

THE CONCEPTUAL, METHODOLOGICAL, AND EMPIRICAL ASPECTS REGARDING BUDGETARY MULTIPLIERS

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Abstract

This paper will present a brief presentation of some conceptual and methodological aspects regarding the fiscal and budgetary multipliers in general, and then a set of budgetary multipliers for Romania for the period 2005-2017 will be calculated. The research methods used in the thesis focuses on evaluations of the theory, studies and interpretations in the literature on tax-budgetary multipliers, methodological analysis, algebraic calculation and interpretation of the economic significance of the obtained results. The results expected to be obtained can be concretized in an evaluation table of the impact of the budgetary multipliers on the economic dynamics in Romania during the reference period.

Keywords: multipliers, budgetary, fiscal, economic cycle

JEL classification: E60, E61, E62

Some conceptual and methodological aspects regarding fiscal and budgetary multipliers

The fiscal-budgetary system is an economic system associated with the real economy, having several properties, such as: it presents a certain rigidity (changes in the fiscal-budgetary system - changes of fiscal-budgetary norms or fiscal-budgetary methodologies can be done only by approving Parliament or, in extreme cases, Government Emergency Ordinances); refers to public financial funds and is (through fiscal-budgetary policy) an important macroeconomic adjustment tool.

In the fiscal-budgetary system, the inputs are normative variables, on the one hand, and behavioral, on the other.

The normative variables are: tax rates or social contribution rates, tax bases, exemptions from budgetary obligations, deferrals, exonerations, etc. All this is the input of the fiscal inputs. There is also a vector of budgetary input containing components such as budget commitments; budget expenditures ceiling; normative budget expenditures, etc.

Behavioral variables are: average or marginal inclination towards consumption; the average or marginal inclination towards saving; the mean or marginal inclination towards importation; behavioral tendencies of the Engel type.

As far as the output of the fiscal-budgetary system is concerned, it should be seen as an effect of the input on the real economy variables: GDP; consumption; investment; productivity; unemployment; balance of trade balance; balance of services balance.

Depending on the way the output with the normative input is associated, it is possible to determine fiscal-budgetary multipliers defined as follows:

- the fiscal multipliers - is calculated by the ratio between the effect in the most aggregated real economy and the change of a regulatory input component specific to the budgetary revenues;
- the budgetary multipliers - is calculated by reporting the most aggregate output of the real economy to the volume of government expenditures, especially investment, as they only have a multiplier effect on GDP;
- the fiscal-budgetary multipliers - is calculated by reporting the most aggregate output of the real economy to a combination of fiscal variables, ie budget variables.

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Fiscal multipliers are the number of units with which output varies, in our case - GDP (considered the effect of the most aggregated real economy), when the input - in our case - the tax rate varies with unit. As for the tax rate, it can refer to any tax (personal income, profit, value added tax).

We note that the fiscal multiplier (m_f) has as input (causal factor), the marginal reaction of the tax rates. The other types of reactions after which the multiplier can be examined generally are not formally discretionary, but are the effects of economic behaviors.

For the fiscal multiplier, the general calculation methodology is:

$$m_f = \frac{\Delta GDP}{\Delta r_i},$$

where:

m_f = the fiscal multiplier;

ΔGDP = the absolute variation on GDP;

Δr_i = the absolute variation of the tax rate.

The economic significance of the marginal tax multiplier expresses, in monetary terms, how many monetary units vary the GDP when the tax rate varies with a unit.

Budgeting multipliers are the number of units with which GDP varies when budget expenditures changes by one unit. As regards budgetary expenditures, it may refer to: the total expenditures of the general consolidated budget; budget spending on investment; to budget expenditures with human capital (education, health).

We note that the causative multiplier in the budgetary area (m_b) is specific to the behavioral reactions of the various formal categories of government expenditures that capture the economic orientation / rationality of the state but, above all, the multiplication effects on output- in the present case, of GDP.

Our interest in analysis is focused on the calculation methodology of the multiplier in the budgetary field, based on two types of reactions of the economic behavior, respectively in absolute size (variation) and in the size of the type of elasticity (variation rate).

