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The Occurrence of Dispositional Optimism among Individual Investors

Występowanie dyspozycyjnego optymizmu wśród inwestorów indywidualnych

Abstract

The primary objective of this study was to estimate the level and distribution of optimism among individual investors in Poland and to investigate whether they are more optimistic than the general population. The second objective was to compare the author's results on the dispositional optimism of individual investors with those of a survey conducted by the Association of Individual Investors. The third objective was to analyze the relationship between optimism and the socio-demographic variables of age, gender, education level, place of residence, and investment experience. The results of the survey indicate that individual investors show an average optimism level of 15.72 points, which is significantly higher than the average standardized score for Poland (14.55 points). The survey showed that the age and investment experience are significant, but that education, gender, and place of residence are not.

Keywords: Optimism, Individual Investors, Behavioral Finance, Disposable Optimism.

JEL: G11, G40, G41

Streszczenie

Głównym celem niniejszego artykułu było oszacowanie poziomu i rozkładu optymizmu wśród inwestorów indywidualnych. Celem pobocznym było porównanie wyników autora dotyczących dyspozycyjnego optymizmu inwestorów indywidualnych z wynikami ankiety przeprowadzonej przez Stowarzyszenie Inwestorów Indywidualnych na temat ich nastrojów. Drugim celem pobocznym była analiza związku między optymizmem a pięcioma zmiennymi społeczno-demograficznymi, takimi jak wiek, poziom wykształcenia, miejsce zamieszkania i doświadczenie inwestycyjne inwestorów indywidualnych. Autor wykorzystał Test Orientacji Życiowej (LOT-R) do oszacowania optymizmu. Wyniki badania wskazują, że inwestorzy indywidualni wykazują średni poziom optymizmu wynoszący 15,72 punktu, ale znacznie wyższy niż średni wynik standaryzacji dla Polski. Badanie wykazało, że na poziom optymizmu wpływają takie cechy społeczno-demograficzne jak wiek i doświadczenie inwestycyjne, przy jednoczesnym braku istotnego wpływu takich zmiennych jak wykształcenie, płeć i miejsce zamieszkania.

Słowa kluczowe: optymizm, inwestorzy indywidualni, finanse behawioralne, dyspozycyjny optymizm.

JEL: G11, G40, G41



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1. Introduction

Traditional finance assumes rational investors and efficient markets, but these assumptions often fail to explain real-world behavior. Behavioral finance offers an alternative view; one that focuses on the cognitive errors and emotional influences that lead to predictable patterns of irrational behavior. Initially, behavioral finance could not pinpoint the strategies that investors employ to mitigate these biases, but it has always recognized that these behavioral patterns are systematic, that they are influenced by mental shortcuts, emotions, and socio-cultural factors, and that the resulting decisions, however irrational they may appear, are entirely predictable (Baker et al., 2019).

Behavioral errors occur at many different levels, and there is still some debate as to how to classify them. One proposed classification divides these errors into cognitive errors, emotional errors, and socio-cultural errors. The first two result from the impact of internal factors on investment decisions, while the last results from the impact of external factors.

The remainder of the paper will be structured as follows: a review of the relevant literature, a description of the methodology employed, a detailed account of the participants and the research procedure, an outline of the instrument and statistical methods used in the self-study, and a presentation of the results of the self-study. The article will conclude with a summary and discussion.

2. Literature review

One of the most frequent observations noted in the decision-making literature is that individuals are overly optimistic about future outcomes (Weinstein, 1983). Dispositional optimism is defined as the general tendency to expect positive future outcomes and it plays an important role in the behavioral process of self-regulation. As shown in the extensive literature, dispositional optimism is a powerful personal trait influencing several aspects of an individual's psychosocial functioning (Steca et al., 2015). Therefore, it can be understood as an individual's unwavering belief that only good things will ever happen to him/her (Ottati et al., 2017). Optimism can most simply be defined as the difference between expectations and reality. When expectations are more positive than reality, there is an optimistic cognitive bias, and if they are more negative than reality, there is a pessimistic cognitive bias (Sharot, 2011). Various phenomena are usually grouped under the heading of "optimism". Shepperd et al. (2013) distinguish between unrealistic comparative optimism and unrealistic absolute optimism. According to the first definition, people rate their own prospects more favorably than those of similar people (or some other reference group), i.e., they deem positive outcomes to be more likely and negative outcomes less likely for themselves than for others. According to the second definition, human risk assessments are unrealistically positive. This can be confirmed by comparing them with assessments that use objective criteria, such as actuarial risk assessments, or by actual results (e.g., end-of-study grades). These forms of optimism must be

