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Impact Analysis of Investment Attractiveness of the Republic of Tatarstan on Fixed Investments of its Leading Companies

Irina Glebova, Ruslan Sadyrtdinov and Dmitry Rodnyansky

Kazan (Volga Region) Federal University, Kazan, Russia

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Abstract: This article presents the impact analysis of investment attractiveness of the Republic of Tatarstan on fixed investments of eight national leading companies. The authors have developed the impact assessment methodology. Using correlation and regression analysis, the authors revealed a statistically significant dependences and character of the relationship between the regressors and the dependent variable. The obtained results allow one to range the investment attractiveness of Tatarstan according to their impact on fixed investments of the leading national companies and offer recommendations to improve the investment attractiveness of the Republic of Tatarstan for balanced territorial development.

Key words: Investment attractiveness · Fixed investments · Territorial development · Region · The Republic of Tatarstan

INTRODUCTION

The fixed investments of the leading resident companies become important under the conditions of volatility in global financial markets. To create favorable conditions, the state needs to know what factors of investment attractiveness of the region have a significant impact on the investment activity of the companies. In present-day Russia, the encouragement of domestic investments is of particular importance due to the slowdown in nationwide economic growth over the recent years.

Literature Review: In the economic literature, there are different points of view concerning the main factors contributing to the advancement of investment attractiveness of the region and the territorial development. Thus, direct foreign investments in the real estate sector are considered as the main critical engine of the tourism development in the United Arab Emirates [1]. Direct foreign investments are an important factor to intensify territorial development, because in addition to increasing the GRP, they contribute to the growth of the regional local investments [2].

In another approach of distinguishing the main factors of territorial development, the regional marketing tools highlighting the advantages of a particular region, are the critical elements of the territorial development [3].

New knowledge, technologies and concepts, i.e. innovative products and ideas are also considered as a driving force of territorial development [4]. Some economists consider the agglomeration and integration processes as the dominant factors affecting and altering the process of territorial development [5, 6].

While acknowledging the validity of the territorial development factors described above, in this study the fixed investment of the regional companies was considered as the dominant factor, as well as its relationship with the level of investment attractiveness of the region.

The Research Methodology: It seems appropriate to examine the companies that specify the intensity of investment processes not only in their industries but in the regional economy as a whole. For this purpose, eight companies were selected, representing three core economy sectors of the Republic of Tatarstan: chemical industry (JSC "Nizhnekamskneftekhim", JSC "Nizhnekamskshina", JSC "Nafis Cosmetics", JSC "QUART" and JSC "Kazan Synthetic Rubber Plant"), engineering industry (JSC "KAMAZ" and JSC "Kazan Helicopter Plant") and petroleum refining industry (JSC "TAIF-NK").

Corresponding Author: Ruslan Sadyrtdinov, Kazan (Volga region) Federal University Kremlevskaya Str., Kazan, 420008, Russia

Table 1: Independent variables (regressors)

	Indicator Name	Factor name
X_1	Tax quota in the Gross Regional Product (GRP), %	Economic
X_2	Employment rate, %	Economic
X_3	Consumer Price Index, %	Economic
X_4	Depreciation of fixed assets at the end of the year, %	Economic
X_5	Number of companies with foreign participation, items	Institutional
X_6	Number of organizations engaged in R&D, items	Innovative
X_7	Average weighted rate on ruble loans to non-financial organizations, %	Financial
X_8	Total retail deposits at institutions of "Tatarstan" Bank of the RF Sberbank, mln rubles	Consumption potential
X_9	Share of the population with incomes above the regional minimum cost of living, %	Consumption potential
X_{10}	Administrative leverage	
X_{11}	Density of hard-surface public roads per 1000 sq. km., km	Infrastructure
X_{12}	Density of public railways per 1000 sq. km., km	Infrastructure
X_{13}	Total exports as a share of GRP, %	Economic
X_{14}	Share of R&D costs in GRP, %	Innovative
X_{15}	Cash income per capita, ruble	Consumption potential

