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## EFFECTS OF EXTERNAL DEBT ON GROWTH WHEN CONTROLLING FOR POLICIES IN POST-SOVIET AND EAST-EUROPEAN EMERGING ECONOMIES

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### Abstract

This paper uses a new database on 22 post-Soviet and East-European newly independent countries with emerging economies in the period between 1990 and 2007. The primary question is to examine the relations among external debt stocks, economic policies, and the growth of per capita GDP. Our findings are threefold: (i) on average, debt has little impact on the growth, (ii) although a significant finding is that debt has a positive impact on the growth in developing countries with good fiscal, monetary, and trade policies but has little effect on the presence of poor policies, and (iii) this positive impact has diminishing returns, i.e. it marginally becomes less productive. A further empirical analysis suggests that these findings are robust along with the used data and the applied econometric methods.

### Introduction

Access to foreign financing represents fundamental importance for developing countries. It is the external resources that allow countries with low levels of domestic savings to accelerate capital accumulation boosting economic growth<sup>1</sup>. However, in the second half of the 1990s indebtedness reached extremely high levels in some developing countries. Consequently, policymakers around the world started to be increasingly concerned with high external indebtedness limiting growth and development in a lot of emerging countries<sup>2</sup>.

Possibly that is the reason why the debt literature has recently focused on two main issues: on the sovereign debt crisis and on the debt determinants. The possible negative consequences of (high) level of external debt, i.e. on debt default and sovereign debt crisis, neglect the factors that affect the general level of debt and the constraints posed by international financial markets on developing countries<sup>3</sup>. There also exists considerable amount of literature on the problems posed by a debt

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<sup>1</sup> **Colombo, Emilio** and **Enrico Longoni** (2009). "The Politics of External Debt in Developing Countries", Working Paper No 196, University of Milan.

<sup>2</sup> **Patillo, Catherine, Hélène Poirson, and Luca Ricci** (2004). "What Are the Channels Through Which External Debt Affects Growth?," IMF Working Paper 04/15 (Washington: International Monetary Fund).

<sup>3</sup> See among the most recent contributions **Manasse and Roubini** (2009), **Van Rijckeghem and Weder** (2009), **Arteta and Hale** (2008). **Manasse, Paolo** and **Nouriel Roubini** (2009). "Rules of thumb for sovereign debt crises", *Journal of International Economics*, 78 (2), pp. 192-205. **Van Rijckeghem, Caroline** and **Beatrice Weder** (2009). "Political institutions and debt crises," *Public Choice*, 138 (3), pp. 387-408. **Arteta, Carlos** and **Galina Hale** (2008). "Sovereign Debt Crises and Credit to the Private Sector", *Journal of International Economics*, 74 (1), pp. 53-69.

overhang. By a debt overhang, I refer to the presence of an existing inherited debt, which is so large that the creditors do not expect to be fully repaid. The effects of this type of a debt overhang have been analyzed in several influential papers, such as Sachs<sup>4</sup>, Krugman<sup>5</sup>, and Easterly<sup>6</sup>.

Instead, it was the foreign aid literature that has more systematically addressed the issue of policy environment. There was a long and inconclusive literature on aid and economic growth in the 1960s, 1970s and 1980s, which was hampered by the limited data availability and considerable debate about the specification and the mechanisms by which aid would affect growth<sup>7</sup>. For example, if greater aid was given in response to slower growth, then the interpretation of aid flows effect on growth was difficult to explain. Hansen and Tarp<sup>8</sup> offer an extensive review of this earlier literature. A paper by Boone<sup>9</sup> revealing that aid financed consumption rather than investment was an innovation in this field. This paper was notable for introducing political determinants of aid as instruments to address problems of reverse causality; however, it also raised much uncertainty on the effects of aid on growth.

Craig Burnside and David Dollar<sup>10</sup> prove that the effect of aid on growth is conditional by economic policies. It later turned out to be extraordinarily influential because it addressed the skepticism implied by Boone (1996) and by the lack of consensus from the earlier literature. Their finding nowadays has enormous policy implications. The Burnside and Dollar (2000) result provides a role and strategy for foreign aid. If aid stimulates growth only in countries with good policies, this suggests that (1) aid can promote economic growth, and (2) it is crucial that foreign aid be distributed selectively from countries that have adopted sound policies. International aid agencies, public policy makers, and the press quickly recognized the importance of the Burnside and Dollar findings<sup>11</sup>.