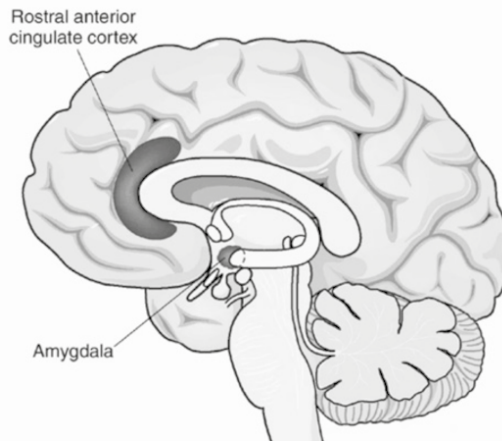
distinguished from dispositional optimism. Dispositional optimism is conceptualized as a personality trait that people display to varying degrees. Generally speaking, it is a tendency to expect positive results. This expectation need not be unrealistic, and the Life Orientation Test measures an overall positive outlook that does not include predictions about specific life events (Jefferson et al., 2017).

Optimism can vary in degree. It may well be that nature has equipped humans with a basic level of optimism, and for various reasons, some display a more optimistic outlook on life than others. Another issue is that people can vary in how optimistic (or pessimistic) they are in different areas of life (Czerw, 2010).

According to normative decision theory, investors should adjust their expectations based on information from their surroundings. So why does optimism persist even though investors have knowledge and experience in the capital market? It turns out that neural mechanisms, and in particular, two areas of the brain, are responsible for optimism. These are: the amygdala nuclei, i.e. a small structure located deep in the brain that is responsible for the reception and processing of emotions; and the pore cortex of the girdle, which is responsible for processing emotions and motivations (Ryguła, 2014).

Figure 1.

Brain regions directly related to optimism



Source: Schacter & Addis, 2007.

A substantial body of research has demonstrated a positive correlation between the activity of these structures and the generation of positive future-oriented thoughts (Ryguła, 2014; Schou-Bredal et al., 2017). These two regions are closely related and, in conjunction with other gyri, and the medial temporal and subcortical regions, constitute the limbic system, i.e., the brain's emotional network. The activity of both the anterior cingulate cortex and the amygdala was found to be diminished when individuals were engaged in contemplating negative future events in relation

to positive future or past events. Moreover, activity in these two regions was most strongly correlated when people envisioned positive future events. Activity in the anterior cingulate cortex correlated with optimism (Schacter & Addis, 2007).

Interest in optimism extends beyond psychology. This concept is ubiquitous in numerous scientific disciplines, including law, economics, decision science, and in medicine. For instance, economists describe the potential dangers of unrealistic optimism among managers, entrepreneurs, and investors (professional and individual).

In their research on managing directors, Malmendier and Tate (2008) found that the highly optimistic ones were prone to excessive risk. They readily indebted their companies, frequently overpaid for acquisitions, and their mergers often devastatingly devalued all the entities involved. Interestingly, these devaluations were invariably precipitous, which compels the conclusion that the stock market is perfectly capable of assessing whether a decision is overly optimistic. Lin et al. (2005) examined the level of optimism among managing directors in Taiwan. The survey covered 869 companies, 1,386 directors and 8,711 forecasts. The directors were asked to forecast their companies' pre-tax profits, and 69% of them were optimistic. Hilary et al. (2016) conducted a similar study on Singapore managers, and found that those who made optimistic forecasts were generally more successful. They even found that excessive optimism can improve a company's performance, because managers put more effort into justifying their overly optimistic forecasts.

Mola and Guidolin (2009) conducted a study on the optimism of professional stock market analysts in connection with investment funds. They found that analysts' recommendations for companies included in investment fund portfolios are unduly optimistic when compared to their recommendations for companies not included. Ertimur, et al. (2011) noted in their research that initial recommendations are less optimistic than „corrective” recommendations issued later. Hu, et al. (2021) found that there is a positive relationship between the quantity of a company's pledge shares and the optimism of analysts' profit forecasts. In other words, analysts are more optimistic about the profits of companies whose controlling shareholders have pledged their shares for loans. Chu and Zhai (2021) found that financial analysts tend to underestimate negative information and overestimate positive information, leading to overly optimistic forecasts, especially for companies with a high risk of insolvency, and investors, relying on these optimistic forecasts, initially overestimate companies with a high risk of insolvency. Radke (2023a) shows that stock market analysts are overly optimistic in valuing companies. The LOT-R psychological test study, however, does not indicate optimism.

