

BUDGETARY REVENUE BREAKDOWN AT THE LOCAL LEVEL OF PUBLIC ADMINISTRATION IN FEDERAL COUNTRIES

Serhiy Shkarlet¹, Iryna Dolozina², Maksym Dubyna³

Abstract. Ensuring the financial autonomy of local government bodies is an important component for creating conditions on accelerating the development of individual territories of the country and increasing the efficiency of their use. Creation of mechanisms for providing sufficient amounts of financial resources, activities of the above-mentioned authorities require thorough research in this area, especially within the study of foreign experience by building budget systems and organizing redistribution of financial resources between their individual components at different levels. Experience of federative countries is particularly significant in this area. The outlined confirms the relevance of the chosen topic of the article. Accordingly, the following goal of the research was set – to identify structural features and trends in the transformation of budget revenues at the local level of public administration in federative countries from 2000 to 2015. To achieve this goal, the following tasks were set: to determine the revenues structure of local government in federative countries; to analyse main tendencies of the change of the specified structure during 2000–2015; to apply cluster analysis in order to identify groups of countries that are similar to the processes of revenue generation of local government budgets in federative countries. *Methodology.* Statistics for assessment of budgetary revenue's breakdown in several federative countries by the IMF data was processed, assessment of breakdown transformation with the use of the Ryabtsev index was done, and similarity and distinctions of revenue's breakdown in different countries with the use of the hierarchical cluster analysis was investigated. *Outcomes.* It was found that among the analysed federative countries, the own tax revenue has a significant share (higher than 30% in a breakdown of all revenue) only in Belgium, Germany, Australia, Canada, and also in Bosnia and Herzegovina; the inter-budgetary transfers take the main position in financing of local budgets in Austria, Belgium, Canada, Russia, and Brazil; own non-tax revenues in local budgets are significant only in Australia and Bosnia and Herzegovina. It was proved that in fifteen years only in Russia, the opposite type of revenues breakdown sources was created and it demonstrates shifting to the centralization of public finance. It was also revealed that in 2000, the countries' cluster structure by breakdown sign had obviously expressed group character, but further it evolved from a group structure to the step structure displaying specifics in the formation of local budgets' revenues in each country. *Practical implications.* Practical outcomes of the study are analytical information on the structure of revenues of local government in federative countries, which may be useful by introducing new mechanisms for increasing the financial autonomy of local self-government. In addition, the obtained data may be useful for other not federative countries in terms of studying peculiarities of the formation of budget revenues of local government and analysis of the impact of such revenues on the socio-economic development of separate territories. *Value/originality.* The conducted study is relevant given the importance of developing local government in federative countries and providing it with the necessary financial resources for independent self-functioning. The data obtained during the research implementation are of practical value and can be used in the process of implementing measures to increase the financial independence of budget revenues at the level of local self-government in federative countries. This research was carried out within the framework of the scientific work performing of the Department of Finance, Banking and Insurance of the Chernihiv National University of Technology on the following topics: "Financial stability of economic systems in crisis management" (No. 0115U001149) and "Theoretical and applied aspects on financial provision of the national economy" (State Registration No. 0113U002741).

Key words: budget, revenues, breakdown, local governance, fiscal policy, federal states.

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Corresponding author:

¹ Chernihiv National University of Technology, Ukraine.

E-mail: shkarlet@ukr.net

² Donetsk National Technical University, Ukraine.

E-mail: dolozirina@gmail.com

³ Chernihiv National University of Technology, Ukraine.

E-mail: maksim-32@ukr.net

1. Introductions

The local governance is the most operative, flexible, and likely the most effective problem-solving mechanism of local communities. This fact causes the tendency of decentralization of the power in the majority of the countries. At the same time, possibilities of increase in charges of local government in providing public services are limited for a number of reasons. At first, the financial autonomy of local governments is significantly limited to the potential of own income. At second, financial resources of local communities may differ that causes the growth of the horizontal conflicts and imbalances. At third, the culture of interaction and cooperation of communities for the implementation of joint projects is an immanent feature of institutional traditions not in all countries. In addition, at fourth, although decentralization of public finance is the general tendency, it is implemented not with identical speed and with various restrictions in different countries.