To our knowledge, another gap in literature is the used country sample. The vast majority of influential empirical papers have applied panel data as a "large sample" of developing countries. They, however, involve no more than 100 economies, and address the time period between 1960s and the early 1990s<sup>12</sup>.

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<sup>4</sup> **Sachs, J.** (1984). "Theoretical issues in international borrowing", Princeton Studies in International Finance, 54.

<sup>5</sup> **Krugman, P.** (1985). "Prospects for international debt reform", International monetary and financial issues for the developing countries (UNCTAD, Geneva). **Krugman, Paul** (1988). "Financing vs. Forgiving a Debt Overhang," Journal of Development Economics, Vol. 29, pp. 253-268.

<sup>6</sup> **Easterly, William** (2001). "Debt Relief." Foreign Policy, 127, pp. 20-26.

<sup>7</sup> **Easterly, W.** (2003). "Can foreign aid buy growth?" Journal of Economic Perspectives, 17, pp. 23-48.

<sup>8</sup> **Hansen, Henrik and Tarp, Finn** (2000). "Aid Effectiveness Disputed." Journal of International Development, 12(3), pp. 375-98.

<sup>9</sup> **Boone, Peter** (1996). "Politics and the Effectiveness of Foreign Aid." European Economic Review, 40(2), pp. 289-329.

<sup>10</sup> **Burnside, Craig and Dollar, David** (2000). "Aid, Policies, and Growth." American Economic Review, 90(4), pp. 847- 68.

<sup>11</sup> **Easterly, William; Levine, Ross and Roodman, David** (2004). "Aid, Policies, and Growth: Comment." American Economic Review, 94(3), pp. 774-80.

<sup>12</sup> An exception is Easterly's comment on Burnside and Dollar, where he extends the data set to extra time periods using the same methodology (Easterly, 2004).

However, by IMF's criteria there are more than 140 developing countries, not counting small countries (e.g. islands, city republics, etc) and those with no consistent data (e.g. countries that had been at war for long periods), there are also some important (and interesting in terms of transition economics) countries that are usually left out from the analysis. Those typically include newly independent emerging economies, such as post-Soviet Republics and post-Socialist block Eastern European countries for which there are no data available before 1990s. And, therefore, they were left out of samples because of robustness concerns.

Hence, the present paper builds the analysis on the two gaps of the literature mentioned above. It applies a new database of 22 post-Soviet and East-European countries over the period from 1990 to 2007 to examine the relationships among total external debt, economic policies and growth of per capita GDP. As already noted above, it was the aid, rather than the debt literature that addressed the issue of economic policy environment in a more intensive manner. Fortunately, for our analysis, state sovereign debt represents the lion's share of the total external debt flowing from the Western developed economies to help enhance the weak economies of these transition countries. And so, it was much like a foreign aid to these post socialist countries, especially in their earlier years of independence. Therefore, the main goal of this paper is to examine empirically the effects of the stock of external debt on growth for a new sample of post-Soviet and East-European developing countries. In particular, the policy factors that played a significant role in influencing a country's debt-ceiling are highlighted. I believe that these factors, shaping the framework within which policymakers make their decisions, are a key element affecting the debt growth relationship, particularly for developing countries.

The underlying hypothesis is that the effect of foreign debt on growth depended on the macroeconomic policies of recipient countries. And more specifically, debt has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies but has little effect in the presence of poor policies.

The remainder of the paper is structured as follows: section 2 presents the data set, the variables used, and the methodology applied, section 3 presents the results, section 4 performs several robustness checks of the obtained results and finally section 5 comprises the conclusive part.

## **1. Data and Methods**

This paper reassesses the links between debt, policy, and growth using new data. The Burnside and Dollar data contain 51 emerging economies and the time period ends in 1993. It addresses a new panel data and thus (1) constructs a new country sample of 22 East-European and post-Soviet Republics, and (2) employs recent data from 1990 to 2007<sup>13</sup>.

Standard regression techniques from the growth literature to measure the effect of external debt on growth have been deployed. In fact, this methodology is based on the similar methodological framework that was applied by Burnside and

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<sup>13</sup> Upon request a country-specific summary statistics is available.

Dollar (2000) and on the much followed criticism; to name just a few: Henrik Hansen and Finn Tarp (2000), Malcolm McPherson (2000)<sup>14</sup>, Carl-Johan Dalgaard and Hansen (2001)<sup>15</sup>. Most of these criticisms center on the model specifications, applied econometric methods, or the data set<sup>16</sup>.

