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Change in Stakeholder Utility Function During Crisis

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ABSTRACT

The purpose of this paper is to examine firm theory through the lenses of stakeholder utility function. Stakeholders are reluctant to leave a company when it faces financial distress. However, they maximize their utility function by seeking other alternatives. The observed behavior may be a result of biased assessment of firm's prospects and available market options. The study provides empirical evidence that stakeholders are risk averse. We defined the utility function of stakeholders as the second moment of economic value added (EVA). The results show that stakeholders' perception of risk is conservative: the distribution of the function is exponential. The higher the return, the higher the expected utility function with declining marginal utility of return. The application of this function to various sets of options revealed that risk attitude of stakeholders depends on the firm's profitability. With a high degree of uncertainty stakeholder perceptions of risk change. We found that probability of stakeholders leaving a company when it is distressed is considerably low, 15.65%. Although they are reluctant to exit, they become more intemperate and, as a consequence, more short-term which undermines the long-run prospects of the business. The findings of this paper are relevant to the evaluation of company's sustainability and estimation of contract duration.

INTRODUCTION

The relationship with stakeholders is critically important in many economic contexts. Understanding a utility function of corporate decision-makers has an undeniable impact on the outcome of business management. Stakeholders respond to positive results and undertake actions to cooperate with a company, however the problem of the company's current perception and its' relation to long-term growth remains significant. Stakeholders assess the utility of their relationship with a company against personal preferences, yet other factors influence their decisions, as well. The maximization of utility directly depends on the level of risk accepted by the company, the degree of asymmetry between the parties, and corporate governance. Agency theory offers a whole range of tools to reduce the asymmetry between a company and its' stakeholders. According to the literature, agents, on the one hand, are aimed to ensure sustainability of firm's long-term development and, on the other, they want to build confidence in the

current state of the company. Given tasks assigned to agents, it is expected that a balance will be found between a desire to satisfy short-term needs of stakeholders and long-term goals of corporate executives.

Managers are seen to be myopic which may be successful in the short term but destroys business in the long run. Excellent current performance may reduce investment in the following periods and make business less sustainable (Chan and Lakonishok, 2004). Managers try to embellish firm's results to avoid stakeholders leaking. Harrison et al. (2010) argues that understanding stakeholders' utility functions can lead to value-creation opportunities, that are sustainable in the long run. This approach focuses on the knowledge about satisfaction of business needs rather than an accounting performance. The difference is that managers value stakeholders' utilities more than expectations of all market participants. Due to excessive market volatility, stakeholders are insured against the risks of long-term strategies while maintaining a number of short-term ones. Stakeholder differs from an investor in goals, strategies and time horizons. The former is bound to a company with some type of vested interest, usually for a longer term, while a shareholder seeks financial benefit and, in the event of adverse circumstances, may exit a business with low costs. Although the "management for stakeholder" approach seems to be necessary, its' successful implementation is not always possible. As Harrison (2010) notes, the methodological tools of the proposed approach have not yet been sufficiently developed. There is currently no way to measure advantages of this method, as well as to turn the knowledge into creating value. Nevertheless, "management for stakeholder" approach is a powerful source of competitive advantage for the company. In our opinion, applying this method to Coase's theory clearly explains the existence of a firm, because it compares not only the costs of long-term relationships but also benefits and satisfaction that these relationships bring in comparison with the market.

