

Williamson's Institutional Analysis of Investments: A Case Study of Bulgarian Forestry

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Abstract

According to data of Eurostat the Gross Fixed Capital Formation in Bulgarian forestry in 2016 and 2017 amounts respectively to 4.90 million EUR and 10.37 million EUR, which assigns Bulgarian forestry to the unsatisfactory 14th place from 15 EU member states by level of investments. In this respect an attempt is made to answer the question: 'Which are the reasons for insufficient investments in forestry in Bulgaria?'. The response to that question is searched by means O. Williamson's four level institutional analysis. Based on a questionnaire survey among specialists working in forestry and hypotheses testing through χ^2 -analysis it is established that among the main reasons for insufficient investment in Bulgarian forestry are some market failures as rent seeking and opportunism. Furthermore by means of Cramer's coefficients it is established that the link between investments and both market failures is strong in terms of strength. According to 80.3% of the inquired specialists,

the limitation of market failures in forestry is possible through increasing the share of stewardships activities carried out by territorial departments of state enterprises with their own forestry equipment and workers.

Keywords: market failures, investments, state forest enterprises, representative sample, χ^2 -analysis.

JEL: B25; D23; C12.

Introduction

Bulgarian forests cover 4.27 million ha, or 38.5% of the country's territory. They provide drinking water, preserve protected plant species and endangered animal species. Furthermore, forests absorb the greenhouse gas emissions and are a natural environment for recreation, tourism and employment activities. In relation with the latter one it should be mentioned that in Bulgaria nearly 60 000 people are employed in forestry, game husbandry, woodworking and furniture industry (Ministry of Agriculture, 2022). It is evident that forest territories are a significant national resource with established economic, social and ecological functions. Nevertheless due to the insufficient investment forestry of Bulgaria,

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it is characterized with: unqualified staff; low labour productivity; obsolete forest equipment; the forest road net is depreciated with low average density (Ministry of Agriculture, 2022); neglected forestry activities (Ministry of Agriculture, 2022; Ministry of Agriculture, Food and Forestry, 2019), which lead to forest fires (Atanasova et al., 2019) and a loss of biodiversity. Because of that the goal of the current article is to reveal the reasons for insufficient investments in forestry in Bulgaria and to point out possible recommendations for their increment.

1. Theoretical Framework of the Research

The reasons which determine the insufficient amount of investments in forestry are manifold and complex. To identify them and to gain insights on how to overcome them it is necessary to create a structure in which an analysis must be carried out. O. Williamson provides such a structure with four levels of institutional analysis (Williamson, 2000). Its essence is described in the lines below.

The first level of Williamson's institutional analysis is called 'social embeddedness'. It deals with informal institutions. According to D. North they derive from definite traditions, own codes of ethics, customs, habits and people's faith (North, 1990; North, 1991). The informal institutions evolve over time and play an important role in structuring interactions among the economic subjects and have implications for the overall socio-economic outcome (Friel, 2017; North, 1990). Here it should be mentioned that informal institutions change very slowly and have evolutionary cycles that last hundreds even thousands of years. Usually this level is taken for granted (Ojuri et al., 2019; Tsoklinova, 2015).

The second level of institutional analysis reflects the institutional environment, i.e. the formal institutions or the formal rules of the game – especially property. The formal institutions are presented by constitutions, legal laws and institutions to enforce the political system, human rights and property rights (their definition and enforcement) (Agboola, 2015; Williamson, 1998; Williamson, 2000). The theoretical grounds of this level of institutional analysis are the economics of property rights. When property rights of natural resources are defined the person who wants 'to use a resource has to pay the owner to obtain it. Chaos disappears; and so does the government except that a legal system to define property rights and to arbitrate disputes is, of course, necessary' (cited in Williamson, 2000). In other words, when property rights on natural resources are well defined and secure through the market forces, resources get the highest price. This provides resources owners with incentives to do investments on purpose to improve the resources condition (Beev et al., 2016; Demsetz, 1967; Larson et al., 1990; Vrigazova, 2017).