Burnside and Dollar's preferred specification is a growth regression with several control variables common to the literature, plus terms for the amount of foreign debt provided to a country (external debt), an index of the quality of the policy environment (policy index), and two debt and policy interaction terms (Debt\*Policy and Debt<sup>2</sup>\*Policy). As control variables, Burnside and Dollar include the logarithm of initial Gross Domestic Product per capita (Log initial GDP). I exclude the two other control variables originally used in Burnside and Dollar paper: measure of ethnic fractionalization and the rate of political assassinations. This exclusion is conditioned by the data availability. However, I do not expect this to greatly affect the analysis, as there are good reasons to argue that both of these variables have remained relatively stable along the considered time period, perhaps except the first few years of transition, which, however, is captured by a dummy variable, which will now be defined.

Nearly all of the countries in the sample exercised significant transition shocks or collapses in their early years, i.e. majority of these economies experienced hyperinflations, huge GDP downfalls (up to 30-35% in extreme cases) and high migration. Therefore, I introduce a dummy variable equal to 1 for 1990-1994 and 0 for the rest, to capture the above mentioned transition effects.

The data are taken exceptionally from World Bank's "World Development Indicators 2009", reflecting data from several World Bank (WB), International Monetary Fund (IMF), World Trade Organization (WTO) and Organization for Economic Cooperation and Development (OECD) reports, e.g. WB Global Development Finance, WB National Accounts data, OECD National Accounts data, International Monetary Fund, Government Finance Statistics Yearbook, WB and WTO GDP estimates.

The external debt variable is the total external debt stock, i.e. the sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt, owed to nonresidents repayable in foreign currency, goods, or services. Data for external debt is measured in current U.S. dollars. Therefore, the growth of GDP per capita and initial GDP levels are also taken in current U.S. dollars.

**Policy Index:** To estimate the policy index, an analogous, but not identical, approach to Burnside and Dollar has been adopted. In their analysis, the policy index is constructed from measures of budget balance, inflation, and the Sachs-Warner openness index. For the budget balance variable, its closest available synonym is used: cash surplus or deficit, which is revenue (including grants) minus ex-

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<sup>14</sup> **McPherson, Malcolm** (2000). "Aid, Policies, and Growth: A Comment." Unpublished manuscript, Harvard University.

<sup>15</sup> **Dalgaard, Carl-Johan** and **Hansen, Henrik** (2001). "On Aid, Growth and Good Policies." *Journal of Development Studies*, 37(6), pp. 17-41.

<sup>16</sup> **Burnside, Craig** and **Dollar, David** (2004). "Aid, Policies, and Growth: Reply." *American Economic Review*, 94(3), pp. 781- 784.

pense, minus net acquisition of non-financial assets (still missing is lending minus repayments). The next problematic variable is the Sachs-Warner (1995) policy index, which is a data set of 1s and 0s representing whether a country has open trade or not. However, this index is reported until 1992, therefore as a proxy I take the foreign trade measure (imports plus exports as percent of GDP at current U.S. dollars).

Burnside and Dollar note that in terms of simplicity and exposition, it would be useful if there was one overall measure of economic policy rather than three separate variables. Besides, it turned out that two of the three components, inflation and trade openness, are almost perfectly correlated, so that they cannot enter into one regression. The reported p value (0.0027) is less than 0.01, hence the correlation between Trade Openness and Annual Inflation is significantly (at 1%) different from 0 (results not reported here).

Therefore, it is natural that the policy index should weight various economic policies according to their impact on growth. This would allow discussing the effectiveness of debt in "good" and "bad" policy environments, where "good" and "bad" would possess precise meaning. Thus, the key feature of the policy index is that it weights the policy variables according to their correlation with growth.

Hence, I use an OLS regression on growth with no debt term (this specification corresponds to Table 1):

$$[1]g_{it} = \alpha + \beta_1 y_i + \beta_2 x_{2,it} + \beta_3 x_{3,it} + \beta_4 x_{4,it}$$

Where  $g$  is the growth of per capita GDP,  $y$  is the state variable controlling for initial per capita GDP,  $x_2$ ,  $x_3$  and  $x_4$  are Trade openness, Annual inflation and Budget deficit/surplus, respectively (over country  $i$  and time  $t$ ).