According to financial theory, a company has two sources of competitive advantages: (1) lower corporate risk with an equal return, (2) long-term growth given an equal risk level. In this study we base our assumptions on the findings of prospect theory (Tversky and Kahneman, 1974). We propose that stakeholders are assumed to have an S-shaped utility function. At the editing stage, stakeholders make decisions under high uncertainty and, as a result, their attitude can be characterized as risky. At the evaluation stage the uncertainty decreases and their curve changes towards risk averse. In general, successful companies have a higher number of stakeholders, indicating that stakeholders are risk averse. However, given unfavourable dynamics, they are reluctant to exit a firm and try to maximize utility based on short-term alternatives (Larkin and Leider, 2012). Their utility function changes along with availability of such alternatives in the market and in the company, they are contracted with. Then, stakeholders start to exhibit riskier nature as traditional goods become inaccessible. As a result, we propose that stakeholders have S-shaped utility function, where the reference point is a point at which they change their preferences to alternative goods. Risk-averse attitude of stakeholders stems from behavioral biases we present in Section 2. These biases define the slope and the curvature of the utility functions. Thus, we assert that stakeholders are mixed risk-averse, whose preferences vary upon external conditions.

Our broad aims for this paper are twofold. First, we investigate conditions under which stakeholders change their risk preferences using utility functions. Our sample covers post-crisis period of Russian economy. We use utility maximization framework to link company's sustainability with satisfaction of stakeholders. This approach differs from the previous studies that associated company's performance with financial indicators. Our contribution here is to present a differentiated context, which seems to have a potential for insights into how to achieve company's long-term growth. The second aim is to explain observed risk preferences of stakeholders with behavioral biases. By blending behavioral theory with corporate finance, we fill a revelatory contribution of the research, which focuses on the integration of concepts from multiple disciplines. The study is presented as follows. In Section 2, we identify the main biases of stakeholders that were presented in previous studies and have an effect on the utility curve. Section 3 reviews main research methods and data used in this study. In Section 4, we approximate the utility function of stakeholders, assuming that it is a compromise between business profitability and alternative benefits. In Section 5, we present the main results and conclude with discussion of implications.

1. LITERATURE REVIEW

Behavioral research in corporate finance is much less developed than in asset pricing. The reason is that data for firm-level decision making are harder to obtain than stock returns. However, in organizations behavioral biases may have a dramatic effect on individuals and seem to be less manageable. For example, it is hard for firms to short-sell biased CEOs. In case of misallocation of their human capital, individuals cannot easily initiate a reverse transaction or sell a share of it. While actions of investors and analysts are external to the firm, errors made by corporate stakeholders become internal behavioral obstacles. Both internal and external biases stem from limited cognitive ability and emotional imperfections. They distort the three basic assumptions of traditional approach to corporate finance: (1) rational behavior, (2) capital asset pricing model (CAPM), (3) the efficient markets. The growing body of literature provides evidence that firms display systematic biases in different business aspects: own growth expectations (Koga and Kato, 2017), market returns (Ben-David, et al., 2013), capital budgeting, evaluation of mergers, structure of capital, compensation schemes. Stakeholders who incorrectly estimate probabilities and severance of risks that business faces employ suboptimal strategies.

1.1 Behavioral biases of individuals

One of the most studied emotional errors is an overconfidence bias. Studies have demonstrated that individuals are prone to be overconfident on a wide variety of topics (Fischoff and Slovic, 1980; Svenson, 1981). Ben-David et al. (2013) present three forms of overconfidence: miscalibration, above-average overconfidence, and illusion of control. Miscalibration is an excessive confidence about having accurate information, mainly, the range and frequency of potential outcomes (Shefrin 2001; Moore and Healy 2008). Above-average effect or relative overconfidence describes individuals who assess their abilities higher than reference group average (Svenson, 1981; Alicke, 1985). Previous studies treat illusion of control as either one of the forms of overconfidence or its' cause. Individuals underestimate the volatility of outcomes that are perceived to be under their control (Alicke, 1985). Next, we present sources of overconfidence, among them are agency problem and past performance.

