DEBTS (PUBLIC AND EXTERNAL) AND GROWTH – LINK OR NO LINK?

Vladimir Šimić
Faculty of Economics Split, University of Split
Cvite Fiskovića 5, 21000 Split, Croatia
E-mail: vsimic@efst.hr

Vinko Muštra
Faculty of Economics Split, University of Split
Cvite Fiskovića 5, 21000 Split, Croatia
E-mail: vmustra@efst.hr

Abstract

Throughout history the world has been faced by high debts, with the recent global financial crisis intensifying the issue of increasing indebtedness (with respect to both public and external debts), especially in the light of sovereign debt crisis that some countries have been subject to recently. This paper explores the debt levels in Central, East and Southeast Europe and investigates their relation with growth. We use annual data on debts and growth from the WIIW database (The Vienna Institute for International Economic Studies) and World Development Indicators (World Bank) on 18 countries. By employing econometric analysis in the form of dynamic panel data analysis our investigation contributes to the literature by covering the recently very hot issue of the dangers of high indebtedness in the region of Central, East and Southeast Europe. Our findings send a strong warning about the need to keep the debts under control.

Key words: *Indebtedness, Growth, Central, East and Southeast Europe*

1. INTRODUCTION

The recent global financial crisis has brought forth the issue of the dangers of high and increasing indebtedness back. Before the crisis it somehow seemed that the world has been accustomed to high levels of debts and high indebtedness practiced by a number of countries was rarely seen as major problem. Although high indebtedness was generally recognized as a concern, no alarms were switched on, and the indebted countries could turn to the world markets as they required. However, sovereign debt crises that some countries have been subject to recently, call for revisiting the issue of the dangers

of high indebtedness. While the previous literature is not entirely clear on the link between debts and growth, there is relatively strong evidence (especially the more recent studies) which sends a warning that high debts may be very dangerous for growth. Investigation in this paper contributes to the literature by covering the recently very hot issue of the dangers of high indebtedness (in terms of both public and external debts) in the region of Central, East and Southeast Europe and exploring their link with growth. Our empirical findings reveal a significant negative relation between debts, both public and external, and growth and send a strong warning about the need to keep the debts under control.

This paper is structured as follows. Section 2 provides the theoretical background for the paper and reviews the empirical literature on the link between debts and growth. Data, research methodology and empirical analysis with results are presented in Section 3. Section 4 concludes.

2. LITERATURE REVIEW

Last couple of years has witnessed a huge increase in the number of empirical studies covering the issue of high indebtedness and its relation with growth. This comes as a natural consequence of the recent global financial and economic crisis and a turmoil that has been created worldwide resulting in consideration of the bankruptcy concerns for a number of sovereign states, both from the group of developed and developing countries. This particularly applies to the countries with very high levels of debt (public and external) in their GDP[1].

Prior to the recent financial crisis the world seemed to have developed high tolerance to the issue of debts. This is probably due to the relatively calm times in the global economy in the 20 years preceding the crisis, especially in the beginning of the 21st century in the presence of global saving glut and very low interest rates. This made reliance on debts a preferable option for a number of countries and unsurprisingly high increases in both government and external debts were observed. The debt levels in several advanced economies exceeding 100% of GDP, and lower but progressively growing debt levels in less developed countries have not been raising too much concern. It seemed as if the world had forgotten the debt crisis of the 1980s and severe consequences it had on a number economies. Following the debt crisis of 1980s many studies investigated the issue of high debts and its sustainability, but primarily focusing on developing economies and with little relevance for advanced countries. A number of studies have shown the danger of high and increasing indebtedness for less developed countries. In the context of developing economies, various theoretical contributions argued that the expected effects of high levels of debts on economic activity in the long run are principally

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[1] Reinhart and Rogoff (2011) present evidence that public debts in the advanced economies have surged in recent years to levels not recorded since the end of World War II, surpassing the heights reached during the First World War and the Great Depression.

