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Transaction Estimation of Institutions

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Abstract The paper represents the fundamental principles and ideas of the transaction theory of economic institutions, which supposes quantification of the quality of institutions through evaluation of economic transactions. The major works of the founders as well as the practical pathways of implementing the theory are discussed. The paper consolidates the author's main contributions to the study of companies' transactions based on their market potential, the technique of institutional atlas design, institutional effects of the staff opportunism decrease, assessment of the transaction costs of hybrid organizations, and the formal representation of the company's external transaction function.

Keywords Transactions, Transaction Costs, Economic Institutions, Economics

1. Introduction

Several Noble Prizes in economics have marked impetuous advance of the institutional theory. R. Coase was awarded the Prize in 1991 for the development of 'the institutional structure of production'. A couple of years later, the D. North's research on 'economic performance through time' received the same honour. The Noble Prize of 2007 was given to L. Gurvitch, R. Mayerson and E. Maskin for the 'theory of economic mechanisms' and, in 2009, to O. Williamson [38] and E. Ostrom (see Munger [21]) for the 'theory of economic organizations'.

Though highly urgent, the problem of quantifying the economic institution quality has not found an adequate treatment thus far. In other words, the need for the theory assessing economic institutions has become as relevant as ever. Nevertheless, it should be noted that some approaches to such a theory have been published and become widely known. Hence, the primary aim of the present study is to systematize the scientific principles and ideas, which might consolidate the practical experience and represent the regularities of society development in terms of transactions of economic institutions, in other words, to elaborate the transaction theory of economic institutions.

The relationships between scientific principles and scientific ideas are the following. Scientific principles are the base of the theory, whereas scientific ideas represent the possible directions of theory development.

2. Transactions

If by economic agents we imply the actors of economic interactions, taking part in production, distribution, exchange and consumption of economic goods, then it is the process of transfer of ownership or activity restriction that regulates the non-manufacturing interactions between them.

J. Commons was the first to address these interactions from the conceptual point of view [8, p. 652]. He suggested using a transaction as the basic unit for the analysis of economic activity. A transaction was understood as alienation and acquisition of the rights of property and liberty created by society. As J. Commons pointed out [9, P.4] 'the smallest unit of activity … should itself contain the principles of conflict, mutuality and order. This unit is a transaction'. O. Williamson elucidated this definition [36, P. 235]: 'a transaction is the transfer of a good or service from the final point of one technological process to the initial point of another adjacent to the former. It is the end of one activity and the beginning of another'.

Therefore, regarding the above-mentioned, the first scientific principle of the transaction theory can be expressed as follows. *A transaction is a single act of economic activity, thus, the minimum base for economic analysis.*

Martins-da-Rocha and Vailakis [18, P. 68] have pointed out that the transactions of information gathering, its transportation, storage and measurement are the principal endogenous transactions, including even such traditional markets as the financial ones. On the other hand, according to an extensive literature review undertaken by A. Rindfleisch and his colleagues [32], distinguishing transaction types has proved to be one of the most promising research directions up to date.

A key to systematization of the economic agents' transactions might be gained from the concept of the company's market potential (Popov, 2004), which is intended to exhibit a variety of transactions at the level of an economic unit. The market potential includes all means and possibilities of a company in the market activity. The

institutional dimension of the company's market potential is the structuring of the established norms of interaction between economic agents, which are designed to optimize its market activity.

The structural analysis of the company's market potential has shown that the transactions of economic agents should include all non-manufacturing operations, i.e. the analytical and communication those (unless they are the main production process of an economic agent). Provided the analytical activity is the search of information and market analysis (the search of buyers), the communication activity is the promotion of goods, security of property rights as well as defence against opportunism. So, the main transaction types of manufacturing enterprises can be differentiated into five types [26]: 1) information search; 2) market analysis; 3) protection of property rights; 4) defence against opportunism; 5) market promotion.

Therefore, it seems a prospective scientific idea in terms of the transaction theory of institutions that *a transaction typology is possible on the basis of the typology of company's economic activities (i.e. on the company's market potential)*.The typology of transactions lets us turn to economic institutions, which are the established norms of interaction between economic agents and to the evaluation of the transaction sector of economy.