The influence of biases on firm's performance may be caused by principal-agent relationships. In the standard model, agent exerts effort, but principals may see only the output. In the case of executives' performance, output has two unobserved sources: effort and luck. Separating skill from luck is usually difficult for principals which implies overconfidence and illusion of control. Underestimating luck in favourable outcome is widespread among firms. For example, Bettman and Weitz (1983) analysed annual reports and found that companies attribute their success to internal factors. In the same time, firm's bad performance is explained by exogenous factors. In the same vein, Bertrand and Mullainathan (2001) show that adjustment of manager's compensation in response to profits is one-sided. When profits rise as a result of external factors, wages are adjusted upwards, while compensation is insensitive to poor performance. In the literature these distortions are considered as a rational response of companies to information asymmetry between managers and investors. The quality of information about subject's performance is important, as overconfidence is seen to be the greatest in settings with infrequent or noisy feedback. Healy and Moore (2007) argue that overconfidence can be reconciled if individuals have correct information about a subject's performance and update it according to Bayes' formula. Firm's performance in the past tends to affect its' own assessment of next periods. There is an empirical evidence that firms are more confident about future prospects both in the short-run (1 year) and long-run (5 years) if they are profitable (Koga and Kato, 2017). A study of Bank of Japan found that in times when businesses face favourable market conditions (business cycle upturn, stock price growth, domestic currency depreciation for exporting companies), they exhibit overconfidence. Negative news turns firms' expectations toward pessimism (Koga and Kato, 2017). However, the influence of the positive news outweighs the impact of negative ones.

We associate the observed relationship with anchoring and confirmation biases. Anchoring bias is a tendency to anchor on one value or idea and not adjust away from it sufficiently (Slovic and Lichtenstein, 1971). Confirmation bias concerns individual's cognitive search process. When seeking for information to make a prediction or forecast, search is skewed towards the initial view of individual. People prefer to

find support than look for disconfirming evidence. Confirmation may be amplified with the rise of complexity of the subject of research. Along with overconfidence, individuals are prone to loss aversion bias. The concept of loss aversion was introduced in the prospect theory by Tversky and Kahneman (1974). Valuing losses more than equivalent gains may help to understand the status quo bias. Status quo bias is unwillingness to change the current state of things since any change would imply a loss of the current state. One form of loss aversion is a reference point bias. Camerer and Malmendier (2007) discuss that individuals compare their current wage with previous earnings or other market alternatives. Reference dependence makes employees more reluctant to exit company if their future income will be less even in short-term perspective. Employees lean to riskier behavior as long as they fear a loss against reference point.

1.2 Stakeholders' behavior

It is believed that individuals act rational and will leave the company if it does not maximize their utility. However, the opposite trend is observed: individuals may be entrenched and hard to get rid of. (Camerer and Malmendier, 2007). This behavior is a consequence of aforementioned cognitive impediments. Ben-David et al. (2013) provided an evidence that corporate executives are highly miscalibrated due to an overestimation of their ability to predict future and underestimation of a range of potential outcomes. The result of this behavior is seen in too narrow confidence intervals of managers and high lower bound estimate. It was shown that CFOs do not adjust forecasts about firm's IRR to volatility of benchmarks (e.g., ROIC). This means that overconfidence amplifies in times of market uncertainty. CFOs substantially underestimate volatility of own-firm prospects, in comparison to historical benchmarks, market returns, individual stock returns and ROIC. Overconfidence about the broad market returns affects the managers' overestimation of the profits of their firms. Another consequence of behavioral biases is observed in the choice of compensation. Larkin and Leider (2012) empirically showed that individuals are more likely to choose convex payment schemes over linear if they are overconfident. However, in the same study it was shown that overconfident subjects often make mistakes when required to pick the scheme which given their performance maximizes their value. These errors cost them up to 15 percent of their initial payoff. As a result, overconfident employees tend to choose convex scheme and continue to do so even if they face losses. Overconfident managers are not risk-averse when it comes to their stock options grants. As rational economic agents, they should exercise their stock options after the vesting period, if they are "in the money" (spot price of stock is above exercise price). On contrary, it was observed that CEOs hold these options and, at the same time, buy company's stock (Camerer and Malmendier, 2007) willing to bear higher risk.

