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MULTIPLE ECONOMETRIC FORECAST OF THE DEVELOPMENT OF SMALL BUSINESS ACTIVITY IN NAVOI REGION

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ABSTRACT

This article makes analyses of the multiple econometric forecast of the development of small business activity in Navoi region. On this case, both theotrical and analytical analyses were conducted in order to make better analyses of the research as the whole. In conclusion, outcomes and shortcomings were stated to get more detailed information and recommendations as the whole

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Introduction

We need to determine which factors may be more positive for the development of small business and private entrepreneurship (SMB), to anticipate the negative effects of which factors, to scientifically substantiate the impact of these factors and draw appropriate conclusions. Therefore, in the implementation of multivariate forecasts for the development of Navoi region, we use the data collected during the regional statistical organizations and scientific research to determine the regression equation to determine the volume of production in the industry. We calculate the gross regional product of the region on the basis of the volume of products created in the CIS.

In Navoi region, we have identified the main indicators that represent the volume of gross regional product (GRP) and the activities of small business and private entrepreneurship (SMPE) as follows:

gross regional product (billion soums) – **Z;**

volume of products and services created in the field of small business and private entrepreneurship (billion soums)) – **Y;**

number of people engaged in small business (thousand people) – $\mathbf{X_1}$**;**

volume of investments in small business (billion soums) – $\mathbf{X_2}$**;**

Number of operating small businesses (thousand) –$\mathbf{X_3}$**;**

value of fixed assets in small business (billion soums)– $\mathbf{X_4}$**.**

During the period 2000–2019, the share of CBT in GNP in Navoi region decreased from 21.5% in 2000 to 18.5% in 2005, and increased to 41.8% in 2016. The volume of goods and services created by KBXT

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was calculated based on this indicator (Table 1).

Table 1

Dynamics of key indicators of small business and private entrepreneurship in Navoi region [1]

Years	Gross regional product, billion soums	Share of small business in the gross regional product,%	Volume of products and services created in the field of small business and private entrepreneurship, billion soums	Number of people engaged in small business, thousand people	The volume of investments in small business, billion soums	Number of operating small businesses, pcs	The value of fixed assets in small business, billion soums
	Z		Y	X_1	X_2	X_3	X_4
2000	146,8	21,5	31,562	115,4	1,5	3180	4,1
2001	225,1	22,7	51,098	133,4	3,2	3902	6,5
2002	380,9	22,3	84,941	143,5	9,6	4448	11,2
2003	549,0	20,0	109,800	159,4	13,4	3668	17,3
2004	702,5	20,8	146,120	180,0	14,1	3161	29,8
2005	1099,4	18,5	203,389	196,2	21,9	3215	45,9
2006	1578,4	19,3	304,631	201,0	28,1	3529	78,5
2007	1887,6	25,6	483,226	214,1	39,9	3955	135,6
2008	2691,8	29,1	783,314	219,5	54,4	4530	234,3
2009	3029,0	31,2	945,048	224,9	108,8	5253	262,4
2010	3836,2	34,4	1319,653	227,5	215,9	5438	337,6
2011	4562,2	35,9	1637,830	231,5	308,8	5986	400,5
2012	5603,5	35,7	2000,450	246,0	374,2	6047	486,9
2013	6587,3	36,1	2378,015	249,1	402,2	6219	599,0
2014	7931,3	36,9	2926,650	253,1	446,1	6309	739,8
2015	9105,3	40,5	3687,647	254,0	599,8	6728	1007,0
2016	10198,7	41,8	4263,057	254,5	657,4	6959	1185,2
2017	14232,2	41,0	5835,202	250,6	1032,4	7569	1521,7
2018	22132,2	41,0	9074,202	229,3	1514,0	9104	2370,0
2019	36685,2	31,3	11482,468	224,8	3432,3	14885	3141,7

In order to make the indicators more reliable in determining and forecasting the dependence of the volume of goods and services created by the IBRD on GRP, it is expedient to calculate all monetary

[1] Compiled by the author on the basis of data from the Navoi regional department of statistics

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indicators in 2019 prices.

Using the GRP growth indicators of Navoi region, the indicators from 2000 to 2018 were determined by multiplying the base price index for 2019. These data are presented in Table 2 below [1].