**Table 1:** Computation of the Policy Index: output of regression [1]<sup>17</sup>

| Source   | SS         | df  | MS         |
|----------|------------|-----|------------|
| Model    | 1.06254562 | 4   | .265636405 |
| Residual | 5.46309005 | 165 | .033109637 |
| Total    | 6.52563567 | 169 | .038613229 |

Number of obs = 170  
 F( 4, 165) = 8.02  
 Prob > F = 0.0000  
 R-squared = 0.1628  
 Adj R-squared = 0.1425  
 Root MSE = .18196

| var1  | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval] |
|-------|-----------|-----------|-------|-------|----------------------|
| var2  | -.0000236 | .0000136  | -1.73 | 0.086 | -.0000505 3.35e-06   |
| var5  | -.0597275 | .057496   | -1.04 | 0.300 | -.1732502 .0537953   |
| var8  | -.018072  | .005992   | -3.02 | 0.003 | -.0299029 -.006241   |
| var11 | 1.724315  | .4108374  | 4.20  | 0.000 | .9131389 2.535491    |
| _cons | .2584436  | .0578426  | 4.47  | 0.000 | .1442366 .3726506    |

It follows from Table 1 that most of the regressed variables are statistically significant (only trade openness is not significant) and that all of them have the expected signs, i.e. budget deficit and Inflation have negative effects on policy,

<sup>17</sup> See Appendix 1 for the variable labels.

whereas the higher foreign trade - GDP ratio has a positive impact on policy. Hence, the weighted policy index can be formed using the regression coefficients from Table 3:

$$[2] \text{Policy} = 0.258 - 0.0597 \text{ Budget Deficit} - 0.018 \text{ Inflation} + 1.724 \text{ Openness}$$

## 2. The Analysis

The main strategy is to explain a range of institutional and policy distortions that can help to elucidate the growth performance of developing countries, in order to ensure that any relationship between debt and growth are strongly linked.

Our analysis focuses on four versions of a panel growth regression, which may be summarized as:

$$[3] g_{it} = \alpha + \partial_1 y_i + \beta_1 D_{it} + \varepsilon$$

$$[4] g_{it} = \alpha + \partial_1 y_i + \partial_2 T_t + \beta_1 D_{it} + \varepsilon$$

$$[5] g_{it} = \alpha + \partial_1 y_i + \partial_2 T_t + \beta_1 D_{it} + \beta_2 D_{it} P_{it} + \varepsilon$$

$$[6] g_{it} = \alpha + \partial_1 y_i + \partial_2 T_t + \beta_1 D_{it} + \beta_2 D_{it} P_{it} + \beta_3 D_{it}^2 P_{it} + \varepsilon$$

Where  $g$  is the growth of per capita GDP,  $D$  is the External debt to GDP ratio,  $P$  is the Policy index and control variables include initial per capita GDP ( $y$ ) and the transition dummy ( $T$ ) and  $\varepsilon$  is the error term.

We start by estimating regression [3]. For this reason, OLS estimation with growth is used depending on external debt and initial income as a control variable. The regression output reports statistically insignificant variables (results not reported here). Moreover, the F test also fails to reject the null hypothesis (the joint significance of all explanatory variables).

At a further step, the transition dummy is introduced (regression [4]). The underlying hypothesis is that our sample of developing countries has suffered major transition shocks experienced by highly unstable macroeconomic environment after the collapse of the Soviet Union, therefore the effect of external debt on growth has to be significantly different from these transition years (1990 to 1994) compared to the rest of the examined period. As expected, the transition dummy (var11) is statistically significant at 1% level, making it an important control variable for the regression. Note that our estimate of external debt (var1) remains insignificantly different from 0, i.e. external debt is ineffective on growth (results not reported here).

For that reason, we proceed to the next model (regression [5]), where we introduce the interaction term between external debt and the estimated policy index. As a result, external debt becomes significant, however, to our surprise, its coefficient is negative, i.e. external debt negatively affects growth. The interpretation for this result is perhaps not appropriate, as the debt literature suggests that the relationship between external debt and growth is much more complex than the way how it is entered into our model. For a fully trustworthy interpretation, it is at least necessary to look for a non-linear relation. We do not attempt such an analysis here and just draw the reader's attention to the established significant effect of debt on growth (rather than on its sign). What I am more concerned here, however, is the interaction term between debt and policy (var 3). It

turns out to be consistent with the underlying hypothesis: it is significantly different from 0 and has a strictly positive coefficient (results not reported here).