Biased behavior affects decisions of individuals in the same way. Employees overconfidence and illusion of control clarify why equity-based compensation schemes were expanded to lower levels of corporate ladder (Bergman and Jenter 2007). In the similar vein, we can explain employees' overly optimistic perception of a company in times of financial distress. Due to overconfidence they underestimate a downside risk and probability of failure. Illusion of control creates an impression that employees may influence company's performance in market downturn. As a result, they are reluctant to exit company when risk-return trade-off is not optimal. In our study, we examine this phenomenon using the period of market slump of 2014 in Russia.

1.3 Utility maximization framework

There is an ongoing debate on the impact of "management for stakeholder" approach on the business. Most authors agree that the effect is negative, however the presented theoretical concept based on knowledge of stakeholder utility function seems quite promising. The presented concept differs from the previous ones by taking into account not a direct relationship between firm's performance and a positive reaction of interested parties but a link between company's sustainability and satisfaction of stakeholders. Although value was transferred from company to stakeholders, it was not lost. Specifically, such affiliations may provide a sort of insurance against bad economic times (Harrison et al., 2010). As it was discussed in Section 2, stakeholders are reluctant to exit a company. The change of a company is associated with high costs and uncertainty. Stakeholders estimate utility of a relationship with the company

based on personal preferences, constantly assessing it against the alternatives available on the market. Specifically, case research and surveys could examine whether new sources of value creation are likely to emerge from "management for stakeholder" approach. Conditions under which stakeholders reveal utility functions to a firm need an empirical evidence, as well. Conventional expected utility maximization framework is presented in order to investigate how individuals' preferences change over time. An expected utility maximiser is required to a priori select and commit possible alternatives if thresholds are not available. We denote expected utility of the outcomes for stakeholders as following:

$$V = \sum_{i=1}^{n} \pi(p_i)v(x_i) \qquad (1)$$

Suppose that stakeholders make their assumptions about company's prospects based on the outcome dynamics that the firm is generating. Then, the relevant indicator of the outcome is a positive value of economic value added (EVA) (2).

$$V = \sum_{i=1}^{n} \pi(p_i)v(EVA_i) \qquad (2)$$

According to equation (2), stakeholders base their assumptions not only on the value of the EVA, but also on the deviation of this outcome from its mean. That is, the mean and the deviation from it are of equal significance to the stakeholders. Therefore, we rewrite the expression (2) to take into account both the mean and its deviation simultaneously (3) (Ruefer, 2019).

$$V = -10 \log\left((\sum_{i=1}^{n} {}^{1}/_{EVA_i^2}) * 1/n \right) \qquad (3)$$

The advantage of this record is that the measured variables are afflicted with dispersion. We can approximate the function with the following assumptions:

- The size of the company and its market share significantly affect the position of the utility function relative to the x-axis.
- Positive returns are a primary requirement for a company.
- In an enabling environment, stakeholders are risk averse. That is, each stakeholder's marginal utility of wealth is assumed to decline along with wealth.
- High uncertainty about future returns changes stakeholder perceptions of risk.
- If it is not possible to predict future returns, stakeholders make assumptions concerning available alternatives.

2. EMPIRICAL RESEARCH

Following the literature, we can argue that interested parties are reluctant to leave the company and maximize the utility of their participation in the firm, taking into account the benefits available to them. The amount of utility received is directly proportional to the well-being of the firm. The location of the utility function of stakeholders is influenced by the company's welfare drivers as well as its' private limitations.

2.1 Hypotheses Statement

H1. The better the welfare of a firm, the more stakeholders assess its utility. As the Tradeoff variable increases, the utility function of stakeholders increases.

H2. If the expectation of welfare is low, stakeholders do not leave the company, but meet their expectations using alternative benefits. The Tradeoff variable has a local minimum on the investigated area.

