УДК 336.13

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TARGET GROUPS FOR INCREASING FINANCIAL POTENTIAL OF THE PPP SECTORS IN ORDER TO THE GOVERNMENT'S FINANCIAL POLICY

Abstract. The relationship between the financial potential of PPP sectors and financial policy has been identified, which testifies to the dependence of the overall development of public-private partnership on strategic decisions at the state level. An analysis of causal relationships with the use of the canonical correlation method has been carried out to determine the relationship between the financial potential of PPP sectors and the power of interaction with public finance policy. This allows not only to assess the prospects of the development of events in the event of a change in one of the indicators in a specific public-private partnership sector, but also in the presence of relevant mathematical and statistical models to obtain an estimate of the magnitude of secondary changes. In turn, government financial policy measures should be tailored to the current state of financial potential of public-private partnership.

It is revealed that the financial potential of PPP sectors has a high degree of interaction with financial policy, which is confirmed by the adequacy of the system of canonical correlation equations. Ranking the indicators of the financial potential of the PPP and determining their factor load allowed formulating targets. Target indicators of public-private partnership financial potential are selected based on the sectors that are the basis for adjusting the state's financial policy in order to increase the financial potential of the public-private partnership: in the public sector - indicators of budget expenditures and the degree of subsidized equalization of regions by the state; by the private sector - indicators of the volume of return of financial resources spent on fixed assets and profitability of business entities; in the financial and credit sector, is an indicator of lending to non-financial corporations.

Keywords: financial policy, public-private partnership, financial potential, public, private, financial and credit sectors.

JEL Classification E63

Formulas: 4; fig.: 1; tabl.: 1; bibl.: 5.

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ЦІЛЬОВІ ОРІЄНТИРИ НАПРЯМІВ ПІДВИЩЕННЯ ФІНАНСОВОГО ПОТЕНЦІАЛУ СЕКТОРІВ ППП ВІДПОВІДНО ДО ФІНАНСОВОЇ ПОЛІТИКИ ДЕРЖАВИ

Анотація. Виявлено взаємозв'язок між фінансовим потенціалом секторів публічно-приватного партнерства та фінансовою політикою, що свідчить про залежність загального розвитку публічно-приватного партнерства від стратегічних рішень на рівні держави. В свою чергу, заходи фінансової політики держави повинні бути сформовані відповідно до поточного стану фінансового потенціалу публічно-приватного партнерства. Для визначення взаємозв'язків між фінансовим потенціалом секторів публічно-приватного партнерства і силу взаємодії із державною фінансовою політикою проведено аналіз причинно-наслідкових зв'язків із застосуванням методу канонічних кореляцій. Це дозволяє не лише оцінити перспективи розвитку подій в разі зміни одного з показників в певному секторі публічно-приватного партнерства, але і за наявності відповідних математичних і статистичних моделей отримати оцінку величини вторинних змін (тобто у іншому секторі).

Виявлено, що фінансовий потенціал секторів публічно-приватного партнерства має високу ступінь взаємодії із фінансовою політикою, що підтверджено адекватністю системи рівнянь канонічних кореляцій. Ранжування показників фінансового потенціалу публічно-приватного партнерства та визначення їх факторного навантаження дозволило сформувати цільові показники. Відібрано цільові показники фінансового потенціалу публічно-приватного партнерства за секторами, які є підґрунтям для коригування фінансової політики держави з метою підвищення фінансового потенціалу публічно-приватного партнерства: за публічним сектором – показники обсягу видатків бюджету і ступінь дотаційного вирівнювання регіонів державою; за приватним сектором – показники обсягу повернення фінансових ресурсів, витрачених на основні засоби та прибутковість діяльності суб'єктів господарювання; за фінансово-кредитним сектором – показник обсягу кредитування, наданого нефінансовим корпораціям.

Ключові слова: фінансова політика, публічно-приватне партнерство, фінансовий потенціал, публічний, приватний, фінансово-кредитний сектори.

Формул: 4; рис.: 1; табл.: 1; бібл.: 5.

