

IMF Working Paper

Absorption Boom and Fiscal Stance: What Lies Ahead in Eastern Europe?

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Abstract

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This paper estimates revenue and expenditure pro-cyclicality with respect to output and domestic absorption in new member states of the European Union and Croatia to assess whether these countries used the boom years of 2003-07 to create sufficient fiscal space. The current crisis has found many countries short of fiscal space. As these countries enter a different phase of capital inflows, some with large vulnerabilities and inflexible monetary policy options, the role of fiscal policy becomes more important. This paper also looks at these issues to see how fiscal policy can play a more effective role in demand management in these countries.

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I. MOTIVATION¹

This paper looks at fiscal development in New Member States (NMS) of the European Union (EU) and Croatia to assess whether countries used the boom years of 2003–07 to create sufficient fiscal space and what implications it has for fiscal policy going forward². During 2003–07, these countries experienced strong growth in both output and domestic absorption leading to, on average, an improvement of 3 percentage points of GDP in their overall fiscal balances (Figure 1).³ However, the average masks diversity across countries in terms of the magnitude and composition of fiscal improvement and whether the improvement gave rise to fiscal space.

Generally speaking, revenue booms seemed to have been the force behind fiscal improvement in countries where growth was stronger and led by domestic absorption (Figure 1). Both GDP and domestic demand grew much faster (at 8 and 10 percent, respectively) in Bulgaria and the Baltics, countries where revenue booms led the fiscal improvement, than in the rest. On the contrary, expenditure reduction was the dominant force behind fiscal improvement in Czech Republic, Slovakia, Croatia and Slovenia, reflecting partly their greater need for structural reduction in expenditure.⁴ Improvement in the overall balance seems to have been stronger in countries that relied on expenditure cuts.

To what extent did the improvement in overall fiscal balance during the boom years create additional fiscal space? If an improvement in the overall balance is being driven by increased cyclical revenues, while expenditure also increases, it can actually imply a reduction in the fiscal space. Thus to create fiscal space, countries would need to improve their overall balances adjusted for the economic boom. Fiscal space can also be created if increased revenues are used to pay down the public debt or build up fiscal reserves, both of which would enhance a country's ability to use counter-cyclical fiscal policy during recessions. This paper investigates whether countries created fiscal space by looking at the impact of the absorption-led growth on government revenue and expenditure in the NMS and Croatia during 2003–07.

Going forward, do these countries' current fiscal frameworks provide for effective demand management? Since the last quarter of 2008, growth and domestic demand in many of these economies have substantially slowed down with a drastic effect on fiscal balances,

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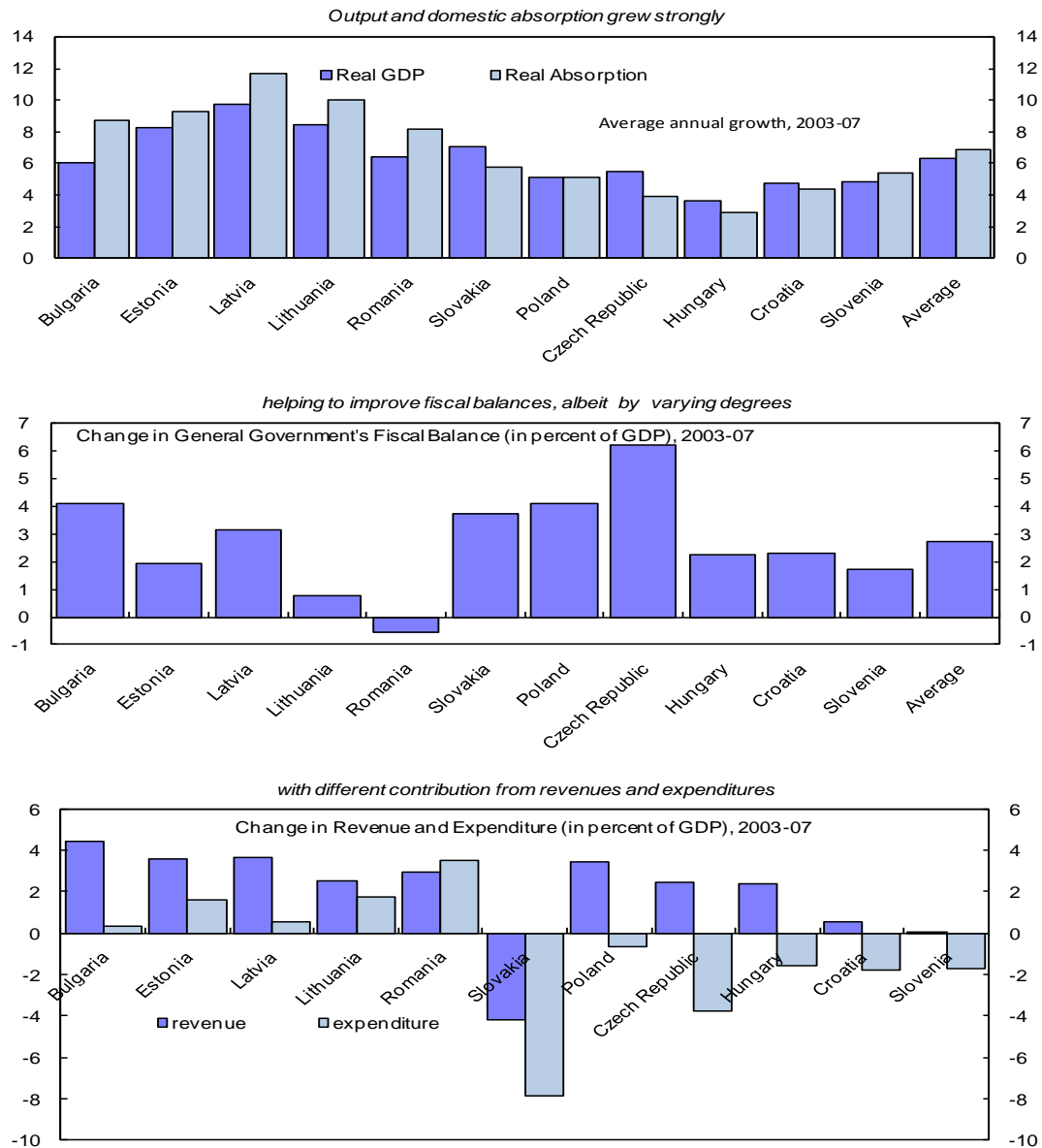
² The New Member States consist of Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia.

³ Domestic absorption, also known as domestic demand, is the sum of private consumption, general government consumption and gross domestic investment.

⁴ On average, public expenditure in these countries at 44 percent of GDP in 2002 was 7 percentage points higher than the average in the Baltics, Bulgaria, and Romania.

particularly on the revenue side. Some countries had to resort to a contractionary fiscal response in the midst of a deep recession, making the limit of fiscal space all too obvious. To what extent are these countries' past growth strategy and fiscal policy to be blamed for such limited space? As these countries enter a different phase of capital flows and credit growth and wait for the Euro adoption, what should the fiscal policy be geared at? The paper tries to answer these questions.

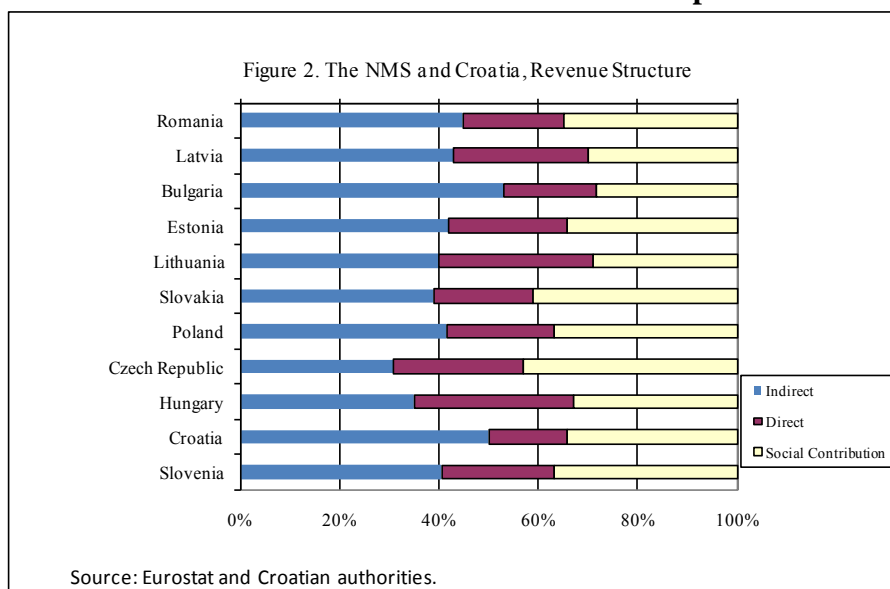
Figure 1. The NMS and Croatia, Growth and Fiscal Policy, 2003-07



Source: World Economic Outlook (WEO) Database.

II. REVENUE DEVELOPMENTS AND CYCLICALITY IN THE NMS AND CROATIA: 2003-07

A. Revenue Developments



During 2003-07, the NMS and Croatia experienced strong revenue growth, but some more so than others (Table 1).

The data suggests two groups: *group one* with Romania, Bulgaria, the Baltics and Slovakia, where real revenue grew, on average, more than twice as fast as in the remaining five Central European

countries (*group two*). Romania had the largest increase with an average rate above 20 percent across all major tax categories, while Slovenia experienced the least increase. Since the difference in revenue performance in the two groups is visible across all tax categories, it is not likely to be driven by differences in the revenue structure. In fact, the broad composition of revenues is quite comparable among these two groups, with the second group depending slightly more on revenues from social contributions (Figure 2).