H3. The expected utility (dependent variable) has different slope depending on the degree of market control. Utility is affected by the market power of the company. In this case, we proceeded from the fact that a leading position in the market increases the likelihood of marginal profit. Imperfect competition is a prerequisite for information asymmetry, and together they stimulate the emergence of new specific

risks called in the literature “too big to fail” which is based on the opportunistic behavior of large companies.

H4. Subsidiaries provide lower utility, comparing to parent companies. The value of subsidiaries is usually limited by their shares in the company since profit is concentrated in the parent company. In this situation, stakeholders become less protected in contracting with a particular subsidiary. Thus, the Group variable, indicating if a firm is subsidiary, is opposite to the dependent variable.

2.2 Data and Methodology

For the empirical analysis we use data on Russian metal companies for the years 2014-2018. The chosen sample covers the recent post-crisis period of Russian economy. The sample was obtained by combining SPARK database and corporate annual reports, it yielded 27451 observations. Missing data on enterprise risk management (ERM) efficiency, anomalous values and gross errors were excluded which resulted in a final sample of 4076 observations. Initial data were checked for normal distribution. Minitab 18 software and Reference Value Advisor V2.1 were employed in empirical analysis. A dependent variable is a stakeholder’s utility function defined in equation (3). To evaluate the current statement, we resorted to the simple linear regression model (4).

$$V = \text{const} + \beta_1 * \text{Tradeoff} + \beta_2 * \text{TradeoffSQ} + \beta_3 * \text{Share} + \beta_4 * \text{DSHARE} + \beta_5 * \text{Group} + \beta_6 * \text{Share} * \text{DSHARE} + \varepsilon \quad (4)$$

To proxy alternative good, we used the variable Tradeoff responsible for the rate of turnover in the firm. This statement is based on the results of empirical studies presented by Puneet and Parmil (2012) and Priya and Nimalathasan (2013). In their work, they received partial confirmation that liquidity and profitability are two ends of a straight line. In the face of uncertainty, liquidity significantly reduces the opportunity costs of a firm, thus, fully meeting the requirements for an alternative good in the context of this study. The variable Tradeoff was calculated as the ratio of return and the alternative good. Since it has a lognormal distribution, we transferred this variable to the logarithm value. TradeoffSQ was designed to check the nonlinear dependence. It was calculated as the square of the logarithm of the ratio. Company’s market share is measured with two variables: (1) the share of firm revenue in the total revenue of the industry (Share) and (2) the degree of market control (DSHARE). The degree of market control is the nominal value that was built using Reference Value Advisor. It equals “1” if market share is less than the lower limit of reference level (0.00008) and “3” if market share is above the upper limit of the reference level (0.003). We also introduce an interaction term with the two variables. In our model we distinguish whether the company is a subsidiary or not (Group).

Table 1. Definition of Variables

Variable	*Definition*	*Source*
Tradeoff	$\ln(^{ROA}/_{CR})$ – the ratio of firm’s return on assets and the alternative good.	SPARK Interfax
TradeoffSQ	$(\ln(^{ROA}/_{CR}))^2$	
Share	A share of firm’s revenue in the total revenue of the industry	SPARK Interfax
DShare	A dummy variable. DShare = 1 if share is under Lower limit of reference interval (<0.00008); DShare = 2 if share is between Lower limit of reference interval and Upper limit of reference interval (more than 0.00008 and less than 0.003); DShare = 3 if share is above Upper limit of reference interval (more than 0.003).	SPARK Interfax
Group	A dummy variable. Group = 1 if company is a part of a holding; Group = 0 if otherwise.	SPARK Interfax

Source: Compiled by authors.

