STUDYING “SPONSORED GOODS” IN CULTURAL SECTOR. ECONOMETRIC MODEL OF BAUMOL’S DISEASE

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Abstract

The paper presents the second part of the study of “sponsored goods” in the cultural sector. It describes economic activities of theaters, concert organizations and museums in three dimensional index space coordinate axes being the lag of labor productivity, faster growth of salaries and tickets prices in relation to the corresponding macroeconomic indices. **The methodology** of constructing such indexes and statistical data used for this purpose are described in the first article published under the title “Symptoms and consequences of Baumol’s cost disease in cultural sector: an econometric study of “sponsored goods”. **The aim** of the present article is to construct and analyse econometric model of cost disease based on statistical data on activities of Russian theaters, concert organizations and museums for the period of 1994-2010.

The regression analysis based on structural model that reflects theoretically predictable links was chosen as a method of study. Such links include first, influence on cost growth of lag of labour productivity in arts organisations and parallel trend in salaries. Second, dependence of increase of income of such organizations on dynamics of labour productivity and ticket prices, third, balanced equation - product of equilibrium conditions for sponsored goods that describes the interrelation between costs of production, prices and budget subsidies.

The calculations made it possible to construct basic and modified econometric models that establish statistical correlations between income deficit and three regressors, namely indexes of labour productivity, salaries and ticket prices. As a result of this model the article presents projections of regression relation of income deficit on «expenditures plane», «income plane» and «economic results plane». **The equations derived allow to conclude** that there is a statistically significant income deficit negative elasticity by labour productivity index, positive elasticity by salaries index and ticket price index, as well as rising dynamics of Russian performing arts organization income deficit and its compensation in the nearest future.

Keywords: «sponsored goods», «cost disease», Baumol’s indexes, econometric models, income deficit.

JEL Classification: C43, L38, Z1, Z11.

1. Econometric model of «Baumol’s cost diseases»

Before creating an econometric model, I would like to make a number of remarks concerning the three particular Baumol’s indices B1, B2 and B3 considered above. The specified indexes can be interpreted as the directing vectors of the three-dimensional space characterizing the comparative dynamics of labor productivity, wages and prices in the arts organizations in relation to the corresponding macroeconomic indicators. Such treatment of the "triptych" of these special Baumol indices makes it possible to measure economic results of activities of art organizations in the coordinates of an index space of $I\{B_1; B_2; B_3\}$. Yet, on the basis of building the indices it is possible to assume their relative independence from each other, which confirms the results of correlation analysis (Tab. 1).

Tab. 1. Matrix of the correlations of Baumol indices

		Theaters			concert organizations			museums		
		B ₁	B ₂	B ₃	B ₁	B ₂	B ₃	B ₁	B ₂	B ₃

B ₁	correlation index	1,000	-0,049	-0,121	1,000	0,362	-0,439	1,000	0,292	0,281
	(Probability)	-	0,853	0,643	-	0,154	<u>0,078</u>	-	0,255	0,275
B ₂	correlation index	-0,049	1,000	0,067	0,362	1,000	0,320	0,292	1,000	0,138
	(Probability)	0,853	-	0,800	0,154	-	0,211	0,255	-	0,598
B ₃	correlation index	-0,121	0,067	1,000	-0,439	0,320	1,000	0,281	0,138	1,000
	(Probability)	0,643	0,800	-	<u>0,078</u>	0,211	-	0,275	0,598	-

Calculations showed that the null hypothesis about the non-correlation of B₁, B₂, B₃ indices can be rejected only in respect of the concert organizations, and for the significance value of 10 % and only for the pair of indices of B₁, B₃. In other words, the impossibility of denial of the null hypothesis for theaters and museums at small values of the correlation indices, which module fluctuates respectively from 0.049 to 0.121 and from 0.138 to 0.292, allows to speak with a certain conditionality about the orthogonal property of the directing axes in this three-dimensional space. A different situation is revealed for the concert organizations where the correlation between the indices B₁, B₃ at the level of 0,439 for the significance value of 8 %, proves the statistical dependence of the indices of productivity and prices.

1.1. Base model

The present analysis confirmed the most important provisions of the Baumol and Bowen's concept and illustrated the existence of fundamental regularities in the comparative dynamics of labor productivity and wages in the organizations of art. The calculations produced also allowed to find out an overinflationary increase in ticket prices in these organizations, adjoining to the positive dynamics of the deficit of their income. It also raised the question of *sufficiency* of the price increase of the income to compensate the objective growth of the expenses of the organizations of art. I connect the answer to this question with the development of the econometric model of the deficit of income of the organizations of art in an index space of $I\{B_1; B_2; B_3\}$.

In order to decide this issue I based my analyses on the structural model reflecting theoretically predicted communications: firstly, influence of the lag of labor productivity and the parallel trend in wages in the arts sector $Cost=f_1(B_1; B_2)$ on the growth of production costs; secondly, dependence of the growth of the income of these organizations on the dynamics of labor productivity and ticket prices $Income=f_2(B_1; B_3)$; thirdly, balance equation - a consequence of the conditions of balance for sponsored benefits (*Rubinstein (2009, page 140-143)*), describing the correlation between costs of production, prices and budgetary subsidies $Cost=f_3(B_3; Sub)$. Replacing the amount of subsidies Sub with the index of the deficit of income of Def¹ and passing to the above mentioned endogenous characteristic of the consequences of the «cost disease» - to the Baumol general index B, – it is possible to construct the general equation:

$$B = F(B_1; B_2; B_3; \xi) \quad (1)$$

¹ According to Russian statistics the amount of budgetary subsidies to theaters, concert organizations and museums fluctuates from 90 to 100 % of the deficit of income and therefore, with the accuracy of an error of ξ , the size of the subsidy can be replaced with the index of the deficiency of the income (coefficients of correlation between them amount: at theaters – 0.97, in concert organizations – 0.94, in museums – 1.00).

Considering this model of the «cost disease» universal for sponsored benefits, it is possible to be limited to its calibration only for *performing arts* (theaters and concert organizations). This is an issue of statistical estimation the factors of linear regression on the basis of panel data² in an index space of $I \{ B_1; B_2; B_3 \}$.

$$B = \omega_0 + \omega_1 B_1 + \omega_2 B_2 + \omega_3 B_3 + \xi \quad (2)$$

where: B – value of the Baumol general index characterizing the consequences of the «cost disease»; B_1, B_2, B_3 – special Baumol indices for labor productivity, wages and prices; ω_1, ω_3 – constant coefficients of regression for all the panel data; ω_0, ω_2 – variable coefficients of regression on theaters, the concert organizations and performing arts in the whole³; ξ – error of regression.