Table 2

Dynamics of key indicators of small business and private entrepreneurship in Navoi region (comparable prices in 2019)[2]

years	Gross regional product, bln. sum	The volume of products and services created in the field of small business and private entrepreneurship, billion soums	Number of people engaged in small business, thousand people	The volume of investments in small business, bln. sum	Number of operating small businesses, pcs	The value of fixed assets in small business, mlrd sum
	Z	**Y**	**X_1**	**X_2**	**X_3**	**X_4**
2000	16749,9	3601,2	115,4	171,2	3180,0	467,8
2001	16990,5	3856,9	133,4	241,5	3902,0	490,6
2002	17784,2	3965,9	143,5	448,2	4448,0	522,9
2003	18117,0	3623,4	159,4	442,2	3668,0	570,9
2004	19262,6	4006,6	180,0	386,6	3161,0	817,1
2005	19690,3	3642,7	196,2	392,2	3215,0	822,1
2006	20787,5	4012,0	201,0	370,1	3529,0	1033,8
2007	21669,6	5547,4	214,1	458,1	3955,0	1556,7
2008	22745,7	6619,0	219,5	459,7	4530,0	1979,8
2009	23565,6	7352,5	224,9	846,5	5253,0	2041,5
2010	24666,8	8485,4	227,5	1388,2	5438,0	2170,8
2011	26643,2	9564,9	231,5	1803,4	5986,0	2338,9
2012	28017,5	10002,3	246,0	1871,0	6047,0	2434,5
2013	29247,6	10558,4	249,1	1785,8	6219,0	2659,6
2014	30932,1	11413,9	253,1	1739,8	6309,0	2885,2
2015	32141,7	13017,4	254,0	2117,3	6728,0	3554,7
2016	33247,8	13897,6	254,5	2143,1	6959,0	3863,8
2017	33730,3	13829,4	250,6	2446,8	7569,0	3606,4
2018	35411,5	14518,7	229,3	2422,4	9104,0	3792,0
2019	36685,2	11482,5	224,8	3432,3	14885,0	3141,7

We evaluate the results by the following evaluation criteria:

We found it necessary to use a regression model in assessing the development of the gross

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regional product. In doing so, we created regression models in n-exponent and linear view. To do this, we used the least squares method in generating process regression models.

Fisher's F-criterion is used to assess the "significance" of the regression equation.

The assessment of the statistical significance of the parameters of the regression equation can also be done using the Student-t criterion (when the number of degrees of freedom is n-2 and the table values of the sign t are found in the Student's distribution table) [2].

We defined the volume of small business and private entrepreneurship products as Y, and created trend models by relating the values obtained from the observations to the time factor t. Based on the statistical data (2000 - 2019) (Table 2), trend models of several variants of KBXT product volume were created and evaluated by evaluation criteria and optimal models were selected. The results obtained by analyzing the process are presented in Table 3.

Table 3[3]

Variable	Model coefficients	Default errors	t- Student measurement	P-value
Y	1,598199	0,099324	16,09071	0,0000
C	12379,16	897,3738	13,79487	0,0000
R2-Determination coefficient	0,934997	The average value of the dependent variable		25404,33
Flattened R2-Determination coefficient	0,931386	The standard deviation of the dependent variable		6612,654
Standard error of regression	1732,138	Akayke's information model		17,84674
The sum of the squares of the remains	54005460	Schwartz's information model		17,94631
The value of the maximum similarity function	-176,4674	Hannan-Quinn criterion		17,86618
F - Fisher criterion	258,9109	DW-Darbin-Watson criterion		0,872556
Probe (F - Fisher criterion)	0,000000			

The analysis of the results obtained in Table 3 shows that the coefficient of determination in the regression model of the process of development of the gross regional product of the region is R2 = 0.9349; Fhisob = 258.91; (when, Fjad = 2.17). When we compared each coefficient on the student criterion, it was found that the calculated values were greater than the table value. Therefore, we have chosen the following regression model as adequate:

Z=12379,16+1,598*Y; (7)

t (13,794) (16,090)

The main factors influencing the growth of products and services in the field of small business and private entrepreneurship in Navoi region were: the number of people engaged in small business, the volume of investments in small business, the number of operating small businesses, the value of fixed assets in small business. Through these factors, we set the goal of constructing a multivariate regression model.

One of the basic rules of multivariate regression modeling is to determine the bond densities between the factors selected for the model, i.e. to investigate the problem of multicollenearity of the relationship between the selected factors [3].

[3] Developed by the author.

The correlation matrix between the influencing factors for the outcome factor was calculated in Eviews 9. We conduct an autocorrelation analysis to determine if there is no multicollenity between these factors (Table 4).