All continuous variables were counted as geometric means over five years. We calculated the geometric mean for each quantitative variable to avoid the influence of temporary shocks and distortions. Because the original data were positively skewed, we transformed it into logarithms. Categorical variables were encoded into binary variables, where 1 means "yes" and "present". Then, we utilised the Mann–Whitney test to assess the relationship of V and binary variables. The Hodges–Lehmann criterion was used to estimate confidence intervals across groups. To check the stability of the parameters of the regression model and the presence of structural changes in the sample, the Chow test was run. In the next section, we assess the linear dependence of the selected variables using statistical analysis and introduce regression results.

3. RESULTS

Table 2. Descriptive Statistics of Variables

Variable	*Public*	*N*	*Mean*	*SE Mean*	*StDev*	*Minimum*	*Q1*	*Median*	*Q3*	*Maximum*
V	0	3225	115.54	0.419	23.80	45.86	99.26	114.31	129.59	192.26
	1	850	149.80	0.945	27.56	66.02	135.19	152.54	172.86	203.82
Tradeoff	0	2095	-3.8843	0.0473	2.1631	-12.4532	-5.0254	-3.6400	-2.5411	13.1483
	1	545	-3.6794	0.0795	1.8567	-12.3303	-4.7061	-3.4853	-2.5563	9.0673
Share	0	2471	-11.113	0.0427	2.123	-14.508	-12.832	-11.408	-9.670	-3.333
	1	746	-7.7795	0.0976	2.6663	-14.4812	-9.4929	-7.4447	-5.6407	-1.8282

Source: Compiled by authors based on SPARK.

In Table 2, we report the number of observations (N), the means, medians, standard deviations (STDev) of the variables, and quartile (75% and 25%) distributions of the variables. In Table 3, we show the correlation coefficients among the variables, where the bottom-left part of the table refers to the Spearman correlation matrix.

Table 3. Spearman Rho values between Variables

	V	*Tradeoff*	*Tradeoff SQ*
Tradeoff	0.153***		
	(0.000)		
Tradeoff SQ	-0.157***	-0.985***	
	(0.000)	(0.000)	
Share	0.743***	0.022	-0.027
	(0.000)	(0.288)	(0.180)

Source: Compiled by authors based on SPARK. P-values are shown in parentheses, *, **, *** represent 10%, 5% and 1% significance level, respectively.

We observe that variables exhibit reasonable variation. As predicted by our hypothesis, the utility measure (V) is positively correlated with Tradeoff and Share and negatively correlated with TradeoffSQ. The Spearman rho between V and variables is significant at the 0.001 level.

We also implemented the Chi-square test to evaluate the difference in expected utility between companies that operate within a group of companies and those without. The results (Table 4) confirmed the statistical significance (at the level of 0.001) of differences within groups (Table 5).

Table 4. Estimation of Difference

Difference	95% CI for Difference
28.61	(21.07; 36.14)

Source: Compiled by authors based on SPARK.

Table 5. Chi-square Test Result

Null hypothesis	H_0: $\mu_1 - \mu_2 = 0$
Alternative hypothesis	H_1: $\mu_1 - \mu_2 \neq 0$

T-Value	DF	P-Value
7.52	107	0.000

Source: Compiled by authors based on SPARK.

To evaluate the current statement, we resorted to the simple linear regression model. The regression results of equation (4) are reported in Tables 6 and 7.

The coefficient estimate on the trade-off is positive and significant at 1% level, indicating that high returns are preferable for stakeholders in the context of expected utility. As for the economic magnitude of the Tradeoff, we can state that its growth increases expected utility by 3.387, while the sample mean of V is 149.8.