The solution of this task demanded preliminary testing of the general and private Baumol indices for stationarity (Dickey-Fuller test). The performed calculations showed that the null hypothesis on a singular root should actually be rejected on all the analyzed variables: 6 rates from 8 can be considered stationary at the significance level of 1 %, one rate – at the significance level of 5 % and only the index B_1 characterizing the gain of the ratio of the labor productivity of theaters to the productivity in economy, - at the marginal significance level of 12 % (Tab. 2).

Tab. 2. Results of the check on stationarity of the temporary ranks

	Augmented Dickey-Fuller test (Prob)	
	Theaters	Concert organizations
The Baumol general index B	0,000	0,001
Special Baumol index B_1	0,124	0,021
Special Baumol index B_2	0,011	0,001
Special Baumol index B_3	0,000	0,000

The results of calculations given in the following table (Tab.3) allow making a number of general conclusions concerning the validation of the model calibration. In particular, it is necessary to emphasize that all the factors in the regression equations for performing arts and separately for theaters appeared significant at the level of 1 % at rather high extent of approach ($R^2=0,427-0,875$).

Tab. 3. Statistical evaluation of regression relationships of the specific deficit of income of the organizations of art.

Variable equations of regression	Value of regression factors (Std. Error)		
	performing arts	theaters	concert organizations
The Baumol general index B			
The Baumol individual index B_1	-1,156*** (0,299)	-1,140*** (0,329)	-1,140*** (0,329)
The Baumol individual index B_2	1,436*** (0,286)	1,423*** (0,342)	1,440*** (0,592)

² The matter is that the initial information containing temporary ranks on theaters, concert organizations and museums was organized in the form of panel data. It made it possible to consider the rates on theaters and concert organizations both as panel data, and in the form of the aggregated array of performing arts. Therefore, in all the calculation tables, the performing arts are allocated in the form of a separate column.

³ Considering certain distinctions in compensation systems of theaters and concert organizations, the factor at the regressor characterizing compensation was chosen as the varied factor. Therefore, both general and special characteristics of theaters and concert organizations were reflected in the built equations of regression.

The Baumol individual index B_3	0,231*** (0,080)	0,238*** (0,087)	0,238*** (0,087)
absolute term	-0,027 (0,028)	-0,034 (0,031)	-0,020 (0,031)
number of observations	34	34	34
R^2	0,642	0,875	0,427
Adjusted R^2	0,607	0,846	0,294
Durbin-Watsonstat. (DW)	2,203	2,215	

«***», «**», «*» - significance (Prob) of the regression factors at the level of 1 %, 5 % and 10 % respectively.

It illustrates the corresponding diagrams of actual and calculated dynamics of the Baumol general index B (Fig. 1 and 2). And though the calculated statistics for the aggregated array of performing arts (DW=2,203) and for panel data on theaters and concert organizations (DW=2,215) proves that the null hypothesis on the existence of the autocorrelation cannot be rejected, the executed tests prove the high quality of the constructed regression dependences in whole.

Fig. 1. Actual and calculated dynamics of the increase of deficit of income per visit of theatrical performances (annual increase, %)

Fig. 2. Actual and calculated dynamics of the increase of deficit of income per visit of concerts (annual increase, %)

We shall analyze then the substantial results of the constructed model of the «cost disease». Firstly, the minus sign of the coefficients ω_1 in all the equations of regression (Tab. 3) specifies that the decrease of private Baumol index B_1 ($B_1 < 0$) and the corresponding increase in the lag of productivity in performing arts from productivity in the economy causes the increase of the specific deficit of income of theaters, concert organizations and performing arts in whole. Moreover, as the calculations showed, the module of the regression coefficients ω_1 is more than one at the significance level of 1 % for all the equations of regression. It allows to admin the negative elasticity of the specific deficiency of the income on the index of the lag (lead) of labor productivity:

$$E_{B_1}^{B_1} = |\omega_1| > 1 \quad (3)$$

Secondly, positive value of the coefficients ω_2 in all the equations of regression (the Tab. 3) proves that the growth of the specific Baumol index B_2 ($B_2 > 0$) – the advancing growth of wages in establishments of art in relation to the average wages in the economy – also promotes the increase in the specific deficit of income of theaters, concert organizations and performing arts in whole. Again did the calculations reveal the elasticity of deficit of income at the significance level of 1 %, yet on the specific index of B_2 characterizing the lead (lag) of wages in the arts sector in relation to the economy in whole:

$$E_{B_2}^{B_2} = |\omega_2| > 1 \quad (4)$$

Thirdly, positive values of the coefficients ω_3 in all the equations of regression reveal that at positive dynamics of this index ($B_3 > 0$), i.e. provided the overinflationary rise in prices of cultural services of the organizations of art, specific deficit of their income increases. In other words, these calculations indicate the existence of a poorly positive elasticity (coefficients of ω_3 are also less than 1 at the significance level of 1 %) of the specific deficit of income on ticket prices in the arts sector :

$$E_{B_3}^{B_3} = |\omega_3| < 1 \quad (5)$$

Fourthly, with a certain share of the conditionality⁴, the executed calculations allow to estimate the contribution of each of the specific indexes of B_1 ; B_2 ; B_3 into the dynamics of the Baumol general index – the

⁴ In relation to this I shall quote one of the renown econometrists – Mr. A. Goldberger: “... when the orthogonality is not present, the concept of the contribution of a single independent variable into the equation of regression remains unavoidably indeterminate” (Goldberger (1964, p.201)). Therefore, in order to calculate the contribution of

increase of specific deficit of income of the organizations of performing arts. The estimation of the contribution of the specified indices separately for theaters and concert organizations, as well as for performing arts in whole is given in the following table (Tab. 4).

Tab. 4. Contribution of individual indexes to the general Baumol's index

	B ₁	B ₂	B ₃	B
Performing arts	36,5%	33,3%	30,2%	100%
Theaters	37,5%	33,0%	29,5%	100%
Concert organizations	35,0%	33,7%	31,3%	100%

Fifthly, the statistical estimation of the coefficients of the equations of regression based on panel data showed small differences of the specified coefficients for theaters, concert organizations and for performing arts in whole. This fact proves the dominance of "general" - characteristic for performing arts in whole – over "special" – available features in the activity of theaters and concert organizations. Moreover, the attempts to expand the limits of the analysis, including museums into calculations, revealed very significant differences from performing arts which did not allow obtaining any statistically valid results for museums.

What in general can we say about the prognostic capabilities of the developed model of the "cost disease"? To what extent does it reveal the structure and mechanisms of forming of the deficit of income of the organizations of performing arts in the future? The answer at the second part of the question demands supplementary researches. As for the structure of the deficit, I shall provide a number of assumptions following the analyses of the developed model, namely three general consequences. They imply the projections of the developed equation of regression (2) on reference planes in the index space of $I\{B_1; B_2; B_3\}$.