In order to create a multifactorial empirical model of the factors influencing the growth of products and services created in the field of small business and private entrepreneurship in Navoi region, all of the above factors are taken and their behavior in the model is examined [4].

Table 4. Correlation matrix between factors influencing the growth of products and services created in the field of small business and private entrepreneurship

	Y	X_1	X_2	X_3	X_4
Y	15206300				
Correlation	1,000000				
SSCP	3,04E+08				
t-Statistic	-----				
Probability	-----				
X_1	133183,7	1745,193			
Correlation	0,817556	1,000000			
SSCP	2663674,	34903,86			
t-Statistic	6,023447	-----			
Probability	0,0000	-----			
X_2	3334274,	28120,07	874834,5		
Correlation	0,914169	0,719667	1,000000		
SSCP	66685487	562401,4	17496689		
t-Statistic	9,568663	4,397530	-----		
Probability	0,0000	0,0003	-----		
X_3	7517607,	55330,30	2254928,	7011282,	
Correlation	0,728063	0,500199	0,910481	1,000000	
SSCP	1,50E+08	1106606,	45098566	1,40E+08	
t-Statistic	4,506004	2,450788	9,340694	-----	
Probability	0,0003	0,0247	0,0000	-----	
X_4	4494953,	42388,40	976412,4	2237490,	1363918,
Correlation	0,987005	0,868823	0,893874	0,723550	1,000000
SSCP	89899063	847768,0	19528249	44749808	27278354
t-Statistic	26,05953	7,444823	8,459136	4,447175	-----
Probability	0,0000	0,0000	0,0000	0,0003	-----

We use the least squares method to create and analyze an econometric model between the volume of products and services created in small business and private entrepreneurship and the factors that affect them.

In order to have multi-factor empirical models of the processes, several options were calculated in the Eviews 9 program and appropriate results were obtained. Table 5 constructs an empirical model for the growth of KBXT output and shows the importance of this model and its parameters using the criteria used in the evaluation [5].

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It was found that the value of the DW criterion, which is the construction of a regression model for the growth of products and services in the field of small business and private entrepreneurship in Navoi region, is higher than the table value. If there is no autocorrelation in the residuals of the resulting factor, then the value of the calculated DW criterion will be around 2. The value of the DW criterion calculated in this example is 1.6. This indicates that there is no autocorrelation from the resulting factor residues.

Table 5

Construction of a regression model of the volume of products and services created in the field of small business and private entrepreneurship

Related variable: Y				
Method: The smallest squares method				
Row: 2000 - 2019				
Number of rows: 20				
Differences	Model coefficients	Standard error	t-Student measure	P-value
X_1	-19,14988	4,123628	-4,643940	0,0003
X_2	2,053966	0,360250	5,701495	0,0000
X_3	-0,439996	0,086200	-5,104334	0,0001
X_4	3,142165	0,220159	14,27223	0,0000
C	5681,322	741,5962	7,660936	0,0000
R^2- Determination coefficient	0,993944	The average value of the dependent variable		8149,905
Flattened R2-Determination coefficient	0,992329	The standard deviation of the dependent variable		4000,829
Standard error of regression	350,4207	Akayke's information model		14,76846
The sum of the squares of the remains	1841920,	Schwartz's information model		15,01740
The value of the maximum similarity function	-142,6846	Hannan-Quinn criterion		14,81706
F - Fisher criterion	615,4260	DW-Darbin-Watson criterion		1,601114
Probe (F - Fisher criterion)	0,000000			

$$\underset{t}{Y =} \underset{(7,660)}{5681,322} \underset{(-4,643)}{-19,150 * X_1} + \underset{(5,701)}{2,054 * X_2} \underset{(-5,104)}{-0,440 * X_3} + \underset{(14,272)}{3,142 * X_4}, \quad (17)$$

Typically, the determination coefficient [0; 1] takes values at the intersection. The closer the value of the coefficient is to 1, the stronger the correlation. In this case, the fact that the coefficient of determination is equal to 0.999 indicates that there is a strong enough correlation between these economic indicators in the model.

We use Fisher's F-criterion to determine the statistical significance of the constructed multifactor econometric model and its relevance to the process under study.

[4]Developed by the author.

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Table value of F-criterion is equal $F_{жадвал}$=4,6777.

$F_{ҳисоб}>>F_{жадвал}$ satisfies the condition, which is statistically significant because the calculated value of the F-criterion is greater than the value in the table, which can be used to forecast the volume of products and services created by small business and private entrepreneurship in future periods.