For the budget multiplier calculated by the marginal response, the calculation formula is:

$$mb_{va} = \frac{\Delta GDP}{\Delta Ch} = \frac{GDP_i - GDP_{i-1}}{Ch_i - Ch_{i-1}},$$

where:

mb_{va} = the budget multiplier (of budget expenditures), in absolute amount (variation);

ΔGDP = the absolute variation on GDP;

ΔCh = the absolute variation in budget expenditures.

The economic significance of the marginal-sized budget multiplier: expresses in monetary terms how many units the GDP varies when total public expenditures or structure varies with one unit.

For the budget multiplier calculated by the elasticity (coefficient) type reaction, the calculation formula is:

$$mb_{rv} = \frac{EGDP}{ECh} = \frac{(GDP_i - GDP_{i-1}) / GDP_{i-1}}{(Ch_i - Ch_{i-1}) / Ch_{i-1}},$$

where:

mb_{rv} = the budget multiplier (of budget expenditures) in the size of the type of elasticity (coefficient);

$EGDP$ = the rate of change in GDP;

ECh = the rate of change in budget expenditures.

The economic significance of the budget multiplier in the size of the type of elasticity (coefficient) expresses the number of percentages by which GDP varies when total public expenditures or in its structure varies by one percent.

Empirical aspects regarding a set of budgetary multipliers calculated for Romania for the period 2005-2017

Budgetary, utility and interest normative causes for our work are those that refer to variations in the following categories of public expenditures:

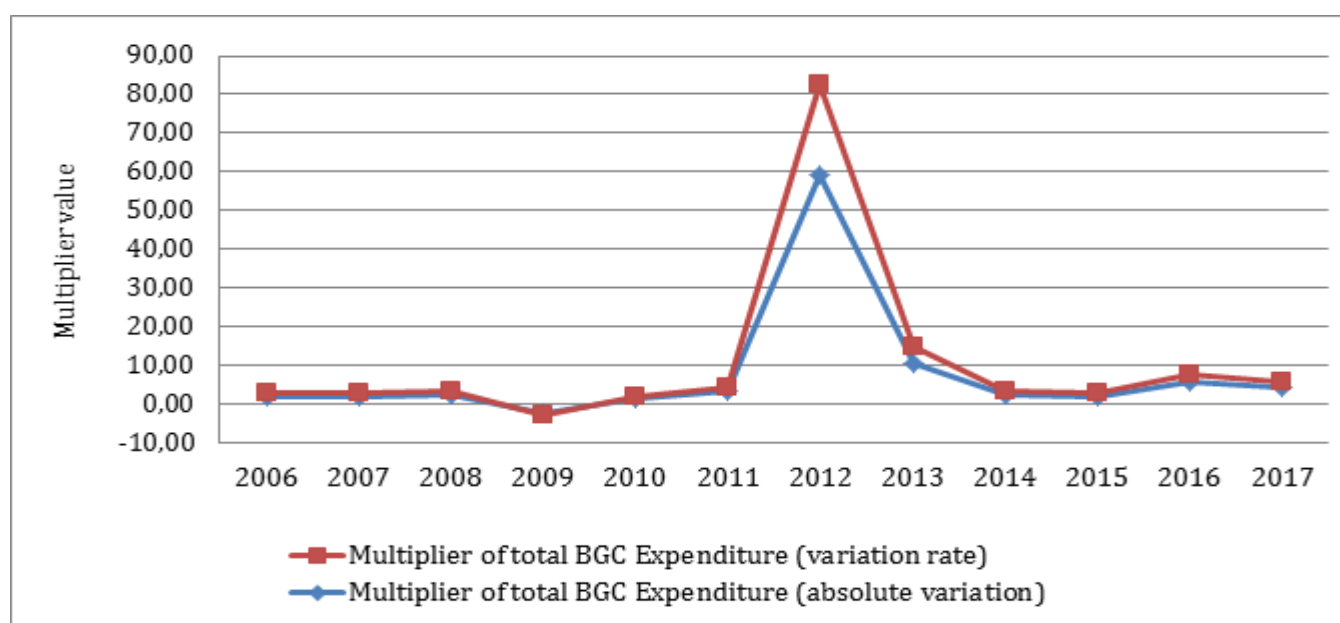
- Total consolidated budget expenditures (BGC);
- Public expenditures on health;
- Public expenditures on education;
- Public expenditures on human capital (considered to be health and education);
- Public expenditures on investment.