Projection on the "plane of expenses" $I^1\{B_1; B_2\}$ permits the analyses of the component of the deficit of expenses which is caused by lagging labor productivity and the "parallel trend" of wages causing general increase in expenses of organizations of art. Projection on the "plane of income" $I^2\{B_1; B_3\}$ makes it possible to estimate the impact on the Baumol general index of the dynamics of income from sale of tickets which, in its turn, depends on the changes of labor productivity and prices in the organizations of art. Finally, projection on the "plane of losses" $I^3\{B_2; B_3\}$ enables description of another component of the dynamics of the deficit of income depending on the extent to which the increase in price of tickets is able to compensate the increase in wages in the organizations of art.

1.2. Three consequences

The most significant points made by Baumol and Bowen are related to the hypothesis about an above-inflation increase in costs caused by lagging productivity and the 'parallel trend' in wages within the performing arts sector (*Baumol, Bowen (1966, p.181)*). To support this hypothesis the authors bring together historical examples illustrating a similar increase in costs. According to their calculations, for instance the average cost of production of plays at the Royal Shakespeare Company in 1963-1964 was 13.6 times higher than in the late eighteenth century. However, the general level of prices in England showed only a 6.2 fold increase during the same period. In other words, production costs at the Royal Shakespeare Company were

specific indices into the increase of the general Baumol index there was used an approximated algorithm based on the measuring of increase of R^2 with the addition of one regression. Taking into account the fact that the results of calculations using this algorithm depend on the order of the use of the corresponding regressors, the averaging procedure, recommended by V. Kruskal (*Kruskal (1987, pp.6-10)*), was implemented to the results.

twice as high as of the increase in general prices in the UK (*Baumol, Bowen (1966, p.182-183)*). Here is another example from their book: between 1843 and 1964 costs per concert at the New York Philharmonic Orchestra rose at a rate of 2.5% per annum, with the annual increase in the consumer price index being 1% (*Baumol, Bowen (1966, p.186)*).

Important though they are⁵, these examples, however, *are no substitute for proof* of the hypothesis that there is a correlation between the dynamics of costs and the two Baumol individual indices measuring the lag (lead) of labor productivity and wages in the arts sector against relevant macroeconomic indicators. At the same time, the model developed in this study makes it possible to obtain the necessary evidence and to verify the validity of the main arguments presented by the discoverers of the 'cost disease.'

To this end, let us consider the first consequence of this model – the projection of an income deficit onto the 'plane of costs' $I^1\{B_1; B_2\}$ ⁶. In this case an increase in the specific deficit of income is completely determined by the dynamics of the costs which are incurred by arts organizations and dependent on B_1 and B_2 indices describing labor productivity and wages:

$$B = \alpha_0 + \alpha_1 B_1 + \alpha_2 B_2 + \xi_1 \quad (6)$$

where: B is the value of the Baumol general index (the rate of increase in the specific deficit of income compared to the previous year); B_1, B_2 – Baumol individual indices for labor productivity and wages; α_1 – the constant coefficient of regression for all panel data; α_0, α_2 – variable coefficients of regression for theaters, concert organizations and the performing arts as a whole⁷; ξ_1 – the error of regression.

Tab. 5. Statistical evaluation of regression relationships of the specific income deficit in the projection onto the 'plane of costs'

Variable regression equations	Value of regression coefficients (Std. Error)		
The Baumol general index B	Performing arts	Theaters	Concert organizations
The Baumol individual index B_1	-1.340*** (0.324)	-1.398*** (0.349)	-1.398*** (0.349)
The Baumol individual index B_2	1.558*** (0.314)	1.473*** (0.347)	1.815*** (0.585)
Absolute term	-0.011 (0.031)	0.006 (0.033)	-0.026 (0.033)
Number of observations	34	34	34
R^2	0.550	0.699	0.408
Adjusted R^2	0.487	0.656	0.323

⁵ A remarkable collection of such examples is contained in the above-mentioned book devoted to the 30-year anniversary of the 'cost disease' discovery (Ed. Ruth Towse (1997)).

⁶ Given the approximate nature of the orthogonality of the guide axes of the index space $I\{B_1; B_2; B_3\}$, projections onto the reference planes I^1, I^2, I^3 will hereafter be represented by regression relationships between certain elements of the income deficit and the Baumol individual indices corresponding to these planes.

⁷ Considering certain differences in remuneration schemes used by various theatres and concert organizations, it has been decided to choose as a variable coefficient the coefficient related to the regressor characterizing the remuneration of labor. Therefore, the given regression equations reflect both general and specific characteristics of theaters and concert organizations.

Durbin-Watson stat. (DW)	2.039	2.068
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****, ***, ** – the significance (probability (Prob)) of the regression coefficient being 1%, 5% and 10% respectively.

What general conclusions can be drawn from the calculation results given in Table 10? First, all the coefficients in the regression equations both for the performing arts as a whole and separately for theaters and concert organizations are statistically significant at the 1 percent level provided a sufficiently good approximation is attained ($R^2=0.408-0.699$). Unlike the previous case, the resulting statistic ($DW = 2.068$) for panel data on theaters and concert organizations satisfies the conditions for the absence of first order autocorrelation at the 5 percent significance level ($DW > d_{PU}=1.869$; $4-DW > d_{PU}=1.869$)⁸. The same conclusion can be reached with regard to the combined data set for performing arts ($DW = 2.039$): the null hypothesis of the presence of autocorrelation can be rejected at the 5 percent significance level. In general, all the tests performed show a good quality of regression relationships (Tab.5).

Second, the minus sign of the coefficients α_1 and the plus sign of the coefficients α_2 in all the regression equations (Tab.5) indicate that the decline in the individual index B_1 ($B_1 < 0$) and its corresponding increase in the lag of productivity in performing arts behind productivity in the economy, along with the increase in the individual index B_2 ($B_2 > 0$) – the leading growth in wages at arts institutions in relation to average wages in the economy – contribute to an increase in the part of the specific income deficit which is determined by the dynamics of costs incurred by theaters, concert organizations, and the performing arts sector as a whole.

These calculations make it possible to come to a general conclusion about the negative elasticity of growth in the income deficit and costs per visit according to the index of the lag (lead) of labor productivity ($E_{B_1}^B = |\omega_1| > 1$), as well as about the positive elasticity of the index of the lead (lag) of wages in the arts sector in relation to the economy as a whole ($E_{B_2}^B = |\omega_2| > 1$). Thus, taking into account the first consequence of the developed 'cost disease' model, the hypothesis about the above-inflation increase in costs caused by lagging productivity and the 'parallel trend' in wages within the performing arts sector can be considered proven.

Analyzing the performance of theaters, concert organizations, and the performing arts sector as a whole in the projection onto the 'plane of income' $I^2\{B_1; B_3\}$, it is necessary to take into consideration the oppositely directed vectors of the relevant Baumol indices: if an increase in labor productivity gives rise to income due to high attendance, higher prices can either raise income in the case of regular attendance or reduce income as a result of negative price elasticity. It should be noted that the price elasticity of demand has long been the focus of research. The results achieved by most researchers can be formulated as follows: with prices set by performing arts organizations, values of the demand elasticity coefficient are negative, relatively small but statistically significant (*Gapinski (1986, p. 20-25), Felton (1992, p.1-12), Moore (1996, p.79-87)*).