negative. While it was recognized that there was also a possibility of a positive impact of debts on growth[2], it was argued that at high levels of debt the expected effects are negative. Theoretically, higher public debts may be considered as endangering the private debts through the crowding out effect and thus reduce expectedly more productive private investment (and in consequence reducing the potential long-run growth). In addition, there may be also an effect on long-term interest rate (which is expected to increase under the pressure of increasing public debt), which again may reduce the long-term growth, with a possibility even of a non-linear effect[3]. Thus, in theory both the positive and negative effects are possible. However, the literature (especially the empirical one) emphasizes the negative relation. In what follows, we provide a brief review of the empirical literature on the link between public debt and growth. As suggested above, the "older" literature on the impact of debts mainly focused on developing countries, particularly in terms of external debt. This literature[4] pointed towards the presence of a negative relation between debts and growth with a recommendation for developing countries to keep their debts under control. As a starting point of our review of the newer evidence of debts on growth we take the very influential study by Reinhart and Rogoff (2011).
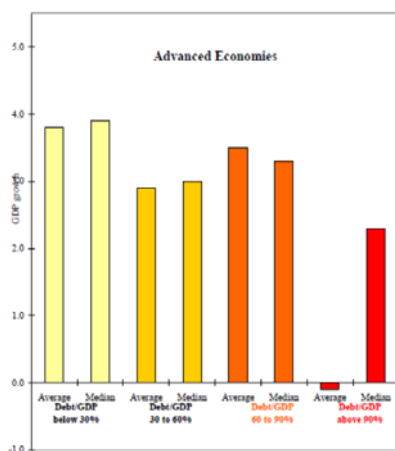

Figure 1: Debt (gross central government debt) and real per capita growth, 1946-2009
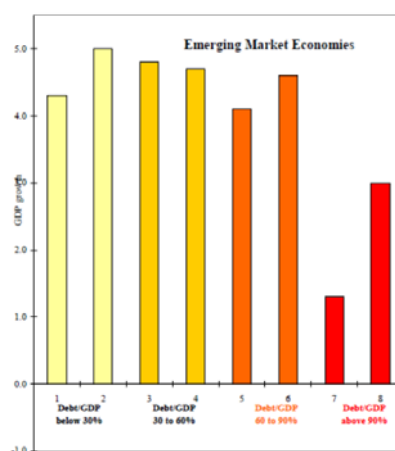
Figure 2: Debt (gross central government debt) and real per capita growth, 1946-2009
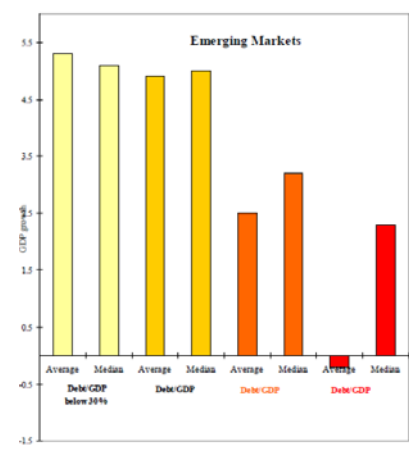
Figure 3: Debt (gross external debt) and real per capita growth: emerging economies, 1946-2009

Source: Reinhart and Rogoff (2011), p. 29

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[2] A possible explanation for a positive impact of higher debt (i.e. accumulated past deficits) on growth would be if those deficits were used to finance productive public investment. However, as argued by Checherita and Rother (2010), a large part of debt increases are related to higher public consumption and transfers, and therefore the possible positive effect related to productive public investment is not realized.

[3] This is due to the so-called debt intolerance phenomenon (Reinhart, Rogoff and Savastano, 2003). Namely, as countries hit debt tolerance ceilings, market interest rates can begin to rise quite suddenly, forcing painful adjustment (thus causing a nonlinear response of growth to debt).

[4] See for example Sachs (1986), Krueger (1987), Afxentiou (1993) and Cunningham (1993). We do not provide a detailed review of these studies as we focus below on more recent evidence covering longer times series and larger sample of countries covering both developing and advanced economies.

Reinhart and Rogoff (2011) find that whereas the link between growth and debt seems relatively weak at "normal" levels, median growth rates for countries with public debt over roughly 90 percent of GDP are about one percent lower than otherwise; for emerging economies – when external debt reaches 60 % of GDP, annual growth declines by about 2%; for levels of external debt in excess of 90% of GDP, growth rates are roughly cut in half. Although the above figures are not obtained by applying a formal econometric investigation of the link between debts and growth, the longitude of the data and coverage of a broad sample of countries seem very informative and point towards the presence of a negative relation, especially at high levels of indebtedness. More formal evidence on the link between debts and growth is reviewed below.

