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The quality of formal institutional subsystems of OECD countries

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Abstract

Motivation: Institutions are the core element of every economic system. Institutions condition all economic, social and political relations within the economy. They are universal. There is no doubt that a non-institutional analysis of contemporary economies is incomplete. The subject of this article are subsystems of formal institutions of OECD countries. This paper is an attempt to supplement contemporary economics with a structural model of formal institutional environments.

Aim: The purpose of the article is to assess the quality of formal institutions of OECD economies and to identify the most important groups of institutions that shape the formal institutional environment of modern economies. A research hypothesis was adopted, stating that the quality of property rights has the strongest positive impact on the quality of formal institutional subsystems.

Results: The analysis of the literature allowed the indication of the importance of (especially formal) institutions in the economy. The constructed soft model allowed for positive hypothesis verification. As it turns out, the quality of formal institutions is positively influenced by all three separate groups of formal institutions, but institutions of property rights are of the greatest importance.

Keywords: institutional economics; formal institutions; soft model; SEM–PLS
JEL: C31; C38; E02; O43; P37

1. Introduction

Institutions are the core of every economic system. There is no doubt that "institutions matter" (North, 1990). Institutions condition all economic, social and political relations in the economy. They are universal. There is no point in analyzing contemporary economies disregarding the institutional approach.

The subject of this article are subsystems of formal institutions of OECD countries. The article analyses the institutions at the macroeconomic level. This paper is an attempt to supplement contemporary economics with a structural model of formal institutional environments.

The aim of the article is to assess the quality of formal institutions of OECD economies and to identify the most important groups of institutions that shape the formal institutional environment of modern economies. As part of the considerations, a research hypothesis was adopted, stating that the quality of property rights has the strongest positive impact on quality of formal institutional subsystems. The year 2017 was selected as the period of research, due to it being the most recently available statistical data.

The quality of institutions was measured using aggregative indexes developed by selected statistical organisations such as: The Fraser Institute (2020), The Heritage Foundation (2020), Property Rights Alliance (2020) and The World Bank (2020). In order to achieve the aim of the article, the soft modelling method (PLS–SEM) was applied. The soft model was estimated using the R computing environment — plspm[1] and SEMpls[2] packages were used. Additional calculations were performed in a MS Excel.

2. Institutions in contemporary economies

Defining institutions is not an easy task. The difficulty of precisely determining what this term means is due to its interdisciplinary and multidimensional nature. An additional difficulty is the fact that institutions are not directly observable, they are invisible (Wilkin, 2016, p. 99).

The concept of institutions has its origins long before the emergence of economics as a science (Hodgson, 2006, p. 2). In economic theory, the exploration of institutions has lasted since the times of classical economics (Gruszewska, 2013a, p. 99). Already A. Smith, both in the *Theory of moral sentiments* and *An inquiry into the nature and causes of the wealth of nations* included institutional issues of the functioning of the economy (Tajima, 2007, p. 579). The particular development of economic theory in the field of institutions took place at the beginning of the 20th century thanks to Veblen (2016, p. 88), who understood institutions as a kind of custom that became obvious and universally accepted (Veblen, 1924, p. 101). The "father" of institutionalism emphasised that institu-

[1] Developed by Sanchez et al. (2014).

[2] Developed by Monecke & Leisch (2012).

tions are the product of past socio-economic processes. They are ideally suited to the past, but will never be fully in line with the conditions of the present.

According to North (1990, p. 1), a representative of new instructional economics (NIE), institutions are the "rules of the game", which are created by people. They shape interpersonal interactions and stimulate exchanges of an economic, political or social nature. Just like Veblen he emphasised the importance of the past in the creation and change of existing institutions[3]. North (1990, p. 118) claimed that institutions are the "bridge" between the past, present and future.

There are three main approaches to institutions in economic theory (Gancarczyk, 2002, p. 82). First of all, institutions are recognised as a system of interdependent, formal and informal, rules and customs. Secondly, they are identified with organisations[4]. Lastly, the third approach defines institutions as a state of equilibrium in the game[5]. This article uses a process approach to institutions that clearly separates them from organisations (entities).

In this article, the definition proposed by Hodgson (2006, p. 18) is adopted, according to which institutions are a system of established and embedded principles (rules) that influence economic, social and political interactions.

The importance of institutions in the economy is indisputable. Institutions are universal — they regulate economic, political and social relations (Vitola & Šenfelde, 2015, p. 278). They give meaning to entities, create a safe area of economic interactions, and thus contribute to increasing the predictability of the behaviour of individuals. However, it seems that the most important function of institutions is to define acceptable solutions, create opportunities, but also to define the boundaries of the functioning of entities (Gruszewska, 2013a, p. 136).

Scheme 1 graphically presents the effect of the implementation and evolution (development) of institutions in the economy. In conditions of uncertainty and high transaction costs, the introduction or appropriate modification of institutions contributes to the increase in the predictability of the individuals' behaviour, which in turn leads to the creation of a relatively safe field of interaction, an increase in environmental stability and a reduction in transaction costs (Iwanek & Wilkin, 1997, p. 19).