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ЦЕЛЕВЫЕ ОРИЕНТИРЫ НАПРАВЛЕНИЙ ПОВЫШЕНИЯ ФИНАНСОВОГО ПОТЕНЦИАЛА СЕКТОРОВ ПЧП В СООТВЕТСТВИИ С ФИНАНСОВОЙ ПОЛИТИКОЙ ГОСУДАРСТВА

Аннотация. Для определения взаимосвязей между финансовым потенциалом секторов публично-частного партнерства и силу взаимодействия с государственной финансовой политикой проведен анализ причинно-следственных связей с применением метода канонических корреляций. Выявлено, что финансовый потенциал секторов ПЧП имеет высокую степень взаимодействия с финансовой политикой, что подтверждено адекватностью системы уравнений канонических корреляций. Ранжирование показателей финансового потенциала ПЧП и определения их факторного нагрузки позволило сформировать целевые показатели. Отобраны целевые показатели финансового потенциала ПЧП по секторам, которые являются основой для корректировки финансовой политики государства с целью повышения финансового потенциала публично-частного партнерства.

Ключевые слова: финансовая политика, публично-частное партнерство, финансовый потенциал, публичный, частный, финансово-кредитный сектора.

Формул: 4; рис.: 1; табл.: 1; библ.: 5.

Introduction. The reform of financial policy involves expanding cooperation between the state, the private sector and civil society institutions, in particular the use of public-private partnerships (PPPs). The introduction of PPP is related to the state's desire to attract private sector financial resources to fulfil societal challenges of socio-economic development. The insufficiently wide introduction of PPPs at the national and local levels is due to the uncertainty of volumes and areas of state financial support and the possibilities of attracting non-state financial resources, which requires the formation of the financial potential of the PPP. However, despite a significant number of studies on the development and implementation of the concept of public-private partnership in Ukraine, the issue of ensuring preparedness and evaluating the financial capacity of PPPs for participants, including the financial potential of public-private partnership, has been neglected.

The main task of developing the financial potential of a public-private partnership is to find out and convincingly justify the extent. One or another potential participant in the public-private partnership is prepared to participate in the financing of the PPP, taking into account their

sustainability and development trends, which will facilitate the intensification of the implementation of the PPP, will provide positive effects.

Previous research on the subject. V. Geets, O. Vasilik, I. Zapatrina, V. Oparin, V. Fedosov, S. Frolov, I. Chugunov, S. Yurii and others made a significant contribution to the study of theoretical and practical principles of the formation and implementation of financial policy. The main provisions of the theory of partnership between the state and the private sector (public-private partnership) are been discussed in the articles of V. Varnavsky, O. Golovinov, M. Gerrard, I. Zapatrina, A. Oppio, P. Leviikanas, M. Suzdalov, F. Torerri, L. Fedulova, P. Shilepnitsky.

Purpose of work is the development of adaptive integrated approach to tax incentives management of enterprises, which will allow forming effective managerial decisions to improve their innovation activity.

Results of the research. The implementation of financial policy depends on many factors. Conditionally they can be divided, depending on sources of formation of financial resources and opportunities of their use. Exactly public-private partnership, as a tool of financial policy implementation, combines these factors at the subjectively-objective level. This is due to the fact that the use of the PPP has an impact on almost all components of financial policy and interacts at all levels of the country's financial system. Therefore, in order to modernize and improve financial policy in Ukraine, first of all, it is necessary to form the most complete picture of the impact of the public-private partnership on it and the degree of interaction between different sectors of the PPP.

As a result of the above study on the evaluation of the financial potential of the public-private partnership and financial policy in Ukraine, a close relationship between the calculated integral indicators was found. However, for further analysis it is necessary to determine which particular indicators have the greatest impact for future directions for the stimulation or regulation.