The federal countries, thanks to features of this type of state system, obviously have the most fertile field for the development of local governance. However, decentralization of powers only theoretically means an increase in the financial autonomy of local budgets. In this regard, the issue on features identification of the revenues of local budgets formation and breakdown of sources of their receipts is of considerable interest.

Thus, the purpose of this article is to study the peculiarities of the formation of local budgets incomes of federal states (Australia, Belgium, Germany, Austria, Canada, Switzerland, the USA, Malaysia, the Russian Federation, Mexico, India, Argentina, Brazil, and Bosnia and Herzegovina). To achieve this goal, the following main tasks were identified: – to identify and analyse the revenue structure received by local government bodies of federal states at places in 2000, 2005, 2010, and 2015; – to distinguish basic features of the structure transformation of the defined income in the relevant periods; – to determine by means of cluster analysis homogeneous federative countries on the basis of similarity of revenue structure of local self-government budgets and their transformation during 2000–2015.

In order to solve these problems, the following research methods were used during the research: grouping – when the totality of countries is allocated for the analysis of the structure of incomes received by their local authorities; analysis and synthesis – when considering the structure of local budgets and summarizing the results obtained; structural analysis – determining the proportion of individual revenue streams in the total amount of revenues to local government in federal countries; cluster analysis – to identify groups of countries based on similar principles and peculiarities of the formation of such revenues; index analysis, in particular, the Ryabtsev index – to identify the level of similarity and differences between the structure of budget revenues of the said authorities in federal countries.

Nowadays more and more researches are devoted to studying the experience of various countries in the formation of local budgets' resource base. Among the latter, it is necessary to pay attention to works by P. Mrkývka, D. Czudek, D. Foremny, V. Bobáková, L. Malikká, D. S. Reznichenko, P. Zhang, G. Turley, N. Ermasova. This issue also draws the attention of Ukrainian scientists among whom the works of O. Muzyka, I. Volokhova, A. Sokolovskaya, and N. Rekova are the most noticeable.

However, in scholarly works, the experience of individual countries with different types of government in the field of local budget revenues, providing the necessary financial resources to the territorial communities, is being considered fragmentally. But, such studies can distinguish both positive and negative features of ensuring the accumulation of local budget revenues and use the results obtained in the process of transformation of national budgetary systems. Particularly relevant results of the study may be for those countries that gradually form their own budget system today, transforming it into the needs of a new system of powers division between central and local authorities.

2. Investigation on the distribution of local budgets of individual federal countries

In this way, we begin with an analysis of the revenue structure of the local governments' budgets of various federal countries. At the same time, a more careful comparative analysis is necessary for the understanding of an overall picture and regularities of fixing to local budgets of certain types of sources of income.

1) to process statistical material for the assessment of budgetary revenue's breakdown. As a statistical basis of the research data of the IMF on public finance of several federal countries (Austria, Germany, Belgium, Canada, the USA, India, the Russian Federation, Switzerland, Argentina, Brazil, Mexico, Bosnia and Herzegovina, and Malaysia) were used. Data on absolute values of revenue of local government budgets in national currencies were processed that allowed calculation of the corresponding budgets' breakdown indicators in 2000, 2005, 2010, 2015. Five-year intervals were chosen randomly, but owing to similarity of electoral cycles of change of governments, and respectively, possible changes of the principles of the budgetary policy, such approach quite allows monitoring of any transformations in the structure of budgetary revenue categories. Unfortunately, owing to lack of data, not all selections formed as identical by the size, however, their addition with information of national statistics was not done proceeding from the need to provide comparability of basic data. It is also necessary to pay attention to the fact that in tables given below, the main categories (taxes, grants, other revenue) are not always

disclosed in categories of a lower order, i.e. basic data are not always classified completely that influences results of the assessment of structural changes dynamics.

