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# STRATEGIC APPROACHES TO THE REVISION OF THE TAX BURDEN IN THE CONTEXT OF THE SECTORS OF THE RA ECONOMY

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Tax Instrument, Tax Burden, Addressable Privileges, Method of Least Squares, Coefficient of Determination, Correlation Analysis.

**ABSTRACT**

The article discussed the strategic approaches to the revision of the tax burden in the context of the RA economy. accordingly, dynamic models were developed and evaluated, through which it is possible to identify the impact of the tax burden on the economic sectors of the economy.
The assessment of the impact of the tax burden on the economic sectors was given by means of the economic-mathematical toolkit, as well as for the purpose of making objective decisions regarding the change of the tax burden.
For this purpose, for the development of the sectors of the RA economy, it was proposed to review the amount of the tax burden, in particular, to implement strategic steps consisting of three stages.

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## Introduction.

The validity of the tax instruments makes it possible to identify and evaluate the tax burden distribution mechanisms in the main sectors of the economy. The purpose of the latter is to justify the need to use tax levers to ensure the economic development of RA, as well as to define targeted privileges, in particular, 3 models were proposed and evaluated in the article.

Model 1.

The volume of industrial output is affected by a factor such as taxes/volume of industrial output, in order to reveal the correlation between the latter, their connection was calculated using the regression equation, which were presented based on the following formula:

$$y = a + bx_1 + \varepsilon t \quad (1)$$

where
y- volume of industrial output (million drams)
$x_1$- taxes/volume of industrial output
εt -is the magnitude of the random error
a,b,-are the elasticity coefficients of constant magnitude and independent variables

Annual official statistical data on the volume of industrial output and taxes/volume of industrial output for 2007-2021 were considered for the analysis. In the presented econometric model, the statistical series are 15, which means that the obtained values are almost close to reality.

The specified model was estimated using the least squares method using the Eviews 9[1] software, and appropriate regression analysis was performed, however, before estimating the model, it is necessary to smooth the data, so for this purpose, we log-transformed the data to avoid false multivariate linear regression.

The results obtained as a result of the regression model evaluation are reflected in table 1, where the coefficients obtained as a result of the evaluation and their statistical properties, t-statistic, Prob., are presented[2]. In addition, the following indicators are also provided to understand the qualitative features of the model: $R^2$, adjusted $R^2$.[3]

Table 1 Model evaluation results[4]

Sample: 1 15
Includedobservations: 15

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| a | 15.06916 | 0.270742 | 33.19931 | 0.0000 |
| b | -2.471570 | 0.326477 | -2.351200 | 0.0023 |
| R-squared | 0.552294 | Meandependentvar | | 14.06709 |
| Adjusted R-squared | 0.514986 | S.D. dependentvar | | 0.397333 |
| S.E. ofregression | 0.276714 | Akaikeinfocriterion | | 0.399901 |
| Sumsquaredresid | 0.918849 | Schwarzcriterion | | 0.491195 |
| Loglikelihood | -0.799305 | Hannan-Quinncriter. | | 0.391450 |
| F-statistic | 14.80332 | Durbin-Watsonstat | | 0.577957 |
| Prob(F-statistic) | 0.002321 | | | |

The coefficient of determination ($R^2$) in equation (1) is 0.55, that is, about 55% of the variation in the dependent variable is explained by the regression, and the adjusted coefficient of determination (adjusted $R^2$) is 0.51, that is, 51%, which indicates that, how the adjustment coefficient of the determined had an effect on the coefficient of determination, and since the adjusted coefficient of determination in the estimated model is close to the coefficient of determination, it means that we have a "quality" regression analysis.

As a result, the values of the estimated linear regression equation were reflected:

$$Y=15.06916- 2.471570*X_1 \quad (2)$$

As a result, (2) through the use of econometric model and mathematical tools, it is possible to give an economic justification that a change of one percentage point in the volume of taxes/industrial output ($X_1$) leads to a decrease of 2.47 percentage points in the volume of industrial output ($Y_1$).

Model 2:

Correlation analysis was conducted in order to reveal the connection between the volume of gross agricultural output and the volume of taxes/gross agricultural output, trade turnover and tax/trade turnover, construction volume and tax/construction volume.

Annual official statistical data on the volume of gross agricultural output and taxes/gross agricultural output, trade turnover and taxes/trade turnover, construction volume and taxes/construction volume for 2007-2021 were considered for the analysis.