Table 1. The NMS and Croatia: Average Annual Real Growth in Revenues (Local currency), 2003-07

	Tax revenue	Tax revenue and social security contributions	Personal income tax	Indirect tax	VAT
<i>Group One</i>	18	16	18	17	19
Romania	23	22	25	22	24
Latvia	22	21	23	22	24
Bulgaria	16	14	13	17	17
Estonia	16	15	15	16	16
Lithuania	14	14	18	12	15
Slovakia	14	12	12	15	17
<i>Group Two</i>	7	7	8	7	7
Poland	10	9	13	9	11
Czech Republic	8	8	8	8	8
Hungary	8	9	8	8	8
Croatia	8	8	7	7	8
Slovenia	2	2	5	1	2

Source: EUROSTAT, IMF and Croatian authorities

Higher real revenue growth during 2003-07 in the first group is therefore likely to be due to one or more of the following four factors.

- *Higher GDP growth.* Higher growth results in higher revenues absent discretionary policy changes. During 2003-07, countries in the first group indeed had higher output growth fueled by higher capital inflows (Figure 1, Table 2).⁵ Similarly, output gaps in the first group were on average 4 times higher than the gaps in the second group (Table 2). Given that most countries in the first group started with a lower GDP per capita, a larger convergence gap has given rise to higher real GDP growth resulting in larger revenue increases.

Table 2. The NMS and Croatia: Output and Domestic Absorption, 2003–07

	Average real GDP growth	Average real domestic absorption growth	Average output gap	Average domestic absorption gap
<i>Group one</i>	7.7	8.9	2.9	8.6
Romania	6.4	8.2	2.2	5.6
Latvia	9.7	11.6	4.9	12.8
Bulgaria	6.1	8.7	1.7	11.6
Estonia	8.3	9.2	4.3	9.9
Lithuania	8.4	10.0	3.9	6.8
Slovakia	7.1	5.8	0.2	4.8
<i>Group Two</i>	4.8	4.4	0.7	1.8
Poland	5.2	5.1	-0.6	-1.2
Czech Republic	5.5	4.0	1.0	1.4
Hungary	3.5	2.4	1.9	3.1
Croatia	4.7	4.4	1.5	3.0
Slovenia	4.8	5.4	-0.3	3.0

Note: Output gaps are calculated as the difference between actual and potential output as a percent of potential output, where potential output was generated using real GDP series reported in the World Economic Outlook (WEO) database using HP filter ($\lambda=25$). Domestic absorption gaps were calculated as output gaps minus current account gaps. Current account gaps were calculated using actual current account balance minus equilibrium current account balances. Equilibrium current account balances were taken from Table 1 of appendix 1 of Rahman (2008).

- *Greater reliance on domestic absorption for growth.* A greater reliance on domestic absorption is likely to be more revenue-enhancing if indirect taxes feature dominantly

⁵ Capital inflows were substantially higher in the first group, both *historically* and *compared to other emerging market countries*. Historically, when compared to the average inflows received (in percent of its GDP) during 1994-02, the first group received almost twice as much capital during 2003-07 as the second group. Compared to what emerging market countries received during 2003-07 (in percent of GDP), the first group received inflows more than twice of what the second group received.

in the revenue structure (IMF, 2008a). For example, while both export- and domestic-demand-driven growth boosts direct tax collection through greater job creation and higher profits, domestic demand has a higher impact on the collection of indirect taxes through both imports and domestic consumption. Apart from the Czech Republic, indirect taxation works as the most important source of revenues in these countries (Figure 2). The higher reliance on indirect taxation would help generate higher revenues in countries where domestic absorption growth was stronger. On average, domestic absorption gaps in the first group was 5 times higher than the gaps in the second group (Table 2).

- *Greater efficiency in tax collection.* There are two factors that could argue for a better tax collection/efficiency in the first group of countries. First, all countries in this group, except Bulgaria and Slovakia, have had a flat tax regime in place by 2007, with the Baltic countries using it since the mid-1990s. A flat income and profit tax regime is generally associated with better collection due to its simplicity and ease of implementation. Second, if we compare the actual and benchmark VAT collections in these countries, the first group fares slightly better than the second group in terms of their distance from the benchmark. Average VAT collection as a percent of GDP falls short of the benchmark collection by 2.8 percentage points in the first group compared to 3.4 percentage points in the second group.

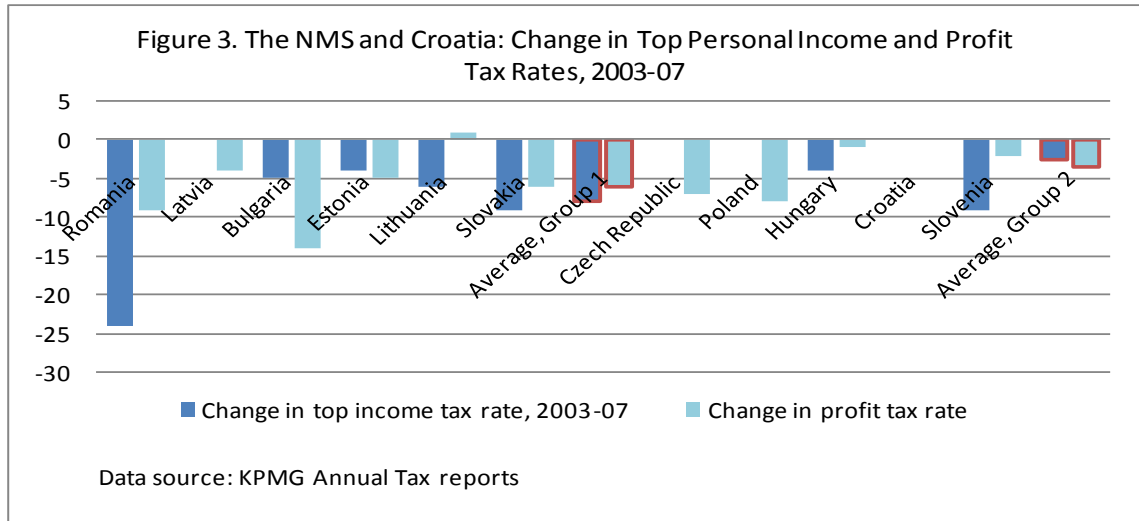
Table 3. The NMS and Croatia: Efficiency of VAT Collection

	VAT base	VAT standard rate	VAT potential collection	VAT actual collection	VAT "shortfall"
Romania	75	19	14	8	-6.6
Latvia	64	18	12	8	-3.8
Bulgaria	70	20	14	11	-2.6
Estonia	56	18	10	9	-1.5
Lithuania	65	18	12	7	-4.4
Slovak Republic	57	10	6	7	1.8
Average, Group 1	64	17	11	8	-2.8
Poland	62	22	14	8	-6.9
Czech Republic	49	19	9	7	-1.2
Hungary	67	20	13	8	-1.4
Croatia	61	22	13	12	-4.9
Slovenia	54	20	11	9	-2.3
Average, Group 2	59	21	12	9	-3.4

Following Mitra and Stern (2003), VAT base is calculated as household consumption as a share of GDP averaged during 2003-07. VAT potential collection is this base times the standard rate.
Data source: Eurostat and World Bank World Development Indicators Database.

- *Discretionary changes in taxes.* During 2003–07, there was a downward movement in the top income tax rates in most countries in group one, where the average top income tax rate dropped by 8 percentage points. Corporate profit taxes also declined on average more in this group, by 6 percentage points, compared to 4 percentage

points in the second group. VAT standard rates remained unchanged during this period in all of these countries except Slovakia. Given that tax rates declined more in the first group, discretionary changes were not likely the source of the revenue boost in the first group apart from their impact on growth and collection.



B. Revenue Pro-Cyclicality

The above discussion suggests that higher output gaps, a higher reliance on domestic absorption, and possibly a more efficient tax collection system explain the stronger revenue performance in group one. In the following section, we investigate this empirically by estimating revenue pro-cyclicality with respect to both output and domestic absorption after controlling for tax efficiency. The goal is to see to what extent revenue growth during 2003-07 were transitory, i.e. being driven by higher output and domestic absorption gaps, and whether the increase was sensitive to growth being driven by domestic absorption.

Pro-cyclicality in fiscal policy has been measured in different ways in the empirical literature. Some have used the correlation between a de-trended real fiscal variable and real GDP growth (Agenor and others, 1999; Talvi and Vegh, 2005; Kaminski and others, 2004). Others have used regressions to estimate the relationship between real growth in a fiscal variable and real GDP growth (Lane 2003; Woo, 2005; Annett, 2007; Thornton, 2008; Ilzetzki and Vegh, 2008). The most common specification to estimate cyclicality in the empirical literature has been to use the real value of a fiscal variable as the dependent variable and real output as independent variable.

We estimate the relationship between revenues and output using three different specifications: (i) responsiveness of real revenues with respect to real output; (ii) responsiveness of real revenues with respect to output gap; and (iii) responsiveness of nominal revenue to GDP ratios with respect to output gap. The variables are entered in log differences in the first and second specifications due to non-stationarity in the data series, while the third specification uses the log values of the variables. The response coefficients in

the first two specifications measure the rate of change in real revenue growth resulting from a one percent increase in real output (or output gap) growth. The response coefficient in the third specification can be interpreted as the elasticity of revenue with respect to the output gap, i.e., the increase in revenue as a share of GDP resulting from a 1 percent increase in the output gap.⁶ The regressions are run for 1995–2007 and for the sub-period 2003–07. The relationship between revenue and real output/output gap is controlled for tax efficiency and flat tax regime.⁷

	Estimated coefficients, this paper	OECD 1/
Total Revenue	1.36	0.93
Personal Income Tax	2.52	1.07
Social Contribution 2/	1.33	0.70
Indirect Tax 3/	1.41	1.00

1/ Average of NMS, except Bulgaria and Romania.
 2/ For this paper's estimation, social contribution includes tax revenues.
 3/ For this paper's estimation, the coefficient reflects elasticity with respect to VAT receipts.