Table 6. Regression Results

Term	Coef	SE Coef	95% CI	T-Value	P-Value	VIF
Constant	226.02	2.48	(221.15; 230.88)	91.28	0.000	
LnTradeOff	3.387	0.444	(2.515; 4.258)	7.63	0.000	2.04
LnTradeOffSQ	0.1411	0.0575	(0.0282; 0.2541)	2.46	0.014	2.19
LnShare	8.277	0.269	(7.748; 8.806)	30.76	0.000	1.71
DSHARE						
2	220	112	(1; 441)	1.96	0.050	2320.73
3	-16.28	8.59	(-33.15; -0.59)	-1.90	0.058	24.03
group						
1	-24.96	2.74	(-30.34; -19.58)	-9.12	0.000	1.02
LnShare*DSHARE						
2	45.7	23.6	(-0.6; 92.0)	1.94	0.053	2320.25
3	-4.41	2.26	(-8.85; -0.04)	-1.95	0.052	22.91

Source: Compiled by authors based on SPARK.

Table 7. Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
12.1828	78.58%	78.24%	77.43%

Source: Compiled by authors based on SPARK.

The degree of market control significantly affects expected utility at the level of 1%. The share of the company with a small market share is 73%. Expected utility growth with an increase in market share is on average 20%. With an increase in the company's market share above 1.25%, V is significantly lower (by 10%) and relatively stable. Subsidiaries have a lower expected utility, and the average premium for non-subsidiaries is 10%.

Particular attention should be paid to the coefficient estimate on TradeoffSQ, which is positive and significant at the level of 1%, which generally indicates that the effect of mutual profitability and liquidity management has a nonlinear dependence with a local minimum in the studied interval.

Share is significant, and a positive coefficient indicates that the growth of variable by 1% increases V by 8.221. Group variable is significant at the level of 1%. Joining a group of companies reduces V by 24.79. DSHARE is significant at the level of 5%. Expected utility is growing if the market share is within the confidence interval. With a value of market share above 0.003, V is declining.

The ability of the model to predict investments is high. R^2 value denotes that 78.58% of observed variability in V can be explained by the differences in the independent variables. The remaining 21.42% of variance is attributed to other variables. Thus, we produce the following regression equation (5).

$$V = 225.53 + 3{,}358\,TradeOff + 0{,}1366\,TradeOffSQ + 8{,}221\,Share + 0{,}0\,DSHARE_1 + 2{,}83\,DSHARE\_2 - 0{,}08\,DSHARE\_3 + 0{,}0\,Group\_0 - 24{,}79\,Group\_1 \quad (5)$$

An examination of the model summary in conjunction with ANOVA (F–value) indicates that the model explains the most possible combinations of predictor variables that could contribute to the relationship with the dependent variables.

In the next step, we find the coefficient value at which the expected utility is minimal. It has been calculated that the minimum value of the function is 213.95, which it takes at Tradeoff equal to 0.0006. This shows that the most negative impact on the expected utility of the stakeholders is on the trade-off when the average annual profitability is 0.06% of the alternative good. The expected utility grows with an acceleration equal to the coefficient $\beta_2 = 0.1366$.

The result generally confirms our assumptions above. With a high degree of uncertainty stakeholder perceptions of risk change. Although they are reluctant to exit a business, they become more intemperate and, as a consequence, more short-term. Their interest in any affordable initiative allows them to build only short-term utility functions and, thus, undermines the long-term sustainability of the business.

In closing, we used the function we acquired to model the utility value to stakeholders. Individual distributional identification revealed that the resulting variable is subject to an exponential distribution with two parameters, 71.22003 and 81.86268, which is most typical for a risk-averse individual. By plotting the distribution of the received function, we found the probability that an individual will remain in business with an unfavourable value for the company welfare is 84.35%. In Table 8, we summarised hypotheses of the study and obtained results, along with tools used.

Table 8. Hypotheses Summary

No.	*Hypothesis*	*Tools*	*Accepted/Rejected*
1	As the Tradeoff variable increases, the utility function of stakeholders increases.	Correlation, regression	Accepted
2	The Tradeoff variable has a local minimum on the investigated area.	Regression	Accepted
3	The dependent variable has different slope depending on the degree of market control.	Correlation, regression	Accepted
4	The Group variable is opposite to the dependent variable.	Chi-square test, regression	Accepted

Source: Compiled by authors.