On the basis of the presented methodology, we calculate the multipliers in the budgetary domain that have as a causal factor these categories of public expenditures, by reacting in absolute size (variation) and by reacting in size to the type of elasticity (variation rate).

Multiplier of total consolidated budget expenditures

This multiplier shows how much GDP varies in total consolidated budget expenditures. We find, based on the two calculation methodologies, that the multiplier records positive or negative values, above or subunits, its size being dispersed in the range of -2.03 and 59.42 in the variation abolished and in the range -0.77 and 23, 37 in the rate of variation, the lower and upper limits corresponding, in both situations, to 2009 and 2012, respectively.

Figure 1. Evolution of the multiplier of the total consolidated budget expenditures (calculated on the basis of absolute variation and the variation rate) in Romania for the period 2006-2017



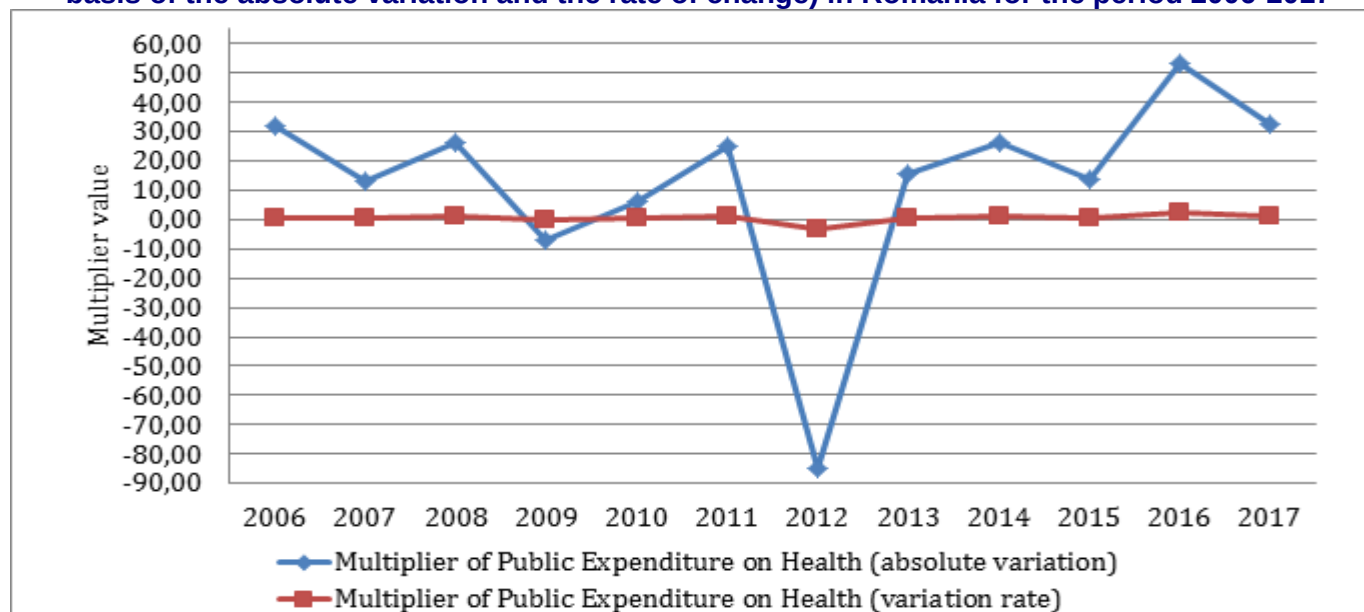
Source: developed by the author on the basis of the data in Annex 1.

Calculated by the two methods, the multiplier of total BGC expenditures registered relatively symmetrical evolutions in terms of their size over the entire analyzed period.

Multiplier of the public expenditures on health

This multiplier shows how much GDP varies in public health expenditures. We find, based on the two calculation methodologies, that the multiplier records positive or negative values, supra or subunits, its size being dispersed in the range of -84.62 and 53.19 in aborted variation and in the range -3.50 and 2, 23 in the rate of variation, the lower and upper limits corresponding, in both situations, to 2012 and 2016 respectively.