The regression results show increased revenue pro-cyclicality with respect to both output and domestic absorption during 2003-2007 (Tables 4 and 5). Real revenue growth rates responded with higher coefficients during this period as opposed to 1995-07 with respect to increases in both output and domestic absorption growth rates. For example, a 1 percent increase in the real output (real absorption) growth rate increased the real revenue growth rate by 0.84 percent (0.50 percent) during 2003–07 as opposed to 0.52 percent (0.36 percent) during 1995-2007. Elasticities with respect to output gaps in all

revenue categories are significantly higher than one during 2003–07 (fifth regression row in table 3). If we compare these elasticities to the budgetary elasticities computed by OECD as a long-term benchmark, there seems to be strong short-term pro-cyclicality during this period (text table).⁸

These results also show that pro-cyclicality of revenues during 2003-07 was driven more by domestic absorption than by output gaps. This is demonstrated by the fact that during 2003–07, the revenue-to-GDP ratio shows a statistically significant positive relationship with absorption gap but a statistically insignificant relationship with output gap (apart from VAT receipts), while the opposite holds for the period 1995-2007.⁹ We interpret this as absorption

⁶ While the last measure is more intuitive and useful in calculating the cyclically-adjusted fiscal position, this is a rather conservative measure of revenue pro-cyclicality given that this measure only detects pro-cyclicality if growth in the fiscal variable is higher than GDP growth.

⁷ Tax efficiency is proxied with the number of hours businesses need to fill out tax forms. This is arguably an imperfect proxy of tax efficiency. The dummy variable for the flat tax regime also captures tax efficiency indirectly. Details of the regression can be found in Appendix 1.

⁸ The OECD elasticities are not estimated but directly derived from tax legislation information. See European Commission (2005) for these elasticities.

⁹ To see whether the presence of an absorption gap boosted the impact of output gap on revenues, we estimated the revenue-output gap relationship by including an interaction term with output and absorption gaps (Appendix I, Table 7). The results show that the presence of an absorption gap indeed increases revenue pro-cyclicality with respect to output gap, and during 2003-07, output gaps only affected revenues significantly as long as there was also an absorption gap.

gaps being more important during 2003–07 in explaining revenue increases than output gaps. Given the dominance of indirect taxation in most countries' revenue structure, an absorption-led growth, which benefits indirect tax collections disproportionately, created higher revenue buoyancy.

Table 4. Revenue Pro-Cyclicality with Respect to Output, Summary Regression Output

Independent Variable	Dependent Variable 1/				
	Total Revenue	Tax Revenue and Social Contribution	Tax Revenue	VAT	Personal Income Tax
	Time period: 1995-2007				
1. Real output	0.52**	0.58**	0.80***	0.69*	1.29***
2. Output gap	0.78***	0.87***	1.06***	1.02**	1.52***
3. Output gap	0.84***	0.95***	1.00***	1.24***	1.52***
	Time period: 2003-2007				
1. Real output	0.84**	0.77**	0.92*	0.36*	1.73**
2. Output gap	1.36**	1.33**	1.39**	1.41*	2.52***
3. Output gap	-0.29	0.31	0.68*	1.45*	0.35

1/ Revenue variables for Regressions (1) and (2) are entered as real values (deflated by CPI), while for (3) revenues variables are entered as ratios to GDP.

Note: *, ** and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 5. Revenue Pro-Cyclicality with Respect to Domestic Absorption, Summary Regression Output

Independent Variable	Dependent Variable 1/				
	Total Revenue	Tax Revenue and Social Contribution	Tax Revenue	VAT	Income Tax
	Time period: 1995-2007				
1. Real absorption	0.36**	0.35**	0.49***	0.50*	0.73***
2. Absorption gap	0.45***	0.45***	0.56***	0.65**	0.80***
3. Absorption gap	0.02	-0.04	0.06	0.14	-0.16
	Time period: 2003-2007				
1. Real absorption	0.50**	0.47**	0.52**	0.51**	0.74**
2. Absorption gap	0.65**	0.59**	0.62**	0.81**	1.01***
3. Absorption gap	0.26**	0.25**	0.59***	1.11***	0.22

1/ Revenue variables for Regressions (1) and (2) are entered as real values (deflated by CPI), while for (3) revenues variables are entered as ratios to GDP.

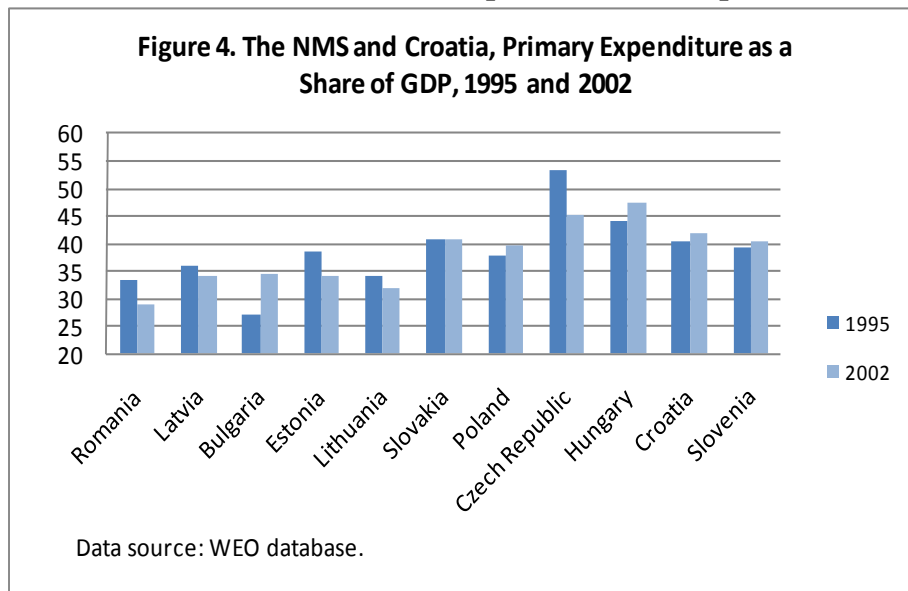
Note: *, ** and *** denote significance at 10 percent 5 percent and 1 percent levels, respectively.

Given the dominance of absorption gap and indirect taxation, having a flat tax regime showed mixed impact on revenues (Appendix 1). Our dummy variable capturing the flat tax regime took the value of 1 beginning the year a country introduced the flat tax regime. This was statistically significant and positive in the first two specifications, implying a revenue-enhancing effect. This probably attests to the efficiency generally attributed to the

flat tax regime.¹⁰ However, the coefficient is negative and significant in the regression where tax revenues are scaled by GDP. The latter probably reflects the impact of rate decreases that were often associated with the introduction of the flat tax regime.

III. EXPENDITURE DEVELOPMENTS AND CYCLICALITY IN NMS AND CROATIA DURING 2003–07

A. Expenditure Developments



During 2003-07, the same countries with large revenue increases were also the ones with the largest increases in expenditure (Table 6). For example, Romania, the country that experienced the largest revenue growth, saw its expenditure

increase at about the same pace (34 percent annually). In contrast, the expenditure increase was much more subdued in the second group, reflecting their larger size of the government (hence, the need for a structural cut), richer income status (hence, a lower need for infrastructure upgrading) and a more modest revenue growth (hence, a higher need for expenditure cuts given the overall Stability and Growth Pact (SGP) constraint). In 2002, the size of public expenditure in most of these countries remained elevated at 46 percent of GDP, more or less at their 1995 levels. In contrast, by 2002 countries in the first group had all reduced their size of public expenditure to around 35 percent of GDP (Figure 4). Hence, the second group definitely had a more urgent need to push ahead with structural reforms in social expenditure, subsidies and public administration, particularly with the advance of the EU accession.

Among major expenditure categories, capital expenditure experienced the largest increase. This is not surprising given that capital expenditure is most susceptible to economic cycles. Additionally, this probably also reflects the need for investment upgrades and use of structural funds that accompanied the EU accession. The strongest increases in capital expenditure were visible in poorer members in the group, such as Latvia, Romania, Lithuania and Bulgaria.

¹⁰ A more explicit proxy for efficiency of taxation came out to be statistically insignificant.

Table 6. The NMS and Croatia: Average Annual Real Growth in Expenditure (Local Currency), 2003–07

	Total Expenditure	Wages	Social Benefits	Consumption	Subsidies	Capital Expenditure
<i>Group one</i>	15	14	14	18	16	28
Romania	21	22	21	25	24	33
Latvia	20	20	12	23	17	62
Bulgaria	12	10	8	13	11	25
Estonia	14	13	14	15	11	16
Lithuania	14	10	14	18	17	27
Slovakia	10	10	15	12	14	3
<i>Group two</i>	6	5	6	9	8	9
Poland	7	5	5	13	24	12
Czech Republic	6	7	7	8	3	11
Croatia	8	7	8	10	8	11
Hungary	7	7	10	8	4	3
Slovenia	0	0	0	5	0	7

Source: EUROSTAT, IMF and Croatian authorities.

