points. The distribution of the variable (number of points in the LOT-R survey) measured by the classic asymmetry coefficient (skewness) is characterized by a weak left-side asymmetry of - 0.607, which allows us to conclude that more analysts are above than below the average. The kurtosis is -252, indicating that the distribution of analyst participation is platykurtic, so the concentration of values around the mean is smaller than in the normal distribution (the distribution is more flattened).

In order to verify the hypothesis 1: Stock market analysts who prepare recommendations are overly optimistic, the Student's t-test was used for one mean, assuming a significance level of 0.05 and a hypothetical mean of 19 points, due to the interpretation of the results from the LOT-R test, where from 19 point begins with a high level of optimism.

Table 4. One-sample test

	Test Value = 19					
	t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Points	-5.442	36	.000	-4.622	-6.34	-2.90

Source: own study.

Table 5. One-Sample effect values

		Standardisation	**Point estimate**	**95% Confidence Interval**	
				Lower	**Upper**
Number of points	Cohen's d	5.166	-.895	-1.273	-.508
	Hedges' correction	5.277	-.876	-1.246	-.497
a. The denominator used in estimation of the effect values. In the case of d Cohen the sample standard deviation is used. Hedges' correction uses the sample standard deviation, plus a correction factor.					

Source: own study.

Analysis with the use of Student's t-test for one sample shows that it is statistically significantly different from the adopted threshold for occurrence of a high level of optimism. Thus, it falls into the rejection area, which obliges us to reject the H_0 hypothesis in favour of the H_1 alternative. The value of the t-statistic expressed in terms of the estimated standard error of the mean is -5,442, which leads to a conclusion that analysts are below the threshold assumed for the level of high optimism.

[3] The average value indicates the average level of positive orientation, it is in the point interval; of 14–18 points.

In order to better illustrate a structure of the analysed group of analysts, the further part of the paper presents a distribution of the level of analysts' optimism according to factors such as age, experience and education understood as professional licences, and shows that there are relationships between variables.

The first group listed among analysts is age. In order to determine whether there is a relationship between age and the level of positive orientation, the independence test χ^2 was performed.

A probability value in the two-sided Fisher's exact test is 0.834, so it exceeds the assumed significance level of $\alpha = 0.05$, i.e. the relationship between studied variables is not statistically significant. The percentage of analysts with different levels of optimism does not differ significantly in the age groups.

Table 6. Structure of analysts by age intervals, education and experience as well as the level of optimism

Variable	Factor	Low level of optimism	Medium level of optimism	High level of optimism
Age	25–34 years	13.50%	8.10%	5.40%
	35–44 years	13.50%	21.60%	10.80%
	44 and more years	10.80%	8.10%	8.10%
Certificate	lack	5.40%	5.40%	2.70%
	1 certificate	18.90%	13.50%	5.40%
	2 and more certificate	13.50%	18.90%	16.20%
Experience	5–10 years	21.60%	24.30%	5.40%
	11–15 years	8.10%	8.10%	13.50%
	16 and more years	8.10%	5.40%	5.40%

Source: own study.

Table 7. Calculations for the independence test χ^2 variable age

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	1.643a	4	.801	.834		
Likelihood Ratio	1.626	4	.804	.834		
Fisher-Freeman-Halton Exact Test	1.782			.834		
Linear-by-Linear Association	.323b	1	.570	.674	.337	.096
N of Valid Cases	37					

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is 2.43.
b. Standardized value is .568.

Source: own study.

The second specified group among analysts is education understood as capital market professional licences[4]. In order to determine whether there is a relationship between education and the level of positive orientation, the independence test χ^2 was performed.

Fisher's stat value: F = 2,420. The two-sided exact significance is 0.420, therefore it is higher than the assumed significance level of $\alpha = 0.05$. Therefore, it can be asserted that a relationship between possession of professional licence and the level of optimism observed in the sample is purely accidental, i.e. it is not an expression of a real cause-effect relationship between these variables.

Table 8. Calculations for the independence test χ^2 education variable

	Value	**df**	**Asymptotic Significance (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**	**Point Probability**
Pearson Chi-Square	2.282a	4	.684	.681		
Likelihood Ratio	2.322	4	.677	.708		
Fisher-Freeman-Halton Exact Test	2.420			.693		
Linear-by-Linear Association	1.235b	1	.266	.306	.170	.065
N of Valid Cases	37					
a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is 1.22. b. 5 cells (55.6%) have expected count less than 5. The minimum expected count is 1.22.						