Figure 2. The evolution of the multiplier of the public expenditures on health (calculated on the basis of the absolute variation and the rate of change) in Romania for the period 2006-2017



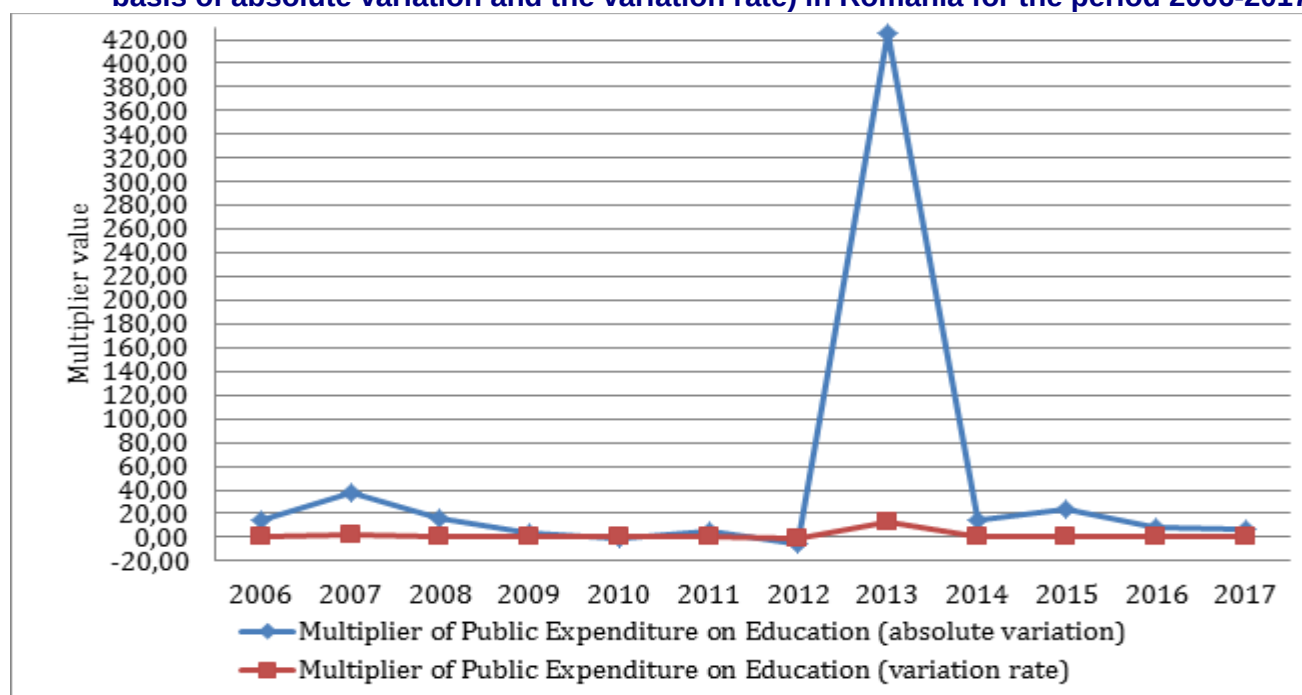
Source: developed by the author on the basis of the data in Annex 1.

Calculated by the two methods, the multiplier of health expenditures recorded asymmetric developments in terms of their size over the entire analyzed period.

Multiplier of the public expenditures on education

This multiplier shows how much GDP varies from public expenditures to education. We find, based on the two calculation methodologies, that the multiplier records positive or negative values, above or subunits, its size being dispersed in the range -6.26 and 426.0 in variation abolished and in the range -0.26 and 12, 68 in the rate of variation, the lower and upper limits corresponding, in both situations, to 2012 and 2013 respectively.