De Bond (1993) found that stock investors tended to be overly optimistic when predicting profits from their own portfolios, but more realistic when predicting the level of the stock market index. Iqbal (2015) found that optimism influences investor decision-making, suggesting that investors rely on their beliefs and personal judgment. Riaz and Iqbal (2015) used a survey to examine the influence of overconfidence, optimism, self-control and illusion of control on investment decisions. They found that confidence, optimism and self-control were significant, but illusion of control was not. Gakhar (2019) surveyed 117 investors in India, and found

that 68.40% of them were optimistic. Neseem, et al. (2021) analyzed the Chinese, Japanese and U.S. markets, and found that the COVID-19 Pandemic dampened investor sentiment. Uncertainty over the development of the outbreak, economic and social constraints, and fears about the future reduced optimism and prompted investors to withdraw from the stock market.

The literature on economics or finance mostly examine optimism as an unrealistic prediction of the future, i.e. the difference between a forecast and reality. However, there is little research on dispositional optimism among capital market participants. This kind of optimism is a character trait that can be examined using psychological tests. Similar conclusions were reached by Puri and Robinson (2007), who contended that the main obstacle to collecting large-scale economic evidence on optimism is measurements: direct psychometric tests of optimism are not carried out in large-scale economic research. The present author noticed a research gap in studies of optimism among capital market participants, including studies of individual investors. The preceding studies have not employed psychological tests.

The following research hypotheses were accordingly formulated and adopted for further investigation:

H1: Individual investors in Poland are excessively optimistic (exhibit a high level of optimism).

H2: The level of optimism of individual investors in Poland is higher than the population average.

Furthermore, the study examined the level of optimism in the fields of psychology, economics, and finance, and the influence of socio-demographic variables thereon.

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 (2010) found that age, but not gender, influences the level of optimism. Glaesmer et al. (2012) found that younger people displayed more optimism than older people, but they did not observe any gender differences. Hinz et al. (2017), by contrast, found that men were more optimistic than women, but that age differences had little effect. For their part, Schou-Berdal et al. (2017) found that age, but not gender, was statistically significant. They did, however, find that people who had higher education were more optimistic. They also showed that people living in cities are more optimistic than those living in villages and towns. Prosad et al. (2015) examined whether demographic characteristics, including age, gender, income, occupation, and experience are associated with overconfidence, optimism, disposition, and herd bias. They found that age, occupation, and experience had a stronger relationship with behavioral bias than the other factors they studied. Ates et al. (2016) found much higher levels of over-optimism, over-confidence, and loss aversion among unmarried investors than married ones. Dawson (2023) found that men are more optimistic than women, especially when it came to the future financial situation. Radke (2023b) conducted a survey on stock analysts using the LOT-R psychological test. The study found no evidence that optimism levels were affected by age, experience or education.

Based on the contradictory research presented above, the author posed the following hypothesis:

H3: The level of optimism among individual investors depends on the socio-demographic variables of age, investment experience, education, place of residence, and gender.

3. Methodology

3.1. Participants and procedures

The study was conducted from August to November 2020. The proposed hypotheses were verified using a quantitative method. The Life Orientation Test (LOT-R) questionnaire was used to survey 1,057 active individual investors in Poland. This included a demographic section that contained questions about the socio-demographic characteristics of the sample, viz. gender, age, investment experience, education, and place of residence. Table 1 shows the socio-demographic characteristics of the research sample.

Table 1.
Sociodemographic characteristics of the sample (n = 1057)

	n	%
TOTAL	1057	100.00%
GENDER		
Female	118	11.20%
Male	939	88.80%
AGE		
18–24	104	9.80%
25–34	226	21.40%
35–44	286	27.10%
45–60	334	31.60%
61 and more	107	10.10%
INVESTMENT EXPERIENCE (IN YEARS)		
0–5	259	24.50%
6–10	250	23.70%
11–15	230	21.80%
16–20	139	13.20%
21–25	123	11.60%
26–30	56	5.30%

	n	%
EDUCATION		
Primary	29	2.70%
Secondary	291	27.50%
Higher (bachelor or engineer)	240	22.70%
Higher Master's degree	485	45.80%
Doctor or professor title	12	1.10%
DOMICILE		
Village	59	5.60%
A town with up to 20,000 inhabitants	120	11.40%
A town with a population of between 20,000 and 50,000	122	11.50%
A city with a population of between 50,000 and 100,000	142	13.40%
A city with a population of between 100,000 and 500,000	325	30.70%
A city with more than 500,000 inhabitants	289	27.30%

Source: Own study based on the results of the survey.