In order to positively influence the activity of individuals in society, institutions need to meet several conditions (Wang, 2002, p. 137). First, they should clearly state the costs, but also the benefits of the choices (institutions must be understandable). Secondly, the institutions' task is to define "the rules of the game" — ex ante restrictions. What is more, institutions must establish

[3] North (1994b, p. 386) pointed out that institutions strongly depend on the past ("path dependence concept").

[4] This approach is used in neoclassical economics and also in everyday language. Some representatives of institutional economics also use this meaning of institutions, for example Williamson (1985) who equated corporations with institutions.

[5] This approach is characteristic especially for Aoki (2000).

sanctions in case of the deviant behaviour of individuals. The sanctions should be severe enough to reduce the benefits for individuals disobeying "the rules of the game" (Gruszewska, 2013a, p. 109). Moreover, institutions have to be characterised by completeness and the mutual relations of: complementarity[6] and substitutability[7] (Bardhan, 2005, p. 521).

Changes are an inherent process of every institutional system. They consist of "constant «clashes» of the rules and their adaptation to social interactions" (Gruszewska, 2017, p. 41). The dynamics of institutional changes are varied — they depend on the type and nature of the institution (Chang & Evans, 2005, pp. 6–8). The evolution of the institutional structure should progress towards building so-called "good" institutions (Rodrik, 2007, p. 153). "Good", i.e. those that improve the flow of information, protect property rights and contracts, and stimulate the behaviour of market participants (Gruszewska, 2013a, p. 157). Efficient institutions are of particular importance to the economic growth and development. The quality of institutions is considered to be one of the deep factors of the growth (Rodrik et al., 2004, pp. 133–134). Alongside institutions, geographical determinants and the openness of the economy are considered to be fundamental growth causes (Acemoglu, 2009, pp. 114–123).

The quality assessment of institutions consists in the analysis of measures of institutional quality developed by international statistical organisations (Kunčič, 2014, p. 143). Such measures are quite often used in institutional analysis. They are also subject to criticism, so the interpretation of the obtained results should be approached with great caution (Voigt, 2013, pp. 15–22). It should be noted that the measures are only a certain approximation of reality, not its exact representation.

Worldwide Governance Indicators (WGIs) are some of the most commonly used in institutional research. They consist of six synthetic variables: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption. Each variable is a stimulant in nature, meaning that higher values indicate higher institutional quality (Kaufmann et. at., 2011). WGIs are commonly used in institutional analysis, for example: Ferrara & Nisticò (2019), Shchegolev & Hayat (2018), Wu (2017). Measures of institutional quality also include indicators developed by The Fraser Institute (Economic Freedom in the World — EFW). EFW variables are estimated on the basis of experts' assessments, and include five areas: size of government, legal system and property rights, sound money, freedom to trade internationally and regulation. They are also, just like WGIs, stimulants of institutional quality and used for the analysis of institutional structure, for example: Balcerzak (2020), Medina-Morala & Montes-Gan (2018). A third

[6] Institutions should be surrounded by other institutions that complement them (Höpner, 2005, p. 333).

[7] Substitution consisting in displacing outdated institutions with new ones, which are of a higher quality (Gruszewska, 2011, p. 55) and better suited to the conditions of the present.

international statistical organisation which provides institutional quality data is The Heritage Foundation. Their Index of Economic Freedom (IEF) includes four main components: rule of law, government size, regulatory efficiency and open markets. Higher values of IEF variables indicate a higher efficiency of institutions. IEF was used in Murphy (2016), Ott (2018), Procházka & Čermáková (2015). Property rights quality can be measured using detailed measures prepared by Property Rights Alliance. The International Property Rights Index (IPRI) assesses formal institutional systems in three spheres: legal and political environment and the quality of physical and intellectual property rights. Examples of the use of these indicators can be found in the works Howard-Hassmann (2013), Koroso et. al. (2019), Owczarczuk (2013).

To measure the efficiency of formal institutional subsystem elements, selected synthetic variables of institutional quality developed by the described statistical organisations were applied. The higher institutional measures (also latent variables) values are, the higher the quality of the institution is.

It should be emphasised that the high efficiency of an institution leads to the creation of conditions enabling the achievement of social and economic benefits for all individuals in society. The quality of the institution, or rather the lack of it, becomes an instrument of explaining the development inequalities of contemporary economies (Myrdal, 1978, pp. 773–775). As Ratajczak (2011, p. 41) aptly points out, in order for economics not to be perceived as a science detached from reality, it must take into account the importance of institutions. It seems that the analysis of changes in contemporary economies is not possible without the aid of institutional economics (Ciborowski et al., 2017, p. 9).

3. Formal institutional subsystem

There are many classifications of institutions within contemporary institutional theory. Divisions according to D.C. North, F.A. Hayek, J. Jütting and O. E. Williamson are presented in Scheme 2. Formal institutions, alongside informal ones, constitute the institutional structure of the economy. Informal institutions include: culture, religion, patterns of behaviours, social trust and "mental models" (Fiedor, 2015, p. 100). There are numerous classifications of formal institutions. For example, North (1994a, p. 360) lists: rules, laws and constitutions as components of formal institutional subsystems. According to Williamson (2000, p. 597) these are: formal rules of the game, politics (and property), bureaucracy and management mechanisms. Dobler (2011, p. 15) distinguishes property rights, the legal system (the rule of law) and democracy within the subsystem of formal institutions.