B. Expenditure Pro-Cyclicality

There is by now a broad consensus in the empirical literature regarding the pro-cyclicality of government expenditure in developing and emerging market countries during good times, where the cause is the typical pro-cyclical access to finance that most developing country governments experience (Gavin and Perotti, 1997; Talvi and Vegh, 2005; Kaminsky and others, 2004; Ilzetzki and Vegh, 2008). The NMS and Croatia are somewhat insulated from such market vagaries due to: (i) the EU accession anchor that makes market access more a function of long-term prospects than of short-term sentiment, and (ii) the availability of EU funds and financing from various other regional financial bodies. However, this seemingly acyclical access to finance may not have prevented expenditure pro-cyclicality in some countries as expenditure rose in many, questioning the degree of fiscal space created by the boom.

To see whether expenditure has been pro-cyclical, we estimate the relationship between expenditure and output using the same three specifications as in revenues: (i) responsiveness of real expenditure to real output; (ii) responsiveness of real expenditure with respect to output gap; and (iii) responsiveness of expenditure to GDP ratio with respect to output gap. The variables are entered in log differences in the first two specifications due to non-stationarity in the data, where the response coefficients show the rate of change in real expenditure resulting from a 1 percent change in real output (or output gap) growth. For the third, the response coefficient measures the expenditure elasticity to output gap. Just as in the case of revenues, these regressions are run for 1995-2007 and also for the sub-period 2003–07. Following the empirical literature, the relationship between expenditure and

output/output gap are controlled for initial level of public debt, political fragmentation, presence of legislative election, and exchange rate regime.¹¹

Table 7. Expenditure Pro-Cyclicity with Respect to Output, Summary Regression Output

Independent Variable	Dependent Variable 1/					
	Total Expenditure	Total Primary Expenditure	Social Expenditure	Compensation to employees	Consumption	Capital Expenditure
Time period: 1995-2007						
1. Real output	0.68**	0.73**	0.22	0.46	0.24	3.35***
2. Output gap	0.89**	0.94**	0.43	0.58	0.46	3.39***
3. Output gap	-0.24	-0.13	-0.53	-0.72	-1.51	4.94***
Time period: 2003-2007						
1. Real output	1.17**	1.18**	0.69	0.56	0.04	3.24***
2. Output gap	1.76**	1.77**	1.31	1.06	0.41	3.47**
3. Output gap	-0.13	-0.04	-0.31	-0.70	-2.29	3.92***

1/ Expenditure variables for Regressions (1) and (2) are entered as real values (deflated by CPI), while for (3) expenditure variables are entered as ratios to GDP. Note: *,** and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 8. Expenditure Pro-Cyclicity with Respect to Absorption, Summary Regression Output

Independent Variable	Dependent Variable 1/					
	Total Expenditure	Total Primary Expenditure	Social Expenditure	Compensation to employees	Consumption	Capital Expenditure
Time period: 1995-2007						
1. Real absorption	0.47**	0.51**	0.12	0.24	0.29	0.96***
2. Absorption gap	0.54**	0.58***	0.22	0.27	0.21	2.03***
3. Absorption gap	-0.16	-0.12	-0.74*	-0.23	-0.60	2.16***
Time period: 2003-2007						
1. Real absorption	0.62**	0.73**	0.2	0.3	0.03	2.46***
2. Absorption gap	0.78***	0.80***	0.32	0.32	0.05	2.21***
3. Absorption gap	0.00	0.03	-0.53	-0.19	-0.66	1.69***

1/ Expenditure variables for Regressions (1) and (2) are entered as real values (deflated by CPI), while for (3) expenditure variables are entered as ratios to GDP. Note: *,** and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

The regression results show some pro-cyclicity in total expenditure solely driven by strong capital expenditure, both during 1995-07 and 2003-07 (Table 7). For example, a 1 percent increase in real GDP growth resulted in a 3.35 percent increase in the growth rate

¹¹ Details of the regression can be found in Appendix II.

of capital expenditure during 1995-07. Unlike in the revenue regressions, the impact of output gap and absorption gap do not seem to differ as absorption gaps also show pro-cyclicality to be limited to capital expenditure during 1995–07 and 2003–07 (Table 8). Pro-cyclicality of capital expenditure do not seem to have increased during the latter period implying that the increase was more a response to structural needs rather than the availability of increased revenues (Table 8). However, overall expenditure seemed to have been more pro-cyclical during the boom years.

The fact that compensation to employees and social expenditure are insensitive to output gaps implies that the “good times” were not generally used to bloat the civil service. Governments in countries experiencing a revenue boom did not seem to make a deliberate effort to distribute the benefits of good times to buy in social cohesion. In fact, social expenditure shows statistically significant counter-cyclicality in at least one regression demonstrating the impact of structural fiscal reforms in many of these countries since 1995 (third regression in Table 8). A one percent increase in the absorption gap contracted social expenditure by 0.74 percentage points of GDP during 1995–07 in these countries.

As for the other determinants, initial level of public debt and legislative elections are both statistically significant while de-jure exchange rate regime and political fragmentation variables were not (Appendix II). Lower debt ratios create bigger fiscal space enabling countries to spend more. This variable was significant in all expenditure regressions. Legislative elections also seem to put significantly positive pressure on expenditure, particularly on flexible expenditure. Political fragmentation and exchange rate dummies were insignificant in all regressions. The latter is somewhat surprising since it is often argued that a fixed exchange rate regime is likely to induce stronger fiscal discipline on countries. In our sub-sample of countries, this effect might have been subdued by the following two reasons: (i) flexibility of the exchange rate regimes might have been compromised either by the presence of substantial euroization of domestic liabilities (Croatia and Hungary), and/or concerns about domestic competitiveness, making the difference in the two regimes less strong; and (ii) the fixed exchange rate regime countries were generally the ones with a less urgent need to cut government expenditure (Figure 4), a higher need for capital upgrade, and a stronger revenue boom, all of which would diminish the confidence/sustainability concerns coming from the exchange rate regime constraint.

IV. DOMESTIC ABSORPTION BOOM AND FISCAL SPACE: WHERE DO COUNTRIES STAND?

We define a country’s fiscal space as its ability to conduct counter-cyclical fiscal policy without jeopardizing fiscal sustainability. Countries could have increased their fiscal space during the boom years by (i) improving their cyclically-adjusted fiscal balances, and (ii) decreasing the stock of public debt. Cyclically-adjusted higher fiscal balances during the boom years, from increased revenues and/or lower expenditures, would build up fiscal space that can be lowered to provide fiscal impulse during recession years. Low levels of public indebtedness imply a higher capacity to borrow and spend during recessions due to lower interest payments and absence of sustainability concerns. In addition, fiscal reserves can also

contribute to building up of fiscal space. Just like international reserves, they help boost a country's ability for counter-cyclical spending.¹² Among the countries in our sample, Bulgaria and Estonia seemed to have found themselves with the largest fiscal space at the end of the boom. Positive fiscal balances, lowered indebtedness and accumulation of fiscal reserves all contributed to the fiscal space in these countries (text table). Hungary and Romania, on the other hand, found themselves with the least fiscal space at the end of the boom.

Fiscal Space at the End of the Boom		
<i>Ranking</i>	Cyclically-adjusted Fiscal Balance/GDP, 2007	Public debt/GDP, 2007
Bulgaria	1.7	19.8
Estonia	1.3	3.4
Slovenia	-0.8	23.4
Latvia	-1.8	7.8
Czech Republic	-2.0	28.9
Croatia	-2.1	33.2
Lithuania	-2.5	17.0
Poland	-2.9	44.8
Slovakia	-3.6	29.4
Romania	-4.5	19.8
Hungary	-5.2	65.8

Cyclically-adjusted balances are calculated using regression coefficients reported in the paper: 0.84 with respect to output gap (used to calculate cyclically-adjusted direct and social security taxes) and 0.26 with respect to absorption gap (to calculate cyclically-adjusted indirect taxes). Data source: WEO and EUROSTAT.

Fiscal space at the end of the boom was determined by the efforts countries put in during the boom years. Not every country used the revenue gains from absorption-led boom years to create additional fiscal space. We looked at how actual revenue and expenditure grew during 2003–07 compared to the revenue and expenditure growth that would be predicted by output gaps (Figure 5).¹³ If revenue and expenditure growth rates are higher than what would be predicted by output gaps (a positive value in Figure 5), we consider that as pro-cyclical. Based on this metric, seven countries seem to show revenue pro-cyclicality: Romania, Latvia, Bulgaria, Estonia, Lithuania, Czech Republic and Hungary. However, only three of these countries, Bulgaria, Estonia, and Czech Republic, managed to translate some of their pro-cyclical revenues into higher fiscal space during this sample period through either counter-cyclical expenditure cuts (Estonia and Czech Republic) or keeping pro-cyclical expenditure growth below that of revenues (Bulgaria). The others (Romania, Latvia,

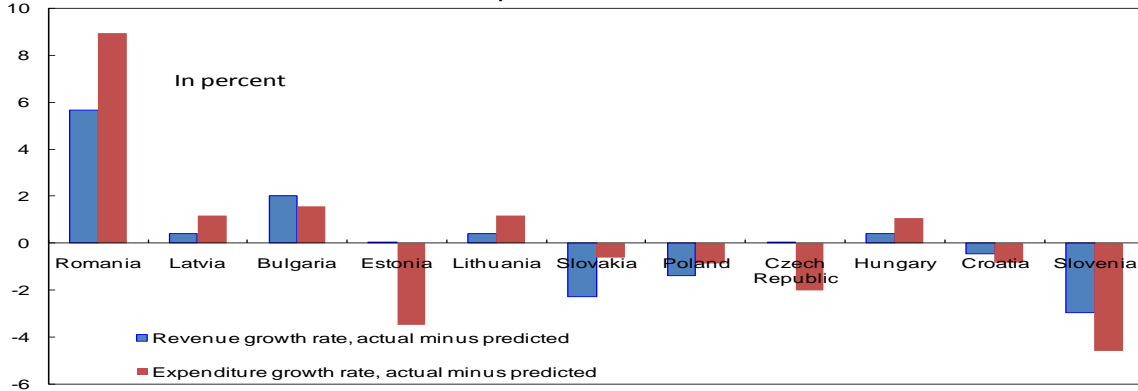
Lithuania and Hungary) did not manage to increase their fiscal space as pro-cyclical expenditure growth during the boom years surpassed that of revenues. As a result cyclically-adjusted deficits remained large and negative at the end of the boom (text table). Our analysis shows that countries that put in higher efforts in terms of bringing down their public indebtedness and improving their cyclically-adjusted fiscal balances during the boom years

¹² There were only two countries in the sample that accumulated fiscal reserves during the boom years, Estonia in the amount of 10 percent of GDP and Bulgaria even higher.