Taking account of this conclusion and leaving aside problems related to relationships between demand and characteristics of arts audiences, I deem it necessary to focus on resolving quiet a narrow issue. What is meant here is seeking an answer to the question: "How is the amount of an income deficit run by arts organizations affected by the dynamics of ticket sales, which in turn depend on changes in the indices B_1 and B_3 – the ratios of labor productivity and prices to relevant macroeconomic indicators. In this context, the elasticity of demand may be of interest only to the extent that the dynamics of ticket sales revenues are determined by the following two drive lines of force: an increase in income due to a direct price increase and a reduction in income caused by a drop in attendance as well as by higher prices.

In this regard, it makes sense to pay attention to a comment made by Heilbrun in his *Handbook of Cultural Economics* (2003). Referring to the main critique of Baumol's major work, along with his follow-up study (*Baumol (1996, p.183-206)*), Heilbrun announces "good news from Baumol." He points out that, on the

⁸ As before, see Table II in the article: Bhargava A., Franzini L., Narendranathan W. Serial Correlation and the Fixed Effects Model: The Review of Economic Studies, Vol. 49, No. 4 (Oct., 1982), p.537.

one hand, technological progress leads to the lagging productivity of the arts sector, and, on the other, "it causes the growth of output per hour and increases real wages, which in turn boosts the demand for arts activities. As for live performing arts, this means that demand for tickets grows, i.e. regardless of price levels the audience will be willing to buy more tickets than before" (*Heilbrun (2003, p.99)*). In response to such an overly optimistic picture one should question whether the "news from Baumol" is really that good? How much does the growth of wages translate into increased demand for cultural goods? And is it not a matter of perception, rather than reality?

In this regard, it is worth considering the second consequence of the 'cost disease' model – the projection of an income deficit onto the 'plane of income' $I^2\{B_1; B_3\}$.

$$B = \beta_0 + \beta_1 B_1 + \beta_2 B_3 + \xi_2 \quad (7)$$

where: B is the value of the Baumol general index (the rate of increase in the specific deficit of income compared to the previous year); B_1, B_3 – the Baumol individual indices for labor productivity and prices; β_1 – the constant coefficient of regression for all panel data; β_0, β_2 – variable coefficients of regression for theaters, concert organizations and the performing arts as a whole⁹; ξ_2 – the error of regression. The results of the calculations are summarized in the following table (*Tab. 6*).

Tab. 6. Statistical evaluation of regression relationships of the specific income deficit in the projection onto the 'plane of income'

Variable regression equations	Value of regression coefficients (Std. Error)		
The Baumol general index B	Performing arts	Theaters	Concert organizations
The Baumol individual index B_1	-0.926** (0.394)	-0.818* (0.427)	-0.818* (0.427)
The Baumol individual index B_3	0.291*** (0.106)	0.277** (0.123)	0.430* (0.251)
Absolute term	-0.008 (0.038)	-0.014 (0.039)	0.005 (0.039)
Number of observations	34	34	34
R^2	0.343	0.402	0.312
Adjusted R^2	0.300	0.317	0.214
Durbin-Watson stat. (DW)	2.157	2.198	

****, ***, ** – the significance (probability (Prob)) of the regression coefficient being 1%, 5% and 10% respectively.

The data in this table allow us to draw some conclusions. First, all the coefficients in the regression equations are statistically significant: in the case of the regressor B_1 – at the 5 percent level for the performing arts as a whole, and at the 10 percent level separately for theaters and concert organizations; in the case of the regressor B_3 – at the 1 percent level for the performing arts as a whole, at the 5 percent level for theaters, and at the 10 percent level for concert organizations. The calculations also point to a good approximation ($R^2=0.312-0.402$). The resulting statistics for the combined array of performing arts (DW = 2.157) and for panel data on theaters and concert organizations (DW = 2.198) indicate that the null hypothesis of the presence of

⁹ In this case it has been decided to choose as a variable coefficient the coefficient related to the regressor characterizing the dynamics of price ratios.

autocorrelation cannot be rejected. In general, all the tests performed show a good quality of regression relationships (*Tab.6*).

Second, the negative coefficients β_1 in all the regression equations indicate that the decline in the individual index B_1 ($B_1 < 0$) and its corresponding increase in the lag of productivity in the performing arts behind productivity in the economy lead to an increase in the specific deficit of income as a result of reduction in ticket sales revenues generated by theaters, concert organizations, and the performing arts sector as a whole. At the same time, the positive coefficients β_2 in all the regression equations indicate that the increase in the individual index B_3 ($B_3 > 0$) – the leading growth in ticket prices at arts institutions (which contributes to the rising dynamics of ticket sales revenues) in relation to the general level of inflation – also has the effect of increasing the specific income deficit.

Third, the coefficients calculated by regression equation (7) allow us to assess the cumulative impact of the Baumol individual indices B_1 , B_3 on growth in the specific deficit of income, i.e. to answer the above question, namely to what extent an above-inflation increase in performance/concert ticket prices can compensate for reduction in sales revenues due to an increase in the lag of labor productivity. The calculations suggest that the above-inflation increase in ticket prices during the period from 1995 to 2010 always led to growth in the specific deficit of income. The only exception is related to theaters in 2009 when the above-inflation price rises were accompanied by reduction in the lag of labor productivity.

We now turn to analysis of the income deficit of performing arts organizations in the projection onto the 'plane of losses' $I^3\{B_2; B_3\}$. As in the previous case, we must bear in mind the adverse effects of relevant Baumol indices: if leading growth (compared with the economy as a whole) in wages directly increases the costs incurred by theaters and concert organizations, as well as raises their income deficit, the above-inflation increase in ticket prices can, as noted above, increase or reduce the amount of income, thus adversely affecting the final results. Therefore, in this case it is necessary to find an answer to the question: "How much increase in ticket prices can offset rising costs now caused by higher wages within performing arts organizations.

In this connection, it is worth considering the third consequence of the 'cost disease' model – the projection onto the 'plane of losses' $I^3\{B_2; B_3\}$ characterizing one of the elements of the income deficit associated with the dynamics of wages and prices.

$$B = \gamma_0 + \gamma_1 B_2 + \gamma_2 B_3 + \xi_3 \quad (8)$$

where: B is the value of the Baumol general index (the rate of increase in the specific deficit of income compared to the previous year); B_2 , B_3 – the Baumol individual indices for wages and prices; γ_1 – the constant coefficient of regression for all panel data; γ_0 , γ_2 – variable coefficients of regression for theaters, concert organizations and the performing arts as a whole¹⁰; ξ_3 – the error of regression.

