

RULE OF GDP GROWTH RATE CHANGE INFLUENCE ON FIXED CAPITAL INVESTMENTS INTO THE COUNTRY'S ECONOMY

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Abstract

Rule of GDP growth rate change influence on fixed capital investments into the country's economy was found. This rule is demonstrated on the example of economic processes behavior in 32 European countries, Japan, Canada, Australia and the USA. These countries were divided into groups according to the World Bank classification based on GNI per capita. The rule for Lower and Upper Middle Income countries groups is the most complete. For High Income countries group only parts of the rule are evident. The threshold values of the GDP growth rates above which the increase of volume of investments is observed regardless of the GDP growth rate value are shown.

The rule is proposed to use while forecasting the innovational and technological development of transition-economy countries.

Key words: Rule, GDP, Investments, Innovation

JEL Classification: E2

1. INTRODUCTION

Many countries are doing forecasting of their innovational and technological development, both on a national and regional scale. While solving this task, scientists and economists confront the problem of forecasting of fixed capital investments into the country's economy. The volume of fixed capital investments is a parameter which is difficult to forecast, and which depends on a big number of factors, not just economic. The way to solve this problem was finding a rule between the volume of fixed capital

investments and one of the macroeconomic indicators. Firstly, the volume of industrial output was chosen, but GDP appeared to be more convenient to use.

We set up a hypothesis that the volume of fixed capital investments into the country's economy somehow depends on GDP growth rate.

To confirm the hypothesis we investigated the economic processes in transition-economy countries (Kononenko, Repin, 2005). Data analysis allowed to formulate the rule of the influence of GDP change on the volume of fixed capital investments for European transition-economy countries (Kononenko, Repin, 2006).

Later on we investigated the economic processes in 32 countries of Europe, and also in Japan, Canada, Australia and the USA. Considering major differences in economical states of the countries, we divided them into groups according to the World Bank classification based on Gross national income per capita.

As the research period the years 1996-2005 were chosen.

In the High income (HI) category the following countries were investigated: Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and the USA (23 countries in total).

In the Upper middle income (UM) category we explored the dependencies in such countries as Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Russian Federation, Slovakia, Turkey (11 countries in total).

In Lower middle income (LM) category we analyzed the economic of Bulgaria and Ukraine.

2. WORK OBJECTIVE

The objective of this work is to check the rule of GDP growth rate change influence on fixed capital investments into the country's economy for countries from different categories. The information for analysis was found on the Statistical Agency EuroStat official site. Also we used the data from the International Monetary Fund. The Ukrainian data were taken from the Ukrainian annual statistical reference book.

3. RULE OF GDP GROWTH RATE CHANGE INFLUENCE ON THE INVESTMENT INFLOWS INTO THE COUNTRY'S ECONOMY

The essence of the rule is the following.

First of all, it is the investment increase into a country's economy with GDP growth rate over certain threshold value different for every country. Moreover the investment inflows increase regardless of the direction of GDP growth rate change as long as this rate remains above the threshold level.

Secondly, the decline or stabilization of investment inflows can be expected if GDP growth rate decreases within the sub-threshold zone.

The third scenario deals with the situation when GDP growth rate increases within the sub-threshold zone subsequently entailing the growth or stabilization of investment inflows.

It should be noticed that the found rule can be violated under the influence of significant factors. For instance, for some political reasons external investments can be flown into a country's economy even when GDP growth rate declines within the sub-threshold zone.

If GDP growth rate increase occurs in the area of negative growth rate values, then this process can be followed by investment inflows decrease.

With the increase of GDP growth rate in the area of minor positive growth rate values the decrease of investment inflows can be also observed.

The rule has been established for dependencies between investment inflows into a country's economy and GDP growth rate indicator as for the same year, so as for a one year delay of the investment volume. In the latter case the dependency of the investment volume in the year t from GDP growth rate in the year t-1 is being considered.

Further the illustration of this rule is shown for some countries from the above-listed groups. In the group HI the most interesting countries from the point of view of the rule are Germany, Italy, Portugal. During the research period in these countries the GDP growth rate value was both positive and negative.