To be able to give a full interpretation of the results, I also run the final regression [6], where I introduce a quadratic interaction term between debt and policy (var 4). The reason is that the quadratic interaction term is consistent with theory, when returns to capital are diminishing, and, secondly, it appeared to improve the fit of the regression by 10%. Debt itself still has a negative significant coefficient, but aid interacted with policy has a significantly positive coefficient, while the quadratic term has a significantly negative coefficient. This implies that the impact of debt on growth is a positive function of the level of policy and a negative function of the level of debt. These results prove the existence of non-linear relationship between external debt and growth. They suggest that the negative sign of the quadratic interaction term indicate diminishing returns to debt, i.e. for good policy countries debt positively affects growth, however this effect marginally becomes less productive (diminishing returns).

**Table 2:** output of regression [6]

| Source   | SS         | df  | MS         |
|----------|------------|-----|------------|
| Model    | .874973949 | 5   | .17499479  |
| Residual | 5.33346354 | 163 | .032720635 |
| Total    | 6.20843749 | 168 | .036954985 |

Number of obs = 169  
 F( 5, 163) = 5.35  
 Prob > F = 0.0001  
 R-squared = 0.1409  
 Adj R-squared = 0.1146  
 Root MSE = .18089

| var5  | Coef.     | Std. Err. | t     | P> t  | [95% Conf. Interval]   |
|-------|-----------|-----------|-------|-------|------------------------|
| var6  | -.0000185 | .0000135  | -1.37 | 0.172 | [-.0000452, 8.16e-06]  |
| var1  | -.2167261 | .0831396  | -2.61 | 0.010 | [-.3808955, -.0525566] |
| var11 | -.0044089 | .0591195  | -0.07 | 0.941 | [-.1211478, .1123299]  |
| var3  | 2.263782  | .6511278  | 3.48  | 0.001 | [.9780489, 3.549515]   |
| var4  | -.9939488 | .6345552  | -1.57 | 0.119 | [-2.246957, .2590594]  |
| _cons | .1378066  | .0474601  | 2.90  | 0.004 | [.0440908, .2315224]   |

The main finding of this section was that the effect of foreign debt on growth depended on the macroeconomic policies of recipient countries. Moreover, the impact of debt on growth is greater in a good policy environment than in a poor policy environment.

**3. Robustness Checks**

In this section, several robustness checks of the results obtained up to this point in two different ways: robustness check of data and of estimation method are conducted. In particular: (i) robustness is checked by taking 2 year averages along the period, and (ii), the validity of the results obtained through the OLS estimator is tested by comparing them with those obtained using different estimation methods which address specific empirical issues.

The majority of the authors in growth literature use three to five year averages to capture the long run effects of growth, rather than short run or cyclical effects<sup>18</sup>. However, in our case of panel data with 18 years and 22 economies such an action would significantly reduce the data making the panel data analysis practically impossible. Still, in the following model I estimate regression [6] using a panel across nine two-year periods from 1990- 1991 through 2006-2007 (table 8). Thus, an observation is a country's performance averaged over a two-year period<sup>19</sup>. The number of observations significantly reduces from 169 reaching 75, but our purpose, here, is to compare the two outputs. A comparison of table 7 and 8 suggests that the averaged and non-averaged regressions on model [6] are almost identical, i.e. external debt to GDP ratio (var1) maintained its 1% significance and negative sign of the coefficient, the debt and policy interaction term (var 3) in both cases is significantly different from zero and has a positive close to each other coefficient (2.26 and 2.69 respectively), the quadratic interaction term, yet again, remained insignificant (significant only at 20%) and maintained its negative close to unity sign. This comparison suggests that our results obtained in the last section are robust along the data.