The economics of property rights assumes costless and easy enforcement of rights, which is rejected by the followers of transaction cost economics like O. Williamson (Argyres et al., 2012; Williamson, 1998) and R. Coase (Coase, 2013; Williamson et al., 1993). According to them, the property rights are realized by means of contracts, which are accompanied with transaction costs. They are costs for searching, bargaining, monitoring and enforcing contracts or, generally speaking, they are the costs for economic system governance (Williamson, 1998). Because of that the third level of Williamson's analysis deals with 'the governance structure' (Williamson, 1998; Williamson, 2000). The

stress is put on contracts between stakeholders and their enforcement on purpose of getting a 'governance structures right' and minimizing transaction costs in the system (Williamson, 1998; Williamson, 2000). From the point of view of forestry, the contracts are broken due to information asymmetry, lack of foresight, rent-seeking and opportunism (Behera et al., 2006). This increases the uncertainty in the system (North, 1990) and transaction costs, and does not stimulate investments in it.

The fourth level of O. Williamson's institutional analysis deals with allocation of resources. Neoclassical economic principles, which govern the functioning of the economy

and mainly the study on decisions' variables – prices and output, are applied (Williamson, 1998; Williamson, 2000).

It should be emphasized that each level of Williamson's analysis is characterized with a different time period, during which the phenomena change. These periods are presented in figure 1 (Lee et al., 2016).

The second and third levels of O. Williamson's analysis provide a complete analysis of property rights, which is the essence of the new institutional economics (NIE). Both levels deal with the improvement of formal institutions and have influence on entrepreneurship (Simon-Moya et al., 2014;

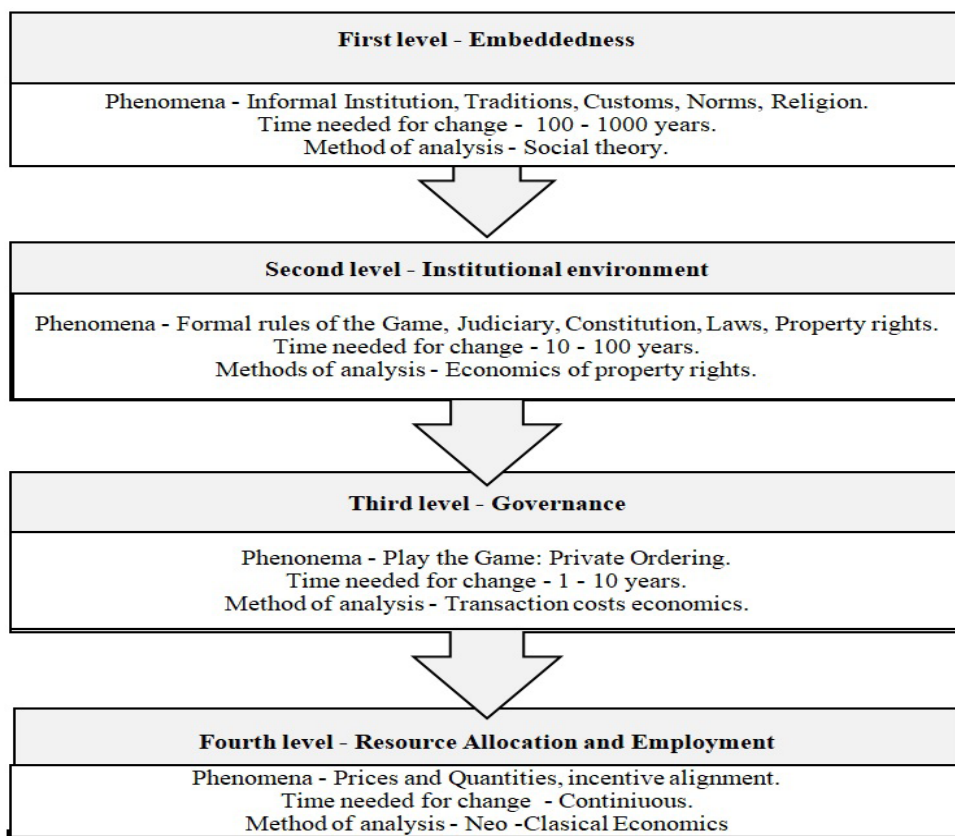


Figure 1. Williamson's Four-Level Institutional Analysis
Source: Adapted from Williamson (2000) and Lee et al. (2016).

Stephen et al., 2005), trade (Levchenko, 2007) and economic development (Robinson et al., 2019; Rodrik et al., 2004).

