EXTERNAL DEBT AND GROWTH IN ARMENIA

ĀRĒJAIS PARĀDS UN ATTĪSTĪBA ARMĒNIJĀ

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Abstract. Present paper investigates the effect of external debt on the economic growth using the quarter data from 1997 to 2008 of Armenian economy. We argue that in order to obtain the expected effect it's necessary to combine all factors which have direct impact or indirect connection with HIPS countries. We showed that this principle would increase the productivity of Armenian economy. Furthermore, we showed the presence of the correlation between the studied indicators. The evaluation of these indicators and their influence on the economy is studied. This study provides calculations of the productivity of the national economy.

Keywords: Gross Domestic Product, investment, external debt, growth, rate, regression.

1. Introduction

The effect of external debt on aggregate economic growth is one of the subjects for hot debates in the economy. A great number of countries with the high level of external debt (Highly Indebted Poor Countries) continue the same strategy increasing their external debt. The purpose of this tactics is to provide stable development of various economic structures.

The aim of the current study is to analyse the indicators evaluating an external debt as well to show that the investigation of these indicators allows creating the basis providing the calculation of productivity. As the case study the Armenian economy is studied.

The basic work is presented in sections 2 and 3. The theoretical and practical parts concerning the influence of an external debt on the economic development of the country as well as the model of this influence on different sectors of economy are presented in the second section.

The tasks of the study are: the evaluation of the effect of external debt on GDP in Armenian economy.

The corresponding qualitative and quantitative research methods based on econometric modelling using quarter data of Armenian economy since 1998 have been studied.

2. The empirical analysis

The data for the investigation presented in current quarterly data of the Armenian economy from 1996 to 2008 are used. In the study we didn't identify channels on which the external debt influences economic development. Instead, we investigated the data which can create the analytical base. The statistical data from different sectors of the economy which are providing the study of the external debt have been introduced. As indicators of an external debt are considered:

a) Counted up rates of the development of Gross National Product in comparison with the last quarter per capita in log (GRPCY);
b) The Gross National Product per capita counted up in comparison with the first quarter in log (LYRPC (-1));
c) The general trade growth in comparison with the last quarter trade in log (TOTGR);
d) Population growth in comparison with the last quarter population in log (POPGR);
e) The external debt in comparison with the last quarter external debt in log (EXTDEBT);
f) Economy openness in comparison with the previous in log (OPEN) (export plus import counted up under gross national product);
g) Growth of total investments counted up under Gross National Product in log (GROINV);
h) Growth of quantity of respondents finished high-school in log (GSEC);
i) Monetary base in log (M1);
j) A consumer price index in log (CPI(1) index).

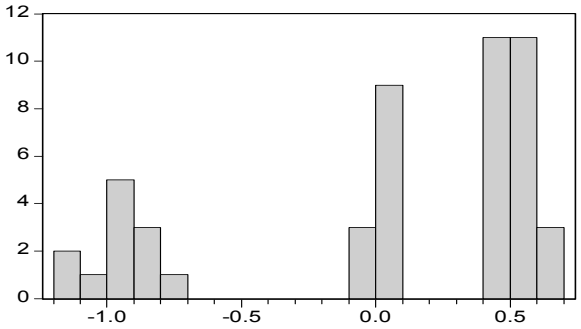
As the model of growth the model is studied:

$$\mathbf{GRPCY_i=\alpha+\alpha_1 LYRICS(1)+\alpha_2(TOTGR)+\alpha_3(POPGR)+\alpha_4(EXDEPT)+}$$
$$\mathbf{+\alpha_5(OPEN)+\alpha_6(GROINV)+\alpha_7(GSEC)+\ \alpha_8(M1)+\alpha_9(CPI(1)index)+\varepsilon_i,}$$

where ε_i is a standard error.

Rates of Gross National Product per capita in log we have been accepted as an explanatory variable. For the detailed research of the correlation between the studied variables it is necessary to carry out the research on economic indicators separately and serially.

First of all, the study of the model with detailed description of ten indicators separately was carried out. The first indicator is **GPRCY**. Proceeding from the data of the analysis on normal distribution, it is possible to draw conclusions that, concluding from indicators Skewness, Kurtosis, Std. Dev. the normal distribution is not presented in the model.