**Table 3:** output of regression [6] with two-year averages

| Source   | SS         | df | MS         |
|----------|------------|----|------------|
| Model    | .416059915 | 5  | .083211983 |
| Residual | 1.33333239 | 69 | .019323658 |
| Total    | 1.74939231 | 74 | .023640437 |

Number of obs = 75  
F( 5, 69) = 4.31  
Prob > F = 0.0018  
R-squared = 0.2378  
Adj R-squared = 0.1826  
Root MSE = .13901

| var5  | Coef.     | Std. Err. | t     | P> t  | [95% Conf. | Interval] |
|-------|-----------|-----------|-------|-------|------------|-----------|
| var6  | -.000018  | .0000159  | -1.14 | 0.260 | -.0000496  | .0000136  |
| var1  | -.2608856 | .1004954  | -2.60 | 0.012 | -.4613685  | -.0604027 |
| var11 | -.0390485 | .0583717  | 0.67  | 0.506 | -.0773999  | .1554968  |
| var3  | 2.696809  | .8187818  | 3.29  | 0.002 | 1.063384   | 4.330234  |
| var4  | -1.027561 | .7957769  | -1.29 | 0.201 | -2.615093  | .5599702  |
| _cons | .1142238  | .0589518  | 1.94  | 0.057 | -.0033818  | .2318293  |

Now we turn to robustness check of the estimation methods used. Table 9 reports estimates obtained with a panel within effects estimator. Despite its disadvantages with variables that are either fixed or display limited time variability,

<sup>18</sup> Some authors like Easterly (2004) use even 10 and 12 year averages when checking for robustness, such an analysis, however, is unfeasible given my developing country data.

<sup>19</sup> Using two year averages is not too restrictive for our sample. The reason is that these countries being in transition do not still have a perfectly functioning market economy with already well-established business cycles. In practice, in case of debt coming from international organizations aiming to boost economic growth, these debtor organizations announce and local governments expect the debt to have significant effects on the economy in short-run, typically less than half a year, e.g. after three months of an 2009 debt issue by IMF aiming to help Armenia recover from global financial crisis, IMF officials criticized the government for "not being able to inject more than half of the debt into the economy".



fixed effects allow to fully control for cross-country unobserved heterogeneity. A comparison with OLS regression (table 3) suggests that the sign of the coefficients, as well as their statistical significances, are all confirmed.

**Table 4:** output of regression [6], Fixed Effects Estimation

|                                   |                        |
|-----------------------------------|------------------------|
| Fixed-effects regression (within) | Number of obs =169     |
| Group variable (i): var12         | Number of groups = 19  |
| R-sq: within = 0.1340             | Obs per group: min = 1 |
| between = 0.0033                  | avg =8.9               |
| overall = 0.0008                  | max = 17               |
|                                   | F(5,145) = 4.49        |
| corr(u_i, Xb) = -0.9985           | Prob > F = 0.0008      |

| var5    | Coef.                                       | Std. Err. | t     | P> t  | [95% Conf. Interval] |  |
|---------|---|-----------|-------|-------|----------------------|--|
| var6    | -.0015334                                   | .0110792  | 0.14  | 0.890 | -.0203643 .0234311   |  |
| var1    | -.2622304                                   | .11887    | -2.21 | 0.029 | -.4971722 -.0272886  |  |
| var11   | -.0053651                                   | .0651152  | -0.08 | 0.934 | -.1340627 .1233325   |  |
| var3    | 2.39559                                     | .9493141  | 2.52  | 0.013 | .5193088 4.271871    |  |
| var4    | -.8825693                                   | .8635546  | -1.02 | 0.308 | -2.58935 .8242115    |  |
| _cons   | -2.661813                                   | 20.03011  | -0.13 | 0.894 | -42.25052 36.92689   |  |
| sigma_u | 1.6008045                                   |           |       |       |                      |  |
| sigma_e | .18166513                                   |           |       |       |                      |  |
| rho     | .98728521 (fraction of variance due to u_i) |           |       |       |                      |  |

F test that all u\_i=0: F(18, 145) = 0.92 Prob > F = 0.5525

There is one more issue concerning check for robustness, which, however, is beyond the scope of this study. Therefore, we just refer to it here without a properly thorough analysis. There is the issue of possible endogeneity of the level of per capita GDP. So far we have dealt with this problem by treating it as predetermined (exogenous). An instrumental variable estimation method might be useful to treat per capita GDP as fully endogenous and compare the resulting outcomes with those reported here.

#### 4. Conclusion

This paper attempts to provide a thorough analytical answer to an important economic issue that demands increasing attention and efforts from policymakers, lending institutions, international organizations, and citizens around the globe: the impact of external debt on growth (Pattillo, 2004). A new database on 22 post-Soviet and East-European newly independent countries with emerging economies in time period between 1990 and 2007 has been generated. The primary question is to

examine the relationships among external debt stocks and growth of per capita GDP, controlling for economic policies.