2. Institutional Framework of Bulgarian Forestry

There is a consensus among the scholars concerning the category 'institutions'. D. North points out that institutions are the 'rules of the game' in a society, the constraints imposed by the people who shape human interactions (North, 2000). In other words, institutions determine the behaviour of individuals and make their actions predictable, which reduces uncertainty in the economic systems. According to St. Pejovic and D. North, this contains the main function of institutions, namely to increase predictability in the behaviour of individuals (cited in Kaneva, 2001). This view is supported by many authors. J. Kregel believes that, like nature, which does not tolerate emptiness, the economic system does not tolerate uncertainty. When the market is unable to provide information, the economic system provides it through the establishment of institutions (Kregel, 1980). They reduce uncertainty and even provide information on possible future actions of other economic agents (Schotter, 1981). W. Koster's point of view is also of interest. He considers the institutions as an abstract concept of the social stratum, and they are based on the values and goals of the respective society (cited in Kaneva, 2001). J. Rawls views the institution as a public system of rules that define services and positions with their legal obligations, powers, privileges, and more (Rawls, 1998).

Summarizing the statements above concerning the category 'institutions' in the present paper it is maintained the idea that it is: a social system of values (principles) defended

by rules. They determine the framework in which the human interactions are realised, the legal obligations, rights, privileges, etc. of the institutionalised authorities and officials.

As it becomes clear from the theoretical framework of the research institution, they are divided into formal and informal. The informal ones derive from definite traditions, own codes, customs, habits and people's faith. Formal institutions are in the basis of the informal ones but they are accepted subjectively by the individuals. Due to this the same formal rules are interpreted differently and lead to different outcomes in different societies (North, 2000). Formal institutions are presented by the constitution, laws and regulations. Some authors divide formal institutions into two groups – fundamental connected with the constitutional order and institutional – related to laws, regulations, contracts and property rights (cited in Kaneva, 2001). Other authors divide formal institutions into an institutional environment and institutional norms. The institutional environment is a network of political, social and legislative rules, which provide the basis for production, exchange and distribution. At the same time institutional norms determine the way in which economic subjects can compete or cooperate as well as the mechanism that can cause a change in laws and property rights (cited in Kaneva 2001). The building of formal institutions follows the processes of evolutionary institutional changes and the transformation of the informal rules into formal. In this way the institutions structure themselves. As a result, gradually, the institutions build the respective institutional framework (matrix). It includes the whole system of laws, rules and norms of behaviour (Spasov, 2002).

The institutional framework has a great influence on the formation and development

of the structure of institutional subjects – organizations. According to D. North, if institutions are the rules of the game then organizations are its players (North, 1994). The set of institutions and organizations created and functioning in accordance with the institutional framework determines the institutional structure of society. In this respect in the lines below institutional subjects functioning in Bulgarian forestry in compliance with the institutional framework and mainly Forest Act accepted in 2011 are briefly presented.

With the Forest Act (ZG) from 1997 the valid till then Forest Act from 1958 was cancelled. The Forest Committee was restructured into the National Forestry Boards (NUG) of the Ministry of Agriculture and Forestry (MZH), which managed state forest territories until 2008. Its structures were Regional Forestry Boards (RUG), State Forestry Services (DL) and State Game Breeding Station (DDvS). RUG was official bodies managing and controlling forest territories on a regional level, while DL and DDvS were official bodies on the local level. In 2008 NUG was renamed to State Forest Agency (DAG), RUG to Regional Forest Directorates (RDG), DL to State Forest Enterprises (DGS), and DDvS to State Hunting Enterprises (DLS). With the amendments of ZG from 2008 DGS received the right to work on their own economic account. With ZG from 2011 a structural reform in state forest administrations was realized. DAG was renamed to Executive Forest Agency (IAG) with structural units 16 RDG. They monitor the implementation of forest legislation in state and non-state forest territories. Apart from 16 RDG, structural units of IAG are also: 2 Forest Seed Control Stations (GSS); 3 Forest Protection Stations (GLS); 11 Directorates of Natural Parks (DPP); Journal 'Forest'. The

management of state forest territories, which are 2 885 194 ha (73% of the total forest area of Bulgaria) (Ministry of Agriculture, Foods and Forestry, 2021; Stoeva et al., 2018), is assigned to 6 State Enterprises (DP) which are independent legal entities. Local departments of 6 state enterprises are 136 State Forest Ranges (TP DGS) and 28 State Hunting Ranges (TP DLS). They are responsible for the economic success of 6 DP. TP DGS and TP DLS performed an insignificant part of silvicultural and timber harvesting activities in state forest territories with their own staff and equipment but the rest is assigned to nearly 1500 private enterprises specialised in forestry activities (Kolev, 2016).

