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**The role of investment in transitive economy conditions**

*Development of the modern economy provides for investment of the economy entity to the activity. Investment allows economy entity to reach advantages before competitors, to realize capacity and as a result to realize strategic objective etc. Main parameters that characterize investment activity are: the quantity of occupied with researching activity; internal expenses to researching activity; expenses of technological innovation; the quantity of organizations who takes a part in investment activity; scale of works realized independently; investment to the main capital; the quantity of elaboration and new used technologies. Nowadays is very important to invest not only science innovation, but the elaboration too, the main and humanity capitals. Today there are some disproportions in investment process. Investors try to realize projects on the territory with developed infrastructure, full of natural resources, thereby minimize investment risks.*

**Роль инвестиций в условиях транзитивной экономики**

*Развитие современной экономики предусматривает инвестиционные вливания хозяйствующих субъектов в свою деятельность. Инвестиции позволяют достичь хозяйствующим субъектам преимущества перед конкурентами, реализовать имеющийся потенциал и, в итоге, осуществить стратегические и иные цели. В качестве параметров, характеризующих инвестиционную деятельность, выступают: количество занятых исследовательской деятельностью; внутренние расходы на исследовательскую деятельность; затраты, связанные с технологическими инновациями; количество организаций, участвующих в инвестиционной деятельности; масштаб работ, осуществлённых самостоятельно; инвестиции в основной капитал; количество разработанных и применённых новейших технологий. Сегодня важно инвестировать не только в научные исследования и разработки, основной капитал, но и в человеческий капитал. В настоящее время существуют определённые диспропорции в инвестиционном процессе. Инвесторы стараются реализовывать проекты на территориях с развитой инфраструктурой, богатых природными ресурсами, тем самым минимизируя риски вложений.*

***Keywords****: investment, economy entity, GDP, factor analysis, forecasting.*

***Ключевые слова:*** *инвестиции, хозяйствующий субъект, валовый внутренний продукт (далее – ВВП), факторный анализ, прогнозирование.*

Development of the modern economy provides for investment of economy the entity to their activity.

Current trend of the capital movement show bigger non-financial sector dependence of external formation source, institutional investors, financial service and instruments [1]. Activity of the enterprises (clients of the credit organization) is like an activity for production and goods realization, labor and service, activity of creation, purchase and realization of investment actives, accumulation of necessary resources. Implementation forms enterprises necessary for resources and services, in accordance to this necessary, they show demand on the market. Enterprises can provide themselves with the necessary financial resources and service to get it in credit organizations and also involve it from other sources.

For definition influences of resource indicators to economic system widely use the method of the factorial analysis, the method of the main component. Methods of factorial analysis are using in the static and social researching with the main purpose to reveal more significant factors has an influence to criteria function and exception of factors that not connected with it. The method of the main component allows by way of regression lines amendments step by step on the basis of the chosen indicators correlation to mark out the main factors. Allocation of the different factors category that promote economic growth is the main purpose of the analysis allows to select a type of economical growth peculiar to economy entity are regressive models [2].

In accordance to earlier researching [3, 4, 5], as parameters that characterize investment activity may be the following: the quantity of occupied with researching activity, internal expenses to researching activity, expenses of technological innovation; independently realized labor scale; investment to the main capital; the quantity of elaboration and new used technologies;

Equation of regressive model is following:

, (1)

Where – is a GDP in a period t; – i-factor`s condition of economic entity economical growth to the end of the t period; – forecast error in a period t.

The feature of this method is restriction of used factors quantity. The quantity of k – factors included to the model limited by the k‹n/3 (n is a number of supervision). This limit is connected with calculation of dispersion mistake y (x): every additional indicator – factor included to the model increase uncertainly and inaccuracy of analysis results in a case of increase [2].

As a period of researching is 16 years (from 1998 to 20013 yy) we`ll use no more 5 factors in the calculation. As a influenced on GDP value factors we`ll regard the following: capital investment to the main capital; innovation factors (state costs for practice scientific researches; internal costs for scientific researches and developments); investment to humanity capital on the base of busy high-educated workers quantity and without it. Opportunity of using above-stated indexes as an explanatory variable is checked by pair correlation coefficient. As an effect of investment activity is not an instant, so for this factors will use 1-year time-shift. Dependent variable is GDP value, independent variable are below. All data are comparable form in 2013 year prices (table 1).