The disclosure and analysis of causal relationships allows, firstly, to assess the sequence of events' development in financial policy of Ukraine in case the situation changes in one sector of the PPP, and secondly, to analyze the relationships between participants of the public-private partnership, which will facilitate optimize the structure of the financial support of the Ukrainian economy, and thirdly, to set targets, which it is expedient to use later in order to increase the financial potential of the public-private partnership. Therefore, a block diagram of the model of the relationship between financial policy in Ukraine and the financial potential of the public-private partnership has been developed in the work (*Fig.*).

In economic and socio-economic studies, it is very important to find among the set of possible dependencies for certain information those that have the closest connection between dependent and explanatory variables. In this case, the question arises — to find among the set of possible dependencies such that is been characterized by a high correlation. It is possible to solve this question by applying canonical correlation. In addition, the method of canonical correlations makes it possible to reduce the volume of input data by removing minor factors that have little impact on the dependent variables, that is, by using canonical correlations, it is possible to avoid errors in specification of the econometric model [1, p. 51].

In the economy, causal relationships trigger the mechanisms of the functioning and development of objects, therefore it is necessary to correctly divide elemental attributes on causal and investigational, at least to a certain degree. The method of canonical correlations, which establishes the connection between the two sets of values of the characteristics, allows finding the maximum correlation between the two sets of values. This problem is solved with the new variables — canonical functions are defined as linear combinations of the initial attributes. Previously the entire set of elementary features should be divided into two groups: explanatory signs and effective signs, which accumulate the effects of the first [2].

1 — **The formation of the matrix of the original data:**
X – the indicators of financial policy
Y – the financial potential of the PPP

2 — **The standardization of original characteristics:**

$$Z_{Yj} = \frac{Y_j - \overline{Y}_j}{\sigma_Y}; Z_{Xk} = \frac{X_k - \overline{X}_k}{\sigma_k}. \qquad (1)$$

3 — **The calculation of correlation matrices:**
the coefficients of correlation within and between groups

$$\mathrm{r} = Z^T Z / n, \qquad (2)$$

Z – the corresponding matrix of standardized data.
n – the number of observation (sample size)

4 — **The finding of the elements of the matrix P:**

$$P = \begin{cases} r_y^{-1} r_{xy} r_x^{-1} r_{xy}^T, & \text{if } s < m \\ r_x^{-1} r_{xy}^T r_y^{-1} r_{xy}, & \text{if } s > m \end{cases}, \qquad (3)$$

5 — **The determination of the characteristic roots and vectors of the matrix P:**

characteristic roots λ are the squares of the canonical correlation coefficients, that is

$$r_L = + (\lambda_L)^{1/2}, \qquad (4)$$
$$\beta_j = r_x^{-1} r_{yx} \alpha_j / r_j, \qquad (5)$$

β_j – the elements of the characteristic vectors of the matrix P;
α_j – the j-th column vector of the coefficients of the linear combination of the first group of signs size s×1.

6 — **The check of the statistical significance**
$$\alpha_j^T r_y \alpha_j = 1; \quad \beta_j^T r_x \beta_j = 1$$

r_1 is significant

r_1 isn't significant

7 — **The formation of the matrix of factor loadings:**
$$V_{L1} = \sum_{j=1}^{s} a2j \; ; \qquad V_{L2} = \sum_{k=1}^{m} a2k, \qquad (6)$$
V_L - absolute contributions of each canonical variable L in the form of the sum of squares of factor loadings across individual groups

