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Kontakt/Contact

ZBW – Leibniz-Informationszentrum Wirtschaft/Leibniz Information Centre for Economics
Düsternbrooker Weg 120
24105 Kiel (Germany)
E-Mail: [rights\[at\]zbw.eu](mailto:rights[at]zbw.eu)
<https://www.zbw.eu/econis-archiv/>

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Identification of Generalized Models of Development of Economic Systems of Rental Character Based on the Retrospective Analysis of World Experience

Liliia V. Matraeva*, Nataliya A. Korolkova

Economic Department, Russian State Social University, V. Pika, 4, Russia, Moscow. *Email: matraeva@rambler.ru

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ABSTRACT

The rental nature of the economic system determines the availability of additional opportunities as well as the problems of its development. The decisive factor is the choice of a development model based on the system of state regulation of rental relations, including the search for effective combinations of state policy mechanisms. The core in most cases is energy policy and energy management as a development factor. Now we can talk about the accumulation of sufficient experience to conduct a comprehensive study of the peculiarities of the development of rental economies. The article reveals the experience of 24 countries of the world (30 cases) with a focus on the peculiarities of the formation and implementation of the state policy. The cluster analysis allowed us to identify three generalized models for the development of rental-type economic systems with a pronounced profile. This provides a basis for the identification of the main priorities.

Keywords: Rental-type Economic System, State Policy Mechanisms, Clustering

JEL Classifications: P510, O570, O110

1. INTRODUCTION

Countries with rental-type economic systems are a large group in the world economic system, but it is, at the same time, a very heterogeneous one: Norway, Chile, USA, Venezuela, Australia, Nigeria, Mexico, Russia, Angola, Indonesia, Saudi Arabia, Canada, Sweden, Bahrain, Colombia, etc. However, the history shows that all these countries are described by the condition of the economic systems characterized by instability due to problems in the system of rental relations. In this regard, each country is faced with the need to search for various combinations of public policy mechanisms that allow them to mitigate macroeconomic risks of a rent nature. This led to the need for the formation of scientifically based approaches aimed at solving these problems.

Conceptual approaches to the assessment of state policy within the framework of rental-type economic systems began to form as

an independent direction in the 1950s and represented a failure of description (in a greater degree) and ways to overcome various negative phenomena in different periods of the economic history of a number of resource-rich countries.

One of the first significant works was an article by Prebisch, 1950, who studied the imbalance of the trade balance and the deterioration of the economic situation of oil-exporting countries with a deterioration in the conditions of foreign trade in the long term due to a fall in commodity export prices relative to the prices for imported industrial goods. The theoretical results obtained were refined and supplemented by Singer and Meier, 1958. This formalized the Prebisch - Singer hypothesis. Their recommendations were the basis for the state policy of a number of Latin American countries of the 1960s-1970s. It was subsequently recognized as ineffective and was strongly criticized. The core of this conceptual model was the policy of import substitution.

The following additions to the theoretical aspects of managing of a rental-type economic system are associated with the definition of a staple trap theory (Innis, 1954; Baldwin, 1956). The study thereof was based on the Canadian experience. As a basis of state policy, it was recommended to build a system of intersectoral relations of a certain type: the export-oriented resource sector was considered as a growth point of the industries that produced the means of production for the commodity sector and industries related to the processing of raw materials. Subsequently, the hypothesis was supplemented and a diversification strategy based on the development of resource exports was suggested (Hirshman, 1977).

A special place among theoretical studies is occupied by the issues of overcoming the Dutch disease (the Groningen effect) (Corden and Neary, 1982; Krugman, 1987; Matsuyama, 1992), described by the diversion of investment in the upstream sector of the economy, the dominance of “simple” technologies, the slowdown in the accumulation of knowledge and decrease in demand for human capital, deindustrialization of the economic system, reduction of the manufacturing sector, primarily the manufacturing industry, as well as unemployment rise. Restructuring of the economic system is considered as the main approach to overcoming negative consequences from the position of state policy. There are two models: British (liberal) and Norwegian (based on government regulation). The British model is based on the regulation of foreign economic changes, therefore, the main activities are the interventions on the foreign exchange market in order to stabilize the exchange rate and support the expansion of international sales markets via product expansion of industries with low competitiveness to the markets of less developed countries. The Norwegian model focuses on the creation of a sustainable sovereign fund, including to promote the implementation of anti-inflationary policies, as well as to support innovative industries, primarily related to the commodity sector (technologies and equipment for oil production).

Consideration of the Nigerian disease phenomenon (Hiro, 2008) manifesting itself in the form of redistribution of rental income without regard to national interests (in the interests of the ruling elites), as well as a high degree of corruption of the isolated political elite, also complemented the theoretical understanding of the management of the rental-type economic system. If we considering the economy of Nigeria, a set of recommendatory measures is associated with the development of competition in the primary industries and the strengthening of the position of private companies compared to state ones (restoring the balance between the private and state sectors).

In the Russian literature, the most significant results in the study of the theoretical aspects of rental-type economic systems management were achieved by Polterovich and Vladimir, 2007. Two theoretical results can be distinguished in their works: the formalization of the hypothesis of “conditional damnation” and the selection of tools to stimulate growth with abundant resources, namely the following aspects:

- The policy of withdrawing most of the resource rent by taxation;

- Passive strategy based on the implementation of the savings function via the formation of sovereign funds (Polterovich and Popov, 2003);
- Development of industrial policy: a summary of recommendations for the formation of state programs aimed at capital accumulation, a critical assessment of the minimum wage measure (Rodrik, 1996; Vorobyov, 2006), public investment in technology (Zhukova, 2006);
- Accumulation of foreign exchange reserves as a tool of low-selectivity industrial policy (Polterovich and Popov, 2005);
- Lowering of fuel prices is equivalent to the entire domestic production subsidizing. It is noted that the undervaluation of prices accelerates growth in the early stages of development (with relatively low GDP per capita) and slows down the growth if the country is sufficiently developed, that is, the tool is associated with the dependence of the threshold nature.