Source: own study.

The third group identified among analysts is experience. In order to determine whether there is a relationship between experience and the level of optimism, the independence test χ^2 was performed.

Table 9. Calculations for the test of independence χ^2 variable experience

	Value	**df**	**Asymptotic Significance (2-sided)**	**Exact Sig. (2-sided)**	**Exact Sig. (1-sided)**	**Point Probability**
Pearson Chi-Square	4.960a	4	.291	.325		
Likelihood Ratio	4.994	4	.288	.355		
Fisher-Freeman-Halton Exact Test	4.864			.300		
Linear-by-Linear Association	.833b	1	.362	.422	.220	.071
N of Valid Cases	37					
a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is 1.70. b. The standardized statistic is .912.						

Source: own study.

[4] For simplicity reasons the paper does not mention the individual licences such as (Stock Broker, Investment Advisor, Chartered Financial Analyst, Certified International Investment Analyst) but only grouped into the following subsets: no licence, 1 licence and 2 or more licences.

Fisher's stat value: F = 4,864. Two-sided exact significance is 0.300, therefore it is higher than the assumed significance level of $\alpha = 0.05$. Therefore, it can be asserted that a relationship between experience and the level of optimism observed in the sample is purely accidental, i.e. it is not an expression of a real cause-effect relationship between these variables.

5. CONCLUSIONS

After conducting statistical analyses, following the Student's t-statistics for one mean, the first hypothesis was verified. In other words, a statistical conclusion can be drawn that there are no grounds to believe that the average in the population from which this sample is derived is 19 points for the LOT-R test. Based on this test, it can also be concluded that the average is most likely lower than the adopted levels, which means that the analysts who prepare the recommendations do not show high, or overly optimism.

In order to make the studied phenomenon more precise, an analysis of the relationship between sentiment in psychological tests and sociodemographic factors such as age, education and experience was carried out. For them, the hypotheses H_2, H_3, H_4 were made.

Thanks to the division into particular sociodemographic features, conclusions were drawn in the scope of partial hypotheses from H_2 to H_4.

Socio-demographic variables, such as age, education and experience did not show a significant statistical effect on the level of sentiment. This did not allow for a positive verification of the hypotheses H_2, H_3, H_4.

The research conducted is different from the research previously conducted by other researches concerning excessive optimism among stock market analysts. The dissimilarity of the results is due to the fact that earlier studies focused on the occurrence of excessive analysts 'optimism in their recommendations as a forecast error, but did not investigate the psychological determinants of analysts' attitudes, contrary to the research presented in the paper.

Optimism is a quality that people can possess to varying degrees. Perhaps nature has equipped analysts with a basic level of optimism, the level of which, using psychological tests, can be estimated at an average level, while analysts, for various reasons, may reveal in the valuation of shares prepared for the needs of stock market recommendations a lower or greater intensity of this feature. This may be due to the presence of cognitive biases, heuristics, and emotions that emerge in the real valuation process.

Stock market analysts may try to explain over-optimism in stock valuations by the fact that analysts use both advanced and heuristic pricing models to determine target prices (e.g., Demirakos Strong, Walker, 2010; Imam, Chan, Shah, 2013; Gleason, Johnson, Li, 2013). The choice of analyst pricing model depends on various factors, such as an analyst and a company characteristic, customer preferences and market prices (e.g. Glaum, Friedrich, 2006; Imam, Barker, Clubb, 2008; Demirakos et al., 2010; Imam et al., 2013).

Due to a conflict of interest between branches of a company, and in particular because individuals are responsible for servicing brokerage houses or banks, reports prepared by analysts may not be completely independent and objective (Imam et al., 2013). In other words, an analyst may feel pressure to issue purchase recommendations if the company employing him/her simultaneously handles the issuing process of a given company. Investors should consider the possibility of an error on the analyst's side and consider the

specificity of his/her company, this will help investors choose the most objective reports (Baker, Filbeck, Nofsinger, 2021).

