



The Impact Assessment of Investment on Economic Growth in Competitive Conditions in the Republic of Azerbaijan

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ABSTRACT

The Keynes type of consumption function parameters have been econometrically estimated on the basis of statistical information of the Azerbaijan economy, in other words, the multiplier has been determined which shows the impact of investment growth to GDP in this article. It was also determined that the decrease in last limit consumption tendency leads to decline in the price of multiplier. Further analyzes were carried out in determining the price of accelerator. The result showed that, although consumption tendency decreased (multiplicative reduction effect), the price of accelerator increased. On the basis of mutual influence model of multiplier and accelerator, it was determined that current prices of multiplier and accelerator, could lead to hesitant growth of GDP. In final part of the article necessary directions and required prices of multiplier and accelerator are shown in order to be able to achieve the balanced growth of the GDP.

KEYWORDS : autonomous and promote investment, multiplier, accelerator, GDP growth, consumption last tendency.

Introduction

It is obvious that the investments play the important role in the economy. Therefore most of developed countries implement the encouraging measurements for expansion of investment activity and stimulate the attraction of foreign investments (reduction of profit tax rate, provision of discounted loans, protection of foreign investments and etc.).

Protection and support of investment activity by the government is a crucial point in development of the countries with transition economies. The world countries implement various policies and measurements related to the capital investment realm. Although most of them have liberal attitude, some countries try to restrict the investment activity. In most of cases the limiting measurements are demands and requirements imposed to attracted technology, type of the equipment, share of local participants, profit sharing between the participants and etc.

As we can see, the attraction of extensive foreign capital to the country can bring about negative consequences. Thus more than 90% of the investments attracted to Azerbaijan's economy are directed to the oil and gas industry, which in its turn brings about imbalanced development. In other words the contribution of the non-oil sector in the economy is gradually declining. In order to prevent that, some portion of internal investments should be directed to non-oil sector of the economy. By application of economic encouraging measurements like accelerated amortization/depreciation, decrease of tax burden, issuance of low-rate loans, provision of government guaranties for investment programs, the government can decrease its dependence from foreign investments.

Let's look at the investment policies implemented in developed countries. In USA the annual growth of production purposed investment accounts for 6.5-7.5% of total invested capital, while the amortization of allocated funds accounted for 8% [76]. The savings of the population accounts for 22.1% of total income, the employment is 47.8%, the growth of total national income in current terms is 10%, growth of GNP is 17-18% and growth of investments directed to the reserves is not less than 3%. The corporate tax rate is 28% and personal income tax rate is 14.5%.

As we can see from information provided above the growth in components of the investment is not great enough. The reason is existence of modern technology in all realms of the economy. Thus the aim of the investment activity is not expansion of the technology application, but its support and efficient utilization. In order to up-

date the existing in Azerbaijan technology we need higher temps of investment growth. Such direction of investment activity can provide the basic for the national investment policy. Recent researches show that the planned restructuring cannot be implemented by the means of internal funds and attraction of the foreign investments is important. According to researches the annual demand for the investment is equal to 1-2 mlrd US dollars, and total demand is around 15-20 mlrd US dollars. The basic problem is preparation, assessment and implementation of investment programs based on internationally accepted standards. Unfortunately Azerbaijan lacks such experience. In our opinion business plans should be prepared based on investment methodology.

The investment is important from point of view of preparation of efficient fiscal and monetary policy as well as evaluation of its impact to the growth of gross domestic product.

Identification of the problem and its theoretical aspects

From the point of affecting the economy the investment has multiplicative and accelerative effects. The multiplicative effect is created when investment does not depend on the revenue and accelerative effect is created when it does.

In order to assess the multiplicative and accelerative effects of investments in Azerbaijani economy we suggest implementing the econometric assessment and its impact on GDP and even application of multiplication based model of Samuelson-Hicks, in this case we can predict the future economic development of the country.

The multiplicative effect is based on Keynesian theory and consumption process.

It is wide known that the correlation between GDP and consumption is reflected by m multiplier. The multiplier is a ratio showing the increase in revenue at given increase in autonomous investment:

$$\Delta Y = m \Delta I, \quad (1)$$

here ΔY – GDP growth; ΔI – investment growth.

Thus,

$$\Delta Y = \Delta S + \Delta I, \quad (2)$$

Here ΔS – increase in consumption expenses (growth of non-production consumption).

From here,

$$m = \Delta Y / (\Delta U - \Delta S), \quad (3) \quad \text{or} \quad m = 1 / (1 - \Delta S / \Delta Y), \quad (4)$$

here $\Delta S/\Delta U$ – the limit of consumption.

The correlation between GDP and governmental expenditures is reflected by automatic regulatory factors. These regulatory factors are connected with tax system: increase in revenues brings about the progressive increase in tax; it its turn it limits the capital investments and growth of GDP.

Under the influence of accelerator there is converse correlation between GDP and production-purpose investments and reserves. The equation reflection of accelerator (a) can be reflected as following:

$$a = K/\Delta Y, \quad (5)$$

here K – capital investment (or change in value of the capital).