¹³ The latter are the fitted values for revenues and expenditure from the regression results shown in Table 4 and 7 (fifth regression). They indicate respectively the predicted growth in revenues during 2003–07 explained by output gap after controlling for the flat tax regime, and predicted growth in expenditure during 2003–07 explained by output gap after controlling for initial level of public debt and election cycles.

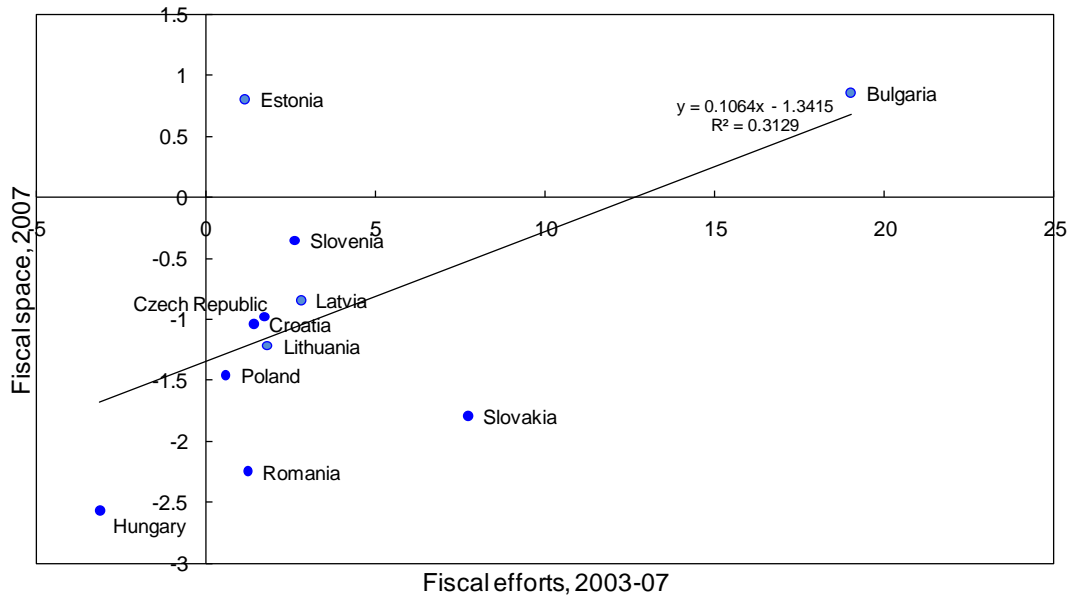
were also the ones that found themselves with most fiscal space at the end of the boom (Figure 6). However, as shown in Figure 6, fiscal efforts were modest in the majority of countries during the boom years.

Figure 5. The NMS and Croatia: Pro-Cyclicality of Revenue and Expenditure, 2003-07



Note. Predicted growth rates are fitted values from the revenue and expenditure regressions in Table 4 (fifth regression) and Table 7 (fifth regression).

Figure 6. The NMS and Croatia: Fiscal Effort and Fiscal Space

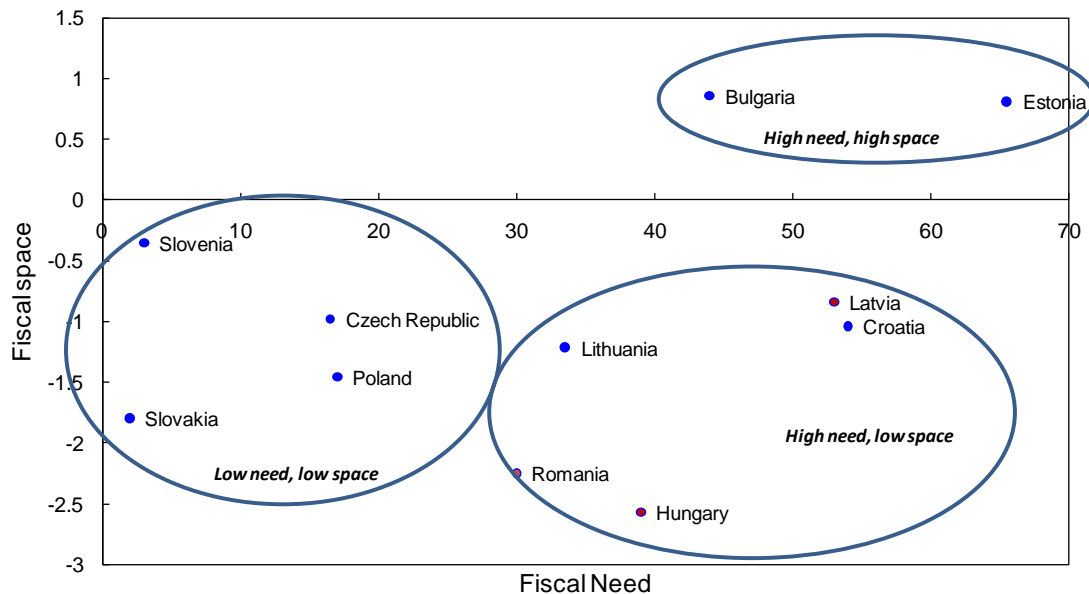


Fiscal space is the average of cyclically-adjusted fiscal balance/GDP and the inverse of public debt/GDP in 2007. Fiscal effort is the average of the change in the following two variables during 2003-07: the cyclically-adjusted fiscal balance and the inverse of public debt/GDP.

Fiscal space was also not the largest in countries that needed it most during the crisis. We view the need for fiscal space as a function of the following two factors: (i) whether a country had other policy tools besides fiscal policy to respond to the downturn and (ii) how badly a country needed domestic stimulus to get out of the downturn. More than half of these

countries have limited alternative policy options either because their exchange rate is legally fixed or de-facto fixed due to large foreign-exchange denominated loans. We measure a country's availability of alternative policy options by the FX-denominated indebtedness of its household and non-financial public sectors. A high such indebtedness would put an effective constraint on the use of other policy tools, whether the de-jure exchange rate regime is flexible or not. We gauge a country's need for domestic stimulus to grow by the importance of exports in its GDP, the rationale being while highly export-dependent countries would start to recover with the improvement in external demand, particularly if the exchange rate is also flexible (for example, Czech Republic and Slovakia), relatively closed economies with exchange rate constraints (for example, Croatia and Latvia) may need to wait much longer for a pick-up in growth. Plotting fiscal space against fiscal need gives us three groups of countries: (i) countries where both space and needs were high; (ii) countries where space was low but needs were high; and (iii) countries where both space and needs were low (Figure 7).

Figure 7. The NMS and Croatia: Need and Availability of Fiscal Space During the Crisis



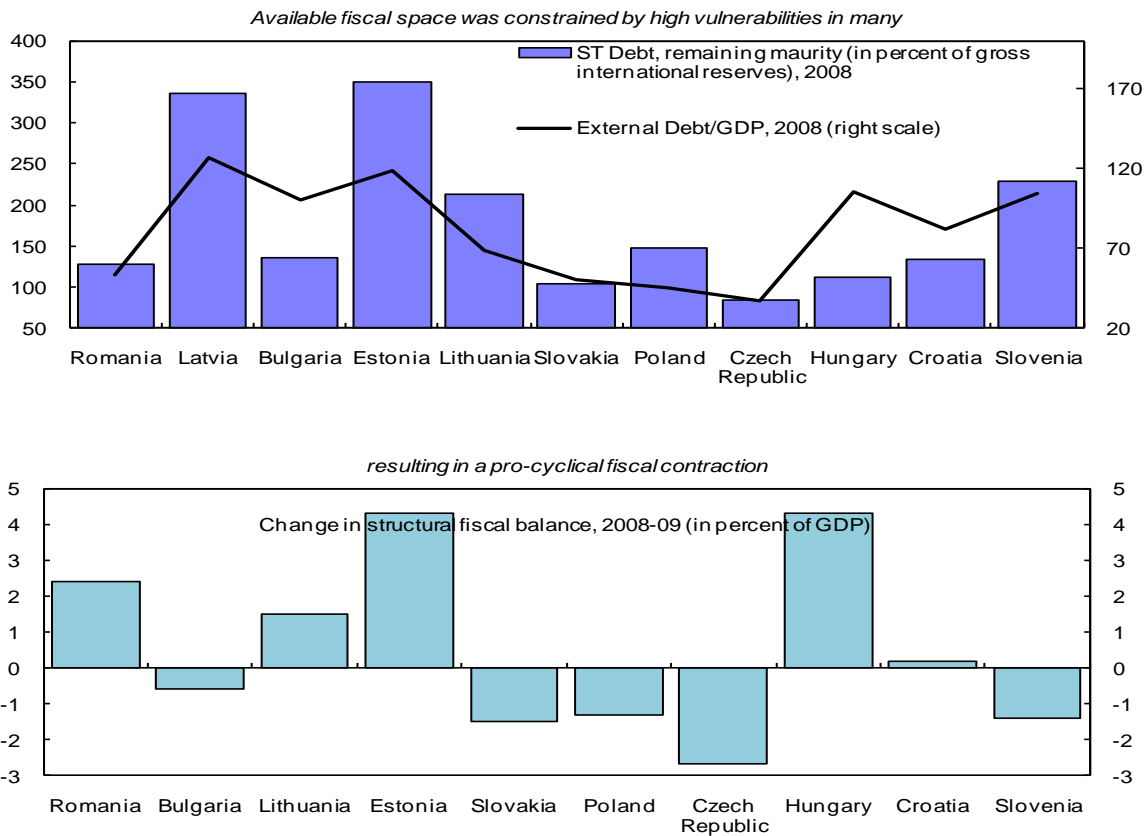
Fiscal space is the arithmetic average of cyclically-adjusted fiscal balance in 2007 and the inverse of public debt in 2007. Fiscal need is the arithmetic average of the stock of FX-denominated debt of household and non-financial private sector (in percent of GDP) in 2007 and the inverse of average exports of goods and services (in percent of GDP). Red dots indicate countries that resorted to a Fund program.