Tab. 7. Statistical evaluation of regression relationships of the specific income deficit in the projection onto 'its own plane'

Variable regression equations	Value of regression coefficients (Std. Error)		
	Performing arts	Theaters	Concert organizations
The Baumol general index B			
The Baumol individual index B₂	1.267*** (0.340)	1.212*** (0.347)	1.212*** (0.347)

¹⁰ In this case it has been decided to choose as a variable coefficient the coefficient related to the regressor characterizing the dynamics of price ratios.

The Baumol individual index B_3	0.298*** (0.095)	0.273** (0.110)	0.477** (0.211)
Absolute term	0.042 (0.027)	0.027 (0.028)	0.050 (0.028)
Number of observations	34	34	34
R^2	0.464	0.724	0.269
Adjusted R^2	0.430	0.685	0.165
Durbin-Watson stat. (DW)	2.107	2.284	

****, ***, ** – the significance (probability (Prob)) of the regression coefficient being 1%, 5% and 10% respectively.

Commenting on the data given in the table above, it is worth pointing out the statistical significance of all the coefficients in the regression equations: at the 1 percent level in the case of the regressor B_2 and in the case of the regressor B_3 for the performing arts as a whole; at the 5 percent level in the case of the regressor B_3 for theaters and concert organizations. These calculations also point to a good approximation ($R^2=0.269-0.724$). Though the resulting statistics for the combined array of performing arts (DW =2.107) and for panel data on theaters and concert organizations (DW=2.284) do not allow us to reject the null hypothesis of the presence of autocorrelation, in general, the calculations show quite a high quality of regression relationships built (Tab. 7).

This enables some meaningful conclusions to be drawn here. Firstly, the positive coefficients γ_1 indicate that leading growth in wages in the performing arts sector compared to average ones in the economy as a whole ($B_2>0$) results in higher costs thus increasing the specific income deficit faced by theaters, concert organizations, and the performing arts sector as a whole. At the same time, the positive coefficients γ_2 indicate that an increase in the individual index B_3 ($B_3>0$) – the leading growth in ticket prices at arts institutions in relation to the general level of inflation – is accompanied by a rise in the specific deficit of income.

Secondly, the coefficients calculated by regression equation (8), much like in the previous cycle of calculations, allow us to assess the cumulative impact of the Baumol individual indices B_2 , B_3 on growth in the specific deficit of income, i.e. to answer another important question: to what extent an above-inflation increase in performance/concert ticket prices can compensate for both a rise in costs resulting from the leading growth in wages and a decline in attendance caused by an increase in ticket prices.

Thirdly, it can be argued that the above-inflation increase in ticket prices during the period from 1995 to 2010 also resulted in growth in the specific deficit of income.

1.3. Modification of the base model

This is a generalization of the model based on the correction of the above-mentioned Baumol individual index B_1 characterizing the phenomenon of lagging labor productivity. The point is that as far as the base model (1) is concerned the said index is defined as the rate of growth (on the previous year) in the ratio of labor productivity in arts organizations to productivity in the economy. Labor productivity in the arts sector has been calculated as a physical indicator, i.e. the number of visits per employee, while productivity in the economy – as an analogue of a physical indicator, i.e. GDP (at constant 1990 prices) per person employed in the economy.

With a view to ensuring better comparability of labor productivity indices in the arts sector and in the economy as a whole, we can slightly modify the definition of the Baumol individual index B_1 . To this end, it is enough to take into account a price component when using labor productivity indices for arts organizations, i.e. to replace the number of visits with an analogue of the actual volume of cultural goods, i.e. the value of income from ticket sales at constant 1990 prices. In this case, labor productivities will firstly be valued in the same monetary units without using (by default) the additional premise of the ho

mogeneity of physical indicators for services provided by theaters, concert organizations and museums; secondly, they will reflect market generated ticket prices, which characterize the different value of cultural goods produced by these organizations (Appendix 5).

Therefore, the modified equation that models the 'cost disease' can be represented as follows:

$$B = F(B^*_1; B_2; B_3; \xi) \quad (9)$$

where: B^*_1 is the adjusted Baumol individual index which measures the rate of growth (on the previous year) in the ratio of productivity in arts organizations (taking account of the price component) to average labor productivity in the economy. In this case the negative values of the Baumol index B^*_1 ($B^*_1 < 0$) indicate that productivity in arts lags behind productivity in the economy, and vice versa, the positive values of this index ($B^*_1 > 0$) indicate a reduction in the existing gap.

Considering the modified 'cost disease' model, it is possible to extend its calibration by adding museums to performing arts institutions (theaters and concert organizations). What is meant here is a statistical estimate based on panel data on linear regression coefficients in the index space $I\{B^*_1; B_2; B_3\}$.

$$B = \omega^*_0 + \omega^*_1 B^*_1 + \omega^*_2 B_2 + \omega^*_3 B_3 + \xi^* \quad (10)$$

where: B is the value of the Baumol general index characterizing the consequences of the 'cost disease'; B^*_1, B_2, B_3 – the Baumol individual indices for adjusted labor productivity, wages and prices; ω^*_0 – the constant coefficient of regression for all panel data; $\omega^*_1, \omega^*_2, \omega^*_3$ – variable coefficients of regression for theaters, concert organizations and museums¹¹; ξ^* – the error of regression.

To solve this problem, appropriate calculations have been carried out. A test for stationarity (Dickey-Fuller test) has been used first. Without repeating the conclusions relating to the previously tested indices, I would only like to point out that the unit root test of the null hypothesis with regard to the adjusted Baumol index B^*_1 has produced a negative result: it can be considered stationary at the 1 percent significance level for all the analyzed arts organizations, namely theaters, concert organizations and museums. The overall results of the calculations are summarized in Table 8.

Tab. 8. Statistical evaluation of regression relationships of the specific income deficit in the modified model

Variable regression equations	Value of regression coefficients (Std. Error)			
The Baumol general index B	Performing arts as a whole	Theaters	Concert organizations	Museums
The Baumol individual index B[*]₁	-1.156*** (0.256)	-1.110** (0.540)	-1.130** (0.488)	0.377* (0.247)
The Baumol individual index B₂	1.429*** (0.269)	1.143*** (0.323)	1.143*** (0.323)	1.143*** (0.323)
The Baumol individual index B₃	1.317*** (0.237)	1.299*** (0.510)	1.277*** (0.396)	-0.748*** (0.275)
Absolute term	-0.032 (0.027)	-0.036 (0.027)	-0.022 (0.027)	0.148 (0.027)
Number of observations	34	51	51	51
R ²	0.681	0.874	0.479	0.202
Adjusted R ²	0.650	0.846	0.359	0.018
Durbin-Watson stat. (DW)	2.135	1.840		

¹¹ Given that the Baumol indices B^*_1 and B_3 contain the price component reflecting differences in the value of cultural goods produced by theaters, concert organizations and museums, it has been decided to choose as variable coefficients the ones related to these regressors, which characterize adjusted labor productivity, wages and ticket prices.