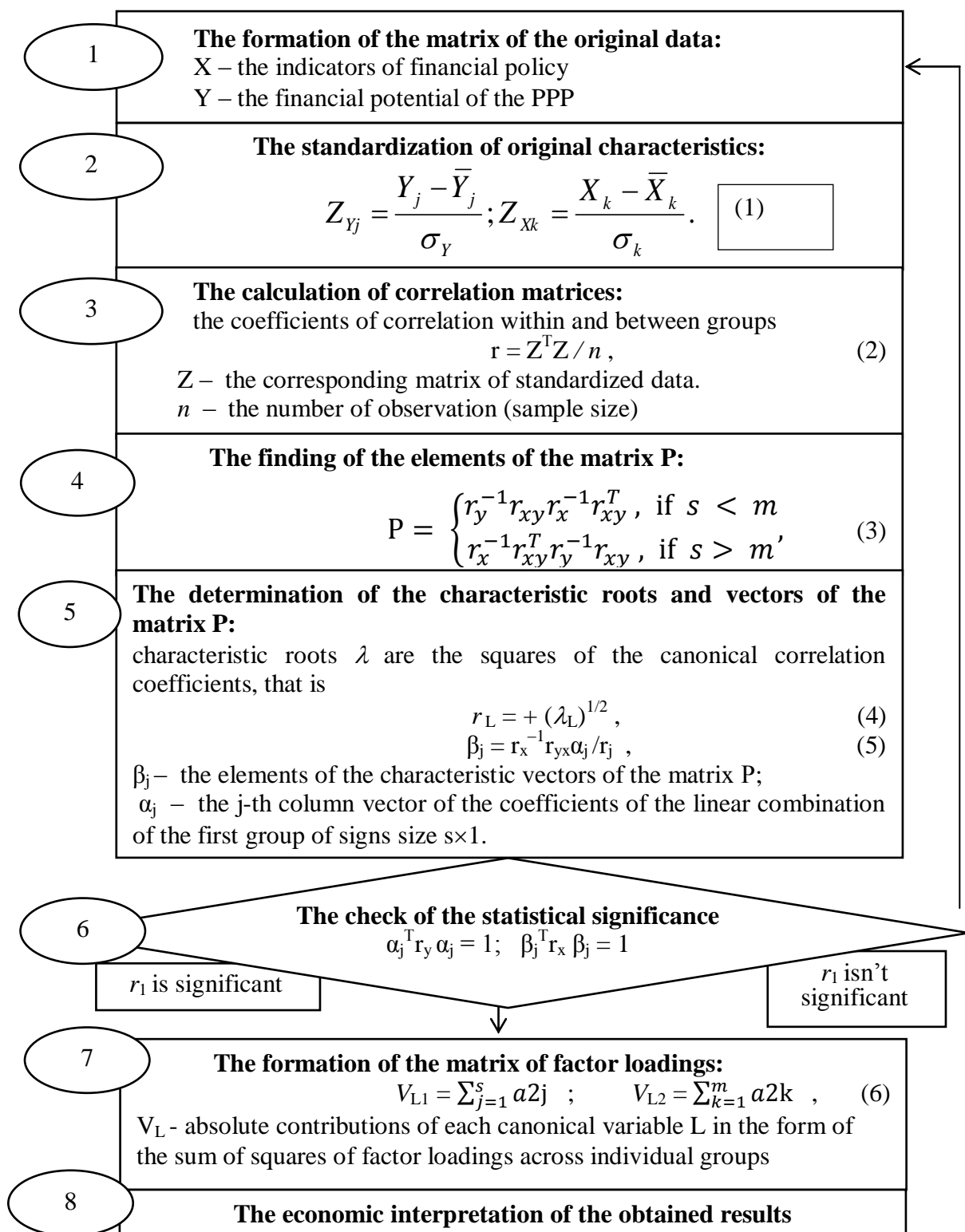**8** — **The economic interpretation of the obtained results**

Fig. A block diagram of forming a model of the dependencies
between the financial policy in Ukraine and the financial potential of the PPP

The complexity of the computational procedure of the canonical analysis was the explanation of its limited application in the analysis features of objects in the economy, but the current development of software and hardware offers the broad possibilities of this mathematical method — remains the only question of adequate formation of a system of features describing the object under study, and detection the mechanism of their cause-effect interaction [3, p. 88—89].

The system of the canonical functions can be considered a new coordinate system, which is best suited for describing the set of correlations between the indicators of different groups.

As the effective features are identified indicators of financial policy of Ukraine $\{y_j\}$, and as the elementary features $\{x_i\}$ are the indicators of the financial potential of the public-private partnership in the context of its sectors (public, private, financial-credit), the system of which formed by results of synthesis of the points of view of leading domestic and foreign authors, is formed according to the stages of the methodical approach to assessing the financial potential of the public-private partnership by sectors (*tabl.*).