2) to analyse the dynamics of revenue's structural changes for local governments' budgets in federal states. Assessment of breakdown transformation was done with the use of the Ryabtsev index (Ryabtsev, Chudilin, 2011). Let $(s_1^1, s_2^1, \dots, s_n^1)$ and $(s_1^0, s_2^0, \dots, s_n^0)$ are vectors of shares of each analysed category of revenue in the budget of a certain level respectively during the studied and basic period. Then, the extent of structural changes can be estimated as:

$$I_R = \sqrt{\frac{\sum_{i=1}^n (s_i^1 - s_i^0)^2}{\sum_{i=1}^n (s_i^1 + s_i^0)^2}}$$

The choice of the Ryabtsev index among other quadratic indexes (The Gallagher Index, The Monroe index, The Gatev index, The Szalai index, The Aleskerov-Platonov index) was caused by two circumstances – its sensitivity to small selections and existence of a scale

Table 1

The scale of assessment of structural distinctions by the Ryabtsev index

Levels	Characteristic of breakdown similarity
0.000 – 0.030	Identity of breakdowns
0.031 – 0.070	Very low level of distinction of breakdowns
0.071 – 0.150	Low level of distinction of breakdowns
0.151 – 0.300	Essential level of distinction of breakdowns
0.301 – 0.500	Considerable level of distinction of breakdowns
0.501 – 0.700	Very considerable level of distinctions of breakdowns
0.701 – 0.900	Opposite type of breakdowns
0.901 and more	Complete antithesis of breakdowns

Source: Ryabtsev, Chudilin, 2001

Table 2

Local budgets' revenue breakdown in 2000, %*

Categories / Countries**	AUT	BEL	DEU	AUS	CAN	CHE	USA	MYS	RUS	MEX
Revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Taxes	16.6	29.0	37.1	37.1	39.2	57.8	37.5	54.9	72.4	58.4
on income, profits, and capital gains	0.1	8.5	29.5	0.0	0.0	48.8	2.3	0.0	35.7	0.0
on payroll and workforce	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
on property	2.6	17.1	5.1	37.1	0.0	8.1	26.9	0.0	0.0	0.0
on goods and services	4.0	3.2	2.4	0.0	0.0	0.2	8.3	0.0	0.0	0.0
on international trade and transactions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
other taxes	0.1	0.2	0.1	0.0	0.1	0.7	0.0	0.0	7.6	1.1
Social contributions	3.9	5.8	1.5	0.0	0.0	0.4	0.5	0.0	0.0	0.0
Grants	61.6	45.9	34.3	17.5	43.6	13.5	39.1	17.1	9.5	27.3
from other general government units	61.6	45.9	34.3	17.5	0.0	13.5	39.1	17.1	9.5	27.3
Other revenue	17.9	19.2	27.1	45.3	17.3	28.4	22.9	27.9	18.1	14.3
property income	1.6	0.8	1.9	2.5	0.0	5.1	10.3	0.0	12.6	1.0
finances, penalties, and forfeits	0.0	0.0	1.2	0.8	0.0	0.5	0.0	0.0	0.3	0.0
transfers not elsewhere classified	2.2	0.0	4.8	9.6	0.0	0.8	0.9	0.0	5.1	5.1

* hereinafter: grey coloured cells contain values that differ from 0; ** hereinafter: AUT – Austria; BEL – Belgium; DEU – Germany; AUS – Australia; CAN – Canada, CHE – Switzerland, USA – United States, MYS – Malaysia, RUS – Russian Federation, MEX – Mexico, IND – India, ARG – Argentina, BRA – Brazil, BIH – Bosnia and Herzegovina

Source: calculated on the basis of IMF Government Finance Statistics

of assessment of structural distinctions (Table 1) that allowed interpreting the received coefficients without the use of the comparative analysis.