"****", "***", "**" – the significance (probability (Prob)) of the regression coefficient being 1%, 5% and 10% respectively.

The results of calculations given in Table 8 allow a number of general conclusions to be drawn concerning the model itself. It should be noted that in the case of the regressors B_2 and B_3 all the coefficients in the regression equations for performing arts and museums are significant at a level of 1%. A somewhat different situation exists for coefficients related to the regressor B_1 : with regard to performing arts in general it is significant at the 1 percent level, in the case of theaters and concert organizations – at the 5 percent level, and as for museum – at a marginal level of 12%. The developed model demonstrates a good degree of approximation for performing arts (with the coefficient of determination ranging from 0.48 to 0.87), and a weak approximation for museums $R^2 = 0.20$ (Fig. 3-5).

Fig. 3. Actual and calculated dynamics of growth in the income deficit per visit to a theatrical performance (modified model)

Fig. 4. Actual and calculated dynamics of growth in the income deficit per visit to a Philharmonic concert (modified model)

Рис. 18. Фактическая и расчетная динамика прироста дефицита дохода на 1 посещение филармонических концертов (модифицированная модель)

Fig. 5. Actual and calculated dynamics of growth in the income deficit per visit to a museum (modified model)

Рис. 19. Фактическая и расчетная динамика прироста дефицита дохода на 1 посещение музея (модифицированная модель)

The resulting statistic ($DW = 1.840$) for panel data on theaters and concert organizations almost satisfies the conditions for the absence of first order autocorrelation at the 5 percent significance level ($DW > d_{PU}=1.869$; $4-DW > d_{PU}=1.869$)¹². As regards the combined data set for performing arts ($DW = 2.135$), the null hypothesis

¹² See Table II in the article: Bhargava A., Franzini L., Narendranathan W. Serial Correlation and the Fixed Effects Model: The Review of Economic Studies, Vol. 49, No. 4 (Oct., 1982), p.537.

esis of the presence of autocorrelation cannot be rejected. On the whole, the calculations show a high quality of regression relationships built. By comparing the graphs of the dynamics of the general Baumol index B with the graphs of the same index calculated using the modified model, it is easy to see their closeness to each other.

At the same time, the identified relationships are related to macroeconomic patterns, which are more clearly evident from the 'bird's eye' view when considering aggregated objects – in this case when analyzing panel data characterizing a whole set of arts institutions. However, phenomena typical of all performing arts organizations and museums, do not remove (as demonstrated by the statistical analysis) the characteristic features of each of these organizations. In this context, museums aimed, among other things, to preserve cultural heritage differ significantly from performing arts organizations since interaction with the audience and the provision of appropriate cultural services to customers are at the core of activities carried out by theaters and concert organizations. These features are reflected in the results obtained.

First, the calculations lead to a conclusion about negative elasticity at the 5 percent significance level of growth in the income deficit per visit to performing arts organizations according to the index of adjusted labor productivity ($E_{B-1}^{B_1} = |\omega_1| > 1$) and about positive elasticity at the 1 percent level according to the index of wages ($E_{B_2}^{B_2} = |\omega_2| > 1$) and the index of ticket prices ($E_{B_3}^{B_3} = |\omega_3| > 1$).

Second, as far as museums are concerned, the situation is totally different. Though museums and performing arts organizations have the same positive elasticity (at the 5 percent significance level) of the specific income deficit according to the index of wages ($E_{B_2}^{B_2} = |\omega_2| > 1$), museums are characterized by opposite (in terms of sign) and smaller (in terms of level) relationships between the specific deficit of income and the Baumol indices characterizing adjusted labor productivity ($E_{B-1}^{B_1} = |\omega_1| < 1$) and ticket prices ($E_{B_3}^{B_3} = |\omega_3| < 1$), that is between the specific income deficit and those indicators which contain market assessments of the value of museum services.

Third, in contrast to performing arts, a decrease in the indicator of the ratio of adjusted productivity within museums to average productivity in the economy, as well as above-inflation rises in museum prices lead (accurately within weak elasticity) to reduction in the specific deficit of income.

1.4. Predictive estimates

What final conclusions and predictive estimates can be obtained on the basis of the econometric model of 'Baumol's disease' and is it possible to consider the developed model as a general one for the entire class of patronized goods?

Firstly, the phenomenon of 'lagging labor productivity' in the arts sector can be considered statistically proven. However, in the Russian context this symptom of the 'cost disease' needs to be defined more precisely given that productivity in theaters, concert organizations and museums not only lagged behind productivity growth in the economy as a whole, but also showed a downward trend. Predictive estimates and projections for the economic performance of arts organizations largely depend on whether or not this trend will continue in the future. It is necessary to find out if the lower limit of productivity in theaters, concert organizations and museums has already been reached or it is an ongoing process, which has been observed for more than 40 years now. This requires some qualitative assumptions.

I detect at least three factors that can determine the dynamics of this indicator. The first one is directly connected with the flow of demand created by the audience and affected by the aforesaid globalization-related trends towards changing value orientations and behavior patterns within the Russian society, which influences artistic choices and the relative size of the audience consuming cultural goods. The second factor is the demographic situation. The downward trend of recent decades and current population projections suggest that there are strong reasons to expect a reduction in the number of active theatre-goers and arts enthusiasts.

The third factor describes the structural component in the dynamics of labor productivity within performing arts organizations and museums. What is meant here are quantitative and, more importantly, structural changes in the range of producers of cultural goods. These changes are accompanied, as already noted, by growth in the number of employees against a backdrop of shrinking demand from the audience. Though all

the above factors have had a negative impact on labor productivity in this sector in the previous 40 years, it is hardly reasonable to expect this situation to continue well into the future.

In order to produce more accurate projections of labor productivity, it is required to carry out additional interdisciplinary studies, including sociological, cultural, demographic and economic analyses of these factors. In the meantime, for the purposes of this work it is sufficient to make the following assumptions. It seems that the 40-year long process of changing audience demand under the influence of globalization-related trends and structural shifts in the supply of cultural and artistic services accompanied by an increase in the number of employees has already or nearly come to an end. We can expect that in the very near future there will be a stable structure of audience demand and an infrastructure stabilization phase within which the dynamics of the number of staff employed by theaters, concert organizations and museums will cease to be a factor in reducing their productivity.

Therefore, in the fairly distant future these two factors are unlikely to have a significant impact on the dynamics of productivity within performing arts organizations and museums. As far as demographics are concerned, the existing trend is not yet expected to change. With this in mind, it can be assumed that productivity in this sector will continue to decline, though at a slower rate and depending only on the dynamics of population change. Therefore, an increase in the lag will be determined mainly by the dynamics of macroeconomic growth. In other words, economic growth will continue to contribute to the phenomenon of 'lagging productivity', thus increasing the income deficit in the arts sector.