4. DISCUSSION

In this article we have achieved most of our objectives. Knowledge of the utility function of stakeholders is promising in business management, however currently its' application is rather limited. In this study we have suggested that stakeholders are reluctant to leave a company because of the high level of uncertainty. Under unfavourable conditions, stakeholders' change their perception of risk, as well as their ability to derive maximum expected utility from the firm. We assumed that stakeholders value their relationship with the firm based on knowledge of its' economic value added. Stakeholders utility function is simultaneously assessed through the average economic value added and its deviations. We have approximated this function according to the assumptions made in the first and second sections of this article. We interpreted the results from a behavioral perspective.

Although presented model is sufficient to study stakeholder utility function, it does not allow to observe the influence of systematic factors on the selection of stakeholders. Special attention should be paid to the risk perception of stakeholders. The results show that stakeholders' perception of risk is conservative: the distribution of the function is exponential. The higher the return, the higher the expected utility function with declining marginal utility of return. The function is characterised by a decreasing coefficient of absolute risk aversion and a constant coefficient of relative risk aversion at return growth. Absolute risk tolerance is very low; the Arrow-Pratt measure is 0.000098. Individual distributional identification revealed that the probability that an individual will remain in business with an unfavourable value for the company welfare is 84.35%.

We can conclude that during the editing phase stakeholders do not have sufficient information about what profitability will be. Thus, they maximize utility based on the available alternatives - the utility curve steeply upwards to the left of the reference point (0.00006) and has a curvature, identical to risk-taker. Further, in the evaluation phase, the curve's character changes towards risk-averse and remains so at any positive ratio more than 0.00006.

One of the purposes of this study is to look at properties of individuals utility function beyond its' convexity. Successive derivatives of U give rise to the discussion of such notions as prudence and temperance, also known as downside risk aversion and outer risk aversion, respectively. The alternating pattern of signs of derivatives is associated with term "mixed risk aversion" (Eeckhoudt and Schlesinger, 2006). Crainich et al. (2013) showed that even though risk lovers and risk averters diverge in the second order, they have conformity in the third order derivative ($u''' > 0$) so that they exhibit prudence. Thus, all decision makers do not tolerate downside risk and build up precautionary savings. If the future income risk is present, they devote their current sources to savings.

In the same vein, Crainich et al. (2013) illustrated the disparity in the signs of even derivatives (u'', u'''', etc.). In the terminology employed by authors, the positive sign of the fourth derivative in risk lovers' utility model ($u'''' > 0$) means that they are intemperate. Our model shows that risk lovers and risk averters disagree about the signs of even derivatives. This result confirms those of Crainich et al. (2013). Regarding the third derivative, we obtained a positive value only for risk-averse decision makers. This implies risk lovers are not prudent as they do not have precautionary savings, although previous studies provided the opposite conclusion (Crainich et al., 2013). Thus, comparing the results of the derived function with early studies showed that the behavior of stakeholders could be characterized as intemperate and not prudent.

CONCLUSION

Empirical findings support our hypotheses discussed earlier. Stakeholders' attitude toward risk changes with increasing uncertainty, as we showed it for post-crisis period. As they become risk-lovers in times of volatility, stakeholders start building short-term utility functions. They display intemperance by valuing short-term gains over long-term benefits which puts pressure on financial stability of a business. Loss-aversion and overconfidence do not let individuals correctly estimate long-term prospects and leave a company when it faces losses. Along with a change in risk preferences, we see that corporate decision-makers become imprudent, as shown by the sign of the second-order derivative. Due to behavioral biases they sacrifice a share of savings by not exercising options and holding unfavourable positions in company's stocks. The findings of this paper are relevant to the evaluation of company's sustainability and estimation of contract duration. As the future research agenda, examination of three groups of stakeholders, customers, employees and managers, using Nash equilibrium concept may provide fruitful insights for stakeholder theory.

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