If we consider equation (1)- (5),

$$K = a * m * \Delta \dot{I}, \quad (6)$$

here – investment growth; – multiplication ratio.

Increase in GDP brings about increase in import of raw materials, materials and equipment. In its turn it limits the production of these goods and production of only supplementary goods.

The government economic policy considers the correlation between the growth of GDP, revenues, taxes and governmental expenditures. On other hand, increase or decrease in total demand can be encouraged by regulation of money turnover.

Depending on length of selected time frame and units of measurement, the parameters indicated above can be reflected in economic

model, but some of them can be ignored. Considering that our model takes only a year, the basic selected parameter was demand factors. Therefore the basic role in the model plays prices, investments and reserves and correlation system between them.

On other hand evaluation of increase and decrease of absolute value of macroeconomic determinants of fast developing country as Azerbaijan is not relevant. From this point of view application of their derivatives is more relevant. For example, the characteristics of structure of money turnover is comprised of increase in prices, the correlation of bank commercial and investment rates, the money volume in the active turnover and its portion in GDP; the structural characteristics of supply and demand correlation contains the nation income and price level, the portion of realized goods in total volume of reserves, the utilization of production forces; the structural characteristics of gross national product consists of profit margin, savings, proportion of consumption and investment, level of salary and profit, the proportion of government orders in GDP and etc.

Thus, we can assess the efficiency of investment policy by the application of above mentioned scheme and dynamics of the economic growth.

Realization of the model and analysis of obtained results

Let's consider the efficiency of the investment policy though review of real parameters. We would like to note that for evaluation purpose we used the period of 2005-2011. First of all we have identified the growth rates of investment and GDP (table 1). In order to evaluate the efficiency of the investment policy we have identified the portion of average DGP growth in total investment:

Table 1. The evaluation of the efficiency of investment activity in Azerbaijan Republic during 2005-2011

Parameters	2005	2006	2007	2008	2009	2010	2011
GDP, mln AZN	12522.5	18746.8	28360.5	40137.2	35601.5	41574.7	50100.0
Also non-oil sector	7001.5	8229.4	10319.4	12223.1	16725.9	18442.7	21790.42
Total investment	6733.8	6910.2	7265.4	6702.1	7724.9	9715,2	12800,0
Also investment in non-oil sector					2058.3	2958.5	
Foreign investments	4628.9	4154.1	3792.7	2460.6	1645.0	2406.5	2521.6
The portion of foreign investments in total GDP, %	37.0	22.2	13.4	6.1	4.6	5.8	5.0
Growth of GDP in comparison with prior year	1,264	1,345	1,250	1,108	1,093	1,050	1,001
Exchange rate, AZN/US dollar	0,92	0,90	0,89	0,80	0,80	0.8038	0.8026

Source:Database provided by State Statistics Committee of Azerbaijan Republic

As we can see from the table the portion of the foreign investment in GDP during 2005-2011 is gradually decreasing. Thus if in 2005 the portion of the foreign investment in GDP was equal to 37.0%, this parameter in 2011 was equal only to 5%. It can be explained by the decrease of investment in oil and gas sector and flow of domestic investments to the non-oil sector. Thus only in 2011 out of total attracted investments in amount of 12.8 mlrd AZN 19.7% were coming from foreign sources. Major part of domestic investments was directed to the non-oil sector.

Considering that the national economy significantly depends on oil and gas industries, we need state investment program which would consider the direction of investment into the non-oil sectors of the economy and their stimulation.

Let's evaluate the impact of the investments to the economy through multiplicative method.

We would like to note that the research (21) was dedicated to the analysis of dynamics of macroeconomic parameters. Notwithstanding this fact we have investigated the multiplication effect in our calculations.

Let's determine the multipliers of investments and expenditures through utilization of dynamics of macroeconomic parameters incurred during the period of 2005-2011. For this purpose we used equation (1)-(5) and grouped the results in table 2 below.

Table 2. The dynamics of GDP and ultimate consumption during 2000-2011, mln AZN

Years	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Parameters												
GDP	4718.1	5315.6	6062.5	7146.5	8530.2	12522,5	18746.8	28360.5	40137.2	35601.5	41574.7	50100.0
Ultimate consumption related expenses	3753.8	3994.2	4565.3	5170.9	5861.3	6579.7	8556.3	12212.5	16829.8	19182.1	6579.7	8556.3

Source: Database provided by State Statistics Committee of Azerbaijan Republic and National Reports of Azerbaijan Republic

$$Ult_Cons_X = 1896.47792 + 0.4052922902 * GDP$$

$$s.s \quad (662.0731) \quad (0.031555)$$

R-squared=0.953748; Adjusted R-squared=0.947966; Durbin-Watson stat=1.472441

Here *Ult_Consumption* expresses the expense of ultimate consumption, *GDP* – gross domestic product, *s.s* – standard deviation of parameters. The identified parameters of regression equation are standard deviation of respective parameters.