All of the above authors adhere to the mainstream economic theory and policy to varying degrees. It supports the “concept of the rental state” (Mahdavy, 1970; Kimelman, 2011) focusing on the decisive role of incomes of rental origin among all incomes of economic entities, as well as highlighting the process of appropriating rent as the basics of social and economic development. At the same time, there is an alternative point of view assuming that “it is impossible to form a successful economic policy on the basis of theories built on abstract mathematical models and calculations,” expressed by Rainer (2011).

It is also interesting that the overwhelming majority of researchers emphasize the “abundance” (wealth) of resources, that the center of attention is focused on resource redundancy as one of the main parameters. At the same time, the rental economy can be built up even in terms of resource availability (under appropriate external conditions for the rent formation). N. Ding and B. Field (Ding and Field, 2005), and further T. Gylfason (Gylfason, 2007) pointed out the significance of the “resource dependence” and “resource security” concept. According to their observations, the first corresponds to the manifestations of the “resource curse,” the second admits the formation of positive trends in the economic development. This statement can be supplemented: resource availability stimulates growth and development of the economy only within certain limits, which largely depend on the existing institutional conditions. At the same time, both the resources and the rental income derived from them can turn from an intensifying factor into a destabilizing one, and vice versa. Closely related to this is the study of the issue, which can be summarized as “the presence of a threshold effect”: there is an estimated threshold value of the level of institutional development, below which the abundance of resources impairs the quality of institutions, and above - does not have a significant effect on it. The presence of this threshold is partially confirmed by the empirical test carried out in the already mentioned work of Mehlum et al., 2005, as well as the last author in the work of Robinson et al., 2006, who established the dependence of the threshold on the quality of institutions in the country’s economy. Along with this, there is a downside: the dependence of the threshold on the magnitude of the resources. This connection was taken into account in the theoretical model of the threshold in the first of the above mentioned works, but the

respective econometric calculations were performed by already noted Polterovich and Vladimir (2007).

Recently, in some works (Zotin, 2017a), there has been an application of the concept of “mismanagement” to the economic policies of countries rich in natural resources. As applied to the management of rental-type economic systems, this term is used to disclose a type of management characterized by both unintentional errors and deliberate unlawful actions by economic entities (first of all, government officials) and the lack of proper internal control and supervision over the activities of rental relations entities. The most striking example is Venezuela. Its history emphasize the periods of the emergence of a new political regime via the financing of oil rent.

Thus, it is possible to make a number of intermediate conclusions about the features of the theoretical study of the problems of formation of the state policy of rental economies:

- The majority of theoretical studies in this area is situational in nature, based on the description of different periods in the economic development of individual countries of the world;
- In many cases, the one-sidedness of the resource path of the economic development is emphasized: the focus is on identifying and describing the shortcomings and paradoxes related to the formation and use of rent in various macroeconomic situations;
- There is a problem of the possibility of replicating the results obtained on the basis of the experience of individual countries.

It is necessary to change the research task itself: do not try to identify key mechanisms as a “medicine” based on the experience of individual countries, go on to the search for combinations of mechanisms that, under certain conditions, will ensure that the rental economy is in an effective state. As a result, there is a need for a comprehensive study that will generalize and systematize the main theoretical approaches to the formation of state policy in the framework of rental-type economic systems management.

This is confirmed by the research activities of the international organizations attempting to create international recommendations for rental-type economic systems. A special place is occupied by analytical brochures and reports of the IMF.

Initially (in the early 2000s), a series of works was observed in the IMF Special Issues, combined with the Oil Wealth Management topic. The studies were based on the consideration of individual cases, for example, Azerbaijan (Niko et al. 2014), and contained an assessment of a specific economic system and recommendations from fund analysts on its further development.

At present, it is possible to note the formation of IMF reports not only in individual countries of the world, but also in the context of specialized issues, in particular, in the mobilization and management of revenues from the commodity sector. This group of publications is presented by the reports of The Managing Natural Resource Wealth Trust Fund (MNRW-TF), operating since 2011. MNRW-TF implements the IMF research and analytical work in this subject area, identifies the approaches based on

successful cases, and draws lessons from national experience for the subsequent formation of international recommendations.

More than 20 projects were implemented in the first phase of the MNRW-TF (May 2011-April 2017). They were aimed at improving the fiscal regimes of managing the extractive industries (improving extractive industry - EI), expanding the capacity of authorities to administer and control income from EI, developing public financial management systems, including sovereign wealth funds, improving the quality of reporting on the accounting of natural resources in national accounts (MNRW-TF, 2016a). This happens via technical assistance, which is to promote the integration of the recommendations of the fund into the state policies of the participating countries, and to conduct customized training.

A special place among the results of the first phase of MNRW-TF is occupied by the developed methodological framework. In particular, some attempts have been made to form comprehensive recommendations on the transformation of state policy (regulatory framework) for rental-type economic systems:

- “Administering Fiscal Regimes for Extractive Industries: a Handbook” (Calder, 2014) - in terms of the effective management of revenues from the extractive industries;
- “Sovereign Asset-Liability Management (SALM) - Guidance for Resource-Rich Economies” (MNRW-TF, 2014) - in terms of the effective management of sovereign funds.

In addition, a methodology was developed for the assessment of the effectiveness of the MNRW-TF project implementation aiming to diagnose the success of the participating countries and based on an approach to project management, especially development projects, called “results-based management.”

The project is now in the second phase of its implementation and focuses on the capacity development via five interconnected modules to improve the fiscal regimes of the upstream and revenue management in the participating countries:

- Module 1: EI fiscal regimes, licensing, and contracting;
- Module 2: EI revenue administration;
- Module 3: Macro-fiscal, public financial management, and expenditure policy;
- Module 4: Exchange rate regimes and macroprudential policies;
- Module 5: Statistics for managing natural resources (MNRW-TF, 2016b).