*Table 1*

**Dynamics of economic indicators for 1998-2013 yy period**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | **GDP, bn rub** | **Investment to the main capital, bn rub (X1)** | **State costs for economic scientific researches, bn rub (X2)** | **Internal costs for scientific researches and elaboration, bn rub (X3)** | **Quantity of busy high-educated , thousand peoples (X4)** | **Quantity of busy haven`t high-education, thousand peoples (X5)** |
| 1998 | 32 574,06 | 2 816,17 | 302,94 | 172,64 | 34 360,96 | 24 076,05 |
| 1999 | 34 642,88 | 2 965,43 | 367,21 | 176,68 | 38 858,51 | 24 223,49 |
| 2000 | 38 122,98 | 3 481,42 | 91,5 | 400,29 | 41 124,50 | 23 945,91 |
| 2001 | 40 063,87 | 3 888,74 | 104,17 | 472,75 | 40 701,82 | 24 421,09 |
| 2002 | 41 964,41 | 4 001,52 | 121,7 | 524,56 | 43 794,87 | 22 863,98 |
| 2003 | 45 026,07 | 4 509,71 | 139,58 | 580,84 | 43 983,03 | 22 356,38 |
| 2004 | 48 257,12 | 5 267,34 | 135,12 | 554,96 | 61 865,81 | 54 52,81 |
| 2005 | 51 334,08 | 5 804,61 | 184,8 | 549,27 | 63 418,58 | 49 20,41 |
| 2006 | 55 519,57 | 6 837,83 | 199,87 | 594,06 | 64 257,75 | 49 10,98 |
| 2007 | 60 258,21 | 8 465,23 | 241,03 | 674,89 | 66 028,69 | 47 41,61 |
| 2008 | 63 420,54 | 9 269,43 | 247,34 | 659,57 | 66 884,89 | 41 18,18 |
| 2009 | 58 460,09 | 8 018,06 | 327,38 | 730,75 | 65 939,94 | 34 70,52 |
| 2010 | 61 092,97 | 8 523,20 | 311,57 | 690,35 | 66 506,96 | 34 26,75 |
| 2011 | 63 698,09 | 9 443,70 | 356,71 | 694,31 | 67 809,78 | 30 46,83 |
| 2012 | 65 886,46 | 10 085,87 | 375,55 | 744,52 | 68 540,51 | 30 04,91 |
| 2013 | 66 755,30 | 10 065,70 | 427,23 | 754,33 | 68 535,80 | 28 55,66 |

*Source: complied by the author [7].*

Analysis of regressive model shows high narrowness connection within GDP and X1, X3, X4, X5 factors. The level is: 0.9584; 0.9112; 0.9601; -0.967. At the same time the connection of GDP and X2 factor is weak and is about 0.4136. Thus correlation coefficient between independent factors and GDP are significant, that`s why marked out factors have an influence to GDP value.

The level of regressive analysis depends of independent factors opportunity to influence for each other; ideal model assumes lack of such interaction. But in actual practice economic growth factors interact with each other directly and indirectly. That`s why influence of each factors group considered separately, and generalization will carry out by the compound formula. R-square calculation coefficient confirms high degree of the model reliability. R-square shows in how many cases Y-variability (that is GDP actual value) can explain means of forecasting X-factor meaning. If the coefficient of explained variation is more, so the regression equation is more reliable. For investment factors (X1) R-square is about 0.919. For the innovative factors (X2, X3) R-square is about 0.928. For the labor factors (X4, X5) is about 0.944.

Inspection of the Darebin – Watson statistic value first order autocorrelation for investment and innovation factors is included to the confidence interval from 0.95 to 1.54 that means lack of rests autocorrelation and further calculation reliability. Calculation meaning Darebin – Watson coefficient for the labor factors is 1.77, that included to the uncertainty zone (within the level of significance α=0.01), that there is a autocorrelation presence probability that can provide it to wrong results of further calculation in a part of absolutely growth rate. Thereof for the exception of further misstatement, use incremental value.

On a purpose of confirming factors significance and susceptibility assessment of GDP value from the model factors, the elastic calculation is carried out [2].

, (2)

Where is i – is one of the independent factors; – is a equation coefficients relevant to i-factor; – mean value of relevant factor within all period; – GDP mean value for all period.