3.2. Instrument

The LOT-R test is the most widely used tool for measuring optimism (Lai & Yue, 2000; Steca et al., 2015; Schou-Bredal et al., 2017; Hinz et al., 2017), and has become the gold standard for assessing dispositional optimism (Cano-García et al., 2015). The Life Orientation Test (LOT) was developed by Scheier and Carver (1985) to assess dispositional optimism. A set of 16 items was applied to diverse student samples and two factors were obtained using factorial analysis with oblique rotation. After several revisions and trials, the tool was eventually refined to consist of twelve items: four measuring optimism; four measuring pessimism; and four serving as fillers. Over time, many researchers came to question LOT's predictive accuracy concerning constructs such as neuroticism, trait anxiety, self-esteem, and self-control. This led to a revision and the eventual development of the LOT-R (Scherier et al., 1994). In LOT-R, three items from the original LOT were eliminated (two 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-report measure of dispositional optimism as described by Scheier, Craver, and Bridges. The LOT-R is a shortened and revised version of the original LOT, with improved psychometric properties (Ottati et al., 2017).

There is ongoing debate about the dimensionality of the LOT-R. However, using the LOT-R as a two-factor scale contradicts the theoretical definition of the scale, which the original authors described as a continuum where pessimism and optimism are viewed as polar opposites rather than separate dimensions. In a recent review, the original authors continued to recommend using the LOT-R as a unidimensional

scale in primary analyses. Moreover, recent studies provide strong support for the unidimensionality of the LOT-R, showing that the two-factor structure is an artifact of item positioning (Schou-Bredal et al., 2017). This study therefore uses the LOT-R as a unidimensional scale.

LOT-R has a good internal consistency, with Cronbach's alpha ranging from 0.70 to 0.80, and test-retest correlations over 4 to 28 months ranging from 0.68 to 0.79 (Scheier et al., 1994). In a Polish standardization sample of 786 people aged 20–55, the mean LOT score was 14.55 with a standard deviation of 4.05. These results are consistent with the mean scores for the original American version. The Polish results were not found to be differentiated on the basis of sex, age, or environment (Jurczyński, 2001).

The LOT-R test consists of 10 items, of which three are optimistic (items 1, 4 and 10), three are pessimistic (items 3, 7 and 9), and four are fillers (items 2, 5, 6 and 8). The results of the fillers are not included in the scoring. Respondents rate their agreement with the statements on a five-point Likert scale, ranging from strong disagreement to strong agreement (Ottati et al., 2017). The overall score ranges from 0 to 24 points, with higher scores indicating higher levels of optimism (Schou-Bredal et al., 2017; Jurczyński, 2001). Walsh et al. (2015) proposed that the minimum possible score is 0 (representing extreme pessimism) and the maximum is 24 (representing extreme optimism). Kreis et al. (2015), Chakraborty (2016), and Marotta et al. (2019) proposed a sub-scale that converts LOT-R test scores into optimism levels. The scale is as follows: 0 to 13 points indicates a low level of optimism; 14 to 18 points indicates a medium level of optimism; and 19 to 24 points indicates a high level of optimism.

3.3. Statistical methods

Descriptive statistics, such as mean, median, mode, standard deviation and percentiles, were used to examine the optimism levels of individual investors in Poland. A one-sample t-test with a significance level of $p = 0.05$ was used to verify hypotheses 1 and 2. The effect size, which estimates the magnitude of the effect in the population, was also examined according to the formula:

$$d = \frac{\bar{X} - \mu_{hip}}{\sigma} \quad (1)$$

where d is the standardized mean difference, \bar{X} is the sample mean, μ_{hip} is the hypothesized population mean under the null hypothesis, and σ is the population standard deviation.

The scale for the effect proposed by Cohen (1992) is defined as follows: 0.2 – small effect; 0.5 – average effect; and 0.8 – large effect.

A multiple linear regression model with the stepwise method was used to verify Hypothesis 3. Regression analysis is used to estimate relationships between variables, and to show how the value of a dependent variable changes when any independent variable changes. A multiple linear regression model is a model with one dependent variable and multiple explanatory variables. It is described by the general formula:

$$y = b_0 + b_1 * x_1 + b_2 * x_2 + \dots + b_k * x_k \quad (2)$$

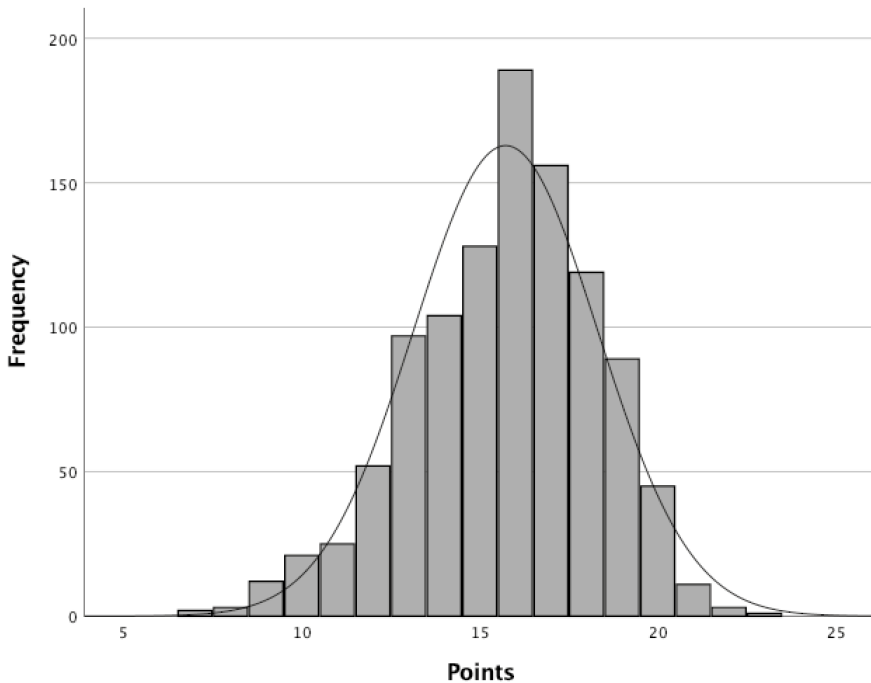
The SPSS statistical package (Version 25) was used to determine the multiple regression model.

3.4. Findings

The mean LOT-R score for the entire sample of 1,057 individual investors in Poland was 15.72 points (SD: 2.589). The median and the mode were both 16 points. The maximum score was 23 points, and the minimum was 7 points. The distribution of points from the LOT-R test is shown in Figure 2.

Figure 2.

Profile of the sample of individual investors from 2020 drawn for results of the LOT-R test for point values ($n = 1,057$)



Source: Own study, based on the results of the survey.

Table 2.
Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Points	0.122	1,057	<0.001	0.977	1,057	<0.001

Note: a. Lilliefors Significance Correction.
Source: Own study, based on the results of the survey.

The p-values of the Shapiro-Wilk and Kolmogorov-Smirnov tests are less than 0.001, indicating that the probability distribution of the variable is not normal. Conversely, the central limit theorem posits that the sampling distribution of the sample mean will tend toward a normal distribution, irrespective of the shape of the distribution of observations in the population from which the sample is drawn. As the sample size increases, the distribution will approach normality (Szymczak, 2018).

Table 3.
Average LOT-R results of individual investors, stratified by gender, age, investment experience, education, place of residence

	Mean	Median	Standard deviation
TOTAL	15.72	16.00	2.589
GENDER			
Female	15.53	16.00	2.669
Male	15.75	16.00	2.579
AGE			
18–24	16.09	16.00	2.114
25–34	15.54	16.00	2.631
35–44	16.02	16.00	2.569
45–60	15.72	16.00	2.699
61 and more	14.99	15.00	2.474
INVESTMENT EXPERIENCE (IN YEARS)			
0–5	15.47	16.00	2.543
6–10	15.54	16.00	2.451
11–15	15.87	16.00	2.602
16–20	16.34	17.00	2.609
21–25	15.77	16.00	2.746
26–30	15.50	16.00	2.757

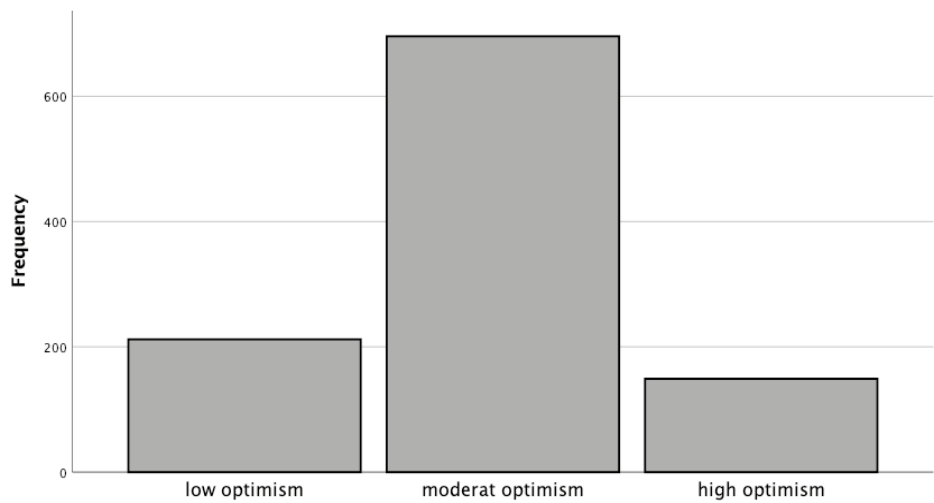
	Mean	Median	Standard deviation
EDUCATION			
Primary	16.59	17.00	2.212
Secondary	15.80	16.00	2.591
Higher (bachelor or engineer)	15.57	16.00	2.652
Higher master's	15.72	16.00	2.575
Doctor or professor title	15.25	16.00	2.563
DOMICILE			
Country	15.69	16.00	2.078
A town with up to 20,000 inhabitants	15.58	16.00	2.789
A town with a population of between 20,000 and 50,000	16.45	16.50	2.260
A city with a population of between 50,000 and 100,000	15.60	16.00	2.352
A city with a population of between 100,000 and 500,000	15.47	16.00	2.633
A city with more than 500,000 inhabitants	15.83	16.00	2.740

Source: Own study, based on the results of the survey.