Table

Indicators of financial policy and the financial potential of the sectors
of the PPP that is the basis for identifying causal relationships

	The indicator
Y_1	The degree of balancing of the region's budget over the ratio of revenues and expenses
Y_2	The level of increase in consumer prices
Y_3	Availability of debt fin. resources as the cost of credit, %
Y_4	The level of profitability of the deposit
Y_5	Activity of the region in investing outside the country
Y_6	The degree of attracting foreign capital to the regions
X_1	The financing of regions at the expense of the state budget
X_2	The financing of regions at the expense of the local budget
X_3	The financing of the regions at the expense of additional source of state financing
X_4	The level of use of financial resources, measured by expenditure budget
X_5	The level of accounts payable of budgetary institutions
X_6	The level of accounts receivable budgetary institutions
X_7	The subsidized degree of alignment of the regions by government
X_8	The share of profitable enterprises
X_9	The effectiveness of operational activities of enterprises expressed profitability
X_{10}	The activity of the private sector in investment processes, expressed as the amount of funding from own funds of enterprises and organizations
X_{11}	The return of financial resources spent on the asset, represented by depreciation
X_{12}	The degree of profitability of business entities
X_{13}	The level of accounts payable of the enterprise
X_{14}	The level of accounts receivable of the enterprise
X_{15}	The volume of lending provided to non-financial corporations
X_{16}	The volume of lending to households
X_{17}	The degree of attraction of additional financial resources from households
X_{18}	The rate of return on funds raised for households
X_{19}	The rate of return on funds raised for non-financial corporations
X_{20}	The activity of the banking sector in investment processes
X_{21}	The degree of involvement of public funds for the extension of construction through the FCS

The results of the analysis are presented in the form of a system of equations of the state of financial policy of Ukraine and the level of financial potential of the public sector of the public-private partnership by sectors.

$$\begin{cases} U_1 = -0{,}0253x_1 - 0{,}0673x_2 + 0{,}0458x_3 + 0{,}9933x_4 + \\ \qquad 0{,}0857x_5 - 0{,}0354x_6 - 0{,}1091x_7 \\ V_1 = 0{,}1426y_1 + 0{,}0938y_2 - 0{,}02235y_3 - 0{,}1012y_4 + \\ \qquad 0{,}5455y_5 + 0{,}6613y_6 \end{cases} \quad (1)$$

where U_1 – the financial potential of the public sector of the PPP;

V_1 – the state of financial policy in Ukraine.

Since in the process of canonical analysis, the initial variables are reduced to a standardized form, the coefficients in the equations for canonical variables (U, V) characterize the effect of the corresponding initial variables (indicators) on canonical variables, which allows the ranking of features or indicators by force of influence.

The canonical scales correspond to the unique contribution that makes the corresponding variable (indicator) into a weighted sum or canonical variable. However, they do not say anything about what part of the variability (variance) each canonical root explains in the variables. However, it is possible to conclude what the proportion of the variance, considering the load of canonical factors [4]. The coefficients of canonical correlation characterize the closeness of interconnections between different linear combinations of two groups of attributes - productive and factor. However, their magnitude does not give any information about what proportion of the variation of the factors of the symptoms of each group is explained by the corresponding canonical variables. The quoted uncertainty can be reduced by contacting the matrix of factor loadings for each group of signs, which confirms the canonical weight.

Thus, among the outcome indicators, the greatest impact has investing outside of Ukraine, and foreign investment in Ukraine. Also important is the degree of a balanced budget. These are the very indicators that the results of the study were determined a significant negative impact on the general state of Ukraine's financial policy. Therefore, these indicators should be defined as targets in the process of reorganization and improvement of financial policy of the state.

Among indicators of the financial potential of PPP sectors, it is necessary to allocate the volume of budget expenditures, subsidized alignment and payables of budget institutions.