3. Transaction Sector

The first attempts to assess the transaction sector of economy were undertaken in the work of J. Wallis and D. North [34]. The authors equalled its volume to the amount of means to ensure transactions, including the resources of government, the companies carrying out transactions (trade, finance, insurance, and estate operations), as well as the transaction costs inside the manufacturing enterprises.

The work of H. Dalen and A. Vuuren [11] has claimed that the size of the transaction sector is largely determined by the specifics of economic activity in different countries. M. Gradstein and K. Konrad [14] have attributed differentiation between countries in terms of their economic development to the establishment of different economic institutions. T. Cavalcanti and A. Novo [4] have proposed a formula, which expresses the dependence of the institutional infrastructure on the country's economic development.

Studying the diversity of institutions, E. Ostrom [23] has offered an extended treatment of the above-mentioned notion. Based on the assessment of different norms, mental models, history and evolution of economic activity, she developed a dictionary to understand the systematics of economic institutions. The variety of economic activity rules, attributes and factors of problem solving was thought to explain the diversity of institutional designs.

Therefore, according to the research of D. Wallis, D. North and E. Ostrom, a second scientific principle of the transaction theory of institutions can be inferred: *economic institutions form the transaction sector of economy.*

Some understanding of the institutional environment of transaction activity can be obtained by designing the institutional atlases [25]. A detailed analysis has demonstrated inadequacy of the institutional structure to back up the economic activity under crisis. It brings us to the second scientific idea of the theory under discussion: *a decrease in the transaction sector of economy makes possible a short-term prediction of economic crises*.

However, there is still a challenging issue of the cost evaluation of economic transactions.

4. Transaction Costs

The cost estimation of economic transactions is expressed by transaction costs. The concept of transaction costs was first coined by R. Coase in his study 'The Nature of a Firm' [5] to provide an insight on the existence of such a hierarchical structure as a firm, being contrast to market. He believed that, carrying out economic activity in these frames, the agents obtain a number of advantages by saving on transaction costs. The specifics of a firm functioning he saw in the suppression of pricing mechanisms and its substitution with the internal administrative control. As O. Williamson [42] highlighted that the assumption of the conventional economic theory that transaction costs are zero was a great analytical convenience and, for a long time, a non-problematic one. However, when R. Coase put an end to this zero logic of transaction costs, it became clear the theory has serious discrepancies, mistakes and anomalies.

In a modern version, the theory of transaction costs, according to O. Williamson [39], is considered a constitutive part of a new institutional theory and is the theory of organization of enterprises, with the subject matter being the multilateral agreement as a form of economic activity. R. Matthews [19] argued that transaction costs involve the expenses of drafting and negotiation of contracts, safeguarding the contractual rights and enforcement of contracts in contrast to manufacturing costs, which are the costs of contract execution.

Therefore, following the R. Matthews's understanding, we can formulate the third scientific principle of the transaction theory of institutions: *transaction costs are all non-manufacturing costs of economic agents.*

At the level of a company, the estimation of transaction costs can have a strict numerical expression. The key to the distinction between transaction costs and transformation costs is the type of operation, which is applied to resources and entails certain expenses. Thus, transformation costs result from transformation of the resources. Due to the definition of transformation costs, transformation of resources can be viewed as the physical conversion of a material. On the other hand, transaction costs arise as a result of the exchange of resources. The resources in the latter case do not change their physical characteristics, but can induce redistribution of property rights.

Another indication of distinguishing transaction costs is

the nature of these expenses. Thus, if expenses are the result of uncertainty, bounded rationality of individuals or opportunistic behavior [29], then such expenses can be referred to as transaction costs. In this case, transaction costs will include both the losses resulting from the presence and function of the above-mentioned factors and the attempts to prevent them, i.e. the losses of risk and risk insurance [16].

The analysis undertaken on the types of transaction costs in a company has allowed the algorithm of transaction cost differentiation: 1) determine the profile activity of a company; 2) determine which resources transform into which output in the framework of the main economic activity; 3) determine to which type of a process the given costs belong to; 4) if the costs are the expenses of the main production process, determine whether these are the expenses of the transaction sphere applying the indicator of operation type vs. resources and the nature of costs; 5) make the conclusion on the type of transaction costs.