Based on education, the highest level of optimism was displayed by individual investors with primary education, with an average of 16.59 points (SD: 2.212). Based on place of residence, the highest level of optimism was found among individual investors from towns having 20,000–50,000 inhabitants, with an average of 16.45 points (SD: 2.260). Based on investment experience, the highest level of optimism was displayed by investors having 16 to 20 years of experience, with an average of 16.34 (SD: 2.609). Based on age, the highest level of optimism was observed among investors aged 18 to 24, with an average of 16.09 points (SD: 2.114). Based on gender, male investors showed a higher level of optimism, with an average of 15.75 points (SD: 2.579). All results are within 1 standard deviation from the mean, which includes approximately 68% of all investor results.

The LOT-R test scores were converted into a sub-scale to better indicate the general level of optimism (low, medium, high). The results are presented in Figure 3.

Figure 3.
Profile of the sample of individual investors from 2020 drawn for results of the LOT-R test for low, medium, and high levels of optimism (n = 1057)



Source: Own study, based on the results of the survey.

The majority of individual investors (65.85%, N = 696) exhibited a moderate level of optimism. In Poland, 20.05% (N = 212) of individual investors demonstrated a low level of optimism, while the lowest proportion of investors (14.10%, N = 149) displayed a high level of optimism.

In order to verify Hypothesis H1 (i.e., to determine whether individual investors in Poland exhibit a high level of optimism), a one-sample Student’s t-test was employed for one mean and a hypothetical mean of 19 points. The significance level was 0.05. This approach was taken in light of the interpretation of the LOT-R test results, which indicate that a high level of optimism is at least 19 points (Kreis et al., 2015; Chakraborty, 2016; Marotta et al., 2019). The results are presented in Table 4.

Table 4.
The results of the T-test on excessive optimism exhibited by individual investors

One-Sample Test						
Test Value = 19						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Points	-41.134	1056	<.001	-3.275	-3.43	-3.12

Source: Own study, based on the results of the survey.

The one-sample Student's t-test indicates that there is a statistically significant discrepancy between the observed data and the pre-established threshold for a high level of optimism. Nevertheless, the t-statistic, expressed as the estimated standard error of the mean, is -41.134, which leads to the conclusion that analysts are below this threshold.

In order to verify Hypothesis H2 (i.e., to determine whether the level of optimism of individual investors in Poland is higher than the population average), the mean score for the Polish population (14.55) from the standardization studies conducted by Jurczyński (2001) was employed. The results are presented in Table 5.

Table 5.

The results of comparing the standardization sample for Poland with the analysts' research sample

One-Sample Test						
Test Value = 14.55						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Points	14.753	1056	< .0005	1.175	1.02	1.33

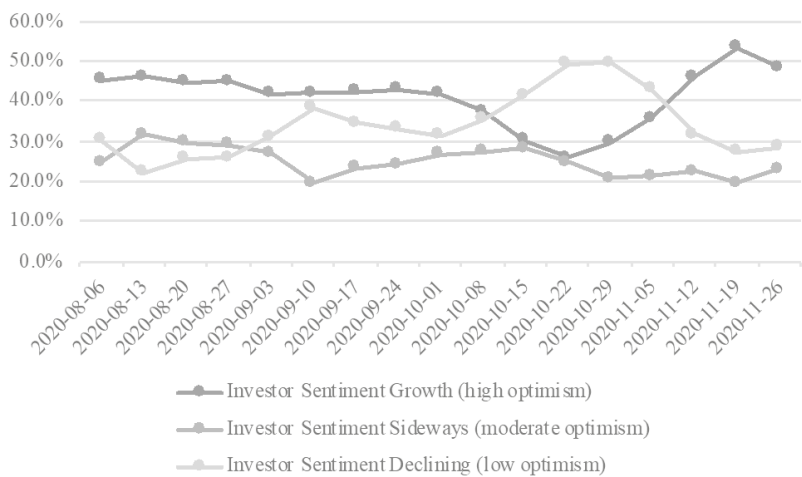
Source: Own study, based on the results of the survey.