In the tables 1 and 2 and in the fig. 1 statistical data related to the economy of Germany are shown. All the presented graphs show the events in chronological order, i.e. one of the dots at the beginning of the curve relates to the year 1996, the other – to the year 2005.

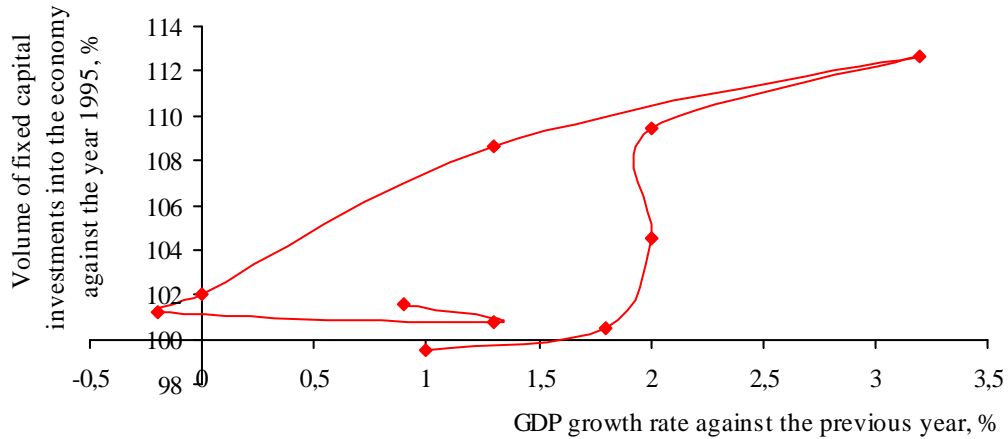
Table-1: GDP growth rate indicators of Germany against the previous year, %

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP	1,0	1,8	2,0	2,0	3,2	1,3	0,0	-0,2	1,3	0,9

Table-2: Fixed capital investments into the economy of Germany against the year 1995, %

Year	1996	1997	1998	1999	2000
Investments	99,5	100,5	104,5	109,4	112,7
Year	2001	2002	2003	2004	2005
Investments	108,6	102	101,2	100,8	101,6

Figure-1: Investment inflows into the economy of Germany (1996-2005)



It is obvious from the figure, that the economics of Germany entered the research period with 0,5 % fall of the volume of capital investments against the year 1995. GDP growth rate in 1996 was only 1 %. The increase of GDP growth rate indicator firstly till 2 %, and then till 3,2 % (2000) was observed. Such growth was accompanied by stable growth of fixed capital investments. The next 3 years the decline of GDP growth rate firstly till 1,3 % and then till 0 % and till -0,2 % (2003) was typical for economy of Germany. As it is shown in the Rule, such fall is accompanied by the fall of investments. Only the GDP growth rate of 1,3 % in the year 2004 allowed to stabilize investments. In the last year of the research period a minor growth of fixed capital investments was observed. From the point of view of the Rule, we presume, that the threshold value for economy of Germany is close to 1,5 % of GDP growth rate.

In the fig. 2 the curve of investment volume change in dependence on GDP growth rate for the economics of Italy is shown. The statistical data are presented in the tables 3 and 4.