In this article the classification proposed by Fiedor (2015, p. 100) is applied. The subsystem of formal institutions consists of: legal order, property rights and various types of regulations (e. g. monetary, labour market, real estate market or business).

3.1. Legal order

The law is a set of norms that can be enforced by courts. It is a system of established rules, the purpose of which is to regulate governments and define the relations between the state and its individuals, and between the individuals themselves (Dworkin, 1967, pp. 18, 40). Law is considered to be the core of not only social (Zhuravlev, 2017), but also economic life (Faundez, 2016, p. 34). Institutions of a legal order are the basis of formal institutional environment — they affect both the shape of property rights[8] and the quality of regulations.

The legal order must be generally recognised as reasonable, appropriate and fair. The law must be adapted to customs embedded in society (Deakin et al., 2017, p. 190). Fuller (1969, as cited in Kwaśnicki, 2009, p. 133) indicates eight features that the law should meet in order to have a positive impact on socio-economic processes (Rossmanith, 2019, p. 135):

- generality, impartiality;
- promulgation of legal acts (common knowledge and accessibility of the law);
- prospectivity;
- clarity and transparency;
- non-contradiction of legal provisions;
- feasibility;
- stability;
- compliance between the activities of state organizations with applicable law.

The quality of a legal order institution depends on the rule of law. According to Dicey (1979, p. xxii), the rule of law means: equality of all individuals in society before the law, uniformity of courts, inadmissibility of raison d'état as a pretext for an act prohibited by law, domination of law over state power (Kwaśnicki, 2009, p. 132), and adherence to the *nullum crimen sine lege* principle (no crime without law).

3.2. Property rights

Property is a relationship between individuals who have rights but also obligations with respect to things (Commons, 1924). Property rights are the institution that defines and delimits the privileges held by individuals over resources (Boudreaux, 2005, p. 4). They are considered as a social instrument which allows and helps to shape expectations that an individual can maintain in contacts with the others (Demsetz, 1974, p. 347).

Property rights are strongly embedded in the existing institutional setup, which includes both formal and informal institutions (Cao, 2012, p. 286). The institutions of property rights mainly take on a formal character, as rights contained in the constitution, laws and other legal regulations (Boudreaux & Aligica, 2008, pp. 40–42). They are a series of related rights of the resource

[8] If property rights institutions are not be secured by appropriate law (legal order), they would not exist (Dobler, 2011, p. 71).

owner and others to whom some of these rights may be transferred (Gruszewska, 2020, p. 49). Schlager & Ostrom (1992, pp. 251–252) indicate five basic rights connected to property:

- access — the right to access and use the owned resource;
- withdrawal — the right to receive benefits due to the use of a resource — at the same time depriving other individuals of the possibility of using the resource;
- management — the right to determine how to use and improve the possessed resources;
- exclusion — the right to decide who can also use the resource;
- alienation — the right to sell, lease or sublease selected property rights.

Only the "full owner" has access to all the listed property rights. Access to selected property rights may also be transferred to other entities, depending on the position in relation to the "full owner" (Gruszewska, 2020, p. 50). Ostrom (2003) created a matrix of property rights that are associated with a position to the "full owner" (Table 1).

The importance of property rights in contemporary economies is indisputable. Boudreaux (2005, pp. 11–16) lists four basic functions of the property rights institutions:

- helping individuals to allocate their resources efficiently;
- creating positive incentives for example to: invest, create, be innovate or save money (Williamson, 2011, p . 97);
- supporting economic development and removing income inequalities (contribution to reducing poverty);
- determining the level or socio-economic welfare ("human flourishing and empowerment").

3.3. Regulatory institutions

Regulatory institutions are the third element of the formal institutional subsystem. Regulation is understood as a process that involves modifying alternatives, outputs, technologies, information and other elements that influence the decisions of individuals (Riker & Ordeshook, 1973). It is a kind of social control carried out by introducing principles and rules in the form of legal and administrative acts (Levi-Faur, 2010, pp. 4–5). The quality of legal order institutions significantly influences regulatory institutions in the economy.

The existence of market mechanism distortions is the reason for regulation (Rodrik, 2007, p. 157). The most common market failures include (Stiglitz, 2000, pp. 77–85): the presence of monopolies (competition distortion), asymmetric information between entities, externalities (especially external costs), the occurrence of public goods provided by public sector, unemployment and other disruptions of a macroeconomic nature (such as inflation or economic underdevelopment). These are economic market failures. Ogus (2002, p. 629)

mentions non-economic market mechanism distortions: distributional injustice and paternalism.

The basic classification of regulations divides them into economic and social (Aktan, 2016, p. 306). Economic regulations are related to categories such as efficiency, effectiveness and competition. Their basic task is to eliminate market mechanism inefficiencies. Social regulations perform two basic functions in the economy: they correct socially harmful effects of economic activity and lead to the achievement of socially desirable results (Windholz & Hodge, 2012, pp. 220–224).