The author's algorithm of the calculation of transaction costs has afforded the empirical dependences of the dynamics of publication activity and research mobility on the transaction costs of academic organizations [28].

Accordingly, the third scientific idea of the transaction theory of institutions is outlined as follows: *estimation of transaction costs is possible based on the non-manufacturing entries of accounting reports.* A reasonable issue arising at this step is whether there is connection between transaction costs and institutional infrastructure. The clue to this understanding can be acquired by studying the coordination of institutions.

5. Coordination of Institutions

Coordination of economic activity of economic agents, thus coordination of economic institutions, is known to take three organization forms: hierarchy, market or hybrid organization. From the point of view of O. Williamson [37], the choice between different organization forms is made after comparing the efficiency of transactions, which these companies perform. Hybrid types of organization represent the combination of two polar coordination types: market and hierarchies (companies). They enable to conceptually bring together such contrast agreements as franchising, company networks or long-term contracts between companies. As a result, an extended number of organization types have been identified in this continuum and brought about numerous investigations mainly dealing with the nature and the role of networks.

K. Menar has argued [20] that hybrid forms might be considered as specific structures of transaction control, being different both from market and hierarchy. They are justified in the case of two- or multilateral dependence of the transaction participants, when the dependence itself causes the need of coordination, but insufficient yet for a complete integration. O. Williamson was convinced that the increase in the specificity of assets from market to strict hierarchy raises transaction costs, with the rate of this increase varying in different management structures. Moreover, the management structures differ by the levels of transaction costs when the specificity of assets are zero or minimal.

The advantage of market under the minimal transaction costs takes place under zero specificity, whereas, the rate of the increase in transaction costs as a result of the increase in the asset specificity is the highest. According to the same parameters, company is opposite to market, and a hybrid takes on an intermediary form. Therefore, when the asset specificity exceeds certain values, market should be substituted by a hybrid structure. However, when the higher level of asset specificity is achieved, a company would be a preferential structure.

So, taking into account the investigations of O. Williamson and K. Menar, the forth scientific principle of the transaction theory of institutions is *transaction costs are proportional to the specificity of assets, and thus, to the level of coordination mechanism of economic institutions.*

One may be suggested separating the independent mechanisms of coordination: market, hierarchy and network. Each this mechanism is characterised by a number of criteria, including the type of a base contract, the characteristics of exchange goods (availability, type of economic goods, etc.), as well as the enforcement mechanism of contract execution. Among other criteria are availability of contracting, the level of the property rights protection on the goods of exchange, the way the resource allocation is coordinated, stimuli to the effective resource use, and the degree of regulating the interactions.

Effective network interactions are based, as a rule, on long-term contracts, trust and partnership. These forms of institutional agreements are reciprocal and use common assets of the partners. The efficiency, thus the way these forms are used, is determined by the level of transaction costs, which are directly dependent on the conditions and characteristics of the transactions performed. The latter traditionally include the specificity of assets, frequency of transactions and the level of economic uncertainty.

Hence, the forth scientific idea of the theory under discussion is *estimation of the density of connections in hybrid organizations is possible based on the levels of transactions and transaction costs.*

Since the partnership in hybrid organization is mainly based on informal institutions, it is worth mentioning the study carried out by C. Williamson [35]. The author has showed that it is informal institutions that make up a ground for economic development, because the efficiency of formal institutions is dictated by the presence of informal restrictions. The formal institutions were estimated by the statistical data of proportional representation in elections, juridical independence and the frequency of constitutional revision. The indicators of an informal institution were the levels of trust, respect, individual certainty and compliance. Therefore, the distinction between formal and informal institutions is an important element when assessing the coordination mechanisms of economic agents' activity.

Nevertheless, it is still unclear how to measure the quality of institutions through transaction costs. D. Wallis and D. North called the relation between transactions and institutions of economic activity the transaction function, in contract to the transformation function [34 p. 97]. Transaction costs are believed to be the costs of exchange, of the transaction function execution. These are concerned with the conversion of investments into outputs.

6. Transaction Function of Institutions

To begin with, let us consider the relations between transaction costs and such an economic institution as a company. Where are the boundaries of the latter?