The Student's t-criterion is used to check the reliability of the parameters and correlation coefficients of the multifactor econometric model (17). In this case, their values are compared with the values of random errors[5].

The t-criterion of the student was calculated ($t_{ҳисоб}$) and table ($t_{жадвал}$) make comparisons H_0 accept or reject the hypothesis. To do this, the table value of the t-criterion is the probability of the selected reliability (α) and degree of freedom ($\text{d.f.} = n - m - 1$) based on the conditions. Here n – number of observations; m – number of factors [2].

Ишончлилик эҳтимоли $\alpha = 0{,}05$ and the table value of the t-meson when the degree of freedom is d.f. = 20-4-1 = 15 is equal $t_{жадвал}$=2,1448.

For the calculated parameters of the multifactor econometric model in terms of the volume of goods and services created in small business and private entrepreneurship $|t_{ҳисоб}| \gg t_{жад}$ the condition must be satisfied.

We use the Darbin-Watson (DW) meson to test the autocorrelation in the remainder of the resultant factor in model (17). The calculated DW is compared to the DW in the table.

If there is no autocorrelation in the remainder of the resulting factor, then the value of the calculated DW meson is around 2. The value of the DW meson calculated in this model is 1.60 ha. This indicates that there is no autocorrelation from the residual factor.

The parameters taken into account in the built models (for linear regression equations) consist of various indicators. Therefore, it is necessary to calculate the coefficients of elasticity in the analysis. In the analysis of the model constructed in Table 6, we calculated the coefficients of elasticity.

Table 6.[6]

difference	Coefficient model	Standard Stylized Ratio	Coefficient of elasticity
X_1	-19,14988	4,123628	-0,494355
X_2	2,053966	0,360250	0,319646
X_3	-0,439996	0,086200	-0,307960
X_4	3,142165	0,220159	0,785566
C	5681,322	741,5962	0,697103

The effect of the parameters of the model on the final result is given in Table 6, according to which the number of people engaged in small business (X1) increased by 1%, the volume of products and services in small business and private entrepreneurship decreased by (Y) -0.4%; If the volume of investments in business (X2) increases by 1%, the volume of products and services created in the field of small business and private entrepreneurship (Y) increases by 0.32%, the number of operating small businesses (X3) increases by 1%. A decrease of 0.32% and an increase in the value of fixed assets (X4)

[5]Econometrics: Textbook. / Pod red. I.I.Eliseevoy. - M .: Finance and Statistics, 2003. - 51-53 p.:

[6]The result obtained by the author using Eviews9.

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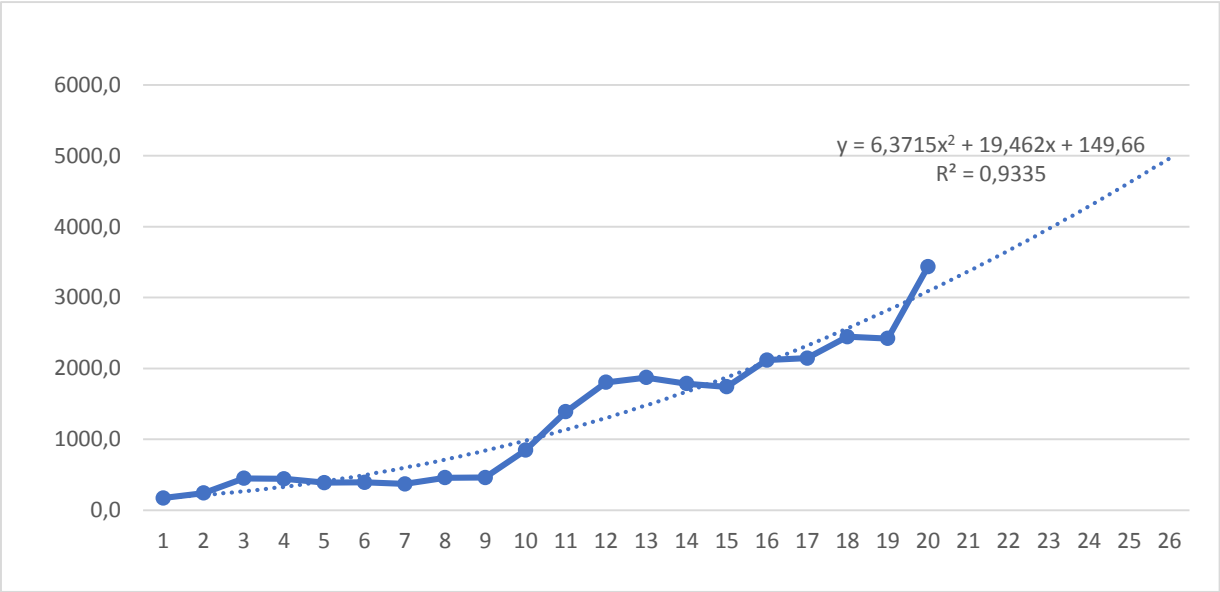
in small business by 1%, an increase in the volume of products and services created in the field of small business and private entrepreneurship (Y) by 0.79%.