3) to analyse the similarity and distinctions of revenue's breakdown. As not only categories of budgetary revenue (tax revenues, transfers, own non-tax income) but also their subcategories are of great importance for assessment of distinction of breakdowns, the hierarchical cluster analysis (a method of single-linkage clustering with Euclidean distances) according to the recommendations of A. Jain (1999), P. Berkhin (2006) in a Statistica 10 package was applied to the solution of this task.

Breakdowns of formation of local budgets' revenues in 2000 in several federal countries are presented in Table 2.

Their studying gives the chance to note that the importance of sources of income was very different. It can be said also that the highest shares of own tax revenues in local budgets were in emerging the countries and Switzerland which is a confederation. In the majority of the countries, the main source of such receipts was taxes on income and property (except Austria). Rather a significant level of own non-tax receipts (on average – 23.8%) was a common feature of the formation of local budgets' revenues. However, the breakdown of tax revenues in basic data was not determined for Canada, Malaysia, Russia, and Mexico, so these results can be hardly considered as full.

Among features which can be revealed in 2005 (Table 3), it should be noted reduction of a share of own tax income (38.8% in comparison with 44.0% in 2000) due to some growth of specific weight of the inter-budgetary transfers and income from property and services.

Table 3

Local budgets' revenue breakdown in 2005, %

Categories / Countries	AUT	BEL	DEU	AUS	CAN	CHE	BIH	RUS
Revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Taxes	14.9	31.2	37.6	38.6	37.9	57.5	56.3	36.7
on income, profits, and capital gains	0.0	10.7	29.7	0.0	0.0	48.4	1.5	30.2
on payroll and workforce	10.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0
on property	2.7	17.1	5.5	38.6	0.0	8.3	10.4	5.8
on goods and services	2.2	3.1	2.4	0.0	0.0	0.2	26.7	0.7
on international trade and transactions	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0
other taxes	0.1	0.4	0.0	0.0	0.1	0.7	1.4	0.0
Social contributions	3.4	5.1	1.6	0.0	0.0	0.4	0.1	0.0
Grants	59.7	47.2	34.4	13.1	44.8	12.5	10.4	53.1
Grants from other general government units	59.6	47.1	34.4	13.1	0.0	12.5	9.7	53.1
Other revenue	22.0	16.5	26.4	48.4	17.3	29.5	33.3	10.1
property income	2.5	0.7	2.1	2.9	0.0	4.6	8.2	0.8
finances, penalties, and forfeits	0.0	0.0	1.3	1.2	0.0	0.6	0.1	0.6
transfers not elsewhere classified	4.2	0.0	4.0	12.4	0.0	0.7	0.9	2.0

Source: calculated on the basis of IMF Government Finance Statistics

In 2010, the falling tendency of the importance of own tax income in local budgets of emerging countries is empirically designated (Table 4). Shares of this category of income in Russia and Brazil made a little more than 20% whereas in the highly developed countries changes were not cardinal. The largest share of own tax revenues as well as in 2005 may be noted in Bosnia and Herzegovina. It is necessary to emphasize that structures of categories of own tax and non-tax revenues most differed among the emerging economies also: if in Brazil and Bosnia and Herzegovina taxes on operations with goods and services played the most significant role in tax income receipts then in Russia – income taxes did.

The most cardinal changes in comparison with 2000 may be found in the formation of local budgets of the Russian Federation: the share of tax revenues was reduced almost twice that had been compensated for the account of the inter-budgetary transfers.

It is also important to concern specifics of Bosnia and Herzegovina, in which tax income of local budgets consisted mainly of taxes on internal operations with goods and services. Besides, mechanism of proportional distribution of receipts from all taxes between budgets of all levels is characteristic of this country (unlike other countries in which separate taxes are assigned mainly only to the budget of the central government or local budgets).

Similar phenomena have been noted also in 2015 (Table 5).