Another explanation for the optimism in the valuation of recommendations may be that professional analysts often do not want to take positions that are fundamentally different from those taken by other analysts. They are afraid that in the event of a mistake their mistake will be remembered for a long time and, as a result, their competence will be doubted. They feel safe by following the crowd. They assume that clients will be more likely to forgive them for an inaccurate analysis if it is consistent with recommendations of many experts and an error is collective, not individual. The effect of a sheep's rush, devoid of logical justification, may lead to a significant shift in the valuation of shares from their intrinsic value. This phenomenon is very characteristic of analysts who prepare recommendations. American economist Edgar Fiedler noted: "the herd instinct among forecasters makes sheep look like independent thinkers" (Baker et al., 2021).

Concluding, the literature provides two explanations as to why target prices only have a limited investment value for investors (Buxbaum, Schultze, Tiras, 2019):

- are optimistically biased as a result of job-related analysts' incentives,
- are based on insufficient valuation assumptions and techniques leading to forecasts that do not accurately reflect intrinsic values.

Conclusions resulting from the conducted research make it possible to indicate specific directions that should be considered when conducting further research in this area. One of the directions that can be outlined is a research analysing which factors increase optimism in the real process of making recommendations. Another direction of research may be an analysis of what neurobiological mechanisms regulate the optimistic cognitive bias. Such research may allow for a better understanding of decision-making mechanisms.

REFERENCES

Agrawal, A., Chen M.A. (2008). *Do Analyst Conflicts Matter? Evidence from Stock Recommendations. "The Journal of Law and Economics",* Vol. 51, No. 3.

Ates, S., Coskun, A., Sahin, M.A., Demircan, M.L. (2016). *Impact of financial literacy on the behavioral biases of individual stock investors: evidence from Borsa Istanbul. "Business and Economics Research Journal",* Vol. 7, No. 3. DOI: 10.20409/berj.2016321805.

Baker, H.K., Filbeck, G., Nofsinger, J.R. (2021). *Finanse behawioralne: co każdy powinien wiedzieć*. Warsaw: Wydawnictwo Naukowe PWN.

Barberis, N., Shleifer, A., Vishny, R. (1998). *A Model of Investor Sentiment. "Journal of Financial Economics",* Vol. 49, No. 3.

Bosquet, K., de Goeij, P., Smedts, K. (2014). *Gender heterogeneity in the sell-side analyst recommendation issuing process*. *"Finance Research Letters",* Vol. 11, No. 2. DOI: 10.1016/j.frl.2013.11.004.

Brunnermeier, M.K., Parker, J.A. (2005). *Optimal Expectations*. *"American Economic Review",* Vol. 95, No. 4.

Brycz, B., Dudycz, T., Włodarczyk, K. (2021). *Are Analysts Really Optimistic in Their Stock Recommendations? The Case of the Polish Capital Market*. *"Emerging Markets Finance and Trade",* Vol. 57, No. 13. DOI: 10.1080/1540496X.2019.1694886.

Buxbaum, M., Schultze, W., Tiras, S.L. (2019). *Target Price Optimism, Investor Sentiment, and the Informativeness of Target Prices*. *"SSRN Electronic Journal".*

Cano-García, F.J., Sanduvete-Chaves, S., Chacón-Moscoso, S., Rodríguez-Franco, L., García--Martínez, J., Antuña-Bellerín, M.A., Pérez-Gil, J.A. (2015). *Factor structure of the Spanish version of the Life Orientation Test-Revised (LOT-R): Testing several models. "International journal of clinical and health psychology",* Vol. 15, No. 2. DOI: 10.1016/j.ijchp.2015.01.003.

Chakraborty, R. (2016). *Dimensional Analysis of Life Orientation in Higher Secondary School Students. "International Journal of Research in Humanities and Social Studies",* Vol. 3, No. 2.

Chen, J., Hong, H., Stein, J.C. (2002). *Breadth of ownership and stock returns. "Journal of Financial Economics",* Vol. 66, No. 2–3.

Collingwood, J. (2018). *Realism and Optimism: Do You Need Both?*, *"Psych Central"* [Access: 20.07.2022]. Access on the internet: https://psychcentral.com/lib/realism-and-optimism-do-you-need-both.

Coval, J.D., Thakor, A.V. (2005). *Financial intermediation as a beliefs-bridge between optimists and pessimists*. *"Journal of Financial Economics",* Vol. 75, No. 3. DOI: 10.1016/ j.jfineco.2004.02.005.