Let's note that the parameters of consumption function were identified by the means of Eviews application and information provided in tables 1-2 [1]. The statistical characteristics of the model and relevant tests show that the model is quite adequate [2]. Considering that the standard deviations of identified parameters are very small, we believe that relevance is high and close to reality (more than 95%). Considering that the determination ratio (R-squared) is close to 1 (0.953748), we conclude that 95.4% of changes in consumption level is explained by the changes in GDP. In other words, the consumption level directly depends on GDP and other constants. It is not surprising that the value of adjusted R-squared is close to the value of R-squared. The fact that the Durbin Watson statistics is equal to 0, its different from 4 and close to 2 indicates that the remaining parts of the model are subject for auto-correction and it is desirable. In other words our model is suitable for forecast purposes as well.

If we look at the model we can see that the autonomous consumption is equal to 1896.47792 mln AZN or approximately 1.9 mlrd AZN. It means that the consumption not depending on the growth of GDP is quite large in the country. It indicates the distortion of equilibrium between consumption and income. Note that in cases when autonomous consumption is equal or close to zero, there is equilibrium between consumption level and GDP growth. The distortion in this equilibrium in Azerbaijan can be explained by following two factors: first, during the recent years the government implemented large transfers from the oil fund to the state budget and some portion of these funds were spent to the consumption; second, decrease in oil price and recent financial crisis.

As we can see from the model the limit of consumption addictiveness is equal to 0.4052922902. In other words, approximately 40.2% of GDP was used as ultimate consumption. The remaining part was saved and it can be reinvested in future.

Now let's calculate the expense multiplier or so called investment multiplier.

As we can derive from equation (4) above the expense multiplier is calculated as following:

$$Multiplier = 1/(1-consumption\ limit) = 1/(1-0.4052922902) = 1.681498$$

In other words increase in expenses by 1 AZN brings about increase in GDP by approximately 1.7 AZN. This increase can be realized through increase in budgetary expenses (for example, transfers from oil fund or budget deficits) or through the autonomous investments (for example, foreign investments).

Let's evaluate the effect of capital investments to the GDP during the indicated periods.

Table 3. the dynamics of GDP and investments in capital expenditure during 2000-2011, mln AZN

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Parameters												
GDP	4718.1	5315.6	6062.5	7146.5	8530.2	12522,5	18746,8	28360,5	40137,2	35601,5	41574,7	50100,0
Investments in capital expenditures	967.8	1170.8	2107.0	3786.4	4922.8	5769.9	6234,5	7471,2	9944,2	7724,9	9715,2	12800,0

Source: Database provided by State Statistics Committee of Azerbaijan Republic and National Reports of Azerbaijan Republic

Using the equation (5) above and information provided in this table we can derive the following regression equation:

$$CapInvest = 3412.844521 + 0.4125921479 * DELTA_GDP + 5864.039194 * DAMMY + [MA(1)=0.8846472053, BACKCAST=2001]$$

The statistical and other tests implemented for this models show that it is adequate and appropriate.

Here *CapInvest* is amount of total capital investments, *Delta_GDP* is GDP growth, in other words difference between current and prior GDP. We know that during the global financial crisis in 2009 the overall nominal price level increased, however its real value decreased significantly under the effect of GDP deflator. In order to consider this effect in the model we introduced the dummy variable. On other hand in order to support the adequacy of the model we introduced shifting variable *MA(1)*.

As a result the accelerator (*a*) was equal to 0.4125921479. In other words, only 41% of GDP growth is directed to the investment. During the investigated period around 3.4 mlrd AZN of investment incurred independently from GDP growth and constant factors (for example, foreign investments, transfers from oil fund to state budget and other capital expenditures). Since 2009 around 5.9 mlrd AZN was directed to capital investments in Azerbaijan as a result of financial crisis. This means that during financial crisis capital flew to the less risky area. However, it was not related with the growth of GDP.

Note that the autonomous investment creates the multiplier effect and the promote investment creates the accelerative effect, which influence the increase in GDP. Thus there is interaction of multiplier and accelerator effects. The scenario for the GDP growth was shown in the model of laureates of Nobel Prize Paul Samuelson and George Hikes [3,4]. The mutual effect of accelerator and multiplier can be reflected in the following way:

$$D = (a+b)^2 - 4a = -0.98143$$

The discriminant is negative, it means that during the subsequent periods the GDP was not increase at the same extend. Note that the similar calculations were implemented for Azerbaijani economy for the periods 1991-1998. As a result, the discriminant was positive, which means that the growth of GDP was expected during the subsequent period [5, p. 48-51]. This forecast was already proved.

If the ultimate consumption expenses increase in comparison with GDP and consumption limit is equal to 0.8, the effect of autonomous investment to GDP will be reflected in multiplier equal to 5. If the portion of promote investment decreases and accelerator is equal to 0.3, the indicated discriminant will be positive. This will bring about growth of GDP during the subsequent periods. Note that the Samuelson – Hikes model reflects only the welfare market. It is based on constant level of prices and interest rates. The significant changes in these parameters can bring about the significant deviations of the results from reality.

Conclusion

We believe that the following measurements are important in the increase in efficiency of the investments:

- Prevailing of consumption growth over the GDP growth;
 - Decrease in capital investment growth in relation to the GDP growth;
 - Holding the price level and interest rates relatively constant.
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