Secondly, we can also accept as proven the conclusion that wages paid by performing arts organizations and museums depend on the 'parallel trend' and from time to time either run ahead or lag behind growth in average wages within the economy. Will this process continue in the future? In the long term it almost certainly will. However, within long time intervals the ratio of wages paid by arts organizations to average wages in the economy can vary significantly.

Previous years show that the ratio of average monthly wages in the cultural sector to average monthly wages in the economy ranged from 44 to 64% (*Kostina (1999)*). A somewhat better situation was observed in the performing arts sector alone and almost the same in the case of museums. As for theaters, this ratio was minimal in 1996, i.e. 70%, and the highest in 1991, i.e. 108%, with an average value of 90%. In the case of concert organizations, the minimum was observed in 2000, i.e. 66%, and the maximum – in 1991, i.e. 126%, with an average value of 77%. As far as museums are concerned, the ratios were as follows: 39% (minimum) in 1992, and 70% (maximum) in 2002, with an average value of 60%.

Commenting on these data, it should be emphasized that it is difficult to make accurate assumptions regarding how this relationship will change in the future. It all depends on the specific circumstances, the general economic situation and the government's social and cultural policy. It is worth pointing out that reduction in the income deficit is possible only when growth in wages in the performing arts sector lags behind wages growth in the economy. It is obvious that such a situation cannot continue indefinitely without causing high employee turnover in the arts sector.

Thirdly, attempting to predict future values of the third Baumol individual index B_3 , which reflects the dynamics of prices for tickets for theaters, concert organizations and museums in comparison with the general rise in prices in the economy, it makes sense to consider the following three basic scenarios. The first one: an increase in ticket prices this year corresponds with the rise in prices in the economy ($B_3=0$). In this situation the increase in the Baumol general index B and respectively the annual increase in the specific deficit of income is dependent only on the two individual indices B_1^* and B_2 , and corresponds to growth in unit costs incurred by performing arts organizations and museums. The second scenario: an increase in ticket prices this year lags behind growth in prices in the economy ($B_3<0$). These dynamics result in negative growth in the Baumol general index B for theaters and concert organizations, while in the case of museums they lead to positive growth. In other words, if ticket prices rise more slowly than inflation, the specific income deficit run by performing arts organizations and museums increases. The third scenario: an increase in ticket prices this year is above inflation ($B_3>0$). In this situation the above inflation increase in prices for tickets for theaters and concert organizations is reflected in positive growth in the Baumol general index B , and as for museums it leads to a decrease in the specific deficit of income.

Therefore, in most cases the developed econometric model of the 'cost disease' predicts a growing increase in the specific income deficit faced by performing arts organizations and museums in Russia. Only in the situation where ticket prices grow more slowly than inflation can we expect some reduction in the specific income deficit, and even then only to the extent that this reduction is not offset by the other two factors – 'lagging productivity' and 'catch-up' growth in wages in the performing arts sector. As for museums, the same 'expectations' of a decrease in the specific income deficit can be based only on an above-inflation rise in ticket prices as well as on wages lagging behind average ones in the economy.

It is worth pointing to one unusual consequence resulting from the developed model. Let us assume that after one year, labor productivity and wages in the performing arts sector remain unchanged compared to those in the economy as a whole ($B_1^{t+1}=0$ and $B_2^{t+1}=0$), and ticket prices are on the same level despite there being general inflation. In this case – "all other conditions being equal" – general inflation turns the index B_3 into a negative value ($B_3^{t+1}<0$) thus causing a decrease in the specific income deficit (at base year prices) run by performing arts organizations. In other words, it is possible to assert that inflation contributes separately to growth in profitability of performing arts organizations. At the same time, museums show the opposite dynamics, namely general inflation and a rise in ticket prices lagging behind such inflation, cause an increase in the income deficit of museums per visit.

2. Final remarks

The economic inefficiency of theaters, concert organizations and museums associated with their genetic inability to pay for themselves, i.e. 'Baumol's disease', gives no reason to believe that this problem can ever be cured, which makes society and arts organizations seek ways to compensate for the deficit of income. What is meant here are budget subsidies, tax breaks, sponsorship and the creation of endowment funds, as well as other forms of non-production income. Therefore, the creation of an effective structure of non-production income is an urgent task for any type of patronized goods.

2.1. Institutional design of non-production income

The research into arts organizations by considering them as part of the national economy has provided the basis for developing the econometric model which has made it possible to confirm *the macroeconomic nature of the 'cost disease.'* Without repeating the conclusions drawn in this study, I would only like to point out the *general character* of the developed model and the possibility of it being applied to all types of patronized goods characterized by lagging productivity compared to average productivity in the economy, which is caused by the peculiarities of 'manual labor' and compounded by real difficulties of replacing manual labor with increased automation.

In this context, it seems that any attempt to calibrate the developed model using statistical data on production and consumption of other types of patronized goods looks very promising, for example with respect to education, health care, sports and restaurant business, as well as regarding industries with low productivity and the high social utility of goods and services. It seems that adaptation of this model to different economic sectors where normative public interests convert production results into patronized goods (*Rubinstein (2009)*), will make it possible to update the 'cost disease' model.

The development of a system of public funding of arts and culture, along with an appropriate sharing of the 'burden of income deficit compensation' among the state, sponsors and producers of patronized goods, remains one of the primary objectives of economic policy. What is meant here is the structure of non-production income and its institutional design. It is obvious that this problem cannot be solved once and for all. It will always depend on specific conditions, dominant value orientations and prevailing preferences that shape social priorities.

Therefore, leaving aside such issues as appropriate funding for theaters, concert organizations and museums, budget and tax policy, improvement of existing legislation and institutional environment, as these are the subject of separate studies, I would simply like to point out in conclusion some aspects of *insufficient* income deficit coverage of these organizations, as well as *the risk of the income deficit transforming into an 'artistic deficit.'*

The traditional focus of analysis here is on the study of undesirable changes in the repertoire of performing arts organizations: the reduction of the number of costume dramas *for the sake of cost savings* and the replacement of symphony concerts by evenings of chamber music, etc. (*Baumol, Bowen (1966, P.175), Heilbrun (2001, P.63-72)*). In Russia the issue of the 'artistic deficit' is often viewed in the context of the motto 'all for sale', and is frequently associated with the erosion of classical values, degradation of artistic tastes, creation of scenes that offend against good taste or decency, use of swear-words, as well as with other ways of attracting the audience at whatever the cost in order *to boost revenues*.

While it is impossible to consider in this paper the qualitative aspects of the 'artistic deficit', as this requires special studies to be undertaken with the involvement of art historians and social scientists, I would simply like to draw attention to economic forms of this deficit and to two special types of transformation of the income deficit into the 'artistic deficit' since these issues do not seem to have been addressed before. What is meant here are *the risks of reducing the supply of cultural and artistic products as well as an unjustified increase in differentiation* in the provision of cultural goods to the public. Let us consider two examples from the distant and recent past which demonstrate the consequences of reducing a 'budget contribution' to covering the income deficit of theaters.