Series: GRPCY
Sample 1996:2 2008:2
Observations 49

Mean	0.033903
Median	0.427711
Maximum	0.620473
Minimum	-1.162911
Std. Dev.	0.610948
Skewness	-0.855286
Kurtosis	2.145714
Jarque-Bera	7.464046
Probability	0.023944

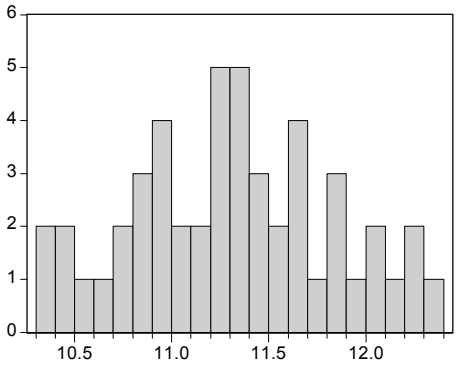
ADF Test Statistic	-12.22480	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(GRPCY)

Figure 1. Histogram and statistical test, Dickey-Fuller Unit Root Test on GRPCY.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

The next studied indicator is **LYRPC (-1).** In comparison with the previous indicator the normal distribution for it is visible. As in the previous model the account of the stability is visible.



Series: LYRPC
Sample 1996:2 2008:2
Observations 49

Mean	11.31245
Median	11.31824
Maximum	12.34417
Minimum	10.32548
Std. Dev.	0.522970
Skewness	0.049810
Kurtosis	2.300262
Jarque-Bera	1.019929
Probability	0.600517

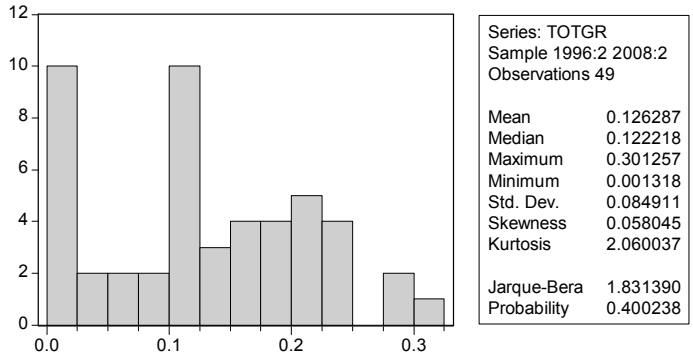
ADF Test Statistic	-4.911445	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(LYRPC)

Figure 2. Histogram and statistical test, Dickey-Fuller Unit Root Test on LYRPC(-1).

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Like the third case for TOTGR Skewness indicators are equal 0.05, Kurtosis 2.06. Therefore, it is possible to draw a conclusion on the presence of normal distribution.



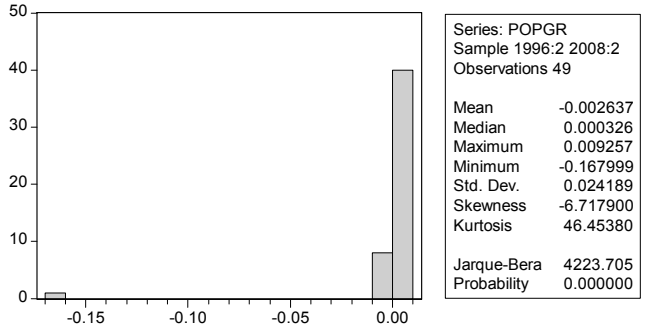
ADF Test Statistic	-3.669890	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(TOTGR)

Figure 3. Histogram and statistical test , Dickey-Fuller Unit Root Test on TOTGR.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Consequently, the behaviour of TOTGR indicator is stable. Analogously **a POPGR** indicator is stable.



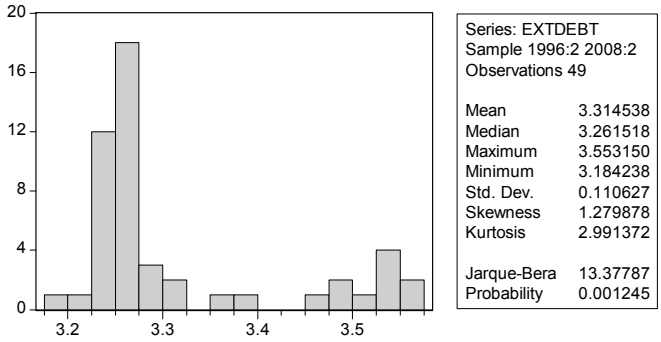
ADF Test Statistic	-4.779124	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(POPGR)

Figure 4. Histogram and statistical test , Dickey-Fuller Unit Root Test on POPGR.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Concerning the indicator **EXTDEBT** of the model we can conclude that its distribution function isn't normal. However, in comparison with the previous objects the stability is not visible.