[1] Eviews is the Windows version of the Micro TSP package that contains an advanced "help" that is essentially a guide to econometric methods. Detailed information about Eviews can be obtained at the following email address: http://www.eviews.com/home.html

[2] И.И.Елисеевой. Эконометрика:Учеб./под ред -М: ,2009,с. 25-28

[3] Я.Р.Магнус, П.К. Катышев, А.А.Пересецкий, Эконометрика, издательство «Дело», М.2004, с. 67

[4] Calculated by the author.

The mentioned correlation analysis was performed by the method of least squares using the Eview9[1] software. Before analysis, it is necessary to smooth the data, so for this purpose we have log-transformed the data to avoid getting a spurious correlation (Table 2).

Table 2. Gross agricultural product volume, taxes/gross agricultural product volume, trade turnover, taxes/trade turnover, construction volume, taxes/construction volume and their logarithmic values in RA (million AMD)[2]

| | **The volume of gross agricultural output** | **Trade turnover** | **Construction volume** | **Taxes and duties [3]** | **Taxes/Gross Agricultural Product Volume (log)** | **Taxes/ Trade turnover (log)** | **Taxes/ Construction volume (log)** |
|---|---|---|---|---|---|---|---|
| 2021 | 933002 | 3390983 | 4700790 | 1586900 | 0.53113 | -0.75934 | -1.08595 |
| 2020 | 819311.9 | 2858058 | 413830.9 | 1416005 | 0.54713 | -0.7023 | 1.230138 |
| 2019 | 853259.8 | 3249221 | 450806.7 | 1495346 | 0.561049 | -0.77606 | 1.199074 |
| 2018 | 892926.7 | 2933313 | 435803.9 | 1284407 | 0.363548 | -0.82584 | 1.08086 |
| 2017 | 908617.3 | 2605972 | 429931.6 | 1184743 | 0.265357 | -0.78828 | 1.013655 |
| 2016 | 878491.7 | 2234376 | 410602.9 | 1104243 | 0.228709 | -0.7048 | 0.989288 |
| 2015 | 945438 | 2277445 | 481496.9 | 1091679 | 0.143824 | -0.73534 | 0.818572 |
| 2014 | 982958.7 | 2406321 | 463858 | 1087379 | 0.100958 | -0.79433 | 0.851947 |
| 2013 | 919089.4 | 2328991 | 453449.3 | 972187.1 | 0.056165 | -0.87364 | 0.762665 |
| 2012 | 841509.9 | 2195506 | 479415.6 | 723786.3 | -0.1507 | -1.10967 | 0.411928 |
| 2011 | 795062.2 | 2049712 | 504824.5 | 630106.8 | -0.23253 | -1.17957 | 0.221678 |
| 2010 | 636683.4 | 1810192 | 588807.7 | 572495.3 | -0.10627 | -1.15118 | -0.0281 |
| 2009 | 552098.6 | 1573195 | 579740.7 | 395580.1 | -0.33337 | -1.38051 | -0.38223 |
| 2008 | 628131.7 | 1676740 | 858680.1 | 432261 | -0.37372 | -1.35558 | -0.68637 |
| 2007 | 633877.4 | 1421800 | 671029 | 471273 | -0.29642 | -1.10424 | -0.35337 |

[1] Eviews is the Windows version of the Micro TSP package that contains an advanced "help" that is essentially a guide to econometric methods. Detailed information about Eviews can be obtained at the following email address: http://www.eviews.com/home.html

[2] Statistical Committee database of the Rebublic of Armenia: https://armstat.am/am/?nid=12&id=02001. Last access: 28.06.2022

[3] Annual reports of the State Revenue Committee of the Rebublic of Armenia: 2009-2021. https://www.petekamutner.am/Content.aspx?itn=tsTITaxStatData and RA NSS database: https://www.armstat.am/am/ Last access: 28.06.2022

The correlation analysis carried out in order to reveal the accuracy of the indicator of gross agricultural output and taxes/gross agricultural output, trade turnover and tax/trade turnover, construction volume and taxes/construction volume shows that there is indeed a significant negative and positive correlation between them ( Table 3).