Figure 3. The evolution of the multiplier of the public expenditures for education (calculated on the basis of absolute variation and the variation rate) in Romania for the period 2006-2017



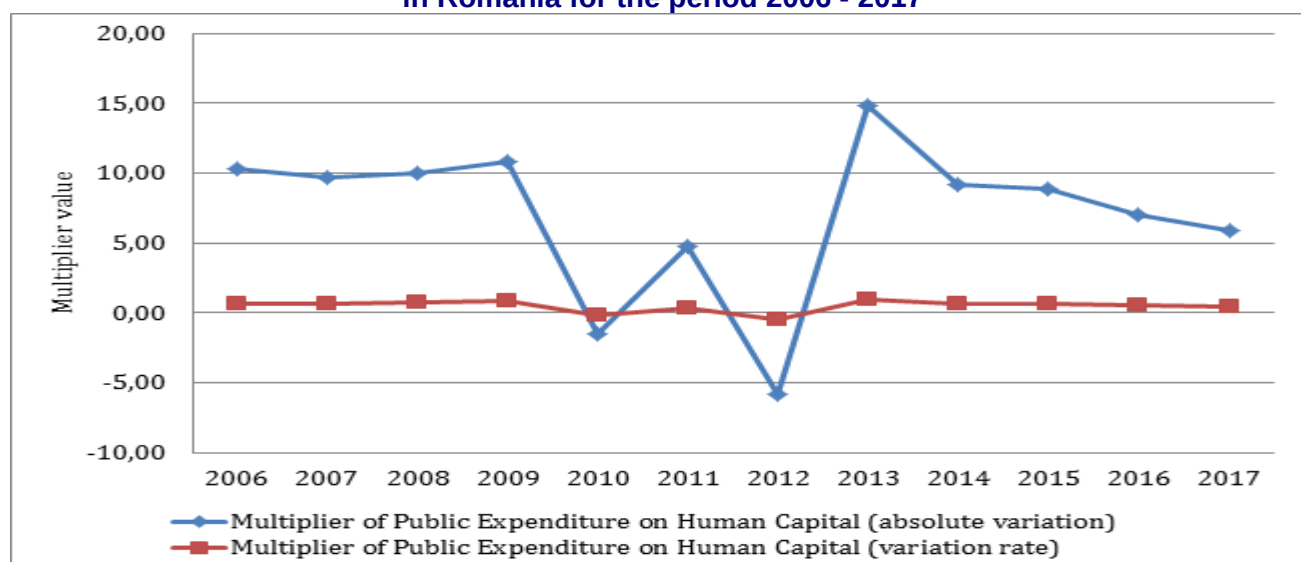
Source: developed by the author on the basis of the data in Annex 1.

Calculated by the two methods, the multiplier for education expenditures records asymmetric developments in terms of their size over the entire analyzed period.

Multiplier of the public expenditures with human capital

This multiplier shows how much the GDP varies with the variation of public expenditures with human capital (resulting from the sum of public expenditures on health and education). We find, based on the two calculation methodologies, that the multiplier records positive or negative values, supra or subunits, its size being dispersed in the range of -6.83 and 14.86 in variation abolished and in the range -0.48 and 1, 01 in the variation rate, the lower and upper limits corresponding, in both situations, to the years 2012 and 2013 respectively.

Figure 4. The evolution of the multiplier of the public expenditures for the human capital (calculated on the basis of the absolute variation and the variation rate) in Romania for the period 2006 - 2017