It is interesting that the MNRW-TF methodology offers exactly an integrated approach to the implementation of the modules involving a combination of public policy mechanisms, and not fragmentary improvements. The most prominent example today is the recommendation on using IMF’s Fiscal Analysis for Resource Industries (FARI) model (MNRW-TF, 2016c): a fiscal analysis (module 1) provides a basis for the assessment of risks associated with the income from the resource sector (module 2), which in turn provides the possibility of macro-budget forecasting of government revenues (module 3).

It should be noted that this approach of MNRW-TF is the most advanced in the field of formation of integrated public policy in the framework of rental-type economic systems management, but focuses on the management of financial flows and the achievement of stability in the field of fiscal policy. In particular, the issues related to structural policy, development of real sectors of the economy, innovation policy, etc. are not addressed. This is confirmed by the current assessment of the most important results of the implementation of the second phase of the project for the participating countries, presented in the annual report of MNRW-TF (MNRW-TF, 2018).

Besides, as part of the formation of international recommendations, it is possible to highlight the development of the Extractive Industries Transparency Initiative standard (EITI 2016) (EITI, 2017), whereby the information on the oil, gas and mining industries is published. It is important to note that the document is not instructive in the management of the upstream sector, but rather a tool that provides information on how this sector is managed. Testing of the EITI Standard ended in 2015 in Norway. By now, the EITI Compliance Test is being implemented in another 48 countries (EITI, 2019) with the support of MNRW-TF. The content of the initiative comes down to the annual provision of key information on sector management by the participating countries, along with the recommendations for sector management improvement. Thus, the base of best practices is being formed and the progress is being monitored in the improvement of the efficiency of resource sector management in selected countries of the world. At the same time, active areas of analysis are contracts and licenses in the sphere of subsoil use, production processes, the taxation system, the income distribution model, the contribution of resource industries to the country's social and economic development. Also there is an interesting fact that the EITI is actively developing the institute of public oversight and discussions in the subject area under study: there is a special requirement for the formation and functioning of a national multi-stakeholder group (representatives of government, industry companies and civil society).

Thus, a review of empirical studies confirms the feasibility of conducting a comprehensive study of rental economies and makes it possible to raise the question of identifying the development model of a rental-type economic system, which leads to an effective state of the system.

2. RESEARCH METHODOLOGY

The study of scientific papers, representing the results of theoretical studies of rental economies, makes it possible to emphasize their one-sidedness, which is explained by focusing on the consideration of a small number of economies or a particular economic system. On the other hand, observations and studies of the economies of different countries of the world described by the systems of rental relations of different degrees of development, that is, empirical studies, allow us to conclude that their experience is possible and expedient to generalize.

Thus, if earlier the study of rental-type economic systems could only be situational in nature and was fragmentary, then, at present,

it is possible to speak of accumulating sufficient experience for comprehensive research in this area. Therefore, it is permissible to assume that a number of generalized models for the development of rental-type economic systems can now be identified based on the experience of using various public policy mechanisms therein.

Consequently, we are faced with the technical task of rental-type economic systems classification as per the state policy mechanisms used therein, that is, identifying homogeneous groups from the entire set of objects studied, uniquely identified and having a clearly interpretable profile. One of the most well-known statistical methods used to solve such problems is cluster analysis. It which allows to form homogeneous groups inside and heterogeneous ones with respect to each other as per given parameters most accurately. At the same time, it is advisable to lay down the optimal ratio of intercluster to intracluster dispersion as the main criterion for the formation of clusters, taking into account the economic task that has been set.

The initial base of the research was formed on the basis of an expert analysis of the mechanisms of state policy used in 30 cases of economic development in various countries. They were coded on a binary scale in the results of the expert's answers, where 0 is the absence of a mechanism, 1 is the implementation of the mechanism within a specific case. The most acceptable for solving the problem is the k-means method. However, the method cannot be applied to binary data (IBM, 2009).

In this regard, a hierarchical cluster analysis has been implemented using an agglomerative algorithm (combining objects, initially considered as separate small clusters, into larger groups) in the SPSS statistical package. The main method of cluster formation is the Ward's method, which allows clustering as a sequential procedure, at each step combining two such classes with minimization of statistical distance between the classes, providing a clearer cluster solution in conditions of data overlap (Vukolov, 2013). Binary data (nominal scale) analysis imposes additional restrictions on the selection of distance metrics. The *Squared Euclidean Distance* for binary data (IBM, 2009) was chosen as an indicator characterizing the measures of differences in the research objects.

The determination of the optimal number of clusters was based on the interpretability of the constructed model (meaningful importance of groups), as well as the following criteria:

- Intercluster distance by analyzing the agglomeration graphs and visual analysis of tree diagrams (Moosmyuller and Rebik, 2015);
- Cluster sizes by building a pivot frequency table for various cluster solutions (from 3 to 5 clusters).

Final cluster centers were calculated to interpret the main characteristics of the formed groups. A report was generated on average values for each attribute, taking into account the establishment of the cluster number as a grouping variable in the absence of the specified ability for hierarchical cluster analysis in the SPSS statistical package. As a result, basic, superstructure and non-involved mechanisms of state policy were identified within the

framework of generalized models of development of rental-type economic systems with clear profiles.

3. SPECIAL TOOLS

3.1. Description of the Information Base Forming Method

The objects of cluster analysis are the state of the rental-type economic systems. The experience of using different mechanisms of public policy aimed at leveling problems in the economies of the specified nature can be considered on the example of 24 countries (the largest producers and exporters of natural resources). At various periods of time, 30 states of these economic systems can be identified (30 cases), which are characterized not only by different sets of mechanisms, but also by levels of economic efficiency.

3.1.1. Venezuela (1970s)

The period of Saudi Venezuela (Venezuela Saudita): the state mega-project “Great Venezuela” was adopted (Yergin, 2017) in the face of the need to overcome the negative recent import substitution policies and control the flow of petrodollars from the oil shock of 1973. The project implemented substantial state intervention in the country’s economic system: creation of a system of subsidies, creation of jobs and artificial increase of the salary plan, diversification of exports by interfering with the activities of non-oil enterprises, etc. The project implementation depended strongly on the sustainability of rental incomes and was ineffective after the fall in oil prices since 1979.