The share of own tax revenues in Russia decreased by 4.6 percentage points and made 16.0%, the share of own non-tax receipts in local budgets' revenue breakdown at Austria, Canada, Switzerland increased a little, however, these changes do not reflect the transformation of institutional structure of the budgetary system, and are situational.

Table 4

Local budgets' revenue breakdown in 2010, %

Categories / Countries	AUT	BEL	DEU	AUS	CAN	CHE	BIH	RUS	BRA
Revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Taxes	14.9	30.9	36.7	35.5	36.2	57.7	53.5	20.6	20.8
on income, profits, and capital gains	0.0	11.1	29.1	0.0	0.0	47.6	8.0	16.7	1.8
on payroll and workforce	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
on property	2.5	17.0	5.1	35.5	0.0	8.5	6.3	3.5	7.3
on goods and services	2.2	2.4	2.4	0.0	0.0	0.2	38.8	0.4	11.7
other taxes	0.1	0.4	0.0	0.0	0.1	1.5	0.4	0.0	0.0
Social contributions	2.9	5.8	1.7	0.0	0.0	0.3	0.0	0.0	7.1
Grants	62.8	46.3	35.1	15.2	47.6	11.4	10.5	44.0	61.3
Other revenue	19.4	17.0	26.6	49.4	16.1	30.6	36.0	35.4	10.8
property income	2.1	0.6	2.1	2.2	0.0	3.7	7.7	0.3	2.4
finances, penalties, and forfeits	0.0	0.0	1.6	1.1	0.0	0.5	0.1	0.6	1.5
transfers not elsewhere classified	1.8	0.0	3.4	17.8	0.0	0.4	11.9	26.8	2.9

Source: calculated based on IMF Government Finance Statistics

Table 5

Local budgets' revenue breakdown in 2015, %

Categories / Countries	AUT	BEL	DEU	AUS	CAN	BIH	RUS	BRA
Revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Taxes	14.4	30.5	38.7	38.1	39.8	56.5	16.0	22.8
on income, profits, and capital gains	0.0	10.3	30.9	0.0	0.0	9.4	12.2	2.4
on payroll and workforce	10.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
on property	2.3	17.3	4.9	38.1	0.0	7.1	3.2	8.0
on goods and services	1.8	2.9	2.9	0.0	0.0	39.9	0.5	12.2
other taxes	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.2
Social contributions	2.2	5.1	1.4	0.0	0.0	0.0	0.0	8.8
Grants	65.1	47.4	37.5	14.5	42.6	4.7	59.9	57.6
Other revenue	18.3	17.0	22.4	47.3	17.6	38.8	24.1	10.8
property income	2.0	0.3	1.7	2.8	0.0	3.1	0.3	3.4
finances, penalties, and forfeits	0.0	0.0	1.3	1.2	0.0	0.1	0.4	1.6
transfers not elsewhere classified	1.2	0.0	2.9	16.3	0.0	7.0	6.3	3.2

Source: calculated based on IMF Government Finance Statistics

3. Outcomes analysis by using cluster analysis within the study of the structure of local budget revenues

The cluster analysis of the countries on the basis of structure of formation of local budgets' revenues (Figure 1) shown increase in a variety between the countries in 2005–2010 in comparison with 2000 (it can be traced by the level of Euclidean distance which top threshold in 2000 was 45, 2005 – 55, 2010 and 2015 – 60).

Besides, it should be noted that if in 2000 the cluster structure had obviously expressed group character whereas, since 2005, the steady group including Bosnia and Herzegovina and Australia (high specific weight of own non-tax receipts in local budgets, a low share of the inter-budgetary transfers in income while about 1/3 receipts – own tax income) and also the big subgroup including Austria, Germany, and Belgium (low and very low levels of own tax income – 10-40%, and the average levels of the inter-budgetary transfers – 40-65%) could be found. For the rest, the cluster structure evolved from a group structure to the step structure displaying specifics in the formation of local budgets' revenues in each country.