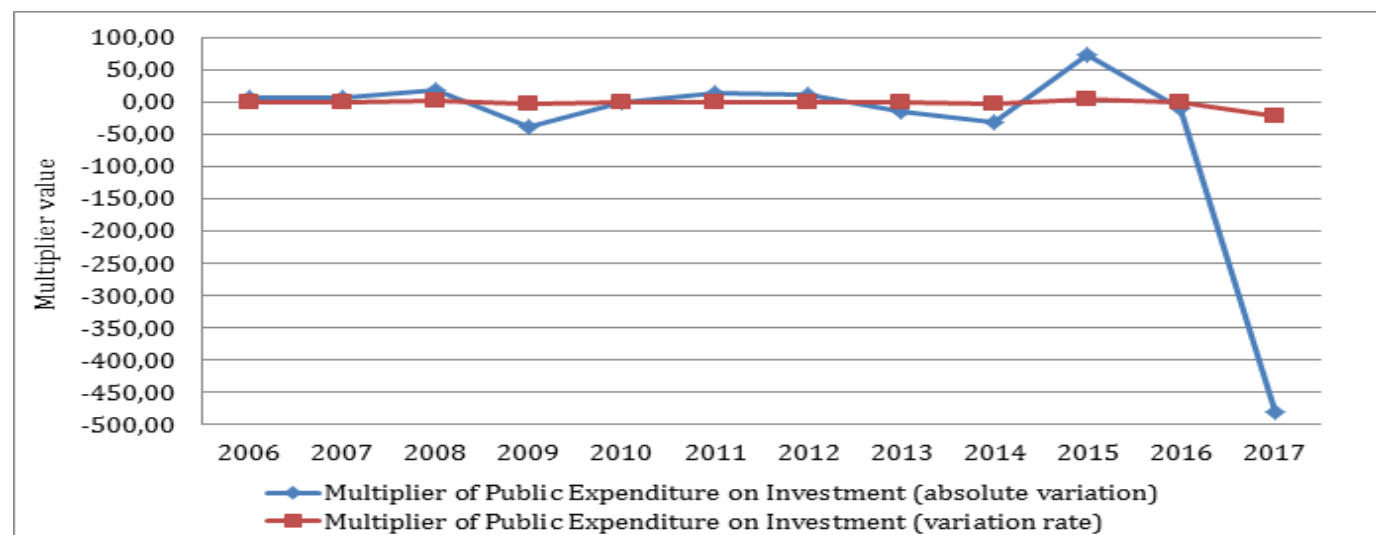
Source: developed by the author on the basis of the data in Annex 1.

Like its components, the cost multiplier for human capital, computed by the two methods, records asymmetric developments, but with a smaller amplitude in terms of their size over the entire analyzed period.

Multiplier of the public expenditures on Investments

This multiplier shows how much GDP varies in the variation in public investment expenditures. We find, based on the two calculation methodologies, that the multiplier records positive or negative values, supra or subunits, its size being dispersed in the range - 479,95 and 74,19 in variation abolished and in the interval - 21,78 and 4,30 in the rate of variation, the lower and upper limits corresponding, in both situations, to 2017 and 2015 respectively.

Figure 5. The evolution of the multiplier of the public expenditures for investments (calculated on the basis of the absolute variation and the variation rate) in Romania for the period 2006 - 2017



Source: developed by the author on the basis of the data in Annex 1.

Calculated by the two methods, the multiplier of investment expenditures records asymmetric developments in terms of their size over the entire analyzed period.

Following the statistics used in the calculation methodology, in correlation with the values recorded by the budgetary multipliers (Annex 1), a number of endogenous causal factors influencing the size of the multiplier were found, common to all the calculated values:

- the multiplier records a negative value when the variance of the input or output is negative;
- the multiplier records a subunit value when the variance of the input variation is higher than the output variation size;
- the multiplier records a unit value (1) when the input variance size is equal to the output variation size;
- the multiplier records an overband value when the input variance size is less than the output variation size.

As regards the two calculation methods used for budgetary multipliers, they are presented by the same variation, expressed in different values, namely in absolute nominal size and in the form of a coefficient.

Impact assessment of calculated budgetary multipliers

The impact of fiscal and budgetary multipliers on GDP is given by their size. To this end, to assess the impact of calculated budgetary multipliers on GDP, we will individually analyze each calculated multiplier.

The multiplier of the total BGC expenditures - from the evolution of this multiplier, we note that it records only one negative value in 2009 in absolute nominal variation as a result of a negative variation of GDP, and in the rest of the years it has positive or sub-unitary values. This size of the BGC total expenditures multiplier reveals a strong impact of the overall budgetary expenditures variation on GDP, confirming to a certain extent the Keynesian economic theory, which argues the high impact of public expenditures on GDP in relation to the alternative to raising tax rates whose mechanism of influence is indirect and relatively diminished. It exposes certain conditions in which the Keynesian economic theory, with regard to the multiplier effect of budget expenditures, is viable, that is to say reduced import orientation and a fixed exchange rate regime, conditions which Romania does not fulfill.