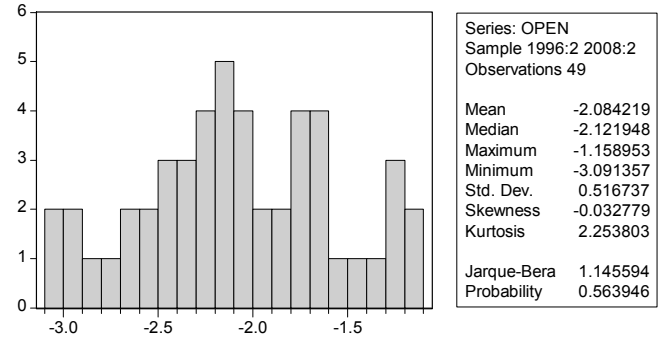
ADF Test Statistic	0.242184	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(EXTDEBT)

Figure 5. Histogram and statistical test , Dickey-Fuller Unit Root Test on EXTDEBT.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Concerning the indicator **OPEN** of the model the distribution function isn't normal. However, Dickey Fuller's test given in the column is not stable. Simultaneously, the value of ADF Test Statistics is not above critical value.



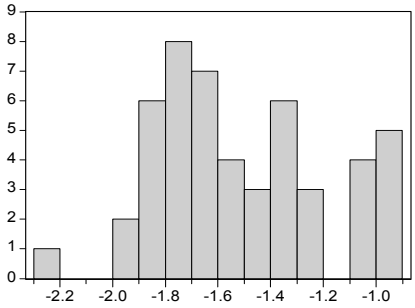
ADF Test Statistic	-5.856262	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(OPEN)

Figure 6. Histogram and statistical test , Dickey-Fuller Unit Root Test on OPEN.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Data **GROINV** specify that there isn't any normal distribution and a time column is not stable.



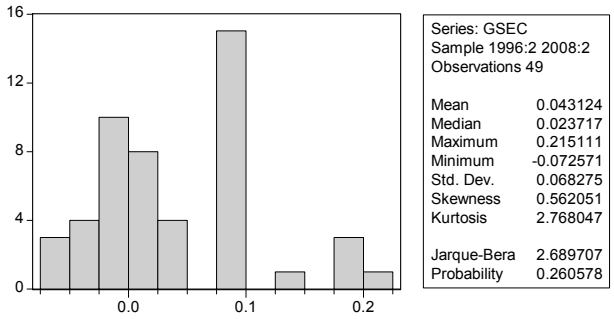
ADF Test Statistic	-1.966002	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(GROINV)

Figure 7. Histogram and statistical test, Dickey-Fuller Unit Root Test on GROINV.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Concerning the **GSEC** we can conclude that its distribution function isn't normal, but a time series is stable.



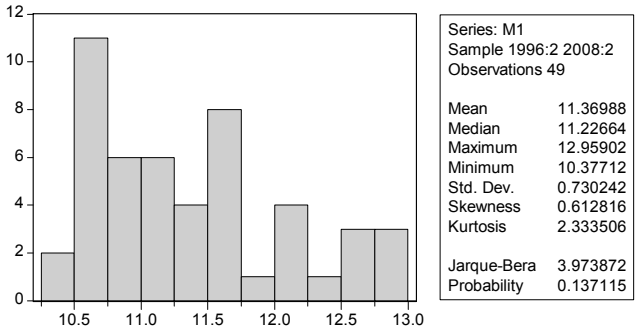
ADF Test Statistic	-3.632689	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(GSEC)

Figure 8. Histogram and statistical test , Dickey-Fuller Unit Root Test on GSEC.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

The distribution function of the variable **M1** is not normal and time series is not stable.



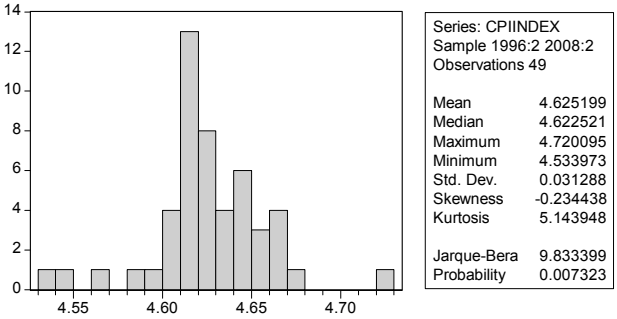
ADF Test Statistic	1.446316	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

Dependent Variable: D(M1)

Figure 9. Histogram and statistical test , Dickey-Fuller Unit Root Test on M1.