As for a question of assessment of dynamics of structural transformations, proceeding from the values of the index of Ryabtsev (Table 6), the following can be found.

In fifteen years in Russia, the opposite type of revenues breakdown sources was created – if in 2000 almost ¾ of

local budgets income was provided with tax revenues, the corresponding indicator of 2015 was only 15% at insignificant (6 percentage points) increase in a share of own non-tax income. Essential level of distinction of breakdowns has been noted also in Australia – however these changes had single character and they can be connected with shortcomings of statistical grouping (in 2000 share of revenue of local budgets by category “Administrative fees” made 32.5% whereas further at approximately identical share of category “Other revenue” which part is “Administrative fees” its internal structure was not marked out properly in basic data).

4. Conclusions

Consequently, a study on the analysis of the income structure of local government bodies in federative countries makes it possible to draw the following conclusions.

1. The research has shown that among the analysed federal countries, own tax revenue has a significant share (higher than 30% in a breakdown of all revenue) only in Belgium, Germany, Australia, Canada, and also in Bosnia and Herzegovina. The inter-budgetary transfers take the main position in the financing of local budgets in Austria, Belgium, Canada, Russia, and Brazil. Own non-tax receipts in local budgets are significant only in Australia and Bosnia and Herzegovina.

Table 6

Ryabtsev indexes of change of local budgets' revenue breakdown

Countries	2005/2000	2010/2005	2015/2010	2015/2000
Austria	0.032	0.041	0.022	0.049
Belgium	0.039	0.013	0.013	0.042
Germany	0.019	0.019	0.048	0.064
Australia	0.216	0.055	0.036	0.216
Canada	0.014	0.029	0.052	0.010
Russian Federation	0.543	0.230	0.191	0.709
Bosnia and Herzegovina		0.152	0.111	0.150*