The bilateral significance is less than 0.05, indicating that there is a statistically significant difference between the mean scores of individual investors and the mean score of the Polish population. The value of the t-test is positive, which confirms that individual investors evince a greater degree of optimism than the „tested value” used for the population average. The mean level of optimism among individual investors in Poland is 1.175 points higher than that of the general population. The lower and upper limits of the range of higher scores are between 1.02 and 1.33 points. The effect size in the sample was estimated to be 0.45 standard deviations for the analyzed variable. A positive sign indicates that the true value is greater than the hypothetical value. In accordance with the Cohen scale, the obtained value is in close proximity to the average value.

As for the second goal of the present study, the results of a survey conducted by the Association of Individual Investors¹ on sentiment during the survey period show that 41% of respondents predicted an upward trend (high level of optimism), 25% indicated a sideways trend (medium level of optimism), while 34% of respondents indicated a downward trend (low level of optimism). The formation of sentiment during the period under review is shown in Figure 4.

¹ This is a weekly survey that asks respondents to indicate the trend in the stock market over the coming 6 months (upward, sideways, or downward).

Figure 4.
Investor sentiment indicator



Source: Own elaboration based on <https://www.sii.org.pl/3438/analizy/nastroje-inwestorow.html>

A comparison of the author’s own results with those of the Association of Individual Investors reveals that only 14.1% of investors exhibited dispositional optimism, whereas 41% of individual investors predicted an upward trend in the stock market. It should be noted that the groups of respondents may not have been mutually exclusive.

In order to verify Hypothesis H3 (i.e. to determine whether the level of optimism among individual investors depends on the socio-demographic variables of age, investment experience, education, place of residence, and gender), a multiple linear regression model was constructed using the stepwise method. Table 6 summarizes the model created by retaining age and investment experience, while removing the remaining three socio-demographic variables.

Table 6.
Variables Entered/Removed

Variables Entered/Removed a			
Model	Variables Entered	Variables Removed	Method
1	Age:		Stepwise (Criteria: Probability-of-F-to-enter <= 0.051, Probability-of-F-to-remove >= 0.100).
2	Investment experience (in years):		Stepwise (Criteria: Probability-of-F-to-enter <= 0.051, Probability-of-F-to-remove >= 0.100).

Note: a. Dependent Variable: Points.

Source: Own study, based on the results of the survey.

Table 7.
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	0.062a	0.004	0.003	2.585	0.004	4.031	1	1,055	0.045
2	0.125b	0.016	0.014	2.571	0.012	12.581	1	1,054	0.000

Note: a. Predictors: (Constant), Age; b. Predictors: (Constant), Age; Investment experience (in years).

Source: Own study, based on the results of the survey.

Table 7 illustrates the process of creating the final construction of the linear regression model. This was achieved through a sequence of adding and removing variables. The final model simply comprises age and investment experience. The incorporation of these variables into the model resulted in increasing the R square coefficient to 0.016. The significance of the model for one variable (age) and following the introduction of the second variable (investment experience) is less than 0.05. Therefore, the model demonstrates an adequate level of fit with the empirical data. The R-squared coefficient indicates the proportion of the dependent variable's variability that can be attributed to the two independent variables. Therefore, the result of 1.6% of the dependent variable (level of optimism) can be attributed to the independent variables (age and investment experience).

Table 8.
Anova

ANOVAa						
	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.936	1	26.936	4.031	0.045b
	Residual	7,049.950	1,055	6.682		
	Total	7,076.886	1,056			
2	Regression	110.096	2	55.048	8.328	0.000c
	Residual	6,966.790	1,054	6.610		
	Total	7,076.886	1,056			

Note: a. Dependent Variable: Points; b. Predictors: (Constant) Age; c. Predictors: (Constant) Age; Investment experience (in years).

Source: Own study, based on the results of the survey.

The number of degrees of freedom for the numerator and denominator of the F index allows the specific distribution, corresponding to an area of 5%, to be identified. Anova analysis demonstrates that the value of F is 8.328, indicating that the model is appropriately adjusted in terms of its variables. Furthermore, the significance level is <0.05, which supports the model's reliability.

Table 9.
Coefficients

		Coefficients a			
	Model B	Unstandardized Coefficients		Standardized Coefficients	t
		Std. Error	Beta		
1	(Constant)	16.157	0.230		70.382
	Age:	-0.139	0.069	-0.062	-2.008
	(Constant)	16.026	0.231		69.285
2	Age:	-0.297	0.082	-0.132	-3.622
	Investment experience (in years):	0.223	0.063	0.129	3.547
					0.000

Note: a. Dependent Variable: Points.

Source: Own study, based on the results of the survey.

The regression results show that there is a negative correlation between age and level of optimism. As stock market investors age, their level of optimism decreases. The level of optimism increases in tandem with years of experience in investing.