Therefore, as a first step of the analysis, a policy variable is constructed, which is the weighted index of three economic policy indicators: budget deficit, inflation and trade openness. The weights are obtained from an OLS regression of these three indicators on economic growth itself.

The analytical part uses standard regression techniques from the growth literature to measure the effect of external debt on growth when controlling for policies. The impact of external debt on growth is insignificant, although a debt-policy interaction term and a debt-policy quadratic interaction term are both highly significantly different from zero and have positive and negative coefficient, respectively. Afterwards, a further empirical analysis aiming to check for the robustness of these results is attempted. An OLS regression on two-year averages and a fixed effect within estimation return identical results. This, in turn, suggests that the findings are robust along the used data and the applied econometric methods.

These findings can be summarized as follows: (i) on average, debt has little impact on growth, (ii) although a significant finding is that debt has a positive impact on growth in developing countries with good fiscal, monetary, and trade policies but has little effect in the presence of poor policies, and (iii) this positive impact has diminishing returns, i.e. it marginally becomes less productive.

**Appendix 1: Variable Labels in Stata**

|      |                                  |       |                                 |
|------|----------------------------------|-------|---------------------------------|
| Var1 | External Debt / GDP (%)          | Var7  | Ln (per capita GDP)             |
| Var2 | Policy Index                     | Var8  | Trade Openness (of GDP)         |
| Var3 | (external debt / GDP) * Policy   | Var9  | Annual Inflation                |
| Var4 | (external debt / GDP)^2 * Policy | Var10 | Budget Deficit/Surplus (of GDP) |
| Var5 | Growth of GDP per capita         | Var11 | Transition Dummy                |
| Var6 | Initial per capita GDP (1990)    | Var12 | Country Dummy                   |

**ԶԱՐԵՅ ԱՍԱՏՐՅԱՆ – Արտաքին պարտքի ազդեցությունը հետխորհրդային և արևելաեվրոպական զարգացող երկրների տնտեսական աճի վրա** – Սույն հետազոտության մեջ օգտագործվել են հետխորհրդային և Արևելյան Եվրոպայի 22 անցումային երկրների 1990-2007 թթ. վիճակագրական տվյալները: Հետազոտության հիմնական նպատակն արտաքին պարտքի, տնտեսական քաղաքականության և մեկ շնչին բաժին ընկնող ՀՆԱ-ի ցուցանիշների միջև առկա կապի ուսումնասիրությունն է: Ստացված հիմնական արդյունքները հետևյալն են՝ (I) ընդհանուր առմամբ արտաքին պարտքի աճը տնտեսական աճի վրա էական ազդեցություն չունի, (II) չնայած վերջինս արտաքին պարտքի ազդեցությունը զարգացող երկրների տնտեսական աճի վրա դրական է և հիմնականում պայմանավորված է արդյունավետ ֆիսկալ, դրամավարկային և առևտրային քաղաքականություններով, և հակառակ դրան՝ այդ ազդեցությունը չնչին է (կամ երբեմն բացասական), երբ տնտեսական քա-

դաբականության արդյունավետությունը ցածր է, և (III) վերը նշված դրական ազդեցությունը ունի նվազման միտում, այսինքն՝ արտաքին պարտքի ազդեցությունը աճի տեմպի վրա պարտքի որոշակի սահմանային մեծությունից հետո չեզոքանում է: Օգտագործված տվյալների բազայի և կիրառված էկոնոմետրիկ մեթոդներով կատարված էմպիրիկ ուսումնասիրությունները ցույց են տալիս, որ վերը բնութագրված արդյունքները արժանահավատ են (robust):

**ЗАРЕ АСАТРЯН – *Воздействие внешней задолженности на экономический рост в постсоветских и развивающихся восточноевропейских странах.*** – В статье изучается взаимосвязь между внешней задолженностью, экономической политикой и ростом ВВП на душу населения, для чего использованы статистические данные по 22 постсоветским и восточноевропейским странам с формирующейся рыночной экономикой в период с 1990 по 2007 гг. Как показывает анализ, рост внешней задолженности мало влияет на экономический рост. Более того, в развивающихся странах с хорошей финансовой, валютной и торговой политикой задолженность даже способствует экономическому росту. Впрочем, этот эффект очень незначителен, а когда страна проводит слабую экономическую политику, он носит отрицательный характер. Кроме того, отмеченное выше позитивное воздействие имеет тенденцию к снижению. Дополнительные эмпирические исследования показывают, что полученные результаты вполне надёжны (robust).