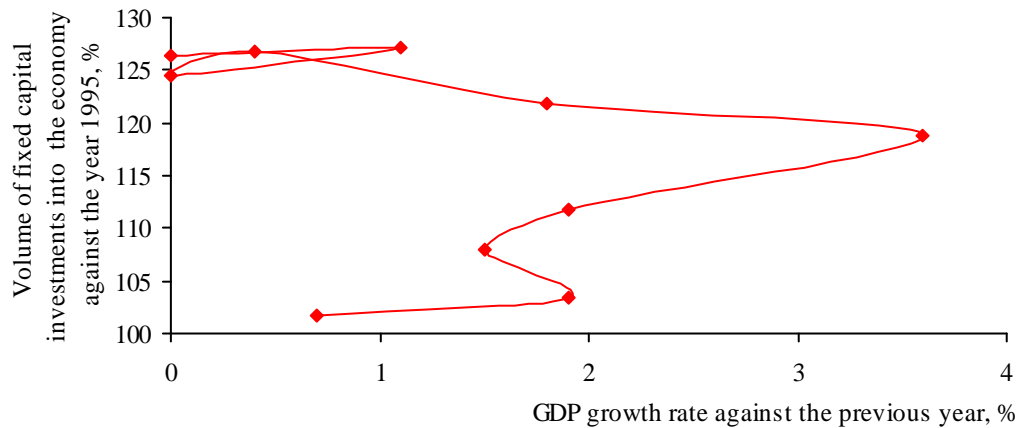
Table-3: GDP growth rate indicators of Italy against the previous year, %

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP	0,7	1,9	1,5	1,9	3,6	1,8	0,4	0,0	1,1	0,0

Table-4: Fixed capital investments into the economy of Italy against the year 1995, %

Year	1996	1997	1998	1999	2000
Investments	101,8	103,5	107,9	111,7	118,8
Year	2001	2002	2003	2004	2005
Investments	121,8	126,7	124,5	127,2	126,4

Figure-2: Investment inflows into the economy of Italy (1996-2005)



As it is shown in the figure, during the period 1996-2002 the stable growth of GDP of Italy was accompanied by the same stable growth of fixed capital investments. In the year 2002 the latter indicator ran up to 126,7 % relatively to 1995, that is rather high value for the advanced develop countries. Further events which took place in the economy of Italy confirm the found Rule. In 2003 and in 2005 the GDP growth rate decreased till 0 % and this decrease was accompanied by the decrease of the volume of fixed capital investments into the economy of a country. In the year 2004 the GDP growth rate of 1,1 % corresponds to appropriate investments increasing.

Let's have a close look at the economical situation in Portugal. Statistical data are shown in tables 5 and 6 and the curve of investments dependence on GDP growth rate can be seen in figure 3.

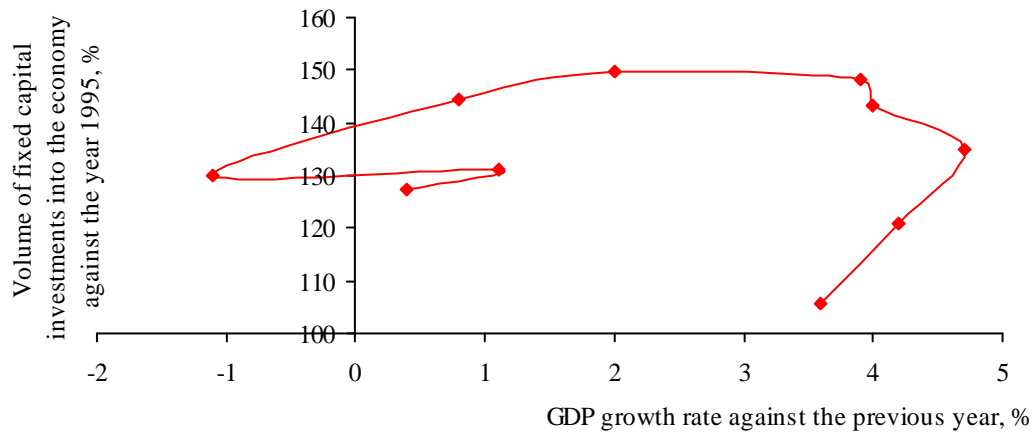
Table-5: GDP growth rate indicators of Portugal against the previous year, %

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP	3,6	4,2	4,7	4,0	3,9	2,0	0,8	-1,1	1,1	0,4

Table-6: Fixed capital investments into the economy of Portugal against the year 1995, %

Year	1996	1997	1998	1999	2000
Investments	105,6	120,7	134,9	143,2	148,1
Year	2001	2002	2003	2004	2005
Investments	149,6	144,4	130	131,1	127,3