3.1.2. Venezuela (1990s)

The country implemented a state policy dictated by the recommendations of the IMF. A package of measures aimed at widespread privatization, opening the country to foreign capital in any sector of the economy, as well as price liberalization has been taken without taking into account economic security. The result is a financial crisis in the mid-1990s (Economic portal, 2019).

3.1.3. Venezuela (2000s)

The adoption of the new economic program, “Bolivarian Socialism of the 21st Century”, in 1998 restored the basic principles of the country’s economic security. Key aspects: building of a strategic planning system, concentrating raw materials and land resources in the hands of society, tight control over them, a complete change of development priorities while maintaining a reasonable balance between the public and private sectors of the economy (Dieterich, 2005). However, manual government is used through non-market mechanisms. The result is economic growth against the background of a short-term artificial increase in the well-being of the country’s population, but without creating of a sustainable basis for economic development.

3.1.4. Angola

Development is constrained by the strong dependence of the state budget on the hypertrophied oil and gas complex. The energy sector is expanded by international oil and gas companies. The participation of Sonangol national company in the extraction of energy resources is very limited. The main function of the company is reduced to concession agreements conclusion and

taxes collection (De Oliveira, 2007). The development of other industries is hampered by the Dutch Disease.

3.1.5. Mexico

Currently, rent dependence is preserved by the maintenance of inefficient tax system and other fiscal mechanisms (Farfan-Mares, 2010).¹ At the same time, the country demonstrates successful economic development by becoming one of the strategic suppliers of oil in the United States (implementing the US energy strategy), strengthening of the economic ties in the non-oil sector, including the development of makiladoras (from 1964 till present time), implementing the program of cross-border development (since the 1980s), the abolition of the monopoly of Petroleos Mexicanos (Pemex) state-owned company and the opening of the oil and gas industry to attract foreign investment (2013).

3.1.6. Azerbaijan

The export-oriented production model and economic diversification has been declared the target model of economic development. This is stated in a variety of strategic documents: “Azerbaijan 2020: A Look into the Future” development concept, the “State Program for the Development of Industry for 2015-2020” and a number of strategic road maps for the national economy and main sectors of the economy. However, the declarative rather than the functional nature of the set of strategic documents is noted, including the “Long-term strategy for managing oil and gas revenues for the period 2005-2025” (Decree, 2004; Reports and Statistics, 2019).

3.1.7. Indonesia

An example of successful diversification of the economy via the implementation of an investment growth model including significant investment in production, export orientation, and reliance on cheap labor (Zotin, 2017b). The leveling of resource dependence, in particular, the dependence of the state budget on rental income, was ensured via the effective state policy, initially (from the 1970s) aimed at developing the agro-industrial complex of Indonesia, and then (from the 1990s) becoming an export-oriented industry due to preferences from the USA (Program Document, 2017) and Japan (Hoekman et al., 2009).

3.1.8. Saudi Arabia (1960-1990s)

This period of the country development is characterized by a high degree of resource dependence. The system of distribution of state budget revenues is of a centralized type, which is associated with the current monarchical system. A complex bureaucratic apparatus was used as an active tool to formalize rent generation: the country implemented the “free institutions design” of state power (Hertog, 2007). The country has not formed a system of taxation and sovereign funds. Industrial policy was fragmented, being a hidden form of redistribution of oil rent without effective development of the non-oil sector.

3.1.9. Saudi Arabia (Since 2000)

The country recognized the need to transform the economic system (after a period of low oil prices from the 1980s-1990s), but there

¹ Makiladoras - various assembly plants, placed by foreign companies (mainly the United States) in Mexico.

is still a strong dependence on fluctuations in the world oil prices (Foudeh, 2017), an inefficient system of energy subsidies, the lack of a developed tax system strong bureaucracy, significant public sector. Saudi Vision 2030 development strategy (Program Document, 2016a) is being implemented in the country to level resource dependence from 2016. Six state programs have been launched and about 96 KPIs have been established, stated in the National Transformation Program 2020 (Program Document, 2016b). A sovereign fund, Public Investment Fund (PIF), has been established. It performs an investment, not a savings function.

3.1.10. UAE

Government policy is centralized due to the dominance of the emirate donor, Abu Dhabi, based on the use of oil rent. The income tax generated by oil and gas companies (55-85%) (PWC, 2015) generated by the state budget surplus becomes the basis for the activity of sovereign funds with an active investment strategy. Regional development is performed taking into account the absence of dependence on world oil prices: the other emirates limit subsidies from Abu Dhabi. The UAE was able to use its geopolitical position as a competitive advantage (1980-1990s) by creating of special economic zones (Biryukov and Biryukova, 2016), removing of customs barriers and an effective labor migration system (Movchan, 2017). Now the UAE is a global financial and business center, the main reseller for a number of developed countries, one of the world's re-export centers.

3.1.11. Iran

Oil rents led to the acceleration of development in the 1970s with the formation of an unbalanced economic system: the White Revolution doctrine (Sergeyev and Sarukhanyan, 2012) suggested agrarian reform and accelerated industrialization from the 1960s on the basis of attracting foreign capital without regard to national and religious specifics. But there is a forced reorientation of the development of the industrial complex to the base of internal reserves (Salitsky et al., 2017) in the period from 1979-2016. The country returned to the implementation of the strategy of already re-industrialization by attracting foreign direct investment after the international sanctions removal (Zotin, 2017c).

3.1.12. Nigeria

An example of public policy for the rental income management, leading to the conservation of social and economic problems. The nationalization of hydrocarbon production and the concentration of rental income at the federal budget level were forced measures to curb regional development problems (Manasseh et al., 2019). This has led to the formation of sectoral imbalances, including the restriction of agricultural development, the development of "Nigerian disease" and the excessive dependence of the state budget on rental income, and exposure to external oil shocks (IMF, 2018). Since 2000, Nigeria has managed to change the rent distribution formula (Grigoriev, 2017a), which provides the basis for the economy diversification with a focus on the revival of the agro-industrial complex and the development of the telecommunications sector.