For the euro area the link between the public debt and growth has been recently investigated by Baum et al. (2012) who find that the short run impact of debt on growth is positive and highly statistically significant, but decreases to around zero and loses significance beyond public debt-to-GDP ratios around 67%. They also find that for high debt-to-GDP ratios (above 95%) additional debt has a negative impact on growth. This evidence is in line with Kumar and Woo (2010) and Checherita and Rother (2010) who also find that only high debt levels (exceeding 90% of GDP) have negative and significant impact on growth. For OECD countries, Cecchetti et al. (2011) find negative and significant impact of debt on growth at high levels of debt to GDP. Panizza and Presbitero (2012) were not able to find any evidence that high public debt hurts future growth in the group of OECD countries. However, they warn that this does not necessarily mean that the negative and significant causal link does not exist, but suggest that the advanced economies in their sample are probably still below the threshold at which debt starts having a negative effect on growth. In summary, it seems that although the negative impact predominates, the most recent empirical evidence does not provide a clear cut case regarding the link between public debts and growth in advanced economies. For developing economies the empirical literature is scarcer and the evidence is mixed. For example, Dao (2011) finds a positive impact of public debt on growth in the sample of 52 developing economies. Presbitero (2011), in contrast, finds that public debt has a negative impact on output growth up to a threshold of 90 percent of GDP, beyond which the effect becomes insignificant.

Similarly with the public debt and its relation with growth, theoretical contributions on the link between external debt and growth also mainly concentrate on the adverse impact on economic activity, particularly at high levels of external indebtedness. Here, the literature predominantly rests on the "debt overhang" argument proposed by Krugman (1988). In similar context, Cohen (1992) argues in favour of a non-linear impact of foreign borrowing on investment, and in consequence on growth.

Thus, in a similar vein as with public debt, the literature holds that beyond a certain threshold external debt will have a negative impact on economic activity. This link is corroborated by empirical studies, especially the more recent ones, which find the non-linear effects. Thus, Patillo et al. (2011) find that the impact of external debt on growth in a sample of 93 developing economies is negative for levels of external debt in GDP exceeding 35-40%. Clemens et al. (2003) also find the negative relationship, but at a lower threshold (beyond external debt in GDP around 20-25%). Cordella et al. (2005) find that there is a negative marginal relationship between debt and growth at intermediate levels of debt, but not at very low debts level or, surprisingly, very high levels (above 70-80% of GDP). Sclarek (2004) also investigated this link in the sample of developing economies and found the linear negative relationship. For developed economies he was not able to provide statistically significant evidence of relationship between external debt and growth in 24 advanced economies. Dao (2011) found that for a sample of 27 heavily indebted countries external debt as a percent of GDP exerts a negative impact on growth. Wamboye (2012) also found that high external debt depresses economic growth in a panel of 49 least developed economies.

3. DATA, RESEARCH METHODOLOGY AND EMPIRICAL ANALYSIS

In our empirical investigation of the link between the public and external debt and growth we use data on 18 countries from Central, East and Southeast Europe.[5] Sources for the data are the Vienna Institute for International Economic Studies database and World Development Indicators (World Bank) database covering the period 1990 - 2010. Before turning to econometric testing, descriptive statistics regarding the public and external debt levels for period 1990 – 2010 for countries in our sample are provided in Table 1. The minimum, maximum and average levels of debt for period 1990 – 2010 are presented, as well as the debt levels in 2010.

Our empirical analysis is conducted in two steps. In the first step the link between the debt (both public and external) and growth is tested. Based on the literature review in the previous section we would expect the debt level to show a non-linear relationship with growth. To test for this non-linear effect in the second step of our analysis we add the debt squared in the model.

We test the links between debt and growth by employing dynamic panel data analysis. Allowing for dynamics in the underlying process is relevant not only to infer on the persistence of the series but also to ensure that the estimates for other parameters are consistent. Therefore, the first challenging task is to establish whether the process under investigation is static or dynamic.

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[5] The countries are: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia and Ukraine.