Figure-3: Investment inflows into the economy of Portugal (1996-2005)



Several stages were typical for the economy of Portugal during the research period. The first one is the period from 1996 to 2000. It was characterized by rather high values of GDP growth rate (in average – 4,08 % annually within 5 years). The annual volume of fixed capital investments into the country's economy stably increased in the same period and in the year of 2000 it achieved almost 50 % of growth relatively to the year 1995. The next stage (2001-2003): the decrease of GDP growth rate, moreover the GDP in 2003 was less than in 2002. The decrease of the volume of fixed capital investments into the economy was natural. It should be kept in mind that in the period of 1998-2002 the major volume of external and internal investments was flown into the economy of Portugal because of the preparation to European football Cup in 2004. In the last two years of the research period the GDP growth rate value became positive although was small. The investment situation almost stabilized. Minor fall of this indicator in 1995 can be the consequence of the GDP growth rate decrease. The threshold value, mentioned in the found Rule, makes up near 2 % of GDP growth rate.

On the example of the aforesaid three countries we demonstrated the found Rule between the GDP growth rate and the fixed capital investments for countries of HI group.

It should be noticed, that the Rule is authentic for all analyzed countries from HI group. For some countries only one part of the Rule was typical during the research period. For example, the economy of the Great Britain during the research period was characterized by a constant investments growth while annual GDP growth rate varied in the range between 1,9 % and 3,8 %.

At the same time, we found minor deflections from the Rule in economy of Austria in the period 2002-2003 and also in the economies of Cyprus (1997) and Sweden (2002-2003). More detailed analysis of economic and political history of those countries will allow understanding the reasons of these deflections.

Further the display of the Rule is shown on the example of economies of two countries from UM group.

In the tables 7 and 8 and in the figure 4 the Poland economy data are shown.

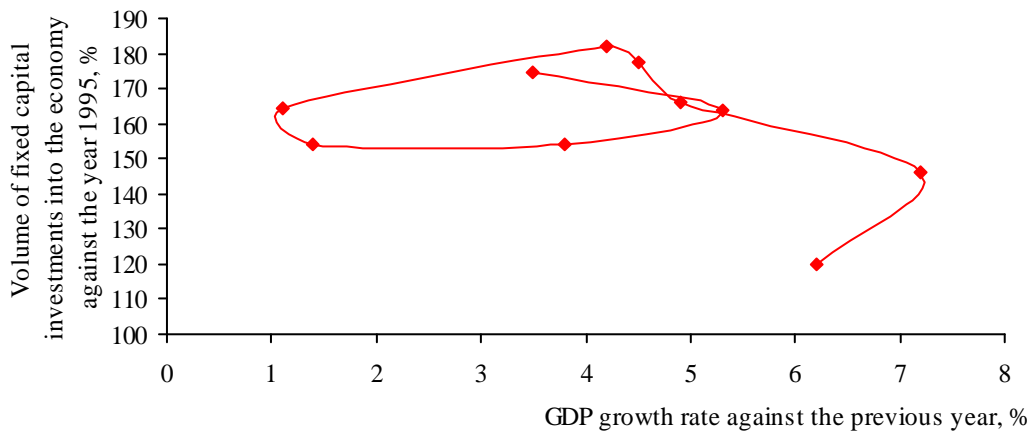
Table-7: GDP growth rate indicators of Poland against the previous year, %

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP	6,2	7,2	4,9	4,5	4,2	1,1	1,4	3,8	5,3	3,5

Table-8: Fixed capital investments into the economy of Poland against the year 1995, %

Year	1996	1997	1998	1999	2000
Investments	119,7	145,9	166,3	177,4	182,2
Year	2001	2002	2003	2004	2005
Investments	164,5	154,2	154,1	163,9	174,5

Figure-4: Investment inflows into the economy of Portugal (1996-2005)