3.1.13. Norway (Until 2014)

The success of the Norwegian experience is formed from the following key components: organizational and functional

management structure (Thurbera et al., 2011), state ownership system, taxation system, rental income distribution system, social policy. There is a two-part management model for the national oil company (since 1985): free participation in the capital (67% of Statoil [MTIF, 2015]) and the State's Direct Financial Interests system. Tax system: the marginal tax rate is 78% (22% is the base tax, 56% is the special tax of oil producing companies (MTIF, 2019). It is also interesting that government revenues are rent-dependent, but the costs are not. This is achieved via the activities of the Global Pension Fund Global (LovData, 2016). As a result, the Norwegian budget is more non-oil and this ensures a balanced development of the country and facilitates the creation of a diversified export-oriented industrial complex.

3.1.14. Norway (Since 2014)

The country is faced with the question of the need for structural transformations for a smooth transition to the progressive nature of the economic system in the context of the exhaustion of its resources. The high sectoral differentiation laid down by the "national champions" support program since the late 1980s provided a shift in the focus of the country's technological development. The measures taken (changes in investment approaches during industrialization and a new innovation policy) have so far shown low performance and additional diversion of investment flow and R&D development towards the oil and gas sector.

3.1.15. United States (Alaska)

A deterrent to unlocking the potential of the region and attracting investment from oil companies is the high level of taxes on oil production on land. Mitigation of the tax regime is hindered by the Senate of the US Congress. Investments in fixed assets play a key role in the economic growth model of Alaska; energy resources are not highlighted as a development factor (Bekareva et al., 2018). The experience of creating the Alaska Permanent Fund in 1976 (APFC, 2019) is also interesting in the example of Alaska. A natural restriction has been created for the misuse of the fund: the budget rule cannot be changed by the authorities, only via a referendum, since they are constitutional norms. Significantly, the fund's policy since 1979 includes a special dividend program: direct distribution of a limited share of revenues generated on the basis of oil rent (10% of the total annual fund income) among state residents around (Alaska's Constitution, 2019).

3.1.16. USA

The entire US state policy is aimed at ensuring its economic and also energy, security and the formation of the country's energy independence (Khlopov, 2015). The current state policy complex is characterized by continuous state supervision of the subsoil development and production processes, flexible tax policy in the extractive industries, the use of a wide range of rent extraction tools (bonuses, rentals, fixed royalties, etc.), clear specification of property rights, accumulation of rent on regional level (Baykova, 2013).

3.1.17. Great Britain

The UK has created an effective system of embedding the oil and gas complex in the national economy via the creation of a

financial system that can successfully absorb large-scale rental incomes, which are then used, including to support and develop the finished product industries (Ryazanov, 2011). At the same time, hydrocarbons are the property of the monarchy, a licensing regime is in force, whereby the licenses are granted for the exploration and production of oil (Act, 1998). The risk of resource depletion and becoming a net importer is updated: in 2017, resource availability is estimated at 4.4 years (BP Statistics, 2018). At the same time, the energy policy of the country is focused on the environmental protection and replacement of electric power capacities taking into account the use of low-carb technologies.

3.1.18. Australia

Regulation of mining is performed at the local level via mining laws of various states and territories. A licensing system is in place to pay royalties (Leary and Kerrigan, 2018). At the same time, the country used the mining industry as a driver for the development of high-tech services. The country realizes the redistribution of funds via an effective tax system (Bobylev, 2013) to support the technological development of the manufacturing and social sectors. At the same time, Australia does not have commodity sovereign funds, that is, the system is built in such a way that it does not require sterilization of the economy and is capable of absorbing all funds within the country.

3.1.19. Canada

The industrialization of the country was performed based on the formation of private investment activity and was financed via natural rent (Howlett et al., 1999; Kapitsa, 2014). At the same time, Canada's state energy policy is based on strengthening its position in world energy markets (foreign policy - Extractive Sector Trade Strategy) (Caulfield, 2015), on the one hand, and on maintaining the investment attractiveness of national production facilities (domestic policy - licensed rental system for the provision of subsoil for use (Baykova, 2013) on the other one. Canada does not support the use of sovereign funds. The exception is Alberta, but its experience is not unequivocal (Kapitsa, 2007). The country also has significant positive experience in the development of energy conservation and energy efficiency policies (NRCan, 2015).

3.1.20. Sweden

A country with an effective economic system has always been export-oriented: initially natural resources (wood and iron ore), then products with high added value (engineering, etc.). At the same time, the main factor-the development of the economic system was labor productivity, not natural resources. State policy is based on: securing the forest as a national asset and renewable resource (Sweden Parliament, 2019), certification system, sustainable development policy of the "Green state of universal welfare", support for the private sector, income redistribution system, social policy, employment policy and spatial planning (Holyavko, 2014).

3.1.21. Chile (Until 2009)

Chile's economic development is based on the copper industry and rental income (Nikolaeva, 2018), but it was characterized by a lack of cost control and low efficiency and ease of manufacture of metal mining and processing until 2009. For a long time, the

main instrument for the development of mining industry in Chile was concession agreements in the framework of exploration and mining of minerals - this was enshrined constitutionally (Act, 1982; Act, 1983). This made it possible to attract the required volumes of foreign investment, but limited the possibilities for technological development of national producers and increased the dependence of government revenues on rental income. In the framework of the sovereign fund management policy (Copper Stabilization Fund), its inappropriate use is noted to repay foreign debt and subsidize domestic prices for gasoline.

3.1.22. Chile (Since 2009)

The state policy on the introduction of innovations in the mining industry has enabled Chile to diversify the economy and exports since 2009, raise the technological level of the country and achieve sustainable economic development. The country implements expanded state support for the innovation activity (Nikolaeva, 2018), including via centralized coordination, organization of regional dialog sites on the problems of sectoral development of regions, the development of the Mountain Cluster, funding as an instrument of accumulation and redistribution of rental income mineral raw materials, as well as foreign investors attracting. Now the country's innovation policy is closely linked to the policy of foreign investment attracting in the mining sector: attracting of new technologies from international companies, and not just financial resources (COCHILCO, 2019). All this makes it possible to gradually integrate Chile's copper industry into international value chains.