The built-in models developed a forecast version of Table 7 in terms of the volume of products and factors influencing it.

MS Excel was used to determine the trend equations of the variables X1, X2, X3, X4 in the model to develop forecast options. The following are trend time equations for each factor:

Number of items in small business and entrepreneurship in Navoi region,X_1:

$$X_1 = 50{,}567 * \ln(t) + 103{,}35 ; \quad R^2=0{,}9194. \tag{22}$$



Volume of investments in fixed capital of small business and private entrepreneurship of Navoi regionX_2:

$$X_2 = 6{,}3715 * t^2 + 19{,}462 * t + 149{,}66; \quad R^2=0{,}9335. \tag{23}$$

Number of CBT subjects in Navoi region,X_3:

$$X_3 = 34{,}286 * t^2 - 343{,}06 * t + 4386{,}3; \quad R^2=0{,}8211. \tag{24}$$

2- picture. Value of fixed assets of small business and private enterprises of Navoi region (billion soums)

The value of fixed assets of small business entities, X_4:

$X_4 = 196{,}73 * t - 28{,}072$; R^2=0,9435. (25)

Trends defined in this MS Excel program and in Eviews 9, based on regression equations of models (7) and (17) tested in different statistical significance criteria Table 7).

Table 7. Forecast of small business and private entrepreneurship activity and factors influencing it in Navoi region [7]

year	Gross regional product, billion soums	Volume of products and services created in the field of small business and private entrepreneurship, billion soums	In the small business, there are thousands and thousands of people	Investments in small businesses amount to $ 1 billion. sum	The number of operating small businesses, quantity	Value of fixed assets in small business, bln. sum
	Z	Y	X_1	X_2	X_3	X_4
2019 real	36685,2	11482,468	224,8	3432,3	14885	3141,7
2020	36573,7	15140,5	257,9	3368,2	12302	4103,3
2021	37656,9	15818,4	260,3	3661,6	13433	4300,0
2022	38737,0	16494,3	262,5	3967,8	14633	4496,7
2023	39813,6	17168,0	264,7	4286,7	15902	4693,4
2024	40886,5	17839,4	266,7	4618,4	17239	4890,2
2025	41955,6	18508,4	268,7	4962,8	18644	5086,9

In Navoi region, the gross regional product will reach 41 trillion by 2025. 955 billion 600

[7] Calculated by the author

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million soums (in 2019 prices), or 153% more than in 2019.

Based on our scientific research, by 2025 the number of CB entities in Navoi region will reach 18,644, and the volume of investments in fixed assets will reach 4 trillion. 962 billion soums and 5 trillion soums of fixed assets. 86 billion It is expected that it will be UZS.

References:

1. Bakoev HN Assessing the effectiveness of small businesses in Navoi region using the method of multifactor indices. // Scientific electronic journal "Statistical Bulletin of Uzbekistan" of the State Statistics Committee. – Tashkent, 2020. - № 1. (http://www.statmirror.uz)
2. Econometrics: Textbook. / Under the editor. II Eliseeva. - M .: Finance and Statistics, 2003. - pp. 51-53:
3. Dimitrios Asteriou and Stephen G. Hall. Applied econometrics. A modern approach using Eviews and Microfit. Revised edition. Palgrave Macmillan, New York, 2007. – p.140-143.
4. Bakoev Kh.N. Econometric assessment of the innovative potential of small businesses. // International Scientific Journal Theoretical & Applied Science, Year: 2020 Issue: 01 Volume: 81, Philadelphia, USA (Global Impact Factor 2015: 0,546; International Society for Research Activity 2019: 4,971; Open Academic Journals Index 2019: 0,350).
5. Bakaev H.N. Main economics of small business in Uzbekistan statistical analysis of indicators. //American Journal of Economics and Business Management, Vol. 3, No.1, Jan-Feb 2020, USA, DOI 10.31150/ (Scientific Journal Impact Factor 2019: 4,986).

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