Cowen, A., Groysberg, B., Healy, P. (2006) *Which types of analyst firms are more optimistic?*. *"Journal of Accounting and Economics",* Vol. 41, No. 1–2. DOI: 10.1016/j.jacceco. 2005.09.001.

Czerw, A. (2009). *Optymizm. Perspektywa psychologiczna*. Gdańsk: Gdańskie Wydawnictwo Psychologiczne.

Dąbrowski, P. (2013). *Huraoptymizm rekomendacji maklerskich w okresie giełdowej dekoniunktury*. "Studia Ekonomiczne", Vol. 174.

De Bondt, W.P.M. (1993). *Betting on trends: Intuitive forecasts of financial risk and return. "International Journal of Forecasting",* Vol. 9, No. 3. DOI: 10.14718/ACP.2017.20.1.3.

Demirakos, E.G., Strong, N.C., Walker M. (2010). *Does Valuation Model Choice Affect Target Price Accuracy?. "European Accounting Review",* Vol. 19, No. 1. DOI: /10.1080/ 09638180902990630.

Drake, M.S., Myers L.A. (2011). *Analysts' accrual-related over-optimism: do analyst characteristics play a role?*. *"Review of Accounting Studies",* Vol. 16, No. 1. DOI: 10.1007/s11142-009-9118-3.

Ertimur, Y., Zhang, F., Muslu, V. (2010). *Why are Recommendations Optimistic? Evidence from Analysts' Coverage Initiations*. *"SSRN Electronic Journal"*.

Gakhar, D. (2019). *Role of Optimism Bias and Risk Attitude on Investment Behaviour. "Theoretical Economics Letters",* Vol. 9. DOI: 10.4236/tel.2019.94056.

Glaesmer, H., Rief, W., Martin, A., Mewes, R., Brahler, E., Zenger, M., Hinz, A. (2012). *Psychometric properties and population-based norms of the Life Orientation Test Revised (LOT-R). "British Journal of Health Psychology",* Vol. 17. DOI: 10.1111/j.2044-8287. 2011.02046.x.

Glaum, M., Friedrich, N. (2006). *After the „Bubble": Valuation of Telecommunications Companies by Financial Analysts*. *"Journal of International Financial Management and Accounting",* Vol. 17, No. 2.

Gleason, C.A., Johnson W.B., Li H. (2013). *Valuation Model Use and the Price Target Performance of Sell-Side Equity Analysts*: Valuation Model Use and Price Target Performance. "Contemporary Accounting Research",* Vol. 30, No. 1. DOI: 10.1111/ j.1911-3846.2011.01142.x.

Hackbarth, D. (2008). *Managerial Traits and Capital Structure Decisions*. *"Journal of Financial and Quantitative Analysis",* Vol. 43, No. 4. DOI: 0.1017/S002210900001437X.

Heaton, J.B. (2002). *Managerial Optimism and Corporate Finance, "Financial Management",* Vol. 31, No. 2.

Hilary, G., Hsu, C., Segal, B., Wang, R. (2016). *The bright side of managerial over-optimism. "Journal of Accounting and Economics",* Vol. 62. DOI: 10.1016/j.jacceco.2016.04.001.

Hinz, A., Sander, C., Glaesmer, H., Brähler, E., Zenger, M., Hilbert, A., Kocalevent, R.D. (2017). *Optimism and pessimism in the general population: Psychometric properties of the Life Orientation Test (LOT-R). "International journal of clinical and health psychology",* Vol. 17, No. 2. DOI: 10.1016/j.ijchp.2017.02.003.

Imam, S., Barker, R., Clubb, C. (2008). *The Use of Valuation Models by UK Investment Analysts*. *"European Accounting Review",* Vol. 17, No. 3. DOI: 10.1080/09638180802016650.

Imam, S., Chan, J., Shah, S.Z.A. (2013). *Equity valuation models and target price accuracy in Europe: Evidence from equity reports, "International Review of Financial Analysis",* Vol. 28. DOI: 10.1016/j.irfa.2013.02.008.

Iqbal, N. (2015). *Impact of Optimism Bias on Investment Decision: Evidence from Islamabad Stock Exchange, Pakistan. "Research Journal of Finance and Accounting"*, Vol. 6, No. 19.