3.1.23. Kuwait

The economic system of Kuwait is characterized by limiting of foreign influence (WIPO, 1962). Foreign participation is limited to the construction and maintenance of oil and gas facilities via one-time contracts. Special attention is paid to the social sector. The policy of expanding social payments is conducted annually (Mihin, 2018). The population is exempt from paying taxes. This set of measures is also associated with the prevention of the formation of social and political tensions characteristic of the countries of the Persian Gulf.

3.1.24. Bahrain

A concentration of economic opportunities, including rental income, was realized on the development of the manufacturing industry: oil refining, petrochemistry, and the aluminum industry under the threat of exhaustion of energy resources (oil and gas). Fiscal reforms are currently underway in the country, including the reduce of energy subsidies and introducing value added tax (CIO, 2017). The formation of sources of government revenues from non-oil sectors is highlighted as one of the main strategic objectives. One of the growth points of Bahrain is the sphere of financial and business services: the strategic position in the center of the Persian Gulf provides the country with development as a financial and business center of oil-exporting countries.

3.1.25. Colombia

The mining sector is the backbone of Colombia's economy and the main source of rental income. Since 2003, the development of the industry began to be associated with attracting foreign investment

in a critical situation of depletion of resources due to the non-use of hydraulic fracturing technology (Neftegaz, 2017). Changes were introduced to the organizational and functional structure of the sector and the status of Ecopetrol backbone company was changed to a partially state-owned company (Zapata and Ricciulli, 2018). The constraining circumstance of development remains social and political tensions in the country.

3.1.26. Zimbabwe

The basis of the economic system is the mining industry after an unsuccessful agrarian reform (2000s): gold, diamonds, iron ore, coal, etc., are mined. Rental income is concentrated in a narrow circle of the ruling elite. The country cannot ensure its own internal development and is limited in attracting foreign investment, including in the extractive sector. There are no high-tech production. Social and political tensions are maintained in the country.

3.1.27. Iraq

Since 2006, the belonging of the oil and gas people of Iraq (Article 111 of Iraq's Constitution) is constitutional. The monopoly on the development of Iraqi oil fields belongs to state-owned companies. In the early 2000s, Iraq has a series of reforms prepared. It was to create a unified system of strategic development of the Iraqi economic system based on the oil and gas sector and attracting foreign investment. The changes were never accepted due to the war initiated by the USA. Two types of service contracts of three types (Strong, 2018) and production sharing contract (almost not used) are now stipulated and legally fixed to attract international oil and gas companies.

3.1.28. Yemen

It is one of the poorest Arab countries. As the main task of developing the national economy, it is currently accepted to attract Arab and other foreign investments in the oil, gas, minerals industries and to achieve a long-term strategic partnership. The main form of relationship has become a production sharing agreement. Special provisions of the contract include exemption from a number of customs duties and related taxes, which reduced the share of rental income in GDP (Abdul, 2013). Interestingly, since mid-2005, the government of Yemen has ceased to insist on the prolongation of contracts with some large international companies (Hunt Oil Company (USA), Nexen (Canada), Total (France), DOF Group (Norway), creating instead national companies (Safir, PetroMasila). Only citizens of Yemen are at the key oil and gas enterprises. This may indicate the beginning of the formation of the principles of economic security and independence.

3.1.29. Kazakhstan

The problems of the public debt increase, provoking of a banking crisis due to uncontrolled lending, "Dutch disease," atrophy of manufacturing industries, and corruption were formed against the background of the initial development of the export-oriented energy-resource mining sector at the expense of foreign investment attracting (Spivak, 2017). At present, it is declared that "in the near future, Kazakhstan will have to continue the process of transition from an economy driven by a factor of "raw materials competitiveness" to an economy based on growth due to the

"investment factor," with further achievement of the prerequisites for the beginning of an economy driven by an "innovations factor" (Decree, 2014; Bekturganova et al., 2019). However, the analysis of strategic documents shows the focus not on a comprehensive transformation, but on the improvement of the current growth model.

3.1.30. Russia

The development of the energy sector forming the basis of the Russian economy, is determined by a number of strategic documents, including the Medium-term Social and Economic Development Forecast, the Energy Strategy, the Energy Security Doctrine and the State Program for Energy Development. A tax reform in the oil and gas sector is being implemented in the country - a "tax maneuver": the gradual zeroing of the export duty on oil and replacement thereof with a mineral extraction tax. The Russian system takes into account the sterilization of the economy - the development of sovereign funds (the Reserve Fund and the National Wealth Fund). However, the implementation of the state policy in this part violated the tasks set during its formation (Kudrin and Sokolov, 2017). De facto management of sovereign funds of Russia showed its low efficiency, and the rate of their exhaustion during the crisis period only confirmed the existence of systemic problems with the stability and balance of the state budget.