It should be mentioned that wood resources provide more than 90% of the revenues of 6 DP (Kolev, 2016). Because of that they are at the bottom of contradictions between economic subjects and insufficient investment in forestry. As of April, 2022, the main legal documents, which regulate the use of wood from forest territories of the Republic of Bulgaria are the Forest Act (ZG) and the Ordinance on the terms and order for assigning the implementation of activities in the forest territories – state and municipal property, and the use of timber and non-timber forest products (the Ordinance). The last document was promulgated in State Gazette vol. 96/6. 12. 2011, amended SG vol. 90/16. 11. 2012. Since then all activities in state and municipal forest territories are subjected for implementation through the Ordinance and not through the Public Procurement Act.

In the Forest Act from 2011, in article 112 it is pointed out that the use of wood from state and municipal forest territories can be realized in two ways: through sales of standing timber and through harvesting and sales of felled timber. The procedures for sale of standing

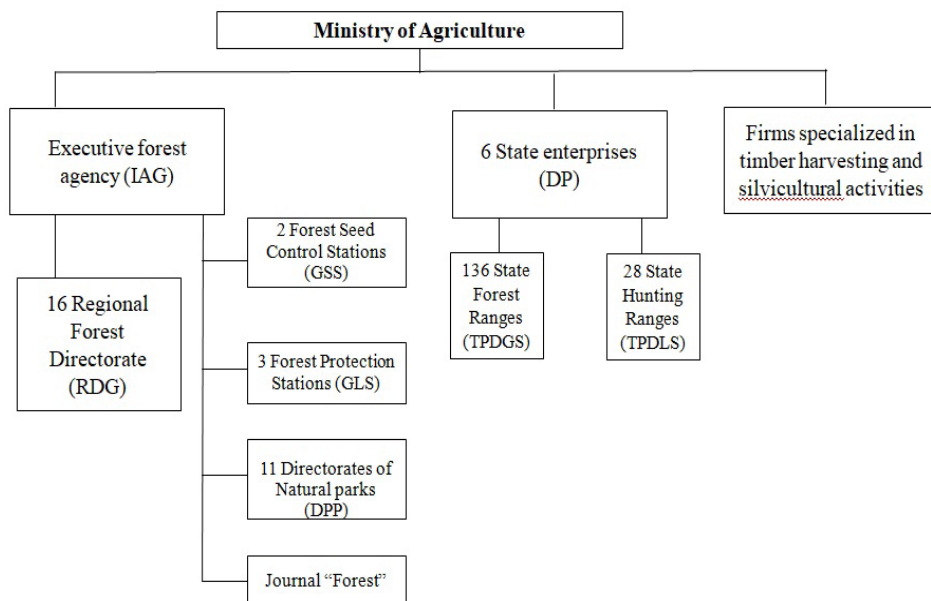


Figure 2. Main Institutional Subjects in Bulgarian Forestry, 2022.

Source: Authors of the Article.

and felled timber are described in details in the Ordinance. In article 49 from the last one it is written that the sales of standing timber must be realized through: tenders with secret and open bidding; electronic auction with bidding; electronic auction with secret bidding with one time price offer; competitive candidate selection; electronic competitive candidate selection for sale; and price list (rates). At the same time in article 66 of the Ordinance it is written that the sale of felled timber from forest areas – state and municipal ownership can be realized in the following ways: through tenders with open bidding; through tenders with secret bidding; price list (rates); through negotiation; e-commerce (electronic auction) with bidding; electronic auction with one-time price offer; and commodity exchange.

To aim more investments in modern wood-harvesting and wood-processing equipment, article 116 of the Forests Law (2011) gives the opportunity to 6 DP and municipalities

owners of forest estates to sign long-term contracts (up to 15 years) with dealers for wood harvesting and sale of the felled timber. In this way the entrepreneurs in forestry will have security that for a long period of time their job will be guaranteed and they will be able to pay the interest rate to creditors as well as to achieve a satisfactory internal rate of return.