The estimated values of the regression coefficients make it possible to formulate an equation that describes the relationship between the level of optimism and age and investment experience. The model is as follows:

$$\text{optimism} = 16.026 - 0.297 * \text{age} + 0.223 * \text{investemt experience} \quad (3)$$

When using this model to calculate optimism using these two independent variables, it has to be borne in mind that the value of the R square determination coefficient is only 0.016.

4. Conclusion and discussion

Economics has traditionally held that exposure to reality and objective probability assessments is beneficial. In accordance with this viewpoint, decisions founded upon accurate, objective, and impartial evidence must be designed to optimize utility. Incorrect judgments not only result in systematic decision errors but also give rise to hasty behavior and inadequate caution. The long-term consequences of optimism for welfare are therefore unclear. The emergence of optimistic, pessimistic, or realistic beliefs may be driven by the intensity of anticipatory emotions, loss aversion, and the cost of distorted decisions, with these beliefs ultimately serving to maximize expected usefulness. The extent to which optimism is beneficial, detrimental, or neutral may be contingent upon its degree. While a degree of optimism can be beneficial, extreme assessments of potentially „desirable” personality traits can have a negative impact. Consequently, the belief that more optimism is always advanta-

geous is erroneous. In fact, the advantages of augmented optimism may diminish, while the disadvantages may intensify (De Meza & Dawson, 2021). The survey was conducted on a group of 1,057 active investment investors in Poland using the LOT-R questionnaire. There were 1.335 million (WSE) active investment accounts in Poland in the second half of 2020.

The mean score obtained on the LOT-R test by individual investors in Poland was 15.72 points (SD = 2.589). The results were converted into a sub-scale indicating the general level of optimism (low, medium, high). This revealed that individual investors in Poland exhibited a moderate level of optimism. A low level of optimism was exhibited by 20% (N = 212) of individual investors in Poland. The majority of individual investors (65.8%, N = 696) exhibited a medium level of optimism. The lowest proportion of individual investors indicated a high level of optimism, at 14.1% (N = 149). The hypothesis that individual investors in Poland display excessive optimism is therefore refuted. However, when compared to the results obtained for the normalization sample of the Polish population of the LOT-R test (mean 14.55, SD: 4.05), individual investors exhibited a significantly higher level of optimism ($p < 0.01$), with an average increase of 1.175 points. The effect size was deemed to be average ($d = 0.45$). The hypothesis that individual investors in Poland display a higher level of optimism than the general population was confirmed. A comparison of the author's results with those of the Association of Individual Investors revealed that only 14.1% of investors exhibited dispositional optimism, whereas 41% of individual investors perceived an upward trend in the stock market. It is important to note that the respondent groups may not have overlapped.

The third hypothesis, which posits that the level of optimism among individual investors is influenced by the socio-demographic factors of age, gender, education, investment experience, and place of residence, has been partially confirmed. The level of optimism among individual investors is influenced by age ($p < 0.05$), a finding that is consistent with studies conducted by Czerw (2010), Glaesmer et al. (2012), Schou-Berdal et al. (2017), and Prosad et al. (2015). In the studies of Stach (2006) and Hinz et al. (2017), the second variable influencing the level of optimism among investors was experience ($p < 0.05$). The same conclusions are drawn from the study by Prosad et al. (2015). No correlation was found between optimism and gender. Similar results were obtained by Czerw (2010), Glaesmer et al. (2012), Schou-Berdal et al. (2017), and education. However, Stach (2006) and Schou-Berdal et al. (2017) reached different conclusions. With regard to place of residence, other results were obtained by Schou-Berdal et al. (2017), who demonstrated that place of residence exerts an influence on optimism. Based on these results, a regression model was constructed to describe the relationships between the significant variables.

The study period could have influenced the results. The research was conducted from August to November 2020, during the COVID-19 pandemic. This could have contributed to a decrease in the level of optimism among investors due to the social and economic situation caused by the pandemic. For this reason, it is proposed that the study be repeated during a stable socio-economic situation. It is further proposed that it be extended to examine the effects of other socio-demographic

variables, such as earnings and marital status, and factors like illusion of control and self-confidence.

Research on optimism among capital market participants is crucial, as it affects how investors perceive their knowledge, underestimate risk, and overestimate their ability to control events. This emotional attitude can influence investment decisions, which are often based on intuition. Empirical studies suggest that investor sentiment strongly explains stock market bubbles and supports theoretical models by Daniel et al. (1998) and Barberis et al. (1998). Despite its importance, sentiment has been overlooked in research on market crashes and financial crises (Wei-Fong Pan, 2020). Analyzing sentiment, such as optimism, can complement traditional economic variables in predicting stock bubbles.

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