Table 1: The main characteristics of the public and external debt levels for 18 selected countries for period 1990 -2010

	COUNTRY	Public debt in GDP (%)				External debt in GDP (%)			
		Min	Max	Average	2010	Min	Max	Average	2010
1	Albania	53.90	72.10	60.99	58.20	23.39	79.81	34.52	42.30
2	Bosnia and Herzegovina	21.80	39.10	30.72	39.10	17.15	38.40	38.40	25.68
3	Bulgaria	13.70	108.30	46.19	16.30	16.17	172.21	92.07	102.80
4	Croatia	29.00	40.10	35.19	40.10	11.70	101.17	52.08	101.17
5	Czech Republic	11.90	37.60	23.78	37.60	27.93	47.81	35.64	47.81
6	Estonia	3.70	8.20	5.79	6.70	31.80	124.68	76.05	115.21
7	Hungary	52.70	85.60	65.87	81.30	53.45	149.75	77.75	141.72
8	Latvia	9.00	44.70	16.55	44.70	31.24	166.57	85.63	166.57
9	Lithuania	11.50	38.00	20.31	38.00	28.56	87.42	51.46	87.42
10	Macedonia	27.90	57.10	41.67	35.40	35.88	59.53	46.51	59.53
11	Montenegro	27.50	84.50	42.54	40.90	15.61	65.69	29.22	29.40
12	Poland	36.80	54.90	44.74	54.90	30.60	75.91	47.68	66.61
13	Romania	6.60	31.00	18.31	31.00	3.03	74.55	31.79	74.55
14	Russia	5.70	143.20	43.84	8.60	4.85	121.66	46.04	33.14
15	Serbia	29.20	169.30	63.39	42.90	39.71	85.56	63.19	-
16	Slovakia	22.10	50.30	37.16	41.00	27.08	74.75	49.40	74.75
17	Slovenia	21.90	38.80	28.10	38.80	27.90	174.56	68.83	114.92
18	Ukraine	12.30	61.00	32.09	39.50	13.20	85.81	39.26	85.03

Source: Vienna Institute for International Economic Studies (2011)

The results of Durbin-Watson test for estimated static model (Fixed effect model, Random Effects model) under equation (1) indicate the dynamic nature of our process and therefore we use the dynamic model[6] onwards. In addition, the two step Arellano and Bond (1991) GMM estimator is used because one step estimation assumes the error terms to be independent and homoskedastic across countries and over time.

The two step estimator relaxes the assumption of independence and homoscedasticity by using the residuals obtained from the first step estimation to construct a consistent estimate of the variance-covariance matrix. Thus, when the error term ε_{it} is heteroskedastic the two step estimator is more efficient (Cole, Moshirian and Wu, 2008). The starting point of our analysis is the model specified below:

$$y_{it} = \mu_t + \tau y_{i,t-1} + X_{it}\beta + \gamma debt_{it} + \varepsilon_{it} \tag{1}$$

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[6] The results of this test are not reported here, but are available on request.

where y_{it} stands for the real GDP growth rate of country i at time t, μ_i are country specific fixed effect, $y_{i,t-1}$ is lagged dependent variable and X is a matrix of explanatory variables. The main variable of our interest, debt level is presented by symbol *debt*. The error term ε_{it} is independent and identically distributed with mean zero and finite variance.

In the first step of our empirical analysis six different regressions have been estimated. Following the paper by Baum et al (2012) all these regressions (options) include the next two control variables: gross fixed capital formation as a share of GDP (INVESTMENT) and trade openness defined as imports plus exports as a share of GDP (OPENNESS). In order to consider the potential influence of the financial crisis options 3 and 4 exclude the data for the years 2009 and 2010. Options 5 and 6 take into consideration influence of both the public (P DEBT) and external debt (E DEBT) level mutually. Option 6 excludes the data for the years 2009 and 2010.

Table 2: The results of two step Arellano-Bond dynamic panel estimator

Variables	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
CONSTANT	-8.386511*** (1.058206)	-.2780022 (.3520681)	.644188*** (.4734621)	3.579969*** (.3525234)	-6.05056*** (1.348374)	.3263082 (.4948464)
GDP_GROWTH (t-1)	.1679062*** (.0509448)	.0707303*** (.0252871)	.2263012*** (.0354123)	.0950796*** (.0231881)	.0738079 (.0428963)	.1979778*** (.041529)
INVESTMENT	.23494*** (.0089869)	.2281801*** (.0096787)	.1466171*** (.0099563)	.1711527*** (.005105)	.2111503*** (.0111564)	.1460121*** (.0085482)
OPENNESS	.1183408*** (.0062663)	.0708036*** (.0077345)	.0422153*** (.0050284)	0053391 (.0107817)	.1399307*** (.0127788)	.0625881*** (.0066981)
P DEBT	-.0623238*** (.013456)		-.0732858*** (.0022661)		-.0446061*** (.0082651)	-.0605846*** (.0039127)
E DEBT		-9.514597*** (1.368052)		-4.075893*** (1.508023)	-8.862774*** (.8853002)	-4.153406*** (.9729071)
Number of observations	215	257	179	221	213	177
Sargan test (p-value)	0.4779	0.5928	0.5199	0.7103	0.5460	0.5434
m1-test (p-value)	0.0235	0.0082	0.0023	0.0022	0.0263	0.0038
m2-test (p-value)	0.2363	0.1818	0.9630	0.2801	0.1222	0.9477