The first historical evidence is concerned with the following two Resolutions of the Council of Ministers of the USSR: No. 537 dated 4 March 1948 and No. 560 dated 6 February 1949. They required that state subsidies to theaters be reduced more than four-fold. Such a decrease in the amount of compensation to cover the income deficit of theaters resulted in a dramatic reduction in the number of theaters: from 828 in 1947 to 569 in 1950, and to 516 in 1953. Thirty-three years later the Council of Ministers of the USSR was sent a letter by V.F. Garbuzov (No. 05/142-5 dated 20 December 1982) in which the then Minister of Finance again raised the issue of taking "a number of measures aimed at increasing the profitability of theater and entertainment companies as well as concert organizations in the next 2-3 years." Shortly after that, further reduction in the number of theaters was stopped by suspending the approved resolution. Twenty more years later the then Finance Minister Alexei Kudrin announced his plan to cut government funding of the arts sector in democratic Russia (*Kudrin (2002)*). Law No. 83-FZ adopted in 2010-2011, along with relevant bylaws, completed this budget reform. In essence, this is the same 'fiscal motivation' and equally unfavorable fiscal policy with regard to culture, and it is associated with the same risk of the income deficit transforming into an 'artistic deficit.'

"For whosoever hath, to him shall be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that he hath." This maxim derived from Matthew's Gospel describes the second type of transformation of the income deficit run by theaters. This is a consequence of the lack of funding which is reflected in the risk of an increase in differentiation of Russian regions in terms of budget subsidies per capita. A high level of regional differentiation according to various socio-economic indicators has always been characteristic of Russia, which is put down to the vast territory, harsh climate, low population density in most parts of the country, as well as to other objective reasons. However, the reduction in the share of the income deficit of arts organizations covered by budget subsidies increases the current level of differentiation, thus transforming the deficit of income into *a rise in inequality* of living conditions in different regions of Russia. The following table based on real statistics can serve as an example (*Tab. 9*).

Tab. 9. The second type of transformation of the income deficit run by theaters

	the ratio of budget subsidies to the income deficit of theaters (%)	Regional differentiation coefficient ¹³
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¹³ In this case the coefficient of regional differentiation is calculated in the same way as the Gini coefficient by replacing the indicator of average per capita income with the indicator of the average budget subsidy.

1997	93.5%	14.8
1998	91.7%	15.4
1999	87.1%	17.8
2000	82.8%	18.0

As the data in this table show, the reduction in the 'budget contribution' to covering the income deficit of theaters leads to an increase in inequality: the coefficient of regional differentiation rose from 14.8 to 18.0 between 1997 and 2000. A similar situation was observed in 2008-2009 when the share of budget allocations declined from 99.0% to 94.5%, which resulted in an increase in regional differentiation from 17.8 to 18.0.

Finally, a concluding remark is necessary. The genetic nature of the 'cost disease' increasing the income deficit of arts organizations, and the negative consequences of insufficient compensation to cover this deficit through budget subsidies indicate the need to address the risk of the income deficit transforming into an 'artistic deficit.' This situation results in long-term losses which are very difficult to recover. In this connection it is worth emphasizing that the economic policy of any nation has to take into account the fact that the costs for eliminating the 'artistic deficit' are normally higher than the income deficit causing such costs.

1.2. On the results of the study

The main findings of the paper can be summarised as follows. First, based on the analysis of the dynamic series of data on performance of Russian theaters, concert organizations and museums for the period of 1970-2010 rr. the three-dimensional index space $I\{B_1; B_2; B_3\}$ is constructed, its directing vectors being «Baumol's indexes» $B_1; B_2; B_3$, that characterize the comparative dynamics of labor productivity, wages and prices in performing arts organizations in relation to the corresponding macroeconomic indicators.

Second, the paper demonstrates the general character of the indices mentioned above, that may be interpreted as fundamental factors of "cost disease" of a wide range of "sponsored goods". Calculations made for one type of such goods, namely performing arts products show that null hypothesis about the non-correlation of B_1, B_2, B_3 indices can be rejected only in respect of the concert organizations, and for the significance value of 10 %. Thus, one can speak with a certain conditionality about the orthogonal property of the directing axes in this three-dimensional space $I\{B_1; B_2; B_3\}$. Besides, statistical data permit to empirically test and confirm for a big time interval the fact that Russian art is infected with the "cost disease". The deficit of income of performing arts organisations makes their public support necessary.

Third, the important outcome of the research is the development of original econometric model of the cost disease for the sponsored goods that describes the dynamics of income deficit in the coordinates of three-dimensional index space $I\{B_1; B_2; B_3\}$. Its construction based on structural model reflecting theoretically predictable links allowed to find a statistical relation between income deficit and individual Baumol's indices $B = F(B_1; B_2; B_3)$. Testing this model on Russian empirical data leads to a number of general conclusions as to the correctness of our calculations. It is necessary to stress in particular that all $B_1; B_2; B_3$ indices analysed are stationary (Dickey-Fuller test) and all coefficients in regression equations are significant at relatively high degree of approximation ($R^2=0,427-0,875$).

Fourth, analysis of coefficients of regression equations based on Russian empirical data points that income deficit increase in a situation of: a)) decrease of individual Baumol's index B_1 ($B_1 < 0$) and the corresponding increase in the lag of productivity in performing arts from productivity in the economy; b) growth of the individual Baumol's index B_2 ($B_2 > 0$) – the advancing growth of wages arts organisations in relation to the average wages in the economy; c) at positive dynamics of Baumol's index B_3 ($B_3 > 0$) provided the overinflationary rise in prices of cultural services of the organizations of art.

Fifth, the econometric model of the cost disease constructed in the paper in the overwhelming majority of cases predicts a growing increase in the specific income deficit faced by performing arts organizations and museums in Russia. Only in the situation where ticket prices grow more slowly than inflation can we expect some reduction in the specific income deficit, and even then only to the extent that this reduction is not offset by the other two factors – 'lagging productivity' and 'catch-up' growth in wages in the performing arts sector. As for museums, the same 'expectations' of a decrease in the specific income deficit can be based

only on an above-inflation rise in ticket prices as well as on wages lagging behind average ones in the economy.

Sixth, the paper shows that the genetic nature of the 'cost disease' increasing the income deficit of arts organizations, and the negative consequences of insufficient compensation to cover this deficit through budget subsidies indicate the need to address the risk of the income deficit transforming into an 'artistic deficit.' This situation results in long-term losses which are very difficult to recover. In this connection it is worth emphasizing that the economic policy of any nation has to take into account the fact that the costs for eliminating the 'artistic deficit' are normally higher than the income deficit causing such costs.

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