Calculation value of elastic coefficient is: for X1 0.478; X2 0.149; X3 0.55; X4 1.691; X5 0.242. Reliability checking of this model for chosen factors shows presence of allowable level of error model percent. Model error for investment factors is 4.54%, innovation factors 3.90%, labor factor 3.94%. Error value is vary from 3.94% to 4.54% and it is allowed level and give an opportunity for further searching of GDP and factors interaction.

Let`s examine long-term growth factors that influences to GDP in more detail.

In accordance with above described method, for the similar period with a period log of 4 years (data showed for 2013 year). As a influenced on GDP value factor, can be the following: capital investment to the main capital; technological innovation costs; foreign investment (table 2). The opportunity of using factors in a model like an independent variable is checked by the pair correlation coefficient. Narrow GDP and analyzing factors connection is high (capital investment to the main capital is 0.8705; expenses for the technological innovation is 0.8459; foreign investment is 0.8554). Thus correlation coefficients between independent factors and GDP are important.

*Table 2*

**Analysis parameters**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **GDP, bn rubles** | **Investment to the main capital, bn rub** | **Expenses for the technological innovation, bn rub** | **Foreign investments, bn rub** |
| 1998 | 32 574,06 | 2 816,17 | 223,75 | 1 431,69 |
| 1999 | 34 642,88 | 2 965,43 | 210,84 | 1 699,60 |
| 2000 | 38 122,98 | 3 481,42 | 324,14 | 1 614,63 |
| 2001 | 40 063,87 | 3 888,74 | 306,99 | 1 868,93 |
| 2002 | 41 964,41 | 4 001,52 | 364,40 | 2 405,94 |
| 2003 | 45 026,07 | 4 509,71 | 467,37 | 3 105,40 |
| 2004 | 48 257,12 | 5 267,34 | 348,17 | 3 306,64 |
| 2005 | 51 334,08 | 5 804,61 | 298,55 | 3 611,81 |
| 2006 | 55 519,57 | 6 837,83 | 436,02 | 3 083,93 |
| 2007 | 60 258,21 | 8 465,23 | 424,21 | 5 598,88 |
| 2008 | 63 420,54 | 9 269,43 | 471,98 | 3 967,04 |
| 2009 | 58 460,09 | 8 018,06 | 601,25 | 3 919,27 |
| 2010 | 61 092,97 | 8 523,20 | 528,76 | 4 596,55 |
| 2011 | 63 698,09 | 9 443,70 | 835,18 | 6 376,56 |
| 2012 | 65 886,46 | 10 085,87 | 957,89 | 5 084,00 |
| 2013 | 66 755,30 | 10 065,70 | 1 112,43 | 5 430,45 |

*Source: complied by the author [7]*

R-square coefficient confirms high level of the model reliability (value 0.879). For checking first order autocorrelation used by Darebin – Watson statistic value. Elastic 1.47 coefficient value is into confidential interval from 0.66 to 1.86. Thus, autocorrelation of lack is absent. Calculate elastic coefficient that could show GDP susceptibility from the model factors. Capital investment value coefficient to the main capital is 0.046; expenses for technological innovation is 0.225; foreign investment is 0.156. Model`s error is 2.93% and it takes the opportunity for the further studying GDP and interaction factors.

Thus, using received regressive model (model 1) can do GDP rate growth forecast in accordance with changing rate.

Based on the actual data of the factors rate and 2013 year GDP value can solve the problem of necessary growth rate definition to reach GDP indicator to 2030 year, in a compliance of country development till 2030 year [8] (table 3).