Table 2: Correlation matrix

	Y							
Regressor	JSC "TAIF-NK").	JSC "KAMAZ"	JSC "Nizhnekamskneftekhim"	JSC "Nizhnekamskshina"	JSC "Kazan Helicopter Plant"	JSC "Nafis Cosmetics"	JSC "QUART"	JSC "Kazan Synthetic Rubber Plant"
X_1	0.32	0.33	0.63	-*	-*	0.98	0.94	-*
X_2	0.37	0.73	-*	-*	0.85	-*	-*	0.53
X_3	-*	-*	0.55	-*	-0.62	0.89	0.72	-0.81
X_4	0.42	-0.56	-*	0.71	-*	0.27	-*	-*
X_5	-*	0.73	-0.35	-*	0.93	-*	-*	0.61
X_6	-*	0.88	-*	-*	-0.85	0.31	-*	-0.44
X_7	-0.29	-0.48	-*	0.7	-*	-*	-*	-*
X_8	0.24	0.6	-0.49	0.33	0.96	-*	-*	0.7
X_9	-*	0.52	-0.43	0.58	0.67	-*	-*	0.61
X_{10}	0.18	0.53	-*	0.49	0.77	0.37	-0.30	-0.38
X_{11}	0.26	0.53	-0.43	0.52	0.84	-*	-*	0.55
X_{12}	-*	-*	0.81	-0.43	-*	-*	0.50	-*
X_{13}	0.5	0.57	0.37	-*	0.45	-*	0.65	-*
X_{14}	-*	-*	-*	-0.61	0.4	-*	-0.43	0.53
X_{15}	0.31	0.55	-0.51	0.33	0.96	-*	-*	0.75

* - No linear relationship

Fixed investment of each company was considered as dependent variable (Y). Fourteen parameters indicating the economic, infrastructure, innovation and institutional factors of the investment attractiveness of the Republic of Tatarstan, as well as the consumption potential of its population, were used as independent variables. To reflect the affiliation of a number of companies with the state, a dummy variable namely "administrative leverage" was introduced. The analysis of the corporate property structure revealed that JSC "QUART" and JSC "Kazan Synthetic Rubber Plant" do not have the administrative leverage, while the rest of the companies do (Table 1).

The data used by the authors is drawn from statistical yearbooks of Republic of Tatarstan for the period 2008-2011 [7-10].

Empirical Research: Basic Results: Let's conduct the analysis on the impact of investment attractiveness on the investment activities of selected companies. At the first stage of the study, using the STATISTICA software package, we define the availability of dependence, identify the character of the relationship between the regressors and the dependent variable and exclude those variables that do not meet the assumption on linearity in concerned correlation. A following correlation matrix was constructed as a result of analysis performed (Table 2).

As it is obvious from Table 2, the level of investment activity of JSC "TAIF-NK" correlates with the share of exports in the GRP (average direct correlation). The tax burden, depreciation of fixed assets, the employment rate of the population and the income per capita shows a

Table 3: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(1)	p-level
Intercept			-175244235	15613157	-11.2241	0.056569
x1	-2.82587	0.203276	-535	38	-13.9017	0.045716
x2	8.77551	0.872076	2387055	237216	10.0628	0.063058
x4	2.58579	0.165958	877092	56293	15.5809	0.040803
x13	-0.49185	0.235701	-35598	17059	-2.0867	0.284494
x15	-7.07038	0.663274	-715	67	-10.6598	0.059547

Table 4: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(1)	p-level
Intercept			-20068211	782788,3	-25. 637	0.024820
x2	0.96517	0.033564	411303	14303.1	28.756	0.022130
x5	3.44163	0.024660	-13378	95.9	139.563	0.004561
x6	-0.33456	0.004030	19708	237.4	-83.017	0.007668
x8	-3.65029	0.014340	-161	0.6	-254.552	0.002501
x13	-0.53733	0.013933	-60926	1579.8	-38.567	0.016503

reasonable relationship with the fixed investments. Correlation between the interest rate, the total retail deposits in commercial banks, the density of roads and the dependent variable is weak. The explanatory variables, that have the strongest correlation with Y, were selected for the regression model (Table 3) to construct the regression equation using the STATISTICA software package.

$$Y=-175244235-535X_1+877092X_4 \quad (1)$$

Determination factor (R^2=99%) shows the high quality of the model. For JSC "TAIF-NK", increasing the tax burden leads to reduction in fixed investments, the increase in depreciation of fixed assets increases the dependent variable. At that, the depreciation of fixed assets has a much greater impact on fixed investments than the tax burden of the company.