*, **, ***- significant at the level of 10%, 5% and 1%; Standard errors are reported in parentheses.

Source: Calculation by authors

The benchmark specification of our growth regression in Table 2 (with two control variables: openness and investment) reveals a negative and statistically significant impact of debts on growth. More specifically, in option 1 we can observe that the two control variables openness and investment have the expected (positive) signs and are statistically significant at 1% level of significance, while our main variable of interest in this option public debt exerts a negative and significant impact on growth. In option 2 the same model specification is used with the only difference that instead of public debt we run our estimations with the external debt included. The results again confirm the significance of the control variables, with expected positive signs, and suggest a very strong negative and significant

impact of external debt on growth. Options 3 and 4 conduct a similar investigation as options 1 and 2, but this time we exclude the years 2009 and 2010 in which the recent global financial and economic crisis may be strongly affecting the links between debts and growth. With this we want to be sure that the relations reported in options 1 and 2 are not generated by the global crisis.

Table 3: The results of two step Arellano-Bond dynamic panel estimator

Variables	Option 7	Option 8	Option 9	Option 10	Option 11	Option 12
CONSTANT	-14.70641 (34.0945)	-4.200071 (38.71167)	-10.35011*** (1.919784)	-2.191742*** (.7413441)	-4.566313** (2.150489)	.6825782 (.7102416)
GDP_GROWTH (t-1)	.1479338 (.0981898)	.1804602** (.0725678)	.2002965*** (.0554534)	.2468582*** (.0409943)	.0656165* (.0399076)	.0802034*** (.0220728)
INVESTMENT	.193089*** (.0382597)	.2085912*** (.0280924)	.2315941*** (.008773)	.1456275*** (.0168884)	.2418527*** (.0157469)	.1730976*** (.0071587)
OPENNESS	.0929996*** (.0180493)	.0915411*** (.0236097)	.1229823*** (.0150635)	.0465352*** (.0068272)	.0635226*** (.0079076)	-.0005225 (.0113104)
P DEBT		-.052734*** (.0123111)	.0000435 (.0256418)	.0258834* (.0142639)		
P DEBT 2			-.0004136*** (.0001459)	-.0006462*** (.0000653)		
E DEBT	-14.11817*** (3.881345)				5.074117 (6.67295)	7.444064** (3.161468)
E DEBT 2					-8.386973** (4.097971)	-7.253698*** (1.465387)
POPULATION	-.7296222 (.9009506)	-.1161155 (.886955)				
OLD DEPENDENCY	.0951999 (1.97605)	-.3278352 (2.256906)				
UNEMPLOYMENT	.3527501 (.1031129)	.195578* (.1013924)				
EDUCATION	-.1591256 (.0945662)	-.0573737 (.0894637)				
GDPpc	.0015406 (.0004979)	.0005912 (.0004552)				
BUDGET	.1426186 (.1215838)	.3140353*** (.0848857)				
Number of observations	217	193	215	179	257	221
Sargan test (p-value)	0.8651	0.6683	0.4154	0.5797	0.6807	0.7005
m1-test (p-value)	0.0438	0.5189	0.0231	0.0028	0.0073	0.0016
m2-test (p-value)	0.7288	0.6145	0.1439	0.6472	0.1746	0.2216
*, **, ***- significant at the level of 10%, 5% and 1%; Standard errors are reported in parentheses.						