In connection with the paragraph above it should be underlined that according to article 115 from ZG of 2011 TP DGS, TP DLS and the municipal forest structure can provide one third of the annual use of wood from state and municipal forest territories to local wood harvesting and processing companies.

Regarding the private forests in article 112 from ZG of 2011, it is stated that the ways of use of wood are determined by their owners. According to article 114 from ZG of 2011, they (private forest owners) and municipalities, which are not able to manage their forest

estates by means of own forest structure, have rights to provide the use of wood on a basis of a contract to state forest enterprises, private individuals and legal entities, registered in the public registers in compliance with articles 235 and 241 from ZG. The terms and order for use of wood are defined in the contract by the forest owner.

3. Methodological Framework

As it has been mentioned above, the second and third levels of O. Williamson's analysis provide a complete analysis of property rights. Both levels deal with the improvement of formal institutions. Due to this the scope of this article is limited to them and on their grounds the **research thesis** is formulated. It states: Among the main reasons for insufficient investments in forestry are the inefficient legislative protection of forest resources property rights, rent-seeking, opportunism, and asymmetry of information. It is verified on the basis of questionnaires filled by representatives of different groups connected with forestry and the application of the χ^2 -method. In its essence this is a method for statistical verification of hypotheses. It is applied to qualitative variables, measured on a nominal or ordinal scale. In order to realize the χ^2 -method, the stages for hypotheses verification should be passed and χ^2_{em} should be calculated. It must be emphasized that the application of the χ^2 -method involves two important restrictive conditions. Firstly, the theoretical values for every cell (f'_{ij}) must not be smaller than 1 and, secondly, if there are values of the theoretical frequencies smaller than 5, they should not be more than 20% of the cells (Turhan, 2020). The strength of the link between the variables, about which the presence of dependence is found, is

established through Cramer's coefficient (Akoglu, 2018; Okeke, 2019).

The data about the insufficient investment in Bulgarian forestry are collected through direct inquiry. The survey is carried out during the period April – May 2022. The representative sample includes 171 individuals, which are randomly selected from all groups connected with forestry in Bulgaria: representatives of forest owners (state, municipalities, private individuals); representatives of companies performing silvicultural and timber harvesting activities; experts from the University of Forestry – Sofia, Forest Research Institute – BAS, members of Association of foresters on private practice "Bulprofor". The shares of different groups in the sample are proportional to their shares in Bulgarian forestry.

4. Results and Discussion

Part of the results from the questionnaires is presented in the current article. The thesis is verified through the answers of the following six questions:

On the 1st question: 'How do you assess the level of investment in Bulgarian forestry?' nearly 86% of the requested answered 'low' and 'very low', which confirms the quantitative data from previous studies about investments in forestry (Kolev, 2017; Kolev, 2019; Kolev et al., 2020). The 2nd question: 'How efficiently does the current legislation protect property rights of forest resource (wooden and non-wooden) in Bulgaria?' is connected with the second level of institutional analysis. The answers of the 2nd question are presented in table 1 and table 2.

From the actual frequencies in table 1 it is obvious that the opinion of respondents is divided in two parts. More than 45% of the inquired think that the property rights of forest wooden resources are efficiently and very

efficiently protected by the legislation while 53.3% of the respondents are of the opposite opinion. The situation with non-wooden resources is similar. Nearly 70% of the inquired persons share the opinion that the property rights of non-wooden resources are not efficiently protected by legislation while according to 30% of them they are efficiently or very efficiently protected by the legislation (see table 2). The sustainable management of forest resources including investment demands good identification and allocation of property rights. By means of them the open access to forest resources is reduced and competitive markets are established (Thiam, 2014). From here arises the first working hypothesis. According to hypothesis zero (H0), there is no connection between the legislative protection of property rights of forest resources and the level of investment in Bulgarian forestry. The

alternative hypothesis (H1) is the opposite. It seems that between the legislative protection of property rights of forest resources and the level of investment in Bulgarian forestry there is a dependence. The theoretical frequencies concerning the connection between property rights of wooden resources and investment in forestry are calculated in table 1, and the property rights of non-wooden resource and investment in forestry in table 2.