Source: Year Book of National Statistic Surveys of the Republic of Armenia

CPI (1) index has normal distribution, and the time series is stable.



ADF Test Statistic	-6.415419	1% Critical Value*	-3.5745
		5% Critical Value	-2.9241
		10% Critical Value	-2.5997

***MacKinnon critical values for rejection of hypothesis of a unit root.**

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(CPIINDEX)

Method: Least Squares

Sample(adjusted): 1996:4 2008:2

Included observations: 47 after adjusting endpoints

Figure 10. Histogram and statistical test , Dickey-Fuller Unit Root Test on CPI(1)index

Source: Year Book of National Statistic Surveys of the Republic of Armenia

Table 1.

The final results of the model (GRPCY is dependent)

Dependent Variable: GRPCY
Method: Least Squares
Date: 12/12/09 Time: 22:10
Sample: 1996:2 2008:2
Included observations: 49

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPIINDEX	0.078714	0.036924	2.131759	0.0394
EXTDEBT	0.073608	0.019339	3.806212	0.0005
GROINV	-0.015376	0.006540	-2.350931	0.0239
GSEC	0.040618	0.013776	2.948483	0.0054
LYRPC	0.999488	0.002337	427.6794	0.0000
M1	-0.051429	0.004370	-11.76933	0.0000
OPEN	0.992957	0.002886	344.0452	0.0000
POPGR	-0.989556	0.038584	-25.64669	0.0000
TOTGR	-0.044474	0.012274	-3.623328	0.0008
C	-9.248575	0.173030	-53.45071	0.0000
R-squared	0.999918	Mean dependent var		0.033903
Adjusted R-squared	0.999900	S.D. dependent var		0.610948
S.E. of regression	0.006120	Akaike info criterion		-7.174537
Sum squared reside	0.001461	Schwarz criterion		-6.788451
Log likelihood	185.7761	F-statistic		53142.24
Durbin-Watson stat	1.285854	Prob(F-statistic)		0.000000

Thus, the data of the table 1 showed that the model for GPRCY confirms the adequacy with 99 per cent. T-Statistics in an absolute value is more than 2, and the indicator Prob (F-statistic) is less than 0.05. Therefore, we could suggest the accuracy of R-squared.

Conclusion

The correlation between variables of the model is studied and we conclude that the direct correlation between factors does not exist.

Operating connection between an external debt and the economic development continues together with the new audience and economic

debates. This, respectively, became a new theme for debate and disputes on international scenes. Experience of the HIPS countries has given a topic for consideration that the increase of the size of an external debt, consequently, has negative influence on per capita income growth. Most debates concern a question, whether it is possible to adopt experience of the developed countries applying it to the HIPS countries. We found that the fundamental literature devoted to the study of the influence of an external debt on economic development suggests that it is not sufficient to study the countries with the high rate of an external debt. In addition it should be noted that these countries do not have stable market share in the international markets and the influence of an external debt on economic development in these countries strongly differs. This situation is caused by the structure of the economy and the public sector.

The study showed that in order to obtain the expected effect it is necessary to combine all factors which have direct or indirect connection with the HIPS countries. These principles will increase the productivity if we make the careful empirical analysis of an external debt and business factors showed the way to evaluate the level of the influences of the economy.

An attempt is implemented to investigate Armenian economy as a case study. In particular it is possible to evaluate changes of GPRCY as consequences of changes of other economic indicators. One of fascinating conclusions is the fact that studied variables are not correlated with GPRCY. The estimation becomes positive in the whole package. The correlation between indicator GPRCY and combination OPEN-GROINV could be considered as one of strategic targets for the investigations.

References

1. Benedict Clements, Rina Bhattacharya,Toan Quoc Nguyen, 2003. External Debt, Public investment, and Growth in Low-income Countries, Working paper, International Monetary Fund

Summary

The investigation of the influence of external debt on the economic growth of the Republic of Armenia is studied. The economic indicators characterizing external debt and economic growth are distinguished and characteristics of these indicators are investigated.