De Rosa & Malyshev (2008, p. 12) list five basic groups of regulations that are of fundamental importance in every economy, which are:
- competition protection (elimination of anti-competitive behaviour);
- access regulation (excluding discrimination in access);
- economic regulation (price regulations, consumer protection);
- technical regulations (safety and environmental regulations);
- introducing periodic corrective regulations.

4. Research method: soft modelling (SEM–PLS)

Soft modelling (SEM–PLS) is a method which was created by Wold (1980a, 1980b). It is a specific type of econometric modeling[9], in which there are two kinds of "softness": observational (measuring latent variables using a set of observable indicators) and distributional (no need to determine multidimensional distribution *ex ante*) (Skrodzka, 2015, p. 59). SEM–PLS is an alternative method to traditional covariance based SEM–CB. The biggest advantage of structural equation modelling (SEM) is that it strongly combines empirics with theory (Skrodzka, 2016, p. 283). SEM–PLS, unlike SEM–CB, allows for the estimation of latent variable values that can be used for linear ordering of objects (observations) in terms of the latent variable and that is why this method was chosen for this research (Hair et. al., 2017, pp. 14–15).

Every soft model consists of two sub-models: an inner (theoretical) and an outer (measurement) one. The theoretical model describes the relationships between latent variables, while the measurement one defines the relations between the hidden variables and their explanatory indicators (Ciborowski & Skrodzka, 2019, p. 389).

Latent variables can be defined in two different ways: deductively (when the latent variable is primary in relation to its diagnostic variables) and inductively. Under the deductive approach, the observable indicators are reflective, while in the inductive analysis, they are formative (Perło, 2014, p. 255). In this article the deductive approach is applied[10].

[9] A detailed description, generalizations and empirical applications can be found in: Perło (2014), Rogowski (1990) and Sanchez (2013).

[10] The external model analysis is mainly based on factor loadings, not weights (Marcinkiewicz, 2013, p. 456).

The selection of diagnostic variables was carried out on the basis of substantial and statistical criterions[11]. From a set of twenty-one diagnostic variables, fifteen were selected for input into the final model[12] (Table 2). Each of selected measure is a stimulant, which means that its higher values indicate a higher quality of the institutions.

A diagram of the soft model applied in the study is presented in Scheme 3. The soft model of the quality of formal institutions consists of four latent variables and thirty directly observable indicators.

LEG (the quality of legal order institutions), PR (the quality of the institution of property rights), and REG (the quality of regulatory institutions) are first level latent variables. The FORM (the quality of formal institutional subsystems) is the second level latent variable (Table 2). The paper assumes that explanatory indicators of the FORM variable are all the observable variables of lower-level latent variables with which this hidden feature remains in an internal relation (Misiewicz et. al., 2019, p. 6).

According to the diagram presented in Scheme 3, the theoretical sub-model is in the form of three stochastic equations (1–3).

$$PR_t = \alpha_1 LEG_t + \alpha_2 + \varepsilon_{1t}, \tag{1}$$

$$REG_t = \beta_1 LEG_t + \beta_2 + \varepsilon_{2t}, \tag{2}$$

$$FORM_t = \gamma_1 LEG_t + \gamma_2 PR_t + \gamma_3 REG_t + \gamma_4 + \varepsilon_{3t}, \tag{3}$$

where:

α_n, β_n, γ_n — structural parameters;

t — year;

ε_{et} — random element of the e-equation.

In the outer model, there are two types of relationships between latent variables and their explanatory indicators: weighting and reflective. The first one assumes that a latent variables are linear combinations of their explanatory measures (4). On the other hand, the reflective relation represents the power of "reflecting" an unobservable measure by its explanatory variables (5) (Perło, 2014, pp. 88–89).

$$\wedge_{j=1,\ldots,k} \wedge_{t=1,\ldots,T} \xi_{jt} = \sum_{i=1}^{n_j} w_{ij} x_{ijt}, \tag{4}$$

$$\wedge_{j=1,\ldots,k} \wedge_{t=1,\ldots,T} \boldsymbol{x}_{ij} = \pi_{ij0} + \pi_{ij}\xi_{jt} + \mu_{ijt}, \tag{5}$$

[11] Statistical and substantive criterions: recognised importance and meaning, variability (classic coefficient of variation at the level above 5%) and presentation in the form of intensity indicators (all selected variables are aggregative measures) (Borkowski, 2020, p. 101).

[12] The selected set of indicators guarantees the best quality of the soft model (the highest values of: the determination coefficients and the Stone–Geisser tests).

where[13]:

ξ_{jt} — value of the *j*-latent variable;
x_{ijt} — *t*-value of the diagnostic variable of the *j*-latent variable;
w_{ij} — weight of the *i*-diagnostic variable of the *j*-latent variable;
π_{ij0} — location parameter of the reflective relation;
π_{ij} — factorial loading of the *i*-diagnostic variable of the *j*-latent variable;
μ_{ijt} — random component of an expected value equal to zero.