* 2015 by 2005

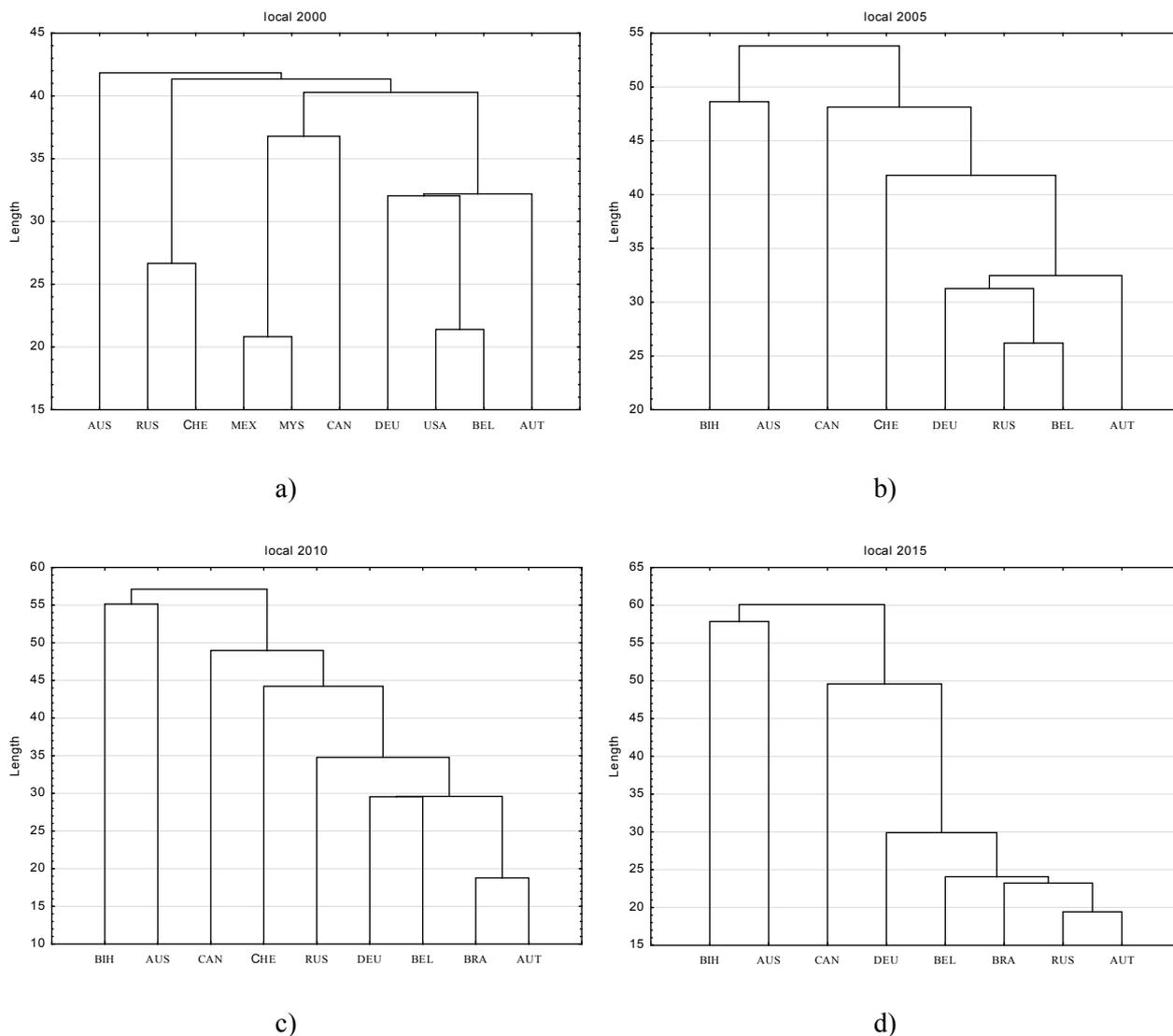


Figure 1. Clusters of countries by local budgets' revenue breakdown in: a) 2000; b) 2005; c) 2010; d) 2015.

2. In fifteen years only in Russia, the opposite type of revenues breakdown sources was created and it demonstrates shifting to the centralization of public finance. Essential level of distinction of breakdowns has been noted also in Australia.

3. In 2000, the countries' cluster structure by breakdown sign had obviously expressed group character, but further it evolved from a group structure to the step structure displaying specifics in the formation of local budgets' revenues in each country.

Thus, it is clear that in countries that are trying to transform the current system of government by decentralizing it with the increase of responsibility of the local government, it is not expedient to take into account the experience of the Russian Federation since decentralization also implies a change in the structure of revenues of such bodies.

Also, by analysing the outcomes of the study, especially those that were identified using cluster analysis, it can be concluded that in the last twenty years, the similarity

of income structures of local government bodies in federal countries has become less and the differences have become more prominent. This indicates that there can be no universal way of creating a budget system for countries conducting reforms in this area. Each state, taking into consideration the mentality and historical peculiarities of its development, must form its own model of appropriate allocation of financial resources between different levels of executive power, gradually changing it to improve the efficiency of its functioning.

The study also provides grounds for arguing that the structure of the budgets revenues of state authorities in different federative countries is also quite different, which indicates the importance of realizing the ultimate goal of reforming the budget system of individual states. The only correct and most effective way, as evidenced by the results of the analysis, does not exist.

It is the above-mentioned conclusions that indicate the relevance of the chosen topic of the article and the need

for further research in this area. Particularly interesting and one that deserves attention is a correlation analysis between the level of incomes of local government bodies and indicators of regional economic development of separate territories, namely, the gross regional product, the level of average wages, and the unemployment rate. It is also interesting to consider that there may

be research into the patterns between the different types of structure of the budget revenues mentioned above and indicators of economic development: which plays a more important role in the development of individual territories: the prevailing share of their own tax revenues or the presence of significant volumes of non-tax revenues.

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