It is these indicators determine the balance of the budget, as well as sufficient permanent sources of income to cover the expenditure part of the state budget. Next, consider the relationship of financial policy indicators with the indicators of the financial potential of the private sector of the PPP.

$$
\begin{cases}
U_2 = 0{,}1615x_8 - 0{,}0474x_9 - 0{,}0842x_{10} + 2{,}8296x_{11} - \\
\qquad 2{,}0257x_{12} + 0{,}0404x_{13} + 0{,}0095x_{14} \\
V_2 = 0{,}0032y_1 + 0{,}0427y_2 - 0{,}124y_3 - 0{,}0251y_4 + \\
\qquad 0{,}3761y_5 + 0{,}802166y_6
\end{cases}
\tag{2}
$$

whereU$_2$– the financial potential of the private sector of the PPP;

V$_2$– the state of financial policy in Ukraine.

In addition for the private sector important is the availability of credit as a factor of accumulation of capital and expansion of its activities. Among the dependent factors that influence financial policy is the level of profitability of the enterprises and depreciation charges, which are part of the expenditure and form the financial result.

Equation of the model of dependence of financial policy of Ukraine from the financial-credit sector of the PPP has the following form.

$$
\begin{cases}
U_3 = 0{,}3189x_{15} - 0{,}084x_{16} + 0{,}0503x_{17} - 0{,}8512x_{18} - \\
\qquad 0{,}0727x_{19} + 0{,}0925x_{20} + 0{,}0083x_{21} \\
V_3 = 0{,}0612y_1 + 0{,}0193y_2 - 0{,}1534y_3 - 0{,}8176y_4 + \\
\qquad 0{,}0566 + 0{,}25288y_6
\end{cases}
\tag{3}
$$

where U$_3$– the financial potential of the financial-credit sector of the PPP;

V$_3$– state of financial policy in Ukraine.

For the financial-credit sector, unlike other, a significant target is the level of profitability of the deposit, as this indicator directly affects the amount of borrowed resources, which in future can been used for active banking operations. In addition, the question of the formation of long-term resources is facing in front of the financial market of Ukraine, since public-private partnership projects are mostly long-term. Among the dependent variables the greatest weight have attracted funds from households (because it is a powerful source of potential long-term financial investments), the volume of lending to non-financial corporations and the activity of the banking system in the investment process.

It is also advisable to identify the relationship between sectors of the financial potential of the public-private partnership. For this conduct a canonical analysis between them in pairs.

$$\begin{cases} U_4 = 0{,}0457x_1 + 0{,}0127x_2 + 0{,}0217x_3 + 1{,}1023x_4 - \\ \qquad 0{,}0652x_5 - 0{,}061x_6 - 0{,}1379x_7 \\ V_4 = 0{,}1216x_8 - 0{,}0172x_9 + 0{,}0022x_{10} - 1{,}18x_{11} + \\ \qquad 2{,}0805x_{12} + 0{,}0055x_{13} - 0{,}0715x_{14} \end{cases} \quad (4)$$

where U_4 – the financial potential of the public sector of the PPP;

V_4 – the financial potential of the private sector of the PPP.

The analysis revealed a high level of dependency of these groups of indicators, indicating a significant effect between subjects of the PPP and the need to improve them in the complex. Among the indicators, target are the same, which affect financial policy in Ukraine, which confirms their decisive influence on the financial activity in Ukraine.

$$\begin{cases} U_5 = -0{,}0858x_1 - 0{,}1372x_2 + 0{,}0361x_3 + 1{,}0204x_4 - \\ \qquad 0{,}1166x_5 + 0{,}0342x_6 - 0{,}2954x_7 \\ V_5 = 0{,}5432x_{15} + 0{,}2267x_{16} + 0{,}2121x_{17} - 0{,}1441x_{18} + \\ \qquad 0{,}1386x_{19} + 0{,}0484x_{20} - 0{,}1747x_{21} \end{cases} \quad (5)$$

where U_5 – the financial potential of the public sector of the PPP;

V_5 – the financial potential of the financial-credit sector of the PPP.