The estimation of the soft model is performed using the partial least squares (PLS) procedure and takes place in three successive stages (Perło, 2014, p. 93):

1. First, an iterative estimation of weight values takes place. At this stage, a decision is made on the scheme for estimating the internal values of latent variables. As part of the modelling carried out in the article, the centroid[14] formula was adopted.
2. Next, parameters (OLS regression) of the theoretical and measurement models are estimated. In the outer sub-model, parameters are factor loadings, but in the inner sub-model, they are a simple (in the case of one exogenous latent variable) or multiple[15] OLS regression estimates.
3. The last stage is to estimate location parameters of both internal and external relations. To estimate intercepts, it is crucial to restore the original metrics by dividing weight and multiplying factor loading values by the appropriate standard deviation. The estimation follows the principles of "classical" econometrics[16], assuming that the mean value of the latent variable takes the form (6) (Rogowski, 1990, p. 45):

$$\bar{\xi}_j = \sum_{i=1}^{n_j} w_{ij} \bar{x}_{ij}, \tag{6}$$

In the soft model, the nature of connections, both in the internal and external submodels, is linear (Misiewicz, 2013, p. 196). As a result of the PLS method, the values of hidden variables for objects are estimated. They can be treated as values of a synthetic indicator that are used to build a ranking of objects (e. g. OECD countries) in terms of a specific hidden structure. Importantly, estimates of latent variables for objects do not have a substantive interpretation they can mainly be used for comparative analysis based on the order of the objects (Mierzyńska, 2011, p. 293).

[13] Equations' symbols on the basis of Lohmöller (1989, pp. 28–29) and Rogowski (1990, pp. 36–37).

[14] The centroid formula was originally proposed by Wold, while the factorial and path schemes are a modifications of the PLS method introduced by J.-B. Lohmöller (Esposito Vinzi et al., 2010, p. 53).

[15] Multiple OLS regression parameters of the inner model allows to verify adopted research hypothesis. Higher values of the structural parameter indicates a stronger impact on the latent variable.

[16] Formulas for calculating location parameters can be found in Lohmöller (1989, p. 31) or Wold (1980b, p. 338).

The verification of the soft model should be substantive and statistical in nature. As part of the substantive verification, the compliance of the estimation results with the initial assumptions is analyzed. In addition, the directions of the stimulant and destimulant signs are assessed (Perło & Roszkowska, 2017, p. 71). Various measures of the estimation quality are used for statistical verification. The article applies the following measures of statistical validation (Sanchez, 2013):

– one-dimensionality coefficients: Cronbach's alpha and Dillon–Goldstein's rho (so-called: Jöreskog's rho)[17];
– determination coefficients (R^2).

Moreover, using the blindfolding method[18], the following will be calculated (Rogowski, 1990, pp. 47–54):

– values of the Stone–Geisser test (S–G) (Akter et al., 2011; Sellin & Versand, 1995, p. 262);
– parameters' standard deviations using Tukey's Jackknifing method.

The assessment of the predictive ability of the model is based on the Stone–Geisser test (Geisser, 1974; Stone, 1974). The test takes values between $-\infty$ and 1. Negative values indicate that the estimated model has poor prediction abilities (Rocki, 1998, p. 110). It is the basis for negative model verification. While calculating S–G test values, one can estimate the standard deviations of the model parameters using Tukey's Jackknifing[19] method (Miller, 1974). For this purpose, the formula (7) was used (Rogowski, 1990, pp. 53–54). A parameter is statistically significant if its standard deviation does not constitute more than 50% of its estimated value — so-called the "2s" rule (Perło, 2014, p. 97).

$$s_\beta = \sqrt{\frac{\sum_{l=1}^{L}\left(b_l - \bar{b}\right)^2}{L}};\ \bar{b} = \frac{\sum_{l=1}^{L} b_l}{L}, \tag{7}$$

where:

b_l — value of the estimator of the selected soft model parameter (weight, factor loading);

L — tested distance.

[17] The Cronbach's alpha and Dillon–Goldstein's rho take values in the range of <0,1>. Values higher than 0.7 identify that set of indicators for the latent variable to be homogenous. Homogeneity coefficients can be only used in the deductive approach of defining latent variables in the model.

[18] The blindfolding method consists in deleting every L-th value of the variable of a selected latent variable and replacing it with a "forecast" (e. g. arithmetic mean of the remaining variables). The procedure is repeated until each observation is predicted at least once. The number L (distance) is chosen arbitrarily. L was assumed in the study at the level of 7. In the literature, it is recognised that the distance should be in the range between 5 and 10, $L \in \{Z\}$ (Chin, 2010, p. 680).

[19] The significance of parameters in the soft model can be also verified using the bootstrapping method (Davison & Hinkley, 1997).

5. Results

The estimation of the external model is presented in Table 3. Weights and factor loadings are statistically significant, in accordance with the "2s" rule. According to the measurement model, all the explanatory indicators are stimulants. The outer model parameters are consistent in terms of signs. The correctness of the selection of variables for latent structures is confirmed by high values (above 0.700) of Cronbach's alpa and Dillion–Goldstein's rho (Table 4).