Signs during cluster analysis in the framework of this study are the mechanisms of state policy implemented in the studied rental-type economic systems. The generalization of world experience allowed us to identify more than 20 mechanisms of state policy, allowing to level the key social and economic problems associated with the system of rental relations. At the same time, it is difficult to give them an unambiguous assessment by the criterion of efficiency: the degree of efficiency depends on the conditions for the implementation of mechanisms and the state of the economy. Under these conditions, it is more reasonable to group from the position of the availability of approbation of mechanisms in rental-type economic systems. Thus, it is possible to single out mechanisms subject to the implementation of experience in various rental economies (Korolkova, 2018):

1. Sterilization of the economy, including the formation of reserve funds that contribute to the redistribution of time and leveling of income;
2. Limiting the dependence of the budget on rental income by the reduce of production;
3. Floating exchange rate;
4. Distribution of a limited share of rental income (investment income) on a non-competitive basis: equal payments, pensions, social benefits;
5. Margin leveling;
6. Long-term contracts for rent-forming resource;
7. Hedging prices for rent-forming resource;
8. Denomination of debt in terms of the resource;
9. Provision of preferences for foreign companies;
10. Export diversification (including commodity exports);
11. Development of non-primary (non-oil) economic relations;
12. Centralization of the extractive industries, and then the resource industry as a whole (in the extreme case, nationalization);

13. Economic diversification via government intervention;
14. Creation of a subsidy system;
15. Development of energy conservation and energy efficiency policies;
16. Fiscal mechanisms, namely discriminatory taxation and regulation;
17. Import substitution policy and protection of domestic producers;
18. Price control in the domestic market;
19. Cartel agreements;
20. Loans at lower rates (on average LIBOR + 1.5%) for economic recovery secured by oil contracts (supported by oil supplies);
21. Restriction of repatriation of profits of foreign companies.

The latter mechanism is excluded during cluster analysis due to the lack of confirmed information for a number of countries.

4. RESULTS AND DISCUSSION

4.1. Experiment (Calculations Themselves)

The results of Euclidean distance calculation taking into account the binary connection were obtained at the first stage of hierarchical clustering and each object of observation was considered as a separate cluster. They show the extent which the rent-type economic systems differ to in the structure (set) of public policy mechanisms used therein. The most similar objects are Nigeria, Yemen, Zimbabwe: the square of the Euclidean distance between these groups is 2.00 and is the minimum among all other values of this indicator. The greatest difference is observed in such a pair as Russia and Yemen (16.00), which first proves the heterogeneity of the generalized models to be identified in them.

The optimal number of clusters is four as per the analysis of the dendrogram.

The preference of the chosen solution is proved by the correlation of the fullness of the clusters for various cluster solutions (from 3 to 6) using the pivot table of frequencies.

It is possible to identify generalized models for the development of rental-type economic systems based on the analysis of the cluster end centers (Table 1).

Evaluation of the participation of mechanisms in the combination of development models allows us to conclude that most of them are important for at least one of the models. The mechanisms with a low contribution rate (from 0.1 to 0.3) include: "Distribution of a limited share of rental income (investment income) on a non-competitive basis," "equalization of the margin" and "diversification of the economy via government intervention." However, the exclusion of these mechanisms during the analysis may cause a distortion of the clarity of the contours of the selected models: they can play a secondary supporting role for a particular combination. At the same time, significant mechanisms of public policy can be divided into three groups depending on their frequency of use in various models:

- Basic mechanisms: frequency of use above 0.75;
- Add-on mechanisms: the frequency of use is more than 0.4, but <0.74;
- Mechanisms not involved: frequency of use is 0.

4.2. Experimental Results (Description of Generalized Models)

The analysis of the resulting combinations of mechanisms allows us to identify three generalized models for the development of rental-type economic systems with clear profile (Table 2):

- Model 1 "Development aimed at the creation of a strong diversified industrial complex";
- Model 2 "Development supported by external support";
- Model 3 "Maintenance of short-term macroeconomic and social stability, without development."

The fourth group included countries with unique models or forming models that do not yet have a clearly defined development vector.

Model 1 "Development aimed at the creation of a strong diversified industrial complex." The most effective state of the economic system within the framework of the model implementation was reached by Norway (Grytten, 2008) and the USA (Kapitsa, 2014; Engerman and Gallman, 1996). The profiles of the economic development of these countries clearly show the use of its own mineral resource base for the formation of a sustainable, diversified industrial complex producing high value-added products. At the same time, this development took place on the basis of a competitive market economy mode relying on private and public-private companies as the locomotives of the scientific and technological process (Ryazanov, 2011).

Three options of its development can be distinguished within the framework of this model:

1. Import-substituting approach: focus on meeting the needs of the domestic market via the development of national industries;
2. Export-oriented approach: recommended for small economies in the conditions of the inability to maintain high growth rates of domestic consumption in the long term, as well as the constraints arising while reducing costs for the cost of production, if production volumes meet domestic demand only;
3. Combined campaign: maintenance of the simultaneous growth of imports of products of the extractive industries and exports of products of the processing industry while maintaining its own resource base.

It should be noted that the development path of the Russian economic system also corresponds to the model in question, but does not ensure its transition to an effective state. It is advisable to look for the reasons for the current situation in the complex assessment of the balance of the Russian economic system.

Model 2 "Development supported by external support." Examples of development as per Model 2 are Mexico, Indonesia, and Colombia. The most characteristic of the group is the economic portrait of Mexico demonstrating the management of the national system via the creation of favorable conditions for external influence, that is, from the developed countries of the world. Mexican experience shows that this path can provide a transition to an effective state of the economic system. Currently, the country's economy is quite diversified, the oil rent from 2016

Table 1: Identification of generalized models of development of rental-type economic systems

Public policy mechanisms	Cluster end centers			
	1	2	3	4
	Without clear profile	With clear profile		
	Unique models or forming models without a pronounced vector of development	Model 3 Maintain short-term macroeconomic and social stability, without development	Model 2 Development with external support	Model 1 Development aimed at the creation of a strong diversified industrial complex
Sterilization of the economy	0.7	0.0	0.0	1.0
Limiting of budget dependence on rental income by reducing of production	0.0	0.0	0.9	0.3
Floating exchange rate	0.0	0.0	1.0	0.8
Distribution of a limited share of rental income (investment income) on a non-competitive basis	0.2	0.0	0.0	0.3
Margin alignment	0.2	0.0	0.0	0.1
Long-term contracts for rent-forming resource	0.3	0.0	0.4	0.7
Hedging of the price of a rent-forming resource	0.5	0.0	0.1	0.0
Denomination of debt in resource units	0.2	0.8	0.0	0.0
Provision of preferences for foreign companies	0.1	0.3	0.6	0.6
Export diversification (including raw material exports)	0.3	0.0	0.4	0.6
Development of non-primary (non-oil) economic relations	0.0	0.3	0.3	0.9
Centralization of the extractive industries, and then the resource industry as a whole (nationalization in extreme cases)	0.8	1.0	0.4	0.1
Diversification of the economy via government intervention	0.4	0.0	0.1	0.2
Creating of a subsidies system	0.5	0.0	0.3	0.4
Development of energy saving and energy efficiency policies	0.6	0.0	0.4	0.8
Fiscal mechanisms, namely discriminatory taxation and regulation	0.3	0.5	0.7	0.7
Import substitution policy and protection of domestic producers	0.2	0.0	0.1	0.6
Domestic price controls	0.2	0.5	0.3	0.1
Cartel agreements	0.1	1.0	0.0	0.0
Lending at lower rates to restore the economy secured by oil contracts (supported by oil supplies)	0.1	0.8	0.0	0.0