Fixed investments of JSC "KAMAZ" are in a strong correlation with the employment rate, a percentage of foreign companies and a number of organizations involved in R&D. The average dependence is observed between Y and the depreciation of fixed assets, proportion of people with cost of living higher than regional living wage, the density of roads, the share of exports in the GRP and per capita income. Moderate correlation with the dependent variable is typical for the tax burden of a company, interest rate and share of R&D costs in the GRP. Let us select the variables that have the strongest relationship with Y (Table 4) and construct a multiple regression equation.

$$Y=-20068211+411303X_2-13378X_5+19708X_6-161X_8-60926X_{13} \quad (2)$$

Determination factor is R_2=99%, i.e. the quality of the derived equation is highly reliable. An employment rate has the greatest impact on fixed investments of JSC "KAMAZ". The percentage of foreign organizations in the Republic of Tatarstan is the second important factor. The least significant variable is a number of organizations involved in R&D.

For the JSC "Nizhnekamskneftekhim", fixed investments have a strong correlation with the density of railway networks, the average relationship with per capita income, the consumer price index and the tax burden. Moderate relationship is observed between the variable Y, a number of foreign companies and the share of exports in the GRP. Let us construct a regression equation considering only pronounced linear dependences (Table 5).

$$Y=- 474959440+505X_1+4117351X_{12} \quad (3)$$

Fixed investments are 87% accounted for these three factors (R_2=87%). The greatest effect on fixed investments of JSC "Nizhnekamskneftekhim" is caused by density of railway networks. Tax burden has a much smaller effect.

For JSC "Nizhnekamskshina" there is strong relationship between the fixed investments and depreciation of fixed assets, as well as the interest rate on credit. The average correlation is observed with the proportion of the population having incomes above the regional minimum cost of living, the density of roads and the share of spending on R&D in the GRP. Moderate relationship with the dependent variable is typical for the total retail deposits in commercial banks, administrative

Table 5: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(3)	p-level
Intercept			-474959440	142879774	-3.32419	0.044913
x1	0.595369	0.260198	505	221	2.28814	0.010618
x3	-0.380106	0.326157	-431944	370638	-1.16541	0.328091
x12	0.874402	0.273080	4117351	1285867	3.20200	0.049256

Table 6: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(3)	p-level
Intercept			-3282856	806286.1	-4.07158	0.026735
x7	0.421646	0.132252	25246	7918.6	3.18820	0.049780
x9	0.626965	0.115268	48052	8834.3	5.43922	0.012201
x14	-0.486573	0.133268	-1677755	459521.5	-3.65109	0.035465

Table 7: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(3)	p-level
Intercept			1234470	294488.1	4.19192	0.024758
x5	1.09475	0.259458	-2231	528.8	-4.21937	0.024334
x6	-0.57890	0.098760	-17880	3050.3	-5.86169	0.009901
x15	1.58527	0.208347	132	17.3	7.60884	0.004711

leverage, density of railway networks and per capita income. We select the variables that have the strongest correlation with Y (Table 6) and construct a multiple regression equation.

$$Y=-3282856+25246X_7+48052X_9-1677755X_{14} \quad (4)$$

Fixed investments are 96% accounted for these three factors (R^2=96%). The greatest impact on investment activity of JSC "Nizhnekamskshina" is due to the proportion of people with incomes above the minimum cost of living. The interest rate on credit is another factor affecting Y variable.

Correlation analysis for JSC "Kazan Helicopter Plant" has shown a strong relationship between the dependent variable and the employment rate, a number of companies with foreign participation, a number of organizations engaged in R&D, the total retail deposits in commercial banks, the availability of administrative leverage, the density of roads and railways and the income per capita. The average correlation is observed with the consumer price index and the proportion of people with incomes above the minimum cost of living. Moderate dependence is shown between the Y and the share of R&D costs in GRP, as well as the share of exports in the GRP. Multiple regression equation (5) is constructed based on the following calculated values (Table 7).

$$Y=- 1234470+2231X_5-17880X_6+132X_{15} \quad (5)$$

Quality of the model (5) is high (R^2=99.4%). Factors impacting the fixed investments of "Kazan Helicopter Plant" are distributed beginning with the largest value as follows: the average income of the population, a number of companies with foreign participation and a number of organizations engaged in R&D.

Based on the calculated correlation coefficients for JSC "Nafis Cosmetics", a strong direct correlation was revealed between fixed investments and the tax burden, as well as the consumer price index. Moderate direct relationship is between the dependent variable and a number of organizations involved in R&D and administrative leverage. Depreciation of fixed assets has little direct relationship with the dependent parameter. According to data presented in Table 8, we plot a multiple regression equation (6).

$$Y=- 208764+20X_1+111X_3+432X_4+54X_6+472114X_{10} \quad (6)$$

Model is characterized by high quality, as the determination coefficient is close to unity. Factors impacting the fixed investments of "Nafis Cosmetics" are distributed beginning with the largest value as follows: depreciation of fixed assets, the consumer price index, the tax burden, a number of organizations involved in R&D, the lack of administrative leverage.