After defining theoretical frequencies, it is calculated that χ^2_{em} for table 1 is equal to 11.678 and for table 2 is respectively 8.084. From the tables for χ^2 -distribution for level of significance $\alpha=0.05$ and six degrees of freedom it is established that χ^2_t is equal to 12.59. As $\chi^2_{em} < \chi^2_t$ the hypothesis zero (H0) is accepted and the alternative (H1) is rejected. In other words, there is no link between the legislative protection of property rights of

Table 1. Actual and theoretical frequencies

Variables			How efficiently does the current legislation protect the property rights of wooden forest resources in Bulgaria?				Total
			Very inefficiently	Inefficiently	Efficiently	Very efficiently	
How do you assess the level of investment in Bulgarian forestry?	Very low	Actual frequencies	9	16	8	0	33
		Theoretical frequencies	4.5	13.5	13.3	1.7	33.0
	Low	Actual frequencies	11	44	51	8	114
		Theoretical frequencies	15.3	46.7	46.0	6.0	114.0
	High	Actual frequencies	3	10	10	1	24
		Theoretical frequencies	3.2	9.8	9.7	1.3	24.0
Total		Actual frequencies	23	70	69	9	171
		Theoretical frequencies	23.0	70.0	69.0	9.0	171.0

Source: Questionnaire survey and authors' calculations.

Table 2. Actual and theoretical frequencies

Variables			How efficiently does the current legislation protect the property rights of non-wooden forest resources in Bulgaria?				Total
			Very inefficiently	Inefficiently	Efficiently	Very efficiently	
How do you assess the level of investment in Bulgarian forestry?	Very low	Actual frequencies	13	13	7	0	33
		Theoretical frequencies	8.3	14.9	9.1	0.7	33.0
	Low	Actual frequencies	27	50	33	4	114
		Theoretical frequencies	28.7	51.3	31.3	2.7	114.0
	High	Actual frequencies	3	14	7	0	24
		Theoretical frequencies	6.0	10.8	6.6	0.6	24.0
Total		Actual frequencies	43	77	47	4	171
		Theoretical frequencies	43.0	77.0	47.0	4.0	171.0

Source: Questionnaire survey and authors' calculations.

forest resources and the level of investment in Bulgarian forestry.

From the answers of the 2nd question of the inquiry card it becomes clear that the property rights of forest resources in Bulgaria are not so efficiently protected. At the same time according to O. Williamson and R. Coase, the realization of property rights is accompanied with transaction costs (Argyres et al., 2012; Coase, 2013; Williamson et al., 1993; Williamson, 1998). In this relation the 3rd question of the inquiry card is: 'How do you assess the level of transaction costs in Bulgarian forestry?'. To this question 34% of the inquired respondents answered 'very high' and 'high' and 66% 'low' and 'very low'. From these controversial responses conclusions cannot be drawn up about the governance of Bulgarian forestry and in particular about the certainty in the system. The last ones is

a precondition for investment in forestry and have to be provided by institutions. Indirectly the level of certainty can be judged by the extent of rent seeking, opportunism and information asymmetry in forestry. These terms are closely related with the third level of O. Williamson's analysis and in particular with verification of three working hypotheses that guide this study and are consecutively presented below.

The idea of 'rent seeking' is introduced by Gordan Tullok in 1967 and more than 50 years later it is more relevant than ever. Different scholars study different aspects of the phenomenon and its effect on economic theory, empirical analysis, control of violence, corruption, regulation, rent extraction, economic development, inequality and so on (Aidt, 2016; Dimakou, 2015; Mitchell, 2019; Robinson, 2019). Without belittling

the achievement of different authors, in the present paper under category 'rent seeking' the classical understanding that a contestable rent generates rent-seeking activities aimed at obtaining the rent is accepted. These activities involve the unproductive use of real resources and cause a social loss. Rent-seeking costs are difficult for measurement but by means of contest theory and some assumptions about the social actions of rent seekers, the size of the social cost can be calculated from the value of the disputable rent. Typical examples of contestable rents are providing monopoly rights, privileged budget distribution, protectionist trade policies, national resource rights etc. (Aidt, 2016). Considering the negative effects of this market failure it is important to check whether there is a link between the answers of the 4th question from the inquiry card: 'To what extent in Bulgarian forestry are there market failures as rent seeking?' and the answers of the 1st question from the inquiry 'How do you assess the level of investment in Bulgarian forestry?'. For that reason the hypothesis zero (H0) means that between the level of investment in forestry and the extent

of rent seeking there is no connection. The alternative hypothesis (H1) is the opposite. It means that there is dependence between the investment in forestry and the extent of rent seeking. In table 3 the theoretical frequencies are calculated. It is established that χ^2_{em} is equal to 16.283 and from the tables for χ^2 -distribution it is established that χ^2_t is equal to 9.488. This means that between the level of investment in forestry and rent seeking there is a connection. The value of Cramer's coefficient is 0.218, which according to H. Akoglu (Akoglu, 2018) determines the strength of the link as strong.