Table 3. Correlation values between selected factors[1]

| | **Gross Agricultural Product Volume** | **Taxes/Gross Agricultural Product Volume** |
|---|---|---|
| **Gross Agricultural Product Volume** | 1.000000 | –0.692716 |
| **Taxes/Gross Agricultural Product Volume** | -0.692716 | 1.000000 |
| | | |
| | **Trade Turnover** | **Taxes/Trade Turnover** |
| **Trade turnover** | 1.000000 | –0.791245 |
| **Taxes/Trade turnover** | -0.791245 | 1.000000 |
| | | |
| | **Construction volume** | **Taxes/Construction volume** |
| **Construction volume** | 1.000000 | 0.776945 |
| **Taxes/Construction volume** | 0.776945 | 1.000000 |

The results of the conducted correlation analysis confirm that there is a significant negative correlation between the volume of gross agricultural output and the volume of taxes/agricultural gross output, trade turnover and tax/trade turnover, namely, a change of one percentage point in the volume of gross taxes/agricultural output brings agriculture a 0.69 percentage point decrease in gross output, and a one percentage point change in taxes/trade turnover decreases trade turnover by 0.79 percentage points. However, it should also be noted that there is a significant positive correlation between the considered factors, the construction volume and the taxes/construction volume index, namely, one percentage point change in the taxes/construction volume leads to an increase in the construction volume by 0.77 percentage points, therefore, the results of the conducted correlation analysis confirm that there is a significant correlation between the considered factors.

In order to reveal the relationship between the volume of services (excluding trade) and taxes/volume of services (excluding trade), their relationship was calculated using a regression equation, which were presented based on the following formula:

$$y = a + bx_1 + \varepsilon t \quad (3)$$

where

y- volume of services (without trade) million drams

$x_1$- Taxes/Volume of Services (without trade)

εt-is the magnitude of the random error

a,b,-are the elasticity coefficients of constant magnitude and independent variables.

Annual official statistical data of volume of services (excluding trade) and taxes/volume of services (excluding trade) for 2007-2021 were considered for the analysis. In the presented econometric model, the statistical series are 15, which means that the obtained values are almost close to reality.

The specified model was estimated by the method of least squares using the Eviews 9[2] software, the appropriate regression analysis was performed, however, before estimating the model, it

[1] Calculated by the author.

[2] Eviews is the Windows version of the Micro TSP package that contains an advanced "help" that is essentially a guide to econometric methods. Detailed information about Eviews can be obtained at the following email address: http://www.eviews.com/home.html

is necessary to smooth the data, so for this purpose, we log-transformed the data to avoid false multivariate linear regression (Table 4).

Table 4. Volume of services, volume of taxes/services and their logarithmic values in RA (million drams)[1]

| | **Volume of services (without trade)** | **Taxes and duties[2]** | **Taxes/Volume of services (without trade)** | **Volume of services (without trade) (log)** | **Taxes/Volume of services (without trade) (log)** |
|---|---|---|---|---|---|
| 2021 | 1879261 | 1586900 | 0.844428 | 14.44639 | -0.1691 |
| 2020 | 1708451 | 1416005 | 0.828824 | 14.3511 | -0.18775 |
| 2019 | 1993439 | 1495346 | 0.750134 | 14.50537 | -0.2875 |
| 2018 | 1725840 | 1284407 | 0.744221 | 14.36122 | -0.29542 |
| 2017 | 1434321 | 1184743 | 0.825995 | 14.1762 | -0.19117 |
| 2016 | 1247165 | 1104243 | 0.885402 | 14.03638 | -0.12171 |
| 2015 | 1131754 | 1091679 | 0.96459 | 13.93928 | -0.03605 |
| 2014 | 1085534 | 1087379 | 1.0017 | 13.89758 | 0.001698 |
| 2013 | 991469.1 | 972187.1 | 0.980552 | 13.80694 | -0.01964 |
| 2012 | 943345.6 | 723786.3 | 0.767255 | 13.75719 | -0.26494 |
| 2011 | 843085.7 | 630106.8 | 0.747382 | 13.64482 | -0.29118 |
| 2010 | 773054.1 | 572495.3 | 0.740563 | 13.5581 | -0.30034 |
| 2009 | 698215.3 | 395580.1 | 0.566559 | 13.45628 | -0.56817 |
| 2008 | 698466.9 | 432261 | 0.618871 | 13.45664 | -0.47986 |
| 2007 | 571794.6 | 471273 | 0.8242 | 13.25654 | -0.19334 |