When functioning, the market involves certain expenses. So, the establishment of a company is the right of an entrepreneur to allocate the resources, taking into account saving on market expenses. Hence, an enterprise is a system of relations arising when the allocation of resources depends on an entrepreneur.

It should be stressed, following R. Coase's idea [5], that the industrial production cannot be performed by a single enterprise only. On the one hand, the growth of an enterprise in size can result in the decline of the entrepreneur's profit, i.e. the expenses on additional transactions inside the company may increase. On the other hand, the bigger the number of transactions performed is, the less able an entrepreneur is to take maximum advantage of the production factors, i.e. to place them in the production steps most effectively.

Hence, the enterprise boundaries in terms of the market exchange are determined by minimization of transaction costs compared to the mean market expenses. When the transaction expenses exceed the market expenses of exchange, it means leaving the boundaries of the company's economic activity. O. Williamson [41, P.12] later extended the idea of R. Coase of reducing the transaction costs inside a company: the principal aim and the result of any institution functioning (such as company) is minimization of transaction costs.

Taking the above-mentioned into account, the fifth scientific principle of the transaction theory of institutions may be defined as follows. *Economic institution establishment result in the reduction of the number of transactions and, thus, the transaction costs on the whole.*

K. Arrow et al. have approached the concept of transaction costs as the costs of economic system exploitation [2]. He compared the influence of transaction costs on economy with one of friction in physics. Such suggestions triggered the conclusion that the closer the economy approaches the Walras's general equilibrium model the lower the level of transaction costs it demonstrates, with the opposite being as true. D. North determined transaction costs as those consisting of assessment of the useful properties of exchange goods, ensuring property rights and enforcement of their execution [22]. These costs were believed to be the impetus of social, economic and political institutions.

Taking these ideas for granted, we propose that *the cost evaluation of an economic institution is the transaction costs of establishing and sustaining this settled norm of interaction between economic agents.* This makes up the fifth scientific idea of the transaction theory of institutions.

Another significant issue is a possible formalization of the transaction function.

Unfortunately, most studies on transaction expenses have tried to tackle the functional dependence between them and various factors in a qualitative or mediated way. Thus, J. Benassy [3], investigating the competitive market mechanisms, suggested that the market equilibrium between the supply of goods and the customers' ability to buy them should result from the strategic function of conformity between the price announcements from different market players. E. Heinesen has admitted the possibility of modeling the transaction function of macroeconomic institutional dimensions [15]. The works of Ch. Koldstad and M. Turnovsky [17] have been concerned with the transactions of information alignment of prices on the goods of different quality. The authors suggested the transaction function as a way to describe the dynamics of information asymmetry on the market.

It is of particular relevance to introduce the transaction function in the labor market, because it is a place where there is an urgent need for information search and for the negotiations over optimal salary between an employer and an employee. F. Alvarez and M. Veracierto [1] have been confident that the functional transaction dependences on various endogenous factors will assist in designing a sensible policy of labor regulation. The comparison between companies in the US and Japan in terms of the transaction costs on maintaining partnership has forced S. Globerman, et al. [13] to raise the problem of the transaction function representation. However, the authors only singled out the expenses, which can afford the functional dependence of the transactions on the parameters of interaction between companies.The transactional function of money has been demonstrated by J. Vuchelen and L. Hove [33]. They showed that introduction of euro as a common payment unit of the EU required substantial transaction costs, which could be described as a model. E. Rahardjo and co-workers [31] have focused on the transaction costs of search and verification of the Internet websites in Indonesia. The authors proved that evaluation of the cost dynamics can be performed by the transaction function. The similar representation of the transactions to manage the flow of goods by taxes has been suggested in the recent study of A. Cunha [10]; however, an explicit form of the transactional function again has not been suggested.

The analysis of the bulk research done into the transaction function development has shown that its clear representation is possible on the basis of classic definitions, which explain the nature of transaction costs, followed by verification of the correlation developed. There might be singled out three key dependences of transaction costs on the parameters of

economic systems. According to T. Eggertsson [12], transaction costs are directly proportional to the number of economic agents, negotiating between one another. On the other hand, from the R. Matthews's standpoint [19], they are inversely proportional to the number of contracts signed and the norms established to guarantee the execution of contracts.