Four variables (L_2 — judicial independence, 0.961; L_1 — rule of law, 0.955; L_3 — impartial courts, 0.929; L_4 — integrity of the legal system, 0.836) are strongly correlated with the LEG latent variable. Only one of LEG variables (L_5 — judicial effectiveness, 0.630) reflected its values quite strongly. A similar situation occurs in the case of the PR latent variable. Four diagnostic indicators (P_3 — property rights protection, 0.980; P_1 — protection of property rights, 0.975; P_4 — physical property rights protection, 0.927; P_5 — intellectual property rights protection, 0.921) have a very strong impact on shaping the PR values. Between the PR and the P_2 — property rights, 0.665 — a strong correlation is observed. The quality of regulatory institutions (REG) latent variable is strongly correlated with three variables (R_2 — regulatory quality, 0.966; R_1 — government effectiveness, 0.939; R_5 — business regulations, 0.860), while quite strongly with other two (R_3 — sound money, 0.689; R_4 — labour market regulations, 0.573). The FORM measure, which is a second-order latent variable, is strongly correlated with eleven observable variables, quite strongly with three, and moderately with one.

The estimated equations of the theoretical model are presented in the form of formulas (8–10). The standard deviations of the structural parameters calculated using the Tukey's Jackknifing method are presented in brackets. All parameters are statistically significant ("2s" principle). The inner model is considered to be coincident.

$$PR_{2017} = \underset{(0.006)}{0.948}\, LEG_{2017} + \underset{(0.230)}{3.497}, \quad (8)$$

R^2=0.899; S–G=0.700;

$$REG_{2017} = \underset{(0.013)}{0.942}\, LEG_{2017} + \underset{(0.230)}{5.451}, \quad (9)$$

R^2=0.887; S–G=0.540;

$$FORM_{2017} = \underset{(0.048)}{0.342}\, LEG_{2017} + \underset{(0.037)}{0.370}\, PR_{2017} + \underset{(0.063)}{0.311}\, REG_{2017} + \underset{(0.293)}{0.026}, \quad (10)$$

R^2=1.000; S–G=0.680.

Equation (8) shows that the quality of legal order institutions has a very strong, positive (0.948) impact on the quality of property rights. The variability of the PR is approximately 90% explained by the variability of the LEG.

The value of the S–G test is equal to 0.700; which proves a good predictive ability of this latent structure.

Legal order institutions also have a very strong positive (0.942) impact on shaping the quality of regulation (9). The equation is adjusted to the empirical data at a high level (R^2=0.887). The latent variable REG has quite good predictive abilities (S–G=0.540).

Equation (10) presents the main function of the article. The strength and direction of the influence of individual institutions on the quality of the formal institutional subsystem is similar, but it is property rights that have the strongest influence on the FORM latent variable shaping. On this basis, the adopted hypothesis can be positively verified. The quality of the equation is ideal (the coefficient of determination is at 1.000). The overall value of the S–G test is at the level of 0.680, which indicates good model predictive abilities.

The soft model describing the quality of formal institutions of OECD countries is considered to be positively substantially and statistically verified.

Rankings of OECD countries according to values of latent variables are presented in Table 5. The objects are classified into four typology groups using the mean and standard deviation[20].

In 2017 the highest quality of legal order institutions are in Finland, while the lowest are in Mexico. The best protected property rights are also found in Finland, and the least protected in Greece. The economy having the highest quality of regulatory institutions is New Zealand, while of the lowest can be found in Mexico. The highest value of the FORM latent variable is in Finland, while the lowest is in Greece.

The group of economies with the highest quality of formal institutions includes four countries: Finland, Switzerland, New Zealand and the Netherlands. The six countries with the lowest quality of formal institutional subsystems are: Slovakia, Poland, Italy, Turkey, Mexico and Greece. It seems that in these countries formal institutions are not pro-developmental. One can even say that their low quality is a kind of a barrier to the dynamics of economic processes.

6. Conclusion

The main purpose of the article was an attempt at a multidimensional assessment of the quality of the formal institutional environment of OECD countries. The aim of the study was achieved with the use of the soft modelling method (SEM–PLS). By analysing much the literature on the topic of the social sciences, it was possible to indicate the importance of institutions in economies. It was emphasised that a contemporary macroeconomic analysis should, or one could even say must, include an institutional analysis.

The estimated soft model of the quality of formal institutions of OECD economies provided many conclusions, but, most importantly, allowed for a positive

[20] The indicators are standardised, which means that the mean is equal to 0, and the standard deviation to 1 (Ciborowski & Skrodzka, 2019, p. 399).

verification of the adopted research hypothesis. As it turns out, the quality of formal institutions is strongly, positively influenced by all three separate groups of formal institutions, but the institutions of property rights are of the greatest importance. The internal model also allowed for the conclusion that legal order institutions have a very strong positive influence on shaping the quality of the property rights and regulatory institutions.

Values of latent variables were used to rank OECD countries in 2017 in terms of the quality of formal institutions. Finland seems to be the economy with the most prosperous formal institutional environment. In 2017 the weakest formal institutional subsystem is in Greece.