Fiscal response during the crisis reflected a country's position in the space-need map.

Countries in the second group, which faced the highest squeeze during the crisis, either resorted to a Fund program or had to take strong counter-cyclical measures resulting in a contraction in their structural balances. On the other hand, despite low fiscal space in countries in the third group, a low need allowed them to afford a fiscal stimulus. Structural fiscal balances in all four of these countries widened during 2009 (Figure 8). High vulnerabilities constrained the use of available fiscal space in some countries. The external credit-driven growth in many of these countries increased their external debt to very high levels while reserve coverage fell short of the safe minimum (Figure 8). Empirical research shows that high external indebtedness reduces the effectiveness of fiscal multipliers in

emerging market economies due to sustainability concerns limiting what fiscal policy can achieve during recessions (see IMF (2008b) and Ilzetzki and others (2009)). At the same time, given that bond spreads are particularly sensitive to larger deficits and debt during times of financial stress, availability of financing also acts as a binding constraint on the use of fiscal policy (Schunecht and others 2010). The Baltics are a case in point. Despite very low public debt levels and a large need, they could not afford a fiscal stimulus due to these concerns.¹⁴

Figure 8. The NMS and Croatia, Constraints in Fiscal Space



Source: WEO database and Country Desks.

V. LOOKING FORWARD: CREATING FISCAL SPACE

While the EU's Stability and Growth Pact (SGP) currently provides a medium-term anchor for fiscal policy in these countries, countries may need to put in place additional fiscal rules in the future to ensure adequate fiscal space for demand management. The SGP fiscal framework requires member countries to keep their general government budget

¹⁴ For Estonia, considerations for the entry into Exchange Rate Mechanism played a role.

deficit to 3 percent of GDP or below and public debt to GDP ratio to below 60 percent. In addition, member states are expected to respect the medium-term budgetary objective of close to balance or in surplus in order to allow for normal cyclical fluctuations, while keeping the overall deficit within the reference value. While useful as a reference, complementary national rules would be useful to address different need for fiscal space in these countries arising from heterogeneity in policy flexibility, external vulnerabilities, and structural reforms. Drawing on the existing fiscal rules in EU member countries, and in line with the SGP framework, the following are some options for fiscal rules that countries can pursue in order to create sufficient fiscal space.¹⁵

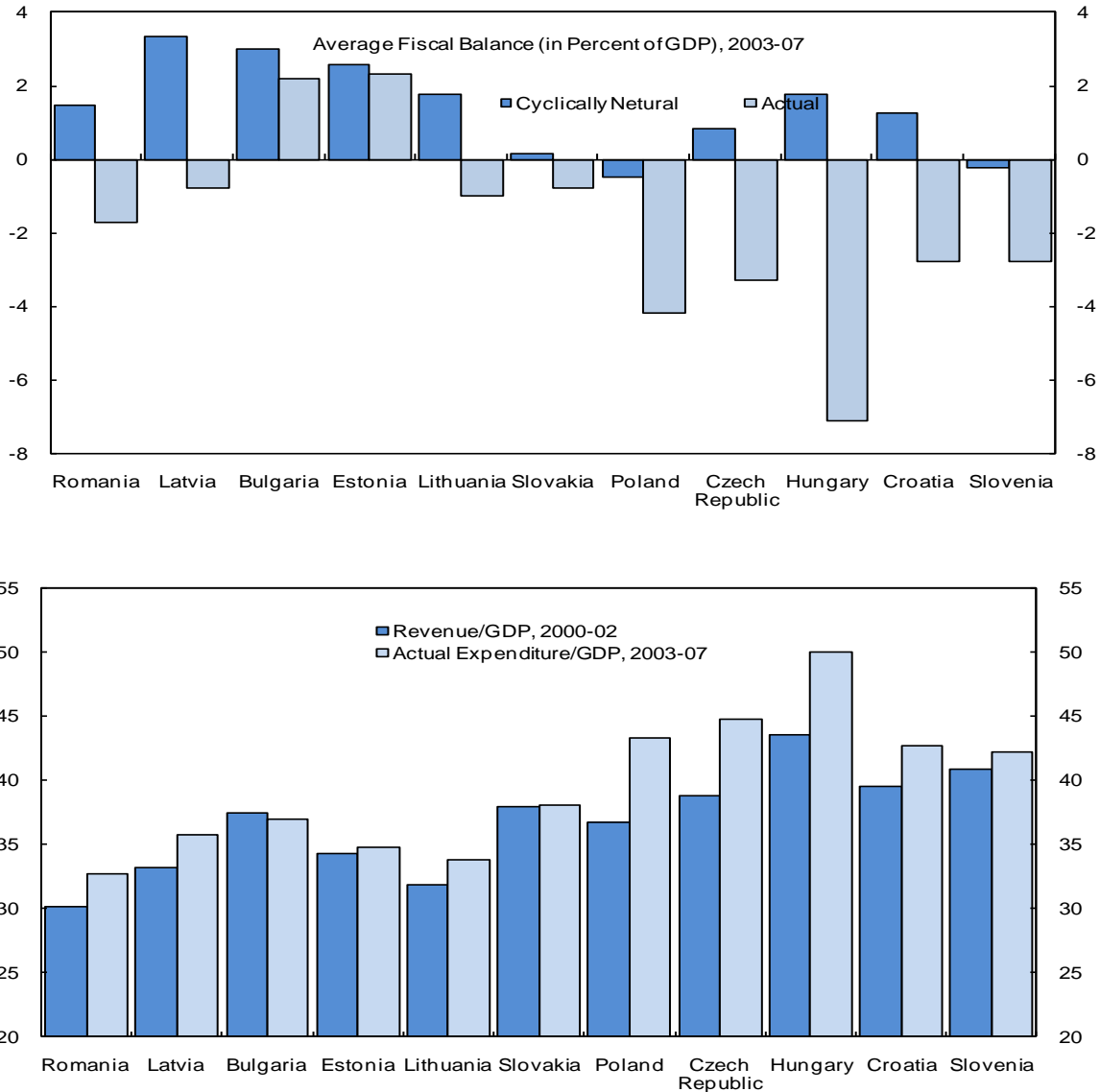
- *Cyclically-adjusted balanced budget rule.* This rule would limit expenditure to cyclically-neutral revenues. Simulation analysis shows these rules to be superior to other fiscal rules in terms of outcome (IMF, 2009). This rule would be most appropriate for countries that have mostly completed their structural reforms (particularly completing privatization and social sector reforms), and have low/moderate public debt levels. Under the rule (currently in practice in Switzerland), a country would need to put an ex-ante ceiling on central government expenditures that would equal to projected revenues adjusted by the output gap. For countries where public indebtedness is high (Hungary) or social sector reforms are pending, the rule would need to accompany an upfront fiscal adjustment to put the debt on a downward path or social expenditure on a sustainable path. If we would apply this rule to our set of countries, i.e. limit expenditure to cyclically-neutral revenues, the fiscal stance in only two countries (Bulgaria and Estonia) would seem to have been close to compliance during 2003-07 (Figure 9, first panel).¹⁶
- *Expenditure limits.* These rules would be appropriate in countries where output gaps are difficult to project or a fiscal rule based on estimated output gaps is politically difficult to implement. Several of our sample countries already practice explicit or implicit expenditure rules. For example, Bulgaria has an expenditure limit of 40 percent of GDP. Some others implement expenditure limits in the context of their medium-term budget (Czech Republic and Croatia). These rules provide a general check against expenditure growth without any reference to revenue over-performance. Some other alternatives can be considered. For example, one alternative would be to limit expenditure to some benchmark revenue level. One such expenditure benchmark could be the revenue-to-GDP ratio during a year when output is at its potential after the completion of all major structural reforms on the revenue side. We show an illustration of this rule in Figure 9 (second panel). Given that revenue-side structural reforms were mostly complete in these countries by the time

¹⁵ For a discussion of existing fiscal rules in EU and other countries, see Annex Table 1 of IMF(2009) , and for a discussion of rules that have been proposed by researchers to replace/supplement the SGP, see Gabor and Szapary (2004).

¹⁶ Cyclically neutral revenues were calculated using an elasticity of 0.84 with respect to output gap and the 0.26 with respect to absorption gap.

of the EU accession, if our fiscal rule were to limit expenditure during the boom years to the pre-boom revenue/GDP ratio (i.e. revenue/GDP during 2000-02), we see that only three of our sample countries, Bulgaria, Estonia and Slovakia, were in compliance. Another way to restrict expenditure would be to limit its real growth rate to that of potential GDP. The rule would essentially eliminate expenditure procyclicality but allow larger capital expenditure in poorer members given their higher potential growth rates.