It is obvious from the figure that in the year 1996 more than 6 % of GDP growth rate corresponded to investment volume growth rate of 19,7 %. During the next 4 years despite the GDP growth rate fluctuations within 4,2–7,2 %, investment inflows into the economy grew constantly, moreover with quite high values (more than 4,8 % annually). This is due to the fact that the annual GDP growth rate was higher than 4 %, that is considered to be high enough. However, later on because of GDP growth rate decrease to 1,1–1,4 % investment inflows began to decline. In 2001 the volume of investments into the economy of Poland was 10 % lower than in 2000. The value of GDP growth rate in 2003 made up 3,8 % that allowed to stabilize the situation with investments. The increase of fixed capital investments into the economy of Poland in 2004-2005 was natural because the GDP growth rate was 5,3 and 3,5 percent correspondingly. The threshold value for the economy of Poland is near 3,5 %. At the same time, this value may lightly decrease through Poland inclusion into the European Union in the year of 2004.

The next country from UM group is Turkey. The statistical data are shown in tables 9 and 10, graphically it can be seen in figure 5.

The found rule is demonstrated in all its aspects on the example of this country.

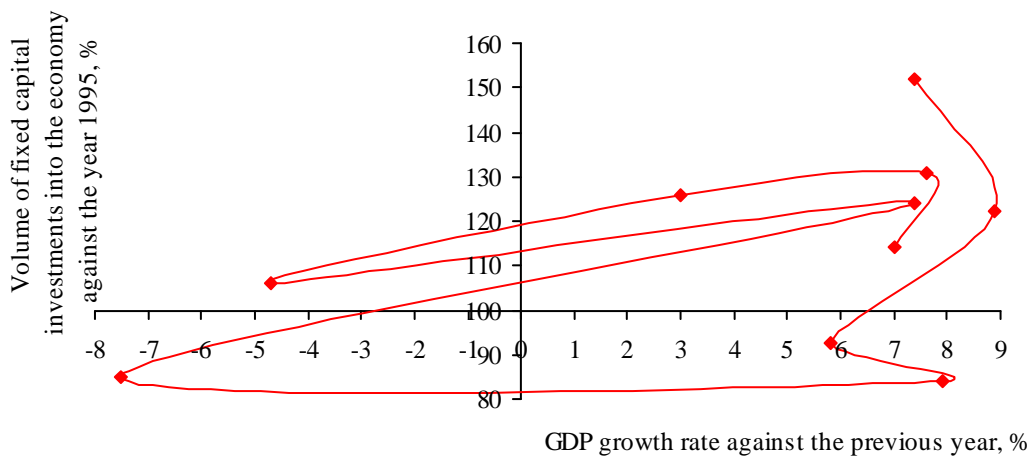
Table-9: GDP growth rate indicators of Turkey against the previous year, %

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
GDP	7,0	7,6	3,0	-4,7	7,4	-7,5	7,9	5,8	8,9	7,4

Table-10: Fixed capital investments into the economy of Turkey against the year 1995, %

Year	1996	1997	1998	1999	2000
Investments	114,1	131	125,9	106,1	124,1
Year	2001	2002	2003	2004	2005
Investments	84,9	84	92,4	122,3	151,7

Figure-5: Investment inflows into the economy of Turkey (1996-2005)



In 1996-1997 the high values of GDP growth rate (7,0 and 7,6 correspondingly) provided the growth of fixed capital investments up to tierce relatively to 1995. In the year of 1998 the GDP growth rate value fell to 3 percent that entailed slight decrease of the volume of investments. Events in the following years were characterized by spasmodic changes of GDP growth rate and corresponding them changes of investments volume. GDP fall followed by the investments fall, growth followed by growth. In 2002 investments growth was not observed, but in future, as soon as the GDP growth rate became more than 5 %, the volume of fixed capital investments characterized by stable annual growth. In particular 4-5 percent is the threshold value for economy of Turkey and the investments volume increase in above-threshold zone.

While considering the situation in Ukraine we decided to investigate all the period of country's independence. So, we've analyzed the 16 years period.

Statistical data are in tables 11 and 12. Graphically these data are shown in figure 6.