If by the contracts signed we understand formal institutions, and by the norms, which enforce the execution of these contracts, non-formal ones, it becomes possible to represent quantitatively the dependence of transaction costs on the major institutional parameters of economic systems.

Taking the above-mentioned into consideration, the transaction function of a company represents the following correlation [27]: transaction costs of a company are proportional to the number of economically active agents, who have signed institutional agreements with the company, and inversely proportional to the number of formal and non-formal institutions with corresponding coeffecients of elasticity.

In contrast to a production function, which estimates the output, the transaction function should describe transaction costs as numerical characteristics of the process of transactions. In this case, it becomes possible to discuss minimization of transaction costs.

Let us take, for instance, a company establishing the business relations with some economic agents. A formalized representation of the transaction function shows that the level of transaction costs will be minimal when there is the maximum number of formal agreements and informal institutions between the company and the agents. If by the formal institutions we mean the norms of making contracts, contract execution, the control of quality and the priperty right security, then, the informal institutions imply the norms, which have not been included in the formal contracts. The transaction expenses of the establishment of informal institutions are likely to involve information search, search of buyers and sellers, the preparation of a contract, and defence against opportunistic behaviour. It goes without saying that in each particular case, the set of formal and informal institutions is defined by the established structure of institutional environment.

By what image it is possible to prove the transaction function? The most correct approach to the proof of sort of the transaction function lays in a set of the necessary statistical information with a further improvement of coefficients of elasticity and sort itself of the transaction function. Production of the task of serious empirical research here sees.

But also at a quality level it is possible to prove possibility of existence of offered sort of the transaction function. Really, classical graph (the fig. 1) about equilibrium of transaction costs of the corporation and of institutional environment demonstrates propagation of limiting social costs of the population at increase of contamination of terrain.

When the factory has unlimited freedom to pollute an environment, its owners do not undertake any gains for limitation of contamination and will reject soiling in an atmosphere until the point Q_2 will be reached, which the limiting value of contamination for the manufacturers is equal to zero. The cumulative limiting costs of the population are equal this point to a segment BC, and exuberant social costs of contamination - square of a delta circuit ABC. This outcome is inefficient till the Pareto, as the equality of limiting social benefits both costs is not observed, and usage of air as a resource does not represent the greatest value.

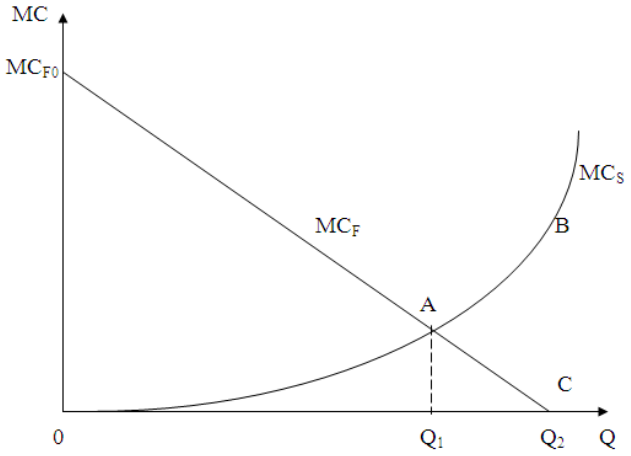

Figure 1. Efficiency of a factory at decrease of contamination environments [12]: MC_F - limiting costs of a factory on decrease of contamination of the environment; MC_S - limiting social costs of contamination for the inhabitants of terrain; Q - value of contamination of the environment

The Fig. 1 shows, that in an interval between Q_1 and Q_2 the damage plotted to the population by contamination, exceeds a cost of a factory, conjugate with clearing. Why the inhabitants of terrain do not pay to a factory compensation for limitation of a level of contamination up to Q_1? The answer that in the given model misses a number of limitations, for example such of transaction costs, as a cost of collective operation of the population, or legal limitations, i.e. the model is inexact. The addition of necessary limitations will reduce the given model in the equilibrium Pareto - status.

Differently, a transaction cost increase at increase of number of the people involved in the process of solution of ecological problems. Therefore, the increase of an amount economically reduces the fissile agents involved in creation of the institutional environment, in proportional increase of transaction costs on creation and maintaining given of institutional structure.