Without going into details about the agency theory under the term 'opportunism' in the current paper the understanding of O. Williamson and namely 'self-interest seeking with a guile' [cited in (Wagner, 2019) in other words 'parties are opportunistic when they act to their benefit yet to the detriment of the other party in the relationship' (Chohan, 2020) is accepted. From here emerges the third working hypothesis for the current paper. By means of the χ^2 -method it is verified if there is a relation between the answers of the 1st and 5th question: 'To what extent in

Table 3. Actual and theoretical frequencies

Variables			To what extent in Bulgarian forestry there are market failures as rent-seeking?			Total
			Very high	High	Low	
How do you assess the level of investment in Bulgarian forestry?	Very low	Actual frequencies	9	24	0	33
		Theoretical frequencies	5.4	21.3	6.3	33.0
	Low	Actual frequencies	24	65	25	114
		Theoretical frequencies	22.0	70.0	22.0	114.0
	High	Actual frequencies	0	16	8	24
		Theoretical frequencies	5.6	13.7	4.7	24.0
Total		Actual frequencies	33	105	33	171
		Theoretical frequencies	33.0	105.0	33.0	171.0

Source: Questionnaire survey and authors' calculations.

Bulgarian forestry are there market failures as opportunism?'.

According to hypothesis zero (H0), between the level of investment in forestry and the extent of opportunism, there is no connection. The alternative hypothesis (H1) is the opposite. It means that between the extent of opportunism and the level of investment in forestry there is a dependence. In table 4 are presented the actual and the theoretical frequencies.

It is calculated that χ^2_{em} is equal to 18.216. From the tables for χ^2 -distribution it is established that χ^2_t is equal to 9.488. As $\chi^2_{em} > \chi^2_t$ hypothesis zero (H0) is rejected and the alternative (H1) is accepted. In other words, there is a link between the existence of opportunism and the level of investment in forestry. Its strength is determined by Cramer's coefficient. It is 0.231, which means that the dependence between the degree of opportunism and the level of investment according to H. Akoglu (Akoglu, 2018) is strong in terms of strength.

The last working hypothesis for the current study is related to 'information asymmetry'. This concept is central in the field of strategic

management, organization behaviour, organization theory, entrepreneurship, corporate social responsibility and human resource management. At the same time the concept has created foundational elements of agency theory, transaction cost economics, institutional theory, resource-dependence theory and so on (Bergh et al., 2019). The importance of the idea about 'information asymmetry' is not subjected to discussion and in the present paper under this term 'a situation in which respective parties own different amounts and types of information over time about a project or contract' (Sceral et al., 2018) is understood. Through the χ^2 -method it is verified if there is a relation between the answers of the 1st and 6th question: 'To what degree in Bulgarian forestry are there market failures as information asymmetry?'.

According to hypothesis zero (H0), between the degree of information asymmetry and the level of investment there is no connection. The alternative hypothesis (H1) is the opposite. It means that between the degree of information asymmetry and the level of investment there is a dependence.

Table 4. Actual and theoretical frequencies

Variables			To what degree in Bulgarian forestry there are market failures as opportunism?			Total
			Very high	High	Low	
How do you assess the level of investment in Bulgarian forestry?	Very low	Actual frequencies	11	21	1	33
		Theoretical frequencies	7.3	22.2	3.5	33.0
	Low	Actual frequencies	24	81	9	114
		Theoretical frequencies	25.3	80.7	8.0	114.0
	High	Actual frequencies	3	13	8	24
		Theoretical frequencies	5.4	12.1	6.5	24.0
Total		Actual frequencies	38	115	18	171
		Theoretical frequencies	38.0	115.0	18.0	171.0

Source: Questionnaire survey and authors' calculations.