Jefferson, A., Bortolotti, L., Kuzmanovic B. (2017). *What is unrealistic optimism?*. *"Consciousness and Cognition",* Vol. 50. DOI: 10.1016/j.concog.2016.10.005.

Jurczyński, Z. (2001. *Narzędzia Pomiaru w promocji i psychologii zdrowia.* Pracowania Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.

Kahneman, D. (2012). *Pułapki myślenia: o myśleniu szybkim i wolnym*. Warsaw: Media Rodzina.

Kicia, M. (2008). *Wpływ myślenia heurystycznego na efektywność decyzji inwestycyjnych na rynku kapitałowym*. *"Acta Universitatis Lodziensis, Folia Oeconomica*", Vol. 218.

King, B.M., Minium, E.W. (2020). *Statystyka dla psychologów i pedagogów*. Warsaw: Wydawnictwo Naukowe PWN.

Kowalski, M.J., Praźników, J. (2007). *Investment Recommendation Optimism – Results of Empirical Research on Polish Capital Market* [In:] *Information Systems Architecture and Technology: Proceedings of 37th International Conference on Information Systems Architecture and Technology – ISAT 2016 – Part IV*, Springer International Publishing, 524, Advances in Intelligent Systems and Computing. DOI: 10.1007/978-3-319-46592-0_6.

Kreis, S., Molto, A., Bailly, F., Dodoun, S., Fabre, S., Rein, C., Hundry, C., Zenasni, F., Rozenberg, S., Pertuiset, E., Fautrel, B., Gossec, L. (2015). *Relationship between optimism and quality of life in patients with two chronic rheumatic diseases: axial spondyloarthritis and chronic low back pain: a cross sectional study of 288 patients*. *"Health Qual Life Outcomes",* Vol. 13, No. 78. DOI: 10.1186/s12955-015-0268-7.

Lai, J.C.L., Yue. X. (2000). *Measuring optimism in Hong Kong and mainland Chinese with the revised Life Orientation Test. "Personality and Individual Differences",* Vol. 28, No. 4. DOI: 10.1016/S0191-8869(99)00138-5.

Lin, Y., Hu, S., Chen M. (2005). *Managerial optimism and corporate investment: Some empirical evidence from Taiwan.* "Pacific-Basin Finance Journal", Vol. 13, No. 5.

Macko, A., Tyszka, T. (2005). *Przedsiębiorczość i ryzykowanie*. *"Decyzje",* Vol. 4.

Malmendier, U., Tate, G. (2008). *Who Makes Acquistions? CEO Overconfidence and the Market's Reaction. "Journal of Financial Economics",* Vol. 89, No. 1.

Malska, W., Koziorowska, A. (2015). *Wykorzystanie testu t dla pojedynczej próby we wnioskowaniu statystycznym*. *"Edukacja – Technika – Informatyka",* Vol. 3, No. 6.

Marotta, A., Sarno, E., Del Casale, A., Pane, M., Mogna, L., Amoruso, A., Felis, G.E., Fiorio, M. (2019). *Effects of Probiotics on Cognitive Reactivity, Mood, and Sleep Quality. "Front. Psychiatry",* Vol. 10, No. 164. DOI: 10.3389/fpsyt.2019.00164.

Mola, S., Guidolin, M. (2009). *Affiliated mutual funds and analyst optimism*. *"Journal of Financial Economics",* Vol. 93, No. 1. DOI: 10.1016/j.jfineco.2008.06.006.

Ottati, F., Noronha, A.P.P. (2017*). Factor structure of the Life Orientation Test-Revised (LOT-R). "Acta Colombiana de Psicología",* Vol. 20, No. 1. DOI: 10.14718/ACP. 2017.20.1.3.

Pastusiak R. (2016). *Błędy poznawcze i nadmierny optymizm na rynku kapitałowym*, *"Przedsiębiorczość i Zarządzanie",* Vol. 17.

—— (2016). *Nadmierny optymizm w wycenach przedsiębiorstw*, *"Annales Universitatis Mariae Curie-Skłodowska, sectio H, Oeconomia",* Vol. 50, No. 4.

—— (2017). *Analiza odchyleń wycen przedsiębiorstw w rekomendacjach maklerskich : nadmierny optymizm*. *"Zeszyty Naukowe Uniwersytetu Szczecińskiego Finanse Rynki Finansowe Ubezpieczenia",* Vol. 89.