On the other hand, the empirical analysis of dependence of transactional costs from a level of introduction of informal norms has revealed their inverse ratio. In the Fig. 2 the outcomes of empirical research of factor handle before contract opportunism of the workers represented. From all diversity of the endogenous opportunism forms of the workers the form of unfavorable takeoff as most determined

and verifiable was selected.

Level of opportunism *R* defined as the ratio of change of outcomes of activity of the worker, gauged, for example, size of not issued production *ΔQ* as a result of unfavorable takeoff to potentially possible outcome of activity *Q,* multiplied on 100%:

$$R = (\Delta Q / Q) \cdot 100\ \%.$$

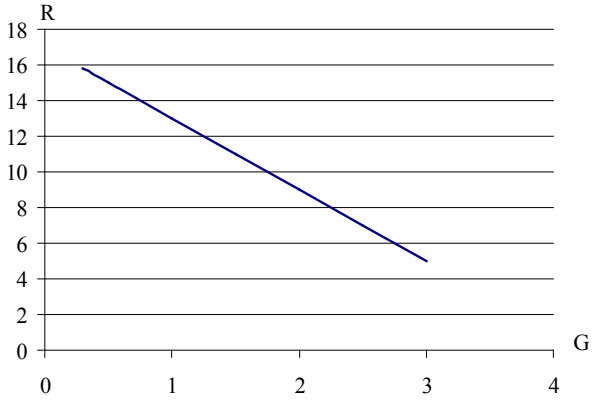

Figure 2. Dependence of a level of unfavorable takeoff R of the workers from a rating of institute of selection of frames G on a five-mark scale, % [29]

The outcomes of empirical research have shown that the level of unfavorable takeoff of the workers is reduced at improvement of professional activity of a staff department. Therefore, a transaction cost on selection of the workers by that will be lower (at decrease of a level of unfavorable takeoff), than above level of normalization of activity of a staff department of the corporation. And these norms can carry informal character defined by psychological specificity of operation with various categories of the workers, acting on the corporation.

The similar dependence can be observed at formal institutions of activity of the managing subject. In the Fig. 3 the dependence of a long of the employees of firm occupied with operation with the information, from an amount of administrative links represented.

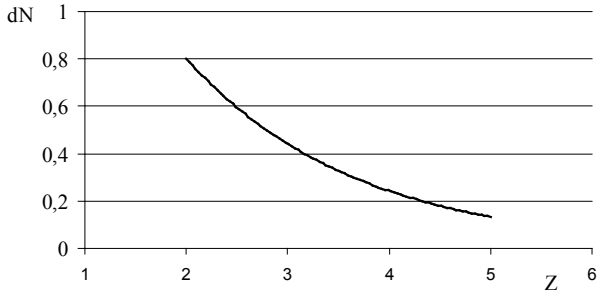

Figure 3. Dependence of a long of the employees of the corporation occupied with operation with the information dN from an amount of administrative links Z [30]

The analysis of the represented dependences shows, that the increase of an amount of administrative links on firm reduces in decrease of number of the experts on operation with the information, and the given dependence has exponential character. Therefore, the increase of an amount of the formalized institutes (control links) reduces in decrease of transaction costs, bound with support of activity of the experts on operation with the information.

To sum up, the integration of the scientific principles and ideas, which consolidate the practical experience and represent the regularities of the society development in terms of the transactions of economic institutions, has enabled to outline the transaction theory of institutions.

The principles of marginality of transactions, establishment of the transaction sector, non-productive nature of transaction costs, proportionality of these costs to the specificity of assets, and minimization of transactions as a result of the institution formation have been introduced by the founders of the present theory and might serve as a ground for new theoretical speculations.

The suggested scientific principles of transaction typology, crisis forecasting, estimation of transaction costs based on the accounting reports, evaluation of the hybrid organization density, and value estimation of economic institutions based on transaction costs may stimulate further research in order to expand the transaction theory of institutions.

In times of a wide application of the heterodox economic theory tools, establishment of the transaction theory of institutions can become a stepping stone for the research forecast of economic activity development.

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