Source: Calculation by authors

The results in options 3 and 4 reveal that the coefficients on debts (both public and external) remain of the same sign and still being statistically significant. The only difference can be observed in option 4 where openness again affects growth positively, but loses significance. In options 5 we include in the underlying model both public and external debt simultaneously to check whether these variables may be picking on one another's effect on growth. Again, we can observe that both public and external debt have independently a negative and significant impact on growth. Option 6 excludes the crisis years, but the estimated coefficients remain of the same sign and statistically significant.Thus, overall

we can conclude that the results from Table 2 indicate a negative influence of the public and external debt on growth. This conclusion is robust even if we exclude the crisis years (2009 and 2010) or if we test public and external debt together. The diagnostic tests (Sargan test and m2 test), reported in rows at the bottom of Table 2, suggest that the estimated models are well specified.

The second step of our empirical analysis starts by checking whether the established links between debts and growth in Table 2 may be affected by a relatively limited specification of our growth regression where we allowed for only two control variables openness and investment. As recognized in the growth literature a number of additional factors may be affecting growth and we want to be on a safe side and so allow for these extra variables in the underlying model. Thus, following Baum et al. (2012) we control for other potentially relevant variables such as the initial level of GDP per capita (GDPpc), population growth (POPULATION), tertiary education (EDUCATION), a measure for the old dependency ratio (OLD DEPENDENCY), the unemployment rate (UNEMPLOYMENT) and the budget balance (BUDGET). The results of this robustness check are presented under options 7 and 8 in Table 3. The other options reported in Table 3 (options 9 through 12) control for a possible non-linear relationship between debts and growth by including the squared values of public (P DEBT 2) and external debt (E DEBT 2).

The results reported under options 7 and 8 seem to suggest that our decision in the first step to have our growth regression specified with only few regressors (openness and investment, complemented with debt in the effect of which on growth we are primarily interested) was a sensible one. Thus, in these two regressions openness and investment remain significant and of the same sign as before, while the new control variables in the widened growth regressions are significant only sporadically. Notwithstanding their lack of significance, we can observe that, even with these extra variables included in the model, the coefficients on external (option 7) and public debt (option 8) remain of the same negative sign as before and still being statistically significant at 1% level. These results, together with the results reported in Table 2, point towards a strong, robust and negative relationship between public and external debts and growth.

As our review of literature suggested a possibility of a non-linear relationship theoretically (pointing towards an inverse U-shape relation) and this has been corroborated by a number of empirical studies, we also check the presence of this non-linear effect in our empirical analysis. We conduct that investigation by including in our underlying model an additional variable in the form of a public or external debt squared. Thus, in Table 3 under option 9 we report the results of this exercise for public debt and its impact on growth. The results indicate that the coefficient on public debt becomes positive but statistically insignificant, while the coefficient on public debt squared becomes negative and

highly significant. This finding indicates a non-linear negative relationship between public debt and growth. When we conduct a similar non-linearity test for the relationship between external debt and growth (option 11), we observe that the coefficient on external debt becomes statistically insignificant, while the coefficient on external debt squared appears highly significant and negative. As in Table 2, in options 10 and 12 we exclude the crisis years and check whether this has any impact on our results. With respect to public debt (option 10) we observe the presence of a non-linear impact on growth, the coefficient on public debt is positive and significant (at 10% significance level) and the coefficient on public debt squared is negative and significant. Regarding the external debt variable, when the crisis years are excluded (option 12), the non-linear effect is present with the coefficient on external debt being positive and significant, while the coefficient on external debt squared is significant and negative. These results, in particular options 10 and 12, suggest that it is not the debts (public and external) in general that are dangerous for growth, but instead the dangers exist at high values of indebtedness. The diagnostic tests (Sargan test and m2 test), reported in rows at the bottom of Table 3, suggest that the estimated models are well specified.

In summary, our results point towards the presence of a strong and robust relationship between debts and growth, suggesting that public and external debts exert a significant impact on growth in the region of Central, East and Southeast Europe, with the debts, public and external, becoming growth depressing at higher levels of indebtedness.

5. CONLUDING REMARKS

This study investigated the relationship between debts (public and external) and growth in the region of Central, East and Southeast Europe. The investigation was conducted by means of dynamic panel data analysis covering the sample of 18 countries. Our results point towards the presence of a statistically significant relationship between public and external debts and growth, with debts becoming growth depressing at higher levels of indebtedness. The results indicate that it is not the debts (public and external) in general that are dangerous for growth, but instead the dangers may arise at high values of indebtedness. In this context, our findings should be taken as sending a warning to policy makers in Central, East and Southeast Europe to keep their debts under control. This warning becomes particularly important given that the recent global economic and financial crisis has brought a number of economies practically on the verge of bankruptcy.

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