Table 5. Actual and theoretical frequencies

Variables			To what degree in Bulgarian forestry there are market failures as information asymmetry?				Total
			Very high	High	Low	Very low	
How do you assess the level of investment in Bulgarian forestry?	Very low	Actual frequencies	12	12	6	3	33
		Theoretical frequencies	4.1	13.1	7.5	8.3	33.0
	Low	Actual frequencies	9	68	28	9	114
		Theoretical frequencies	14.0	66.0	26.0	8.0	114.0
	High	Actual frequencies	0	19	5	0	24
		Theoretical frequencies	6.9	9.9	5.5	1.7	24.0
Total		Actual frequencies	21	99	39	12	171
		Theoretical frequencies	25.0	89.0	39.0	18.0	171.0

Source: Questionnaire survey and authors' calculations.

After defining theoretical frequencies (see table 5), it is calculated that χ^2_{em} is equal to 11.124 and from the tables for χ^2 -distribution it is established that χ^2_t is equal to 12.59. The conclusion is that there is no relation between the information asymmetry and level of investment in Bulgarian forestry.

According to 80.3% of the inquired specialists, the limitation of market failures in forestry is possible through increasing the share of stewardships activities carried out by TP DGS and TP DLS of DP with their own forestry equipment and workers. Furthermore, according to the opinion of 87.7% of the respondents, the investments in own forestry equipment by TP DGS and TP DLS is a prerequisite for the emergence of competition among economic subjects in Bulgarian forestry. By means of competition the irrational speculative opportunities for profit, which includes the market failures, discussed above, are minimized and profit is pursued in a rational way typical for the rationally organized capitalist enterprise (Weber, 2001). Under the term 'capitalist' M. Weber understands economic action, which is based on the expectation for profit through

the use of chances for exchange i.e. peaceful chances for acquisition. Acquisition through force follows its own specific laws so it is not appropriate for it to fall under the same category as exchange-oriented acquisition. Where profit is achieved in a rational way the respective action is oriented towards capital calculation. This means that: 'at the beginning of each entrepreneurial activity we have an initial balance, before each individual action – calculation, in the control and verification of expediency – subsequent calculation, at the end in order to establish the received 'profit' – final balance'. When the framework of rules does not force the capitalist enterprise to more strict calculation of benefits and costs its acts are based on general judgment or on traditional practices. Profit is pursued through violence, robbery of subordinates and military campaigns, speculation and political interference (Weber, 2001). The rational organization of the capitalist enterprise is not achievable without the presence of two components of development – the separation of the household from the enterprise and the associated with it rational bookkeeping.

These two key elements are possible due to the rational structure of law and governance. This is so because: 'modern capitalism based on the rational enterprise needs susceptible to calculation technical means of labour as well as jurisprudence susceptible to calculation and governance in accordance with formal rules' (Weber, 2001). Without rules, adventurous and speculative capitalism are possible but not a rational private enterprise with reliable calculations of revenue and expenses. The last one organizes the labour of individuals forcing them to act rationally (goal-oriented rational) (Weber, 2001).

5. Conclusion

On the grounds of the theoretical framework of the research and the questionnaire survey the following conclusions and recommendations can be drawn up:

Firstly, the level of investment in Bulgarian forestry is low. This statement is proven not only by the actual size of investments in forestry (Kolev, 2019; Kolev et al., 2020), but also by the opinion of 81% of the inquired specialists;

Secondly, the institutions do not create security and predictability in the system of forestry. The property rights of forest resources are not well protected and some market failures as rent seeking (according to 80.7% of the respondents), opportunism (according to 89.5% of the respondents) and information asymmetry (according to 66.6% of the respondents) are met.

Thirdly, the main reasons for insufficient investment are opportunism and rent-seeking. By means of Cramer's coefficients it is established that the link between the level of investments and both market failures is strong in terms of strength.

Fourthly, to restrict the market failures in Bulgarian forestry according to 80.3% of the respondents it is reasonable to establish an institutional framework that enables transition towards rationally organized enterprises. Through strict calculation of revenues and costs they should be motivated for goal-oriented rational social actions, which lead to competition and effective protection of property rights. The first steps in this direction have to be: TP DGS and TP DLS should invest in their own fixed assets and should increase the share of stewardship activities carried out with their own workers and equipment; the management teams of TP DGS and TP DLS should have the exclusive right to determine independently the organization of the production process in state forest territories.

Fifth, in Bulgarian forestry the revenues from non-timber forest products and services should be increased. This will help to reduce the pressure on wood resources use and will stimulate the investment in ecosystem services.

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