Table-11: GDP growth rate indicators of Ukraine against the previous year, %

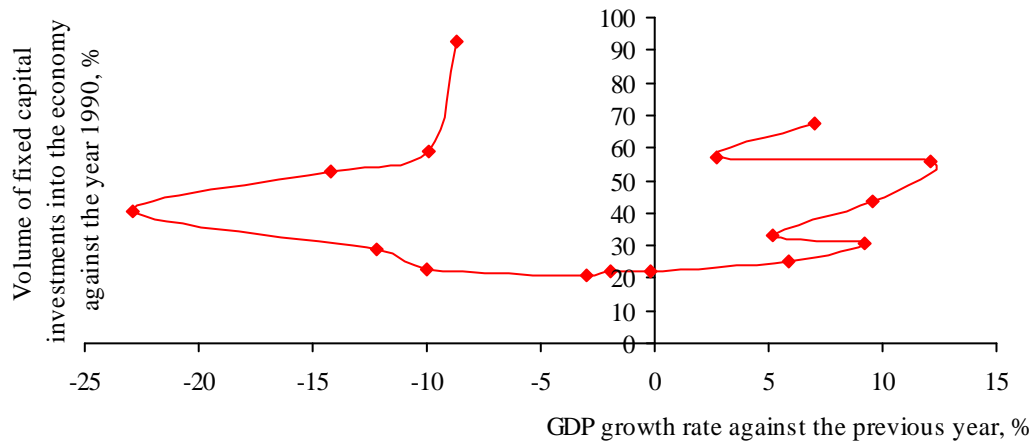
Year	1991	1992	1993	1994	1995	1996	1997	1998
GDP	-8,7	-9,9	-14,2	-22,9	-12,2	-10	-3	-1,9
Year	1999	2000	2001	2002	2003	2004	2005	2006
GDP	-0,2	5,9	9,2	5,2	9,6	12,1	2,7	7,0(*)

(*) - Preliminary information

Table-12: Fixed capital investments into the economy of Ukraine against the year 1990, %

Year	1991	1992	1993	1994	1995	1996	1997	1998
Investments	92,9	58,6	52,5	40,7	29,1	22,7	20,7	21,9
Year	1999	2000	2001	2002	2003	2004	2005	2006
Investments	22	25,2	30,4	33,1	43,5	55,7	56,8	67,6

Figure-6: Investment inflows into the economy of Ukraine (1991-2006)



The analysis of the curve shown in the figure allows to certain the rightness of considerations according the dependency of investment inflows into the economy from the GDP growth rate. The falling of Ukrainian GDP at the beginning of 1990-s led to the decline of investment inflows into the country's economy. The turning point occurred in 1995 when GDP growth rate for the first time since 1990 was although negative but in absolute rate lower than in the preceding year. However, 3 years were needed for annual investment inflows into the state economy to increase. The first insignificant increase took place only in 1998. The significant increase began in the years when GDP growth rates became higher than 5%. In the year 2005 a slight growth of GDP (by 2,7 %) was observed and it lead to such slight growth of investments volume. The situation in 2006 changed and the 7 % of GDP growth rate was followed by rather considerable growth of fixed capital investments volume into the economy of Ukraine.

Among the countries from UM and LM groups the deflection from the Rule was found only in economy of Lithuania in 2000. The reason of such deflection is to be clarified after more detailed research of economical and political events in Lithuania that year.

4. CONCLUSION

Thus, we've analyzed the economical processes in 36 countries during the period 1996-2005. In Romania we considered only the period between 2000 and 2005 because of the previous years data absence. In Ukraine the research period was between 1991 and 2006 years. As it was mentioned above, only in 4 countries 5 points fell out from the found Rule.

We've confirmed the hypothesis that the volume of fixed capital investments into the country's economy depends on GDP growth rate. This dependence is shown both for transition-economy countries and for advanced develop countries.

Later on it is proposed to research the threshold value behavior under the influence of different economic factors.

At present the found rule of GDP change influence on the investment inflows into the country's economy is proposed to use for forecasting the country's development in educational, scientific, industrial and trade spheres.

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