Institutions should become a "routine" in researching economic processes. They are the core of every socio-economic structure. Not only does the quality of these institutions have a direct impact on economic growth itself, but also on its determining factors (deep growth determinants).

The article is the beginning of author's considerations on institutions in modern economies. Subsequent studies assume an analysis of the informal institutional environment, with a particular emphasis on economic culture institutions.

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Appendix

Table 1.
Bundles of property rights associated with a position in relation to the "full owner"

Specification	Full owner	Proprietor	Authorized claimant	Authorized user	Authorized entrant
access	+	+	+	+	+
withdrawal	+	+	+	+	
management	+	+	+		
exclusion	+	+			
alienation	+				

Source: Ostrom (2003, p. 251).

Table 2.
Diagnostic indicators of latent variables in the soft model

2nd order latent variable	1st order latent variable	Diagnostic variables		Source of data
FORM	LEG	L_1	rule of law	World Bank
		L_2	judicial independence	
		L_3	impartial courts	Fraser Institute
		L_4	integrity of the legal system	
		L_5	judicial effectiveness	Heritage Foundation
	PR	P_1	protection of property rights	Fraser Institute
		P_2	property rights	Heritage Foundation
		P_3	property rights protection	
		P_4	physical property rights protection	Property Rights Alliance
		P_5	intellectual property rights protection	
	REG	R_1	government effectiveness	World Bank
		R_2	regulatory quality	
		R_3	sound money	
		R_4	labour market regulations	Fraser Institute
		R_5	business regulations	

Source: Own preparation based on: Fraser Institute (2020), Heritage Foundation (2020), Property Rights Alliance (2020), World Bank (2020).

Table 3.
Inner model estimation

Latent variable	Indicator	Weight	Standard deviation	Factorial loading	Standard deviation	R^2
LEG	L_1	0.256	0.012	0.955	0.020	0.912
	L_2	0.253	0.009	0.961	0.024	0.924
	L_3	0.252	0.010	0.929	0.032	0.864
	L_4	0.206	0.012	0.836	0.055	0.699
	L_5	0.167	0.016	0.630	0.058	0.397
PR	P_1	0.246	0.009	0.975	0.028	0.950
	P_2	0.151	0.019	0.665	0.086	0.442
	P_3	0.246	0.012	0.980	0.027	0.960
	P_4	0.230	0.009	0.927	0.038	0.859
	P_5	0.224	0.012	0.921	0.032	0.848
REG	R_1	0.295	0.014	0.939	0.018	0.882
	R_2	0.297	0.010	0.966	0.033	0.933
	R_3	0.174	0.016	0.689	0.048	0.474
	R_4	0.141	0.015	0.573	0.056	0.328
	R_5	0.274	0.011	0.860	0.029	0.739
FORM	L_1	0.089	0.003	0.952	0.024	0.907
	L_2	0.089	0.003	0.947	0.026	0.897
	L_3	0.088	0.005	0.936	0.034	0.876
	L_4	0.074	0.004	0.783	0.045	0.613
	L_5	0.058	0.006	0.626	0.054	0.392
	P_1	0.090	0.004	0.963	0.029	0.927
	P_2	0.057	0.007	0.614	0.068	0.377
	P_3	0.090	0.003	0.966	0.022	0.934
	P_4	0.086	0.003	0.918	0.032	0.844
	P_5	0.083	0.005	0.888	0.036	0.789
	R_1	0.088	0.005	0.942	0.034	0.887
	R_2	0.089	0.003	0.951	0.036	0.905
	R_3	0.055	0.005	0.586	0.064	0.343
	R_4	0.046	0.004	0.485	0.050	0.235
	R_5	0.082	0.003	0.871	0.024	0.759

Source: Own preparation.

Table 4.
Measures of uniformity of latent variables

Latent variable	Type of indicators	Number of indicators	Cronbach's alpha	Dillion–Goldstein's rho
LEG	reflective	5	0.915	0.939
PR		5	0.938	0.955
REG		5	0.871	0.909
FORM		15	0.968	0.973

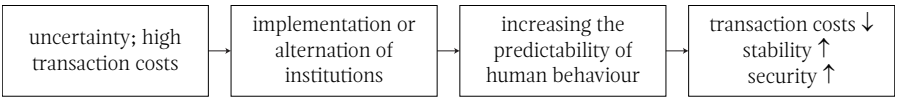
Source: Own preparation.