*Table 3*

**GDP value forecast, bn rubles**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Период** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** |
| **Development variant 1** | | | | | | | | | | | | | | | | |
| GDP gain | 3,1% | 3,3% | 3,8% | 3,2% | 2,7% | 2,5% | 2,5% | 2,6% | 2,5% | 2,4% | 2,4% | 2,0% | 1,9% | 1,8% | 1,8% | 1,6% |
| Gain factor 1 | 11,2% | 5,2% | 5,9% | 5,0% | 4,2% | 3,7% | 3,8% | 3,8% | 3,6% | 3,5% | 3,5% | 2,7% | 2,6% | 2,5% | 2,5% | 2,2% |
| Gain factor 2 | 5,0% | 4,2% | 4,8% | 4,1% | 3,4% | 3,1% | 3,1% | 3,2% | 3,1% | 2,9% | 2,9% | 2,3% | 2,3% | 2,2% | 2,2% | 1,9% |
| Gain factor 3 | 5,0% | 4,2% | 4,8% | 4,1% | 3,4% | 3,1% | 3,1% | 3,2% | 3,1% | 2,9% | 2,9% | 2,3% | 2,3% | 2,2% | 2,2% | 1,9% |
| Gain factor 4 | 0,8% | 2,5% | 2,9% | 2,6% | 2,2% | 2,1% | 2,2% | 2,3% | 2,2% | 2,2% | 2,2% | 1,8% | 1,8% | 1,7% | 1,8% | 1,5% |
| Gain factor 5 | 0,8% | 2,5% | 2,9% | 2,6% | 2,2% | 2,1% | 2,2% | 2,3% | 2,2% | 2,2% | 2,2% | 1,8% | 1,8% | 1,7% | 1,8% | 1,5% |
| GDP gain, investment factor | 5,4% | 2,5% | 2,8% | 2,4% | 2,0% | 1,8% | 1,8% | 1,8% | 1,7% | 1,7% | 1,7% | 1,3% | 1,3% | 1,2% | 1,2% | 1,0% |
| GDP gain, innovation factors | 3,5% | 2,9% | 3,3% | 2,8% | 2,4% | 2,1% | 2,2% | 2,2% | 2,1% | 2,1% | 2,1% | 1,6% | 1,6% | 1,5% | 1,5% | 1,3% |
| GDP gain, investment to humanity factor | 1,6% | 4,7% | 5,6% | 4,9% | 4,3% | 4,0% | 4,2% | 4,3% | 4,3% | 4,2% | 4,3% | 3,5% | 3,4% | 3,3% | 3,4% | 2,9% |
| General GDP gain | 3,1% | 3,3% | 3,8% | 3,2% | 2,7% | 2,5% | 2,5% | 2,6% | 2,5% | 2,4% | 2,4% | 2,0% | 1,9% | 1,8% | 1,8% | 1,6% |
| **Development variant 2** | | | | | | | | | | | | | | | | |
| GDP gain | 3,3% | 3,8% | 4,3% | 4,6% | 4,6% | 4,3% | 4,0% | 3,7% | 3,7% | 3,5% | 3,4% | 3,3% | 3,2% | 3,1% | 3,0% | 2,8% |
| Gain factor 1 | 11,6% | 6,1% | 6,8% | 7,0% | 6,8% | 6,3% | 5,7% | 5,3% | 5,1% | 4,8% | 4,6% | 4,5% | 4,3% | 4,1% | 3,8% | 3,7% |
| Gain factor 2 | 5,2% | 4,8% | 5,5% | 5,7% | 5,6% | 5,3% | 4,8% | 4,5% | 4,4% | 4,2% | 4,0% | 3,9% | 3,8% | 3,6% | 3,4% | 3,3% |
| Gain factor 3 | 5,2% | 4,8% | 5,5% | 5,7% | 5,6% | 5,3% | 4,8% | 4,5% | 4,4% | 4,2% | 4,0% | 3,9% | 3,8% | 3,6% | 3,4% | 3,3% |
| Gain factor 4 | 0,9% | 2,9% | 3,4% | 3,7% | 3,8% | 3,7% | 3,5% | 3,4% | 3,4% | 3,3% | 3,3% | 3,3% | 3,2% | 3,1% | 3,0% | 3,0% |
| Gain factor 5 | 0,9% | 2,9% | 3,4% | 3,7% | 3,8% | 3,7% | 3,5% | 3,4% | 3,4% | 3,3% | 3,3% | 3,3% | 3,2% | 3,1% | 3,0% | 3,0% |
| GDP gain, investment factor | 5,5% | 2,9% | 3,3% | 3,4% | 3,3% | 3,0% | 2,7% | 2,5% | 2,4% | 2,3% | 2,2% | 2,1% | 2,0% | 1,9% | 1,8% | 1,8% |
| GDP gain, innovation factors | 3,7% | 3,4% | 3,8% | 4,0% | 3,9% | 3,7% | 3,4% | 3,1% | 3,1% | 2,9% | 2,8% | 2,7% | 2,6% | 2,5% | 2,4% | 2,3% |
| GDP gain, investment to humanity factor | 1,8% | 5,5% | 6,5% | 7,1% | 7,2% | 7,1% | 6,8% | 6,5% | 6,6% | 6,4% | 6,3% | 6,3% | 6,2% | 6,1% | 5,9% | 5,7% |
| General GDP gain | 3,3% | 3,8% | 4,3% | 4,6% | 4,5% | 4,3% | 4,0% | 3,7% | 3,7% | 3,5% | 3,4% | 3,3% | 3,2% | 3,1% | 3,0% | 2,8% |