Analyzing equation of the model, one can conclude that the ranking of the indicators by force of influence in the relationship between the financial potential of the public and financial-credit sectors of the public-private partnership has the form:

$$\begin{cases} U_6 = 0{,}2334x_8 - 0{,}0862x_9 + 0{,}0517x_{10} + 1{,}2731x_{11} - \\ \qquad 0{,}603x_{12} + 0{,}3429x_{13} - 0{,}0863x_{14} \\ V_6 = 0{,}7178x_{15} + 0{,}0911x_{16} + 0{,}0757x_{17} - 0{,}0449x_{18} + \\ \qquad 0{,}2049x_{19} - 0{,}1931x_{20} - 0{,}2844x_{21} \end{cases} \quad (6)$$

where U_6 – the financial potential of the private sector of the PPP;

V_6 – the financial potential of the financial-credit sector of the PPP.

According to the results of the analysis in addition to above selected indicators should be paid attention to the consumer price index, what affects the level of savings of the population, and consequently on the volume of deposits and additional attracted resources from households.

In contrast the previous ones, this analysis has allocated the payables of enterprises, which may be the cause of non-repayment of funds to banks or other financial institutions and the rate of return on funds raised for non-financial corporations that affects the decision of the business entity on the allocation of free financial resources in favor of other financial instruments. Based on the results of calculations of statistical indicators in the constructed models of systems of complex features, it was proved that pairs of the canonical function are distinguished by the existing close relationship, as evidenced by the values of the coefficients of the canonical correlation (r_{ij}) and also confirmed their importance according to the Pearson criterion (the significance level of the relationships, not more than 0.001).

Conclusion. Thus, the method of canonical correlations opens broad possibilities for finding tools that can increase the level of implementation of financial policy through the simultaneous analysis of multiple output parameters and a large number of determining factors, their ranking on the basis of the analysis of the structure of the canonical variables and their factor loadings.

The results of the analysis confirm the link between the components of the financial potential of the PPP in the public, private and financial-credit sectors, as well as their interaction with financial policy in Ukraine. Also, indicators (both resulting and dependent) were identified that have the greatest impact. Therefore, in order to solve the existing problems in the financial potential of the PPP of Ukraine, the necessary prerequisite is to direct the measures of financial policy to the selected targets in order to stimulate them. An important component of implementing the concept of the public-private partnership in Ukraine in financial policy is the creation of prerequisites for cross-sectoral interaction. The relationship between the financial potential of the PPP sectors and financial policy has been identified, which testifies to the dependence of the overall development of the PPP on strategic decisions at the state level. In turn, state financial policy measures should be tailored to the current state of financial potential of the PPP.

In order to determine the relationship between the financial potential of the public-private partnership sectors and the strength of interaction with the public financial policy, a causal

relationship analysis was conducted using the canonical correlation method. This allows not only to evaluate the prospects of a change in one of the indicators in a particular PPP sector, but also to obtain an estimate of the magnitude of the secondary changes (in another sector) in the presence of appropriate mathematical and statistical models.

It is revealed that the financial potential of PPP sectors has a high degree of engagement with financial policy, as evidenced by the adequacy of the canonical correlation equation system. The ranking of PPP financial potential indicators and determining their factor loadings allowed them to form targets (for financial policy is activity of the region in investing outside the territory of the country and the degree of attraction of foreign capital to the regions; for the financial potential of the public sector of the PPP is the amount of budget expenditures for the financial potential of the private sector of PPPs is the return of financial resources spent on fixed assets and profitability of activities economic entities; for the financial potential of the PPP financial-credit sector, the volume of credit provided to non-financial corporations), which are guidelines for adjusting the financial policy of the state.

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Стаття рекомендована до друку 03.12.2019   *© Тищенко В. Ф., Остапенко В. М.,*
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The article is recommended for printing 03.12.2019   *© Tyschenko V. F., Ostapenko V. M.,*
Karpova V. V., Shigol F. A.