Table 5.
Ranking of OECD countries for 2017 in terms of estimated values of latent variables

Country	LEG	R.	PR	R.	REG	R.	FORM	R.
Finland	1.449	1.	1.518	1.	0.904	6.	1.335	1.
Switzerland	1.039	5.	1.412	2.	1.435	2.	1.321	2.
New Zealand	1.167	3.	1.063	6.	1.459	1.	1.246	3.
The Netherland	1.252	2.	1.119	3.	1.187	3.	1.211	4.
United Kingdom	0.958	6.	1.114	4.	0.767	11.	0.983	5.
Canada	0.860	8.	0.982	7.	1.002	5.	0.970	6.
Australia	0.900	7.	0.946	8.	0.878	9.	0.932	7.
Sweden	1.062	4.	0.857	10.	0.740	12.	0.912	8.
USA	0.707	13.	0.878	9.	1.058	4.	0.898	9.
Denmark	0.823	10.	0.794	12.	0.885	8.	0.853	10.
Japan	0.603	16.	1.110	5.	0.644	13.	0.820	11.
Norway	0.851	9.	0.451	17.	0.831	10.	0.709	12.
Germany	0.620	15.	0.462	16.	0.903	7.	0.661	13.
Luxembourg	0.592	17.	0.638	13.	0.582	14.	0.613	14.
Austria	0.784	11.	0.850	11.	0.083	18.	0.612	15.
Iceland	0.762	12.	0.411	18.	0.582	15.	0.597	16.
Ireland	0.649	14.	0.467	15.	0.537	16.	0.565	17.
Belgium	0.218	20.	0.489	14.	0.011	19.	0.263	18.
Estonia	0.125	21.	0.021	21.	0.358	17.	0.156	19.
France	0.242	19.	0.308	19.	−0.143	20.	0.153	20.
Israel	0.336	18.	0.119	20.	−0.206	21.	0.095	21.
Chile	−0.343	22.	−0.365	22.	−0.501	27.	−0.409	22.
Korea Republic	−0.452	23.	−0.444	23.	−0.288	23.	−0.413	23.
Czech Republic	−0.554	25.	−0.567	24.	−0.443	26.	−0.532	24.
Lithuania	−0.552	24.	−0.797	26.	−0.207	22.	−0.550	25.
Portugal	−0.715	27.	−0.579	25.	−0.396	25.	−0.585	26.
Spain	−0.631	26.	−0.907	28.	−0.596	28.	−0.736	27.
Latvia	−0.784	28.	−1.311	32.	−0.386	24.	−0.872	28.
Slovenia	−0.857	29.	−1.155	30.	−0.885	30.	−0.994	29.
Slovakia	−1.516	34.	−0.840	27.	−1.026	31.	−1.146	30.
Poland	−1.345	30.	−1.373	33.	−0.714	29.	−1.189	31.
Italy	−1.366	31.	−1.112	29.	−1.219	33.	−1.253	32.
Hungary	−1.415	33.	−1.572	35.	−1.040	32.	−1.385	33.
Turkey	−1.899	35.	−1.557	34.	−1.987	34.	−1.848	34.
Mexico	−2.175	36.	−1.242	31.	−2.510	36.	−1.988	35.
Greece	−1.394	32.	−2.191	36.	−2.299	35.	−2.004	36.

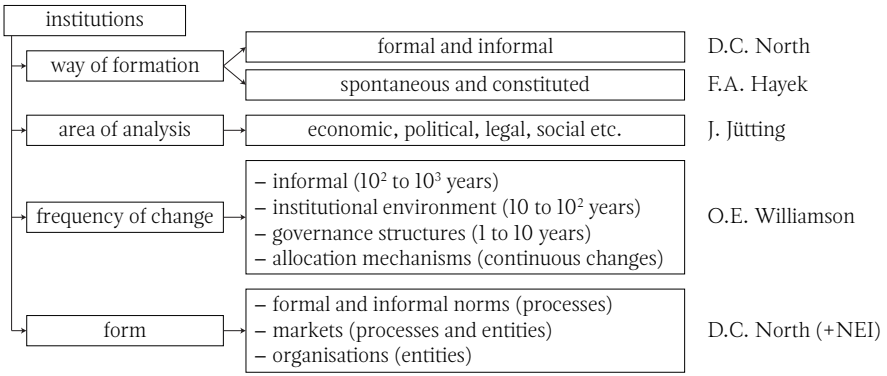
Source: Own preparation.

Scheme 1.
Formation, evolution and functioning of institutions in the economy



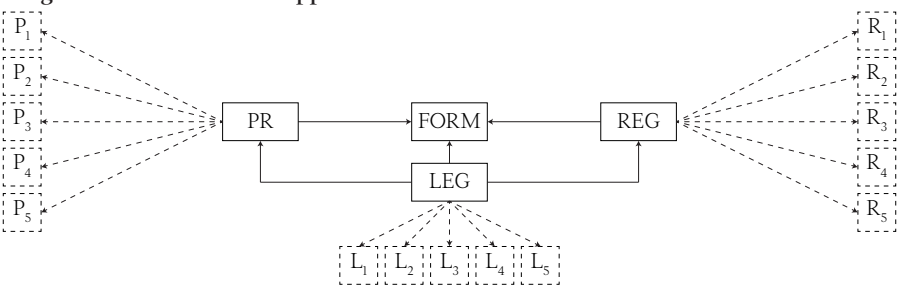
Source: Dobler (2011, p. 21).

Scheme 2.
Selected contemporary classifications of institutional structure



Source: Own preparation based on: Gruszewska (2013b, p. 170), Hayek (1978, p. 37), Jütting (2003, pp. 11–14), North (1991, p. 97), Wilkin (2016, p. 104), Williamson (2000, p. 597).

Scheme 3.
Diagram of the soft model applied in the article



Source: Own preparation.