| **Development variant 3** | | | | | | | | | | | | | | | | |
| GDP gain | 6,2% | 6,8% | 8,1% | 8,2% | 6,4% | 6,2% | 6,1% | 5,6% | 5,4% | 5,1% | 4,7% | 4,1% | 4,1% | 4,0% | 3,7% | 3,6% |
| Continuation of table 3 | | | | | | | | | | | | | | | | |
| Gain factor 1 | 16,6% | 10,8% | 12,3% | 12,0% | 9,0% | 8,5% | 8,2% | 7,5% | 7,0% | 6,5% | 6,0% | 5,2% | 5,0% | 4,9% | 4,5% | 4,3% |
| Gain factor 2 | 9,0% | 8,6% | 10,1% | 10,0% | 7,7% | 7,3% | 7,1% | 6,5% | 6,2% | 5,8% | 5,4% | 4,7% | 4,6% | 4,5% | 4,1% | 4,0% |
| Gain factor 3 | 9,0% | 8,6% | 10,1% | 10,0% | 7,7% | 7,3% | 7,1% | 6,5% | 6,2% | 5,8% | 5,4% | 4,7% | 4,6% | 4,5% | 4,1% | 4,0% |
| Gain factor 4 | 2,5% | 5,3% | 6,6% | 7,0% | 5,8% | 5,8% | 5,9% | 5,6% | 5,5% | 5,3% | 5,1% | 4,5% | 4,5% | 4,5% | 4,2% | 4,1% |
| Gain factor 5 | 2,5% | 5,3% | 6,6% | 7,0% | 5,8% | 5,8% | 5,9% | 5,6% | 5,5% | 5,3% | 5,1% | 4,5% | 4,5% | 4,5% | 4,2% | 4,1% |
| GDP gain, investment factor | 7,9% | 5,1% | 5,9% | 5,7% | 4,3% | 4,1% | 3,9% | 3,6% | 3,3% | 3,1% | 2,8% | 2,5% | 2,4% | 2,4% | 2,1% | 2,1% |
| GDP gain, innovation factors | 6,3% | 6,0% | 7,0% | 7,0% | 5,4% | 5,1% | 5,0% | 4,6% | 4,3% | 4,1% | 3,7% | 3,3% | 3,2% | 3,2% | 2,9% | 2,8% |
| GDP gain, investment to humanity factor | 4,8% | 10,2% | 12,7% | 13,3% | 11,1% | 11,1% | 11,4% | 10,9% | 10,7% | 10,3% | 9,8% | 8,8% | 8,7% | 8,8% | 8,1% | 8,0% |
| General GDP gain | 6,2% | 6,8% | 8,1% | 8,1% | 6,4% | 6,1% | 6,1% | 5,6% | 5,4% | 5,1% | 4,7% | 4,1% | 4,1% | 4,0% | 3,7% | 3,6% |

*Source: complied by the author*

At the same time the received forecast based on GDP value purpose proves the importance of separate investment factors and allows define priority directions of investments.

Analysis shows that today it`s important to invest not only scientific researches and development, the main capital, but the humanity capital too. As the investment to humanity capital have a smaller payback period, investment`s cost to humanity capital is bigger than to another GDP growth factors.

At the same time in accordance with results of the factors analysis we can conclude that for achievement GDP forecast value, factors increase should be much higher than current tendency.

If to consider that investment allow economic entity to reach advantages before competitors, to realize potential and carry out directed to GDP growth strategic purposes and others, monitoring of defined GDP factors is a very actual. Necessary to mark out that nowadays there are different disproportions in investment process. Investors try to realize projects on the territories with development infrastructure, full of natural resources thereby minimize investment risks. Thus territories subdivide under the social and economic wellbeing, that`s redeployment of resources to the indigent subjects isn`t realize. This fact requires a special public authority attention and need investment policy correction towards increase in financing.

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