The multiplier of public expenditures for health - from the evolution of this multiplier for the analyzed period we find that it records two negative values, namely in 2009, as a result of a negative variation of GDP, and in 2012, wider, amid a negative variation in expenditures public health, and in the rest of the years it has positive or sub-unitary values. This size of public expenditures multiplier for health, relatively symmetrical with the multiplier of total BGC expenditures, except for 2012 and 2013, reveals a strong impact of the change in public health expenditures on GDP. We appreciate that the manifestation and qualitative impact of this multiplier are not very relevant at a lag of 0, but its effects are stratified over time, and the variation in time of the multiplier may have an inverse relationship proportional to GDP variation (the increase in public health expenditures may mean a deterioration in the population's health, impairment of work capacity and, as a consequence, a reduction in production, while reducing public health expenditures would mean a reverse situation).

The multiplier of public expenditures for education - the evolution of this multiplier for the analyzed period shows that it records two negative values, namely in 2010 and 2012, as a result of negative variations of the public expenditures for education, while in the rest of the years it has positive values under or over. This size of the public expenditures multiplier for education, below the one of the multiplier of the total BGC expenditures, with the exception of 2007, 2009 and 2013, reveals a lesser impact of the change in public expenditures on education on GDP. We appreciate, like the multiplier of public health expenditures, that the manifestation and qualitative impact of this multiplier are not very relevant at a lag of 0, but its effects stratify over time. However, unlike the multiplier of public expenditures on health, this causal factor (education expenditures) over time could generate profound multiplier effects on GDP. (increasing public expenditures on education may mean increasing professional training and, as a consequence, increasing labor productivity, hence GDP).

The multiplier of public expenditures for human capital - this multiplier, whose causal factor is represented by public expenditures allocated by the state for human capital (public health expenditures + public expenditures for education), signifies the variation of production (absolute variation, rate of change) expenditures on human capital. From its evolution for the analyzed period we find that it records two

negative values, respectively in 2010 and 2012, as a result of negative variations of these expenditures, and in the rest of the years it recorded positive values under or above the unit. Analyzed in its structure, we see a more pronounced impact of public health expenditures on the size of the multiplier of public expenditures with human capital, with the exception of 2013, where the strong impact of the expenditures multiplier on education is significant, being the only supra-unit value of the multiplier coefficient over the entire period .

We appreciate, as we have done in the case of the structural elements of the public expenditures multiplier for human capital, that its manifestation and qualitative impact are not very relevant at a lag of 0, but the accumulations are stratified over time with these occurring the multiplying effects on GDP.

The multiplier of public expenditures on investment - this multiplier, as opposed to the multiplier of expenditures for human capital, where multiplier effects require more time, is considered the "engine" of the economy, generating ample multiplication effects, with their propagation over long-term , from the causal factor. The evolution of this multiplier for the analyzed period shows that it records six negative values, respectively, in the years 2009, 2010, 2013, 2014, 2016 and 2017. This evolution was due to negative variations in public investment expenditures excluding 2009 when there was a negative change in GDP. In the remainder of the year, the multiplier of public expenditures on investment records positive or sub-unitary values. The size of the public expenditures multiplier for investment reveals a low impact on GDP, amid a low allocation, often lower than in previous years. Their level in 2006 was 24.6 billion lei, and in 2017 it was 34.4 billion lei. An explanation of these insufficient and oscillating allocations is that this category of expenditures has been used as a means / instrument of fiscal consolidation, in the sense of maintaining the conventional budget deficit of the consolidated general budget within the limits of the institutional commitments assumed.

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Annex 1. Multiplier of total expenditures of BGC, public health expenditures, public expenditures for education, public expenditures for human capital and expenditures for public investments in Romania for the period 2006-2017