Fixed investments of JSC "QUART" have strong direct correlation with the tax burden and the consumer price index. Density of railway networks and the share of

Table 8: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(1)	p-level
Intercept			208764	331.1312	630.46	0.001010
x1	1.113738	0.000035	20	0.0006	31780.20	0.000020
x3	0.000682	0.000024	111	3.8939	28.56	0.022282
x4	0.001981	0.000021	432	4.6145	93.60	0.006801
x6	0.002242	0.000023	-54	0.5525	-98.07	0.006491
x10	0.247164	0.000034	-472114	65.8975	-7164.37	0.000089

Table 9: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(1)	p-level
Intercept			-4287003	183580.4	-23.3522	0.027245
x1	0.671176	0.023359	11	0.4	28.7327	0.022148
x3	-0.272126	0.044177	-6161	1000.1	-6.1598	0.102456
x12	0.434852	0.022695	40793	2129.0	19.1604	0.033196
x13	0.300301	0.017688	1941	114.3	16.9777	0.037454
x14	-0.348691	0.029583	-469862	39862.9	-11.7869	0.053882

Table 10: The results of the regression analysis

	Beta	Std.Err.	B	Std.Err.	t(4)	p-level
Intercept			500873.9	180554.5	2.77409	0.050121
x3	-0.591616	0.214357	-4489.8	1626.8	-2.75996	0.050852
x15	0.495434	0.214357	1.5	0.6	2.31125	0.081919

exports in the GRP reveal average relationship with the dependent variable. Moderate relationship is observed with the share of R&D costs in GRP and administrative leverage. Selecting independent variables given in Table 9, we derive a multiple regression equation (7).

$$Y=-\ 4287003+11X_1+40793X_{12}+1941X_{13} \quad (7)$$

Here R^2=99%, i.e. fixed investments are 99% accounted exactly for these three indicators. Factors affecting the fixed investments of JSC "QUART" are distributed beginning with the largest value as follows: density of railway networks, the share of exports in GDP and the tax burden.

Investment activity of JSC "Kazan Synthetic Rubber Plant" demonstrates a strong relationship with the consumer price index, the total retail deposits in commercial banks, the density of railway networks and the income per capita. Employment, the proportion of people with incomes above the regional minimum cost of living, the density of roads, the share of R&D costs in GRP and the percentage of organizations with foreign participation have average correlation with Y. Moderate correlation shows up between the dependent variable and a number of organizations involved in R&D, as well as administrative leverage. Selecting independent variables from Table 10, we derive a multiple regression equation (8).

$$Y=-\ 500873.9-4489.8X_3+1.5X_{15} \quad (8)$$

Here R^2=85%, i.e. fixed investments of JSC "Kazan Synthetic Rubber Plant" are 85% accounted for two indicators: per capita income and the consumer price index are the factors that affect fixed investments of this company.

CONCLUSION

Conducted impact analysis has revealed the effect of several factors of investment attractiveness of the Republic of Tatarstan on fixed investments of eight companies studied. The tax burden has an adverse effect on fixed investments of four companies (JSC "TAIF-NK", JSC" Nizhnekamskneftekhim", JSC "Nafis Cosmetics" and JSC "QUART"). A number of organizations involved in R&D are important to the JSC "Nafis Cosmetics", JSC "Kazan Helicopter Plant" and JSC "KAMAZ". The investment activity of companies such as JSC "Nizhnekamskshina", JSC "Kazan Helicopter Plant", JSC "KAMAZ", JSC "Kazan Synthetic Rubber Plant" and JSC "Nafis Cosmetics" depends on the financial and economic indicators. A number of companies with foreign participation are significant for fixed investments of JSC "KAMAZ" and JSC "Kazan Helicopter Plant". The share of exports in the GRP seems to be important for the investment activity of JSC "QUART", JSC "KAMAZ"

and JSC "TAIF-NK". The density of roads and the railway networks have the greatest effect on fixed investments of JSC "Nizhnekamskneftekhim" and JSC "QUART". The lack of administrative leverage adversely affects the investment activities of "Nafis Cosmetics". Among the companies having the administrative leverage, JSC "Kazan Helicopter Plant" stands aside and has strong correlation coefficient.

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