The results obtained as a result of the estimation of the regression model are reflected in table 5, where the coefficients obtained as a result of the estimation and their statistical properties of the t-statistic, Prob.[3] In addition, the following indicators are also provided to understand the qualitative features of the model: $R^2$, Adjusted $R^2$.[4]

Table 5. Model evaluation results[5]

Sample: 1 15
Includedobservations: 15

| | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| a | 14.93334 | 0.217884 | 68.53791 | 0.0000 |
| b | -0.805574 | 0.258859 | -5.067130 | 0.0003 |

| | | | |
|---|---|---|---|
| R-squared | 0.681493 | Meandependentvar | 13.87169 |
| Adjusted R-squared | 0.654951 | S.D. dependentvar | 0.380937 |
| S.E. ofregression | 0.223766 | Akaikeinfocriterion | -0.024871 |
| Sumsquaredresid | 0.600853 | Schwarzcriterion | 0.066423 |
| Loglikelihood | 2.174096 | Hannan-Quinncriter. | -0.033322 |
| F-statistic | 25.67581 | Durbin-Watsonstat | 0.811107 |
| Prob(F-statistic) | 0.000277 | | |

[1] https://www.armstat.am/am/ Last access: 28.06.2022
[2] Annual reports of the State Revenue Committee of the Rebublic of Armenia: 2009-2021. https://www.petekamutner.am/Content.aspx?itn=tsTITaxStatData. Last access: 28.06.2022
[3] И.И.Елисеевой. Эконометрика: Учеб./под ред -М: ,2009,с. 25-28
[4] Я.Р.Магнус, П.К. Катышев, А.А.Пересецкий, Эконометрика, издательство «Дело», М.2004,с. 67
[5] Calculated by the author.

The coefficient of determination ($R^2$) in equation (4) is 0.68, that is, about 68% of the variation in the dependent variable is explained by the regression, and the adjusted coefficient of determination (adjusted $R^2$) is 0.65, that is, 65%, which indicates that how the adjustment coefficient of the determined had an effect on the coefficient of determination, and since the adjusted coefficient of determination in the estimated model is close to the coefficient of determination, it means that we have a "quality" regression analysis.

As a result, the values of the estimated linear regression equation were reflected:

$$Y=14.93334- 0.805574*X_1 \quad (4)$$

As a result, using the (4) econometric model and mathematical tools, it is possible to give an economic justification that a change of one percentage point in the volume of taxes/services (without trade) ($X_1$) leads to a decrease of 0.80 percentage points in the volume of services (without trade) ($Y_1$).

Table 6. Description of the evaluation results of the three models[1]

| **Description of econometric models** | **Tax burden** | **Description of the sector** |
|---|---|---|
| **Model 1: By volume of industrial output** | Negative impact | Industry |
| **Correlation** | | |
| **Model 2:** | | |
| By volume of gross agricultural output | Negative impact | Agriculture |
| By volume of trade turnover | Negative impact | Trade turnover |
| By volume of construction | Positive impact | Construction |
| **Model 3: According to the volume of services (no trading)** | Negative impact | Services (no trade) |

As presented in table 6, the tax burden has a negative impact on all sectors of the RA economy, just their size differs in its mathematical significance.

For the development of the sectors of the RA economy, we suggest to review the amount of the tax burden, in particular, to implement the following strategic steps:

Step 1 - reduce the level of the tax burden in the sectors that provide employment growth,

Step 2 - to optimize the tax burden on the basis of the principle of fairness of taxation, according to the increase of tax revenues of the state budget, increase of economic and social efficiency,

Step 3 - apply sectoral tax levers according to the system of targeted tax benefits.

Considering the post-war situation in the republic, we suggest applying:

• Establish a differentiated VAT rate (0%, 5%, 10%, 20%) and a maximum of 20% for imported goods in order to promote domestic production in RA.

However, the application of the differentiated maximum rate of VAT is not free from risks, in particular, many international bilateral trade agreements have been signed with the Republic of Armenia, the republic is becoming a member of the CIS, and the application of such a discriminatory principle will later lead to the breaking of bilateral agreements, limiting the volume of exports from Armenia. Basically, the presented proposal is one of the ways to increase the economic efficiency in terms of VAT, if it is simultaneously applied from the point of view of ensuring the neutrality of the tax burden.

It should also be noted that in terms of the fair distribution of the tax burden, the differentiated VAT rate is indirectly affected by monetary factors such as inflation.

[1] Calculated by the author.

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