Indic / timp	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Nominal GDP	290,49	347,00	428,98	538,05	526,35	529,62	562,06	595,37	637,46	668,14	712,66	762,34	858,33
Absolute variation		56,52	81,98	109,07	-11,70	3,28	32,44	33,30	42,09	30,69	44,52	49,68	95,99
Variation rate		0,19	0,24	0,25	-0,02	0,01	0,06	0,06	0,07	0,05	0,07	0,07	0,13
Total expenditures BGC / mld. lei	96,10	122,17	159,54	203,24	208,99	211,24	221,10	221,66	225,55	236,84	258,03	266,72	288,58
Absolute variation		26,07	37,37	43,69	5,76	2,25	9,86	0,56	3,89	11,29	21,19	8,69	21,85
Variation rate		0,27	0,31	0,27	0,03	0,01	0,05	0,00	0,02	0,05	0,09	0,03	0,08
Public health expenditures / mld. lei	7,51	9,29	15,51	19,70	21,42	21,92	23,23	22,84	25,57	26,74	29,94	30,87	33,80
Absolute variation		1,78	6,22	4,19	1,72	0,51	1,31	-0,39	2,73	1,16	3,20	0,93	2,93
Variation rate		0,24	0,67	0,27	0,09	0,02	0,06	-0,02	0,12	0,05	0,12	0,03	0,09
Public education expenditures /mld.lei	10,45	14,18	16,39	23,09	20,30	17,59	23,04	17,72	17,82	19,99	21,82	27,97	41,28
Absolute variation		3,73	2,22	6,70	-2,79	-2,72	5,45	-5,32	0,10	2,17	1,83	6,15	13,31
Variation rate		0,36	0,16	0,41	-0,12	-0,13	0,31	-0,23	0,01	0,12	0,09	0,28	0,48
Public expenditures on human capital /mld.lei	17,96	23,47	31,91	42,79	41,72	39,51	46,27	40,56	43,39	46,73	51,76	58,84	75,08
Absolute variation		5,50	8,44	10,89	-1,08	-2,21	6,76	-5,71	2,83	3,34	5,03	7,09	16,24
Variation rate		0,31	0,36	0,34	-0,03	-0,05	0,17	-0,12	0,07	0,08	0,11	0,14	0,28
Public expenditures on investment /mld lei	15,60	24,60	35,80	41,80	42,10	37,40	39,90	42,60	39,70	38,70	39,30	34,60	34,40
Absolute variation		9,00	11,20	6,00	0,30	-4,70	2,50	2,70	-2,90	-1,00	0,60	-4,70	0,20
Variation rate		0,58	0,46	0,17	0,01	-0,11	0,07	0,07	-0,07	-0,03	0,02	-0,12	0,01

Multipliers / years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Multiplier of total expenditures of BGC (absolute variation)		2,17	2,19	2,50	-2,03	1,46	3,29	59,42	10,81	2,72	2,10	5,72	4,39
Multiplier of total expenditures of BGC (variation rate)		0,72	0,77	0,93	-0,77	0,58	1,31	23,37	4,03	0,96	0,74	2,07	1,54
Multiplier of public expenditures on health (absolute variation)		31,80	13,17	26,05	-6,82	6,47	24,77	-84,62	15,40	26,36	13,91	53,19	32,77
Multiplier of public expenditures on health (variation rate)		0,82	0,35	0,94	-0,25	0,26	1,03	-3,50	0,59	1,06	0,56	2,23	1,33
Multiplier of public expenditures on education (absolute variation)		15,17	36,96	16,28	4,19	-1,21	5,95	-6,26	426,00	14,11	24,36	8,08	7,21
Multiplier of public expenditures on education (variation rate)		0,55	1,51	0,62	0,18	-0,05	0,20	-0,26	12,68	0,39	0,73	0,25	0,26
Multiplier of public expenditures on human capital (absolute variation)		10,27	9,71	10,02	10,88	-1,48	4,80	-5,83	14,86	9,19	8,85	7,01	5,91
Multiplier of public expenditures on human capital (variation rate)		0,64	0,66	0,75	0,87	-0,12	0,36	-0,48	1,01	0,63	0,62	0,51	0,46
Multiplier of public expenditures on investment (absolute variation)		6,28	7,32	18,18	-39,02	-0,70	12,98	12,34	-14,51	-30,69	74,19	-10,57	-479,95
Multiplier of public expenditures on investment (variation rate)		0,34	0,52	1,52	-3,03	-0,06	0,92	0,88	-1,04	-1,91	4,30	-0,58	-21,78

Source: AMECO Database, calculations by the author