—— (2018a) *Dyskonto wartości przedsiębiorstwa z tytułu nadmiernego optymizmu. Podejście modelowe*. *"Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*", No. 533.

—— (2018b). *Heurystyka nadmiernego optymizmu w wycenach przedsiębiorstw*, *"Annales Universitatis Mariae Curie-Skłodowska, sectio H, Oeconomia",* Vol. 51, No. 6.

Pastusiak, R., Keller, J. (2015). *Rekomendacje inwestycyjne a realia gospodarcze: nadmierny optymizm wśród analityków giełdowych*. *"Ekonomista",* nr 6.

—— (2019). *Determinants of occurrence of excessive optimism among analysts of the Warsaw Stock Exchange*. *"Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu/Proceedings of Rijeka Faculty of Economics: Journal of Economics and Business",* Vol. 37, No. 1.

Prosad, J.M., Kapoor, S., Sengupta, J. (2015). *Behavioral biases of Indian investors: a survey of Delhi-NCR region. "Qualitative Research in Financial Markets",* Vol. 7, No. 3. DOI: 10.1108/QRFM-04-2014-0012.

Puri, M., Robinson, D.T. (2007). *Optimism and economic choice*. *"Journal of Financial Economics",* Vol. 86.

Riaz, T., Iqbal, H. (2015). *Impact of Overconfidence, Illusion of control, Self Control and Optimism Bias on Investors Decision Making; Evidence from Developing Markets Research*. *"Journal of Finance and Accounting",* Vol. 6, No. 11.

Scheier, M.F., Carver, C.S. (1985). *Optimism, coping and health: assessment and implications of generalized outcome expectancies. "Health Psychology",* Vol. 4. DOI: 10.1037/0278-6133.4.3.219.

Scheier, M.F., Carver, C.S., Bridges, M.W. (1994). *Distinguishing optimism from neuroticism (and trait anxiety, self-mastery and self-esteem): a reevaluation of the Life Orientation Test. "Journal of Personality & Social Psychology",* Vol. 67. DOI: 10.1037//0022-3514.67.6.1063.

Schou-Bredal, I., Heir, T., Skogstad, L., Bonsaksen, T., Lerdal, A., Grimholt, T., Ekeberg, Ø. (2017). *Population-based norms of the Life Orientation Test-Revised (LOT-R). "International journal of clinical and health psychology",* Vol. 17, No. 3. DOI: 10.1016/ j.ijchp.2017.07.005.

Sharot, T. (2011). *The optimism bias*. *"Current Biology",* Vol. 21, No. 23. DOI: 10.1016/j.cub.2011.10.030.

Shepperd, J.A., Klein, W.M.P., Waters, E.A., Weinstein, N.D. (2013). *Taking Stock of Unrealistic Optimism*. *"Perspectives on Psychological Science"* Vol. 8, No. 4. DOI: 10.1177/1745691613485247.

Shepperd, J.A., Pogge, G., Howell, J.L. (2017). *Assessing the consequences of unrealistic optimism: Challenges and recommendations*. *"Consciousness and Cognition",* Vol. 50. DOI: 10.1016/j.concog.2016.07.004.

Shepperd, J.A., Waters, E.A., Weinstein, N.D., Klein, W.M.P. (2015). *A Primer on Unrealistic Optimism*. *"Current Directions in Psychological Science",* Vol. 24, No. 3. DOI: 10.1177/0963721414568341.

Stach, R. (2006). *Optymizm. Badania nad optymizmem jako mechanizmem adaptacyjnym.* Cracow: Wydawnictwo Uniwersytetu Jagiellońskiego.

Szymczak, W. (2018). *Podstawy statystyki dla psychologów: podręcznik akademicki*, Warsaw: Difin.

Walsh, D., McCartney, G., McCullough, Van Der Pol, M., Buchanan, D., Jones, R. (2015). *Always looking on the bright side of life? Exploring optimism and health in three UK post- industrial urban settings. "Journal of Public Health",* Vol. 37. DOI: 10.1093/pubmed/fdv077.

Weinstein, N.D. (1983). *Reducing unrealistic optimism about illness susceptibility. "Health Psychology",* Vol. 2, No. 1. DOI: 10.1037/0278-6133.2.1.11.