Source: Compiled by the author

is a small share in GDP - 1,495%, comparable to the average world level (1,019%). For comparison, the level of the Russian Federation is 7.006% (WB, 2019). The results were achieved mainly due to a significant degree of openness of the economy. About 1/3 of Mexican exports now account for the production of about 3,000 enterprises of Makiladoras, including the world's largest manufacturers of automobiles and electronics, which is more than 3 times higher than the volume of export earnings from the sale of crude oil (Spivak et al., 2017). The basis of the Mexican industry are the enterprises of free economic zones with a preferential customs regime for importing of the components from abroad and duty-free export of most of the manufactured products. Mexico also has a diversified agriculture (CC RF, 2019).

Indonesia has diversified its economy since the 1980s until now in a similar way. As part of the economic system, sustainable agribusiness and export-oriented industries were built via preferences from the United States and Japan, as well as the

relocation of investment from the newly industrialized countries of East Asia in the 1990s.

Model 3 “Maintenance of short-term macroeconomic and social stability, without development.” This model predetermines the focus of the government policy on the maintenance of short-term macroeconomic stability of the system. This path is currently followed by countries such as Angola, Nigeria, Yemen. The use of a low-efficiency rent-forming resource for these countries has resulted in underdeveloped infrastructure, relative closeness of the economy, restriction of rights and freedoms, low investment attractiveness, and management of excess revenues in foreign markets without reinvestment in the domestic economy. A set of public policy measures aimed at containing social tensions in the current political cycle.

It is also interesting to emphasize that the creation of a subsidy system is not of a system-forming nature for the formation of generalized development models of the economic systems under consideration. Moreover, this mechanism is often

Table 2: Description of the generalized model of development of rental-type economic systems

Group of mechanisms	Frequency of use	Model 1 Development aimed at the creation of a strong diversified industrial complex	Model 2 Development with external support	Model 3 Maintain short-term macroeconomic and social stability, without development
Basic mechanisms	0.75 and more	Sterilization of the economy; Development of non-commodity relations; Energy saving and energy efficiency measures; Floating exchange rate Long-term contracting	Floating exchange rate; Limiting of the dependence of the budget on rental income by production reducing	Centralization of extractive industries, and further resource industry in general (nationalization in extreme cases) Cartel agreements
Add-on (if required)	0.4-0.74	Fiscal mechanisms (discriminatory taxation and regulation); Export diversification, including raw materials; Import substitution policy; Provision of preferences for foreign companies	Provision of preferences for foreign companies; Fiscal arrangements (tax mitigation for foreign companies)	Demonetization of debt in terms of resources Crediting at lower rates for economic recovery (formal reason) secured by raw materials (oil) contracts
Mechanisms that are not involved	0	Monetary instruments	Mechanisms that can adversely affect investment climate change	Mechanisms for structural change in the economy
Countries		Australia, Norway, USA, Canada, Chile (until 2009), Bahrain, Kazakhstan, Russia	Mexico, Indonesia, USA (Alaska), UK, Sweden, Chile (since 2009), Colombia	Angola, Nigeria, Zimbabwe, Yemen

Source: Compiled by the author

counterproductive and hampers the development of the economic system. For example, Indonesia has developed a fuel subsidy system in the 1960s (Grigoriev et al., 2017b). The consequence of this measure was the irrational use of oil products. The same difficulties faced Saudi Arabia, Venezuela, and Norway at various stages of their development.

5. CONCLUSION

The conducted research allowed to draw a number of results and conclusions of theoretical and practical importance.

A cluster analysis was conducted on 20 mechanisms of state policy within the framework of rental-type economic system management based on the experience of 24 countries of the world, reflecting 30 states of economies in various conditions of their operation.

The generalized models of the development of rental-type economic systems with clear profiles have been revealed:

- Model 1 “Development aimed at the creation of a strong diversified industrial complex”;
- Model 2 “Development supported by external support”;
- Model 3 “Maintenance of short-term macroeconomic and social stability, without development.”

A profile has been determined for each model based on the selection of sets of basic, superstructural and non-involved mechanisms of public policy. The backbone mechanisms for the identified models are the following ones:

- Model 1: Development of non-commodity relations, diversification of exports, including raw materials, long-term contracting, as well as measures for energy saving and energy efficiency;

- Model 2: Preferences for foreign companies and a floating exchange rate;
- Model 3: Centralization of the extractive industries, and then the resource industry as a whole (nationalization in extreme cases), as well as cartel agreements.

It should also be emphasized, including for the current and future development of the Russian economic system, that the creation of a subsidy system is not of a systemic nature, but only relevant to complementary (combining) mechanisms.

The approach suggested in the work allows to focus the developed perspective state policy within the framework of a certain concept of its formation. It is possible to determine an effective combination of mechanisms and identify the list of required adjustments in the system of state programs of the country based on the parameters of the identified development model.

Further areas of research for generalized models of the development of rental-type economic systems may be related to two areas:

- Description and systematization of sets of conditions which various generalized models of development of rental-type economic systems are formed and/or function under;
- Specification of the parameters of the models taking into account the various phases of economic cycles, for example, based on the delimitation of cases of periods of high and low world oil prices.

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