Figure 9. The NMS and Croatia, Illustrative Fiscal Rules



Source: WEO and author's calculation.

- *Maintaining Fiscal reserves.* Should the capital-inflow driven credit growth resume, creating fiscal reserves from revenue windfall, much like what is in practice in

resource-rich countries, would be another way to ensure effective demand management. Such rule would need to be tied to a certain GDP growth and/or capital inflows projection based on investment requirement of the country. Such a rule would avoid the need to project actual capital inflows or output gaps, rather could work with an assumption of what is sustainably absorbable by countries. Fiscal reserves can be used for both counter-cyclical measures during recessions or to meet one-time transition costs from social expenditure reforms.

VI. CONCLUSION

The analysis in this paper shows limited fiscal efforts during the boom years in most of these countries and highlights the need for higher fiscal space going forward, particularly in those countries that are highly vulnerable with limited policy options.

While low public indebtedness, completion of structural fiscal reforms, and limiting expenditure pro-cyclicality to capital outlays help, as shown during this current crisis, these may not be adequate for a counter-cyclical fiscal response during recessions. Economic cycles in these countries are likely to be deeper and more unpredictable requiring a higher fiscal space, particularly if other policy options are limited. For fiscal policy to play an effective role in demand management, expenditure needs to be cyclically-neutral. In the absence of automatic stabilizers and given heterogeneous need for fiscal space, these countries would benefit from putting in place national rules to ensure such outcome.

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Appendix I. Estimation of Revenue Pro-Cyclicality

Regression equations:

$$D\log(RR_{t,i}) = a + b \cdot D\log(\text{real output}_{t,i}) + c \cdot \text{flattaxdummy} + d \cdot \text{taxefficiency}_i \quad (\text{Table 1})$$

$$D\log(RR_{t,i}) = a + b \cdot D\log(\text{output gap}_{t,i}) + c \cdot \text{flattaxdummy} + d \cdot \text{taxefficiency}_i \quad (\text{Table 2})$$

$$\log(R_{t,i}/\text{output}) = a + b \cdot \log(\text{output gap}_{t,i}) + c \cdot \text{flattaxdummy} + d \cdot \text{taxefficiency}_i \quad (\text{Table 3})$$

Where

- $R_{t,i}$ = Total revenue or one of the following components (i) tax and social security contribution receipts, (ii) tax revenue, (iii) VAT receipts and (iv) income tax receipts
- $RR_{t,i}$ = Total revenue or one of the above components deflated by the consumer price index
- Output gap = The ratio of real GDP and HP-filtered real GDP
- Flattaxdummy = A dummy variable which takes the value of 1 beginning the year a country enacts the flat tax regime.
- Taxefficiency = number of hours businesses need to fill out tax forms (source: WDI database).

Table 1. Panel Regression Results, Real Revenue and Real Output

C	DLog(Real Output)	Flat tax dummy	R-squared	Number of observation	Time
Dlog(real total revenue)					
0.05**	0.84	0.03	0.20	55	2003-07
0.07***	0.52**	0.04***	0.18	113	1995-2007
DLog(real tax revenue and social contribution)					
0.06***	0.77**	0.04	0.19	55	2003-07
0.06***	0.58**	0.04**	0.18	112	1995-2007
Dlog(real tax revenue)					
0.05**	0.92*	0.03	0.19	55	2003-07
0.05***	0.80***	0.04**	0.21	112	1995-2007
Dlog(real VAT revenue)					
0.08**	0.36*		0.13	55	2003-07
0.08***	0.69*		0.05	109	1995-2007
Dlog(real income tax revenue)					
0.02*	1.73**	0.006	0.16	55	2003-07
0.03*	1.29***	0.03	0.19	112	1995-2007

Note: *, **, and *** denote significance at 10%, 5% and 1% levels respectively.

Table 2. Panel Regression Results, Real Revenue and Output Gap

	C	Dlog(Output gap)	Flat tax dummy	R-squared	Number of observation	Time
Dlog(real total revenue)						
	0.08***	1.36**	0.05***	0.28	55	2003-07
	0.09***	0.78***	0.06***	0.21	113	1995-2007
Dlog(real tax revenue and social contribution)						
	0.08***	1.33**	0.05***	0.28	55	2003-07
	0.08***	0.87***	0.05***	0.21	112	1995-2007
Dlog(real tax revenue)						
	0.09***	1.39**	0.06***	0.25	55	2003-07
	0.08***	1.06***	0.06***	0.24	112	1995-2007
Dlog(real VAT revenue)						
	0.11***	1.41		0.04	55	2003-07
	0.11***	1.02**		0.07	109	1995-2007
Dlog(real income Ttx revenue)						
	0.08***	2.52***	0.03	0.21	55	2003-07
	0.08***	1.52***	0.06***	0.2	112	1995-2007

Note: *, **, and *** denote significance at 10%, 5% and 1% levels respectively.

Table 3. Panel Regression Results, Nominal Revenue and Output Gap

	C	Log(Output gap)	Flat tax dummy	R-squared	Number of observation	Time
Log(nominal total revenue/GDP)						
	-0.91***	0.29	-0.15***	0.60	55	2003-07
	-0.89***	0.84***	-0.14***	0.49	130	1995-2007
Log(nominal tax revenue and social contribution/GDP)						
	-1.05***	0.31	-0.16***	0.54	55	2003-07
	-1.04***	0.95***	-0.15***	0.50	130	1995-2007
Log(nominal Tax revenue/GDP)						
	-1.5***	0.68*	-0.13***	0.40	55	2003-07
	-1.5***	1.00***	-0.09***	0.25	130	1995-2007
Log(nominal VAT/GDP)						
	-2.45***	1.45*	-0.12**	0.14	55	2003-07
	-2.54***	1.24***	-0.01	0.06	130	1995-2007
Log(nominal income Tax/GDP)						
	-2.45***	0.35	0.01	0.21	55	2003-07
	-2.54***	1.52***	0.06***	0.2	130	1995-2007

Note: *, **, and *** denote significance at 10%, 5% and 1% levels respectively.

Regression equations:

$Dlog(RR_{t,i}) = a + b * Dlog(\text{real absorption}_{t,i}) + c * \text{flattaxdummy} + d * \text{taxefficiency}_i$ (Table 4)

$Dlog(RR_{t,i}) = a + b * Dlog(\text{absorption gap}_{t,i}) + c * \text{flattaxdummy} + d * \text{taxefficiency}_i$ (Table 5)

$\log(R_{t,i} / \text{output}) = a + b * \log(\text{absorption gap}_{t,i}) + c * \text{flattaxdummy} + d * \text{taxefficiency}_i$ (Table 6)

Where

- $R_{t,i}$, $RR_{t,i}$, Flattaxdummy and taxefficiency_i are same as before; and

- Absorption gap = The ratio of real absorption and equilibrium absorption, where equilibrium absorption is the difference between equilibrium output and equilibrium current account deficit (the latter is taken from Table 1 of Appendix 1 of Rahman, 2008).

Table 4. Panel Regression Results, Real Revenue and Real Absorption

	C	Dlog(Real Absorption)	Flat tax dummy	R-squared	Number of observation	Time
Dlog(real total Revenue)	0.07***	0.50**	0.03*	0.23	55	2003-07
	0.07***	0.36**	0.04***	0.17	113	1995-2007
DLog(real tax revenue and social contribution)	0.07***	0.47**	0.04*	0.22	55	2003-07
	0.07***	0.35**	0.04***	0.18	112	1995-2007
Dlog(real tax revenue)	0.07***	0.52**	0.03	0.21	55	2003-07
	0.06***	0.49***	0.04***	0.20	112	1995-2007
Dlog(real VAT Revenue)	0.07***	0.51*		0.18	55	2003-07
	0.09***	0.50*		0.06	109	1995-2007
Dlog(real income tax Revenue)	0.06**	0.74**	0.02	0.14	55	2003-07
	0.05*	0.73***	0.04*	0.18	112	1995-2007

Note: *, **, and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 5. Panel Regression Results, Real Revenue and Absorption Gap

	C	Dlog(Absorption gap)	Flat tax dummy	R-squared	Number of observation	Time
Dlog(real total revenue)	0.08***	0.65**	0.05***	0.3	55	2003-07
	0.08***	0.45***	0.05***	0.21	113	1995-2007
Dlog(real tax revenue and social contribution)	0.08***	0.59**	0.05***	0.28	55	2003-07
	0.08***	0.45***	0.05***	0.2	112	1995-2007
Dlog(real tax revenue)	0.08***	0.62**	0.05***	0.26	55	2003-07
	0.08***	0.56***	0.05***	0.23	112	1995-2007
Dlog(real VAT revenue)	0.11***	0.81**		0.09	55	2003-07
	0.12***	0.65**		0.05	109	1995-2007
Dlog(real income tax revenue)	0.09***	1.01***	0.04*	0.21	55	2003-07
	0.07***	0.80***	0.06***	0.19	112	1995-2007

Note: *, **, and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 6. Panel Regression Results, Nominal Revenue and Absorption Gap

	C	Log(Absorption gap)	Flat tax dummy	R-squared	Number of observation	Time
Log(nominal total revenue/GDP)						
	-0.92***	0.26**	-0.17***	0.62	55	2003-07
	-0.90***	0.02	-0.14***	0.42	130	1995-2007
Log(nominal tax revenue and social contribution/GDP)						
	-1.06***	0.25**	-0.17***	0.54	55	2003-07
	-1.0***	-0.04	-0.14***	0.41	130	1995-2007
Log(nominal tax revenue/GDP)						
	-1.5***	0.59***	-0.15***	0.49	55	2003-07
	-1.5***	0.06	-0.08***	0.15	130	1995-2007
Log(nominal VAT/GDP)						
	-2.48***	1.11***	-0.16***	0.26	55	2003-07
	-2.55***	0.14	-0.008	0.01	130	1995-2007
Log(nominal income tax/GDP)						
	-2.65***	0.22	0.02	0.01	55	2003-07
	-2.58***	-0.16	0.06***	0.01	130	1995-2007

Note: *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 7. Panel Regression Results, Absorption-led Output Gap and Revenues

	C	Dlog(Output gap)	Dlog(Absorption gap)*	Flat tax dummy	R-squared	Number of observation	Time
Dlog(real total revenue)							
	0.08***	0.99***	0.10**	0.05***	0.24	113	1995-2007
	0.08***	0.18	0.21**	0.05***	0.35	55	2003-07
Dlog(real tax revenue and social contribution)							
	0.08***	1.07***	0.10**	0.05***	0.24	113	1995-2007
	0.08***	0.37	0.17*	0.05***	0.32	55	2003-07
Dlog(real tax revenue)							
	0.08***	1.25***	0.08*	0.05***	0.26	113	1995-2007
	0.09***	0.43	0.17*	0.05***	0.3	55	2003-07
Dlog(real VAT revenue)							
	0.11***	1.37***	0.13*		0.08	113	1995-2007
	0.11***	0.002	0.24*		0.1	55	2003-07
Dlog(real income tax revenue)							
	0.07***	1.76***	0.11*	0.05***	0.22	113	1995-2007
	0.09***	1.24	0.23*	0.03	0.26	55	2003-07

Note: *, **, and *** denote significance at 10 percent, 5 percent and 1 percent levels, respectively.

Appendix II. Estimation of Expenditure Pro-Cyclicality

Regression equations:

$$D\log(RE_{i,t}) = a + b*d\log(\text{real output}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e*legelec + f*erdummy \text{ (Table 1)}$$

$$D\log(RE_{i,t}) = a + b*d\log(\text{output gap}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e*legelec + f*erdummy \text{ (Table 2)}$$

$$\log(E_{i,t}/ \text{nominal GDP}) = a + b*\log(\text{output gap}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e* egelec + f*erdummy \text{ (Table 3)}$$

Where

- E= Expenditure at the level of general government or one of the following components (i) total primary expenditure, (ii) social expenditure, (iii) compensation to employees and (iv) flexible expenditure. Flexible expenditure is defined as total expenditure less compensation, social benefits, interest payments and subsidies, i.e., the part of expenditure that are subject to discretion. The two main items in flexible expenditure are government consumption and capital expenditure.
- RE= Expenditure at the level of general government or one of the above components deflated by consumer price index.
- PD= Public debt to GDP ratio. Lower public debt implies higher scope for expenditure increase.
- PF= political fragmentation index, the probability of two deputies picked at random from the legislature will be of different parties (source: WB Database for political institutions); higher political fragmentation is likely to put upward pressure on expenditure.
- Legelec>equals one if the country has had a legislative election that year (source: WB Database for political institutions).
- Erdummy>equals one if the country had had a fixed exchange rate (defined as currency board, or a fixed regime); a fixed exchange rate regime is expected to increase fiscal discipline in a country particularly with open financial market.

Table 1. Panel Regression Results, Real Expenditure and Real Output

C	Dlog(Real Output)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
Dlog(Real total expenditure)						
0.12**	0.68**	-0.02*	0.04**	0.17	81	1995-2007
0.10*	1.17**	-0.02	0.03	0.27	55	2003-07
Dlog(real primary expenditure)						
0.11**	0.73**	-0.02	0.04**	0.17	81	1995-2007
0.10*	1.18**	-0.02	0.04	0.28	55	2003-07
Dlog(real social expenditure)						
0.12***	0.22	-0.02	0.04**	0.10	81	1995-2007
0.16***	0.20	-0.02	0.01	0.13	55	2003-07
Dlog (real compensation)						
0.14***	0.46	-0.02**	0.03*	0.14	81	1995-2007
0.16**	0.56	-0.04**	0.03	0.22	55	2003-07
Dlog (real consumption expenditure)						
0.07	0.24	0.01	0.03	0.02	81	1995-2007
0.15*	0.04	0.02	0.03	0.06	55	2003-07
Dlog (real capital expenditure)						
0.02	3.35***	-0.03	0.06	0.22	81	1995-2007
0.10	3.24***	-0.04	0.02	0.22	55	2003-07

Note: *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 2. Panel Regression Results, Real Expenditure and Output Gap

C	Dlog(Out put gap)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
Dlog(real total expenditure)						
0.18***	0.89**	-0.03***	0.04**	0.19	112	1995-2007
0.18***	1.76**	-0.04***	0.02	0.32	55	2003-07
Dlog(real primary expenditure)						
0.18***	0.94**	-0.03***	0.04**	0.18	112	1995-2007
0.19***	1.77**	-0.04**	0.02	0.31	55	2003-07
Dlog(real social expenditure)						
0.14***	0.43	-0.02*	0.04**	0.11	112	1995-2007
0.15***	1.31	-0.02*	0.01	0.18	55	2003-07
Dlog(real compensation to employees)						
0.18***	0.58	-0.03***	0.03*	0.14	112	1995-2007
0.21***	1.06	-0.04***	0.02	0.24	55	2003-07
Dlog(real consumption expenditure)						
0.10**	0.46	0.01	0.03	0.03	112	1995-2007
0.15**	0.41	-0.02	0.03	0.07	55	2003-07
Dlog(real capital expenditure)						
0.34***	3.39***	-0.07**	0.05	0.09	112	1995-2007
0.39***	3.47**	-0.08**	0.01	0.21	55	2003-07

Note: *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels, respectively.

Table 3. Panel Regression Results, Nominal Expenditure and Output Gap

C	log(Out ut gap)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
log(nominal total expenditure/GDP)						
-1.23***	-0.24	0.09***	0.02	0.34	86	1995-2007
-1.33***	-0.13	0.12**	0.03	0.41	65	2003-07
log(nominal primary expenditure/GDP)						
-1.18***	-0.13	0.07***	0.02	0.21	86	1995-2007
-1.28***	-0.04	0.09***	0.03	0.30	65	2003-07
log(nominal social expenditure/GDP)						
-2.67***	-0.52	0.21***	0.01	0.41	86	1995-2007
-2.9***	-0.31	0.28***	0.02	0.51	65	2003-07
log(nominal compensation expenditure/GDP)						
-2.33***	-0.72	0.0005	-0.003	0.02	86	1995-2007
-2.35***	-0.69	0.01	-0.01	0.03	65	2003-07
log(nominal consumption expenditure/GDP)						
-1.59***	-1.51	-0.05	0.05	0.04	86	1995-2007
-1.63***	-2.29	-0.05	0.07	0.04	65	2003-07
log(nominal capital expenditure/GDP)						
-1.59***	4.94***	-0.04	0.01	0.21	86	1995-2007
-2.97***	3.93***	-0.10**	0.01	0.27	65	2003-07

Note: *, **, and *** denote significance at 10 percent, percent, and 1 percent levels, respectively.

Regression equations:

$D\log(RE_{i,t}) = a + b*d\log(\text{real absorption}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e*legelec + f*erdummy$ (Table 4)

$D\log(RE_{i,t}) = a + b*d\log(\text{absorption gap}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e*legelec + f*erdummy$ (Table 5)

$\log(E_{i,t}/\text{nominal GDP}) = a + b*\log(\text{absorption gap}_{i,t}) + c*\log(PD_{,t-1}) + d*PF_{i,t} + e* egelec + f*erdummy$ (Table 6)

Table 4. Panel Regression Results, Real Expenditure and Real Absorption

C	Dlog(real Absorption)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
Dlog(Real total expenditure)						
0.13***	0.47**	-0.02*	0.03**	0.19	81	1995-2007
0.11*	0.62**	-0.02	0.04	0.26	55	2003-07
Dlog(real primary expenditure)						
0.12**	0.51**	-0.02*	0.04**	0.20	81	1995-2007
0.12*	0.73**	-0.01	0.02	0.30	55	2003-07
Dlog(real social expenditure)						
0.13***	0.12	-0.02	0.03**	0.10	81	1995-2007
0.16***	0.20	-0.02	0.01	0.13	55	2003-07
Dlog (real compensation)						
0.15***	0.24	-0.03**	0.03*	0.14	81	1995-2007
0.19**	0.30	-0.04**	0.03	0.16	55	2003-07
Dlog (real consumption expenditure)						
0.07	0.29	0.01	0.02	0.04	81	1995-2007
0.15**	0.03	-0.02	0.03	0.06	55	2003-07
Dlog (real capital expenditure)						
0.09	0.96***	-0.02	0.06**	0.17	81	1995-2007
0.07	2.46***	-0.03*	0.03	0.32	55	2003-07

Note: *, **, and *** denote significance at 10 percent 5 percent, and 1 percent levels, respectively.

Table 5. Panel Regression Results, Real Expenditure and Absorption Gap

C	Dlog(Absorption gap)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
Dlog(Real total expenditure)						
0.17***	0.54**	-0.03**	0.04**	0.21	112	1995-2007
0.18***	0.78***	-0.03**	0.02	0.33	55	2003-07
Dlog (real primary expenditure)						
0.16***	0.58***	-0.03**	0.04**	0.22	112	1995-2007
0.18***	0.80***	-0.03**	0.02	0.33	55	2003-07
Dlog (real social expenditure)						
0.14***	0.22	-0.02*	0.03**	0.11	112	1995-2007
0.17***	0.32	-0.02*	0.02	0.14	55	2003-07
Dlog (real compensation expenditure)						
0.17***	0.27	-0.03**	0.03*	0.14	112	1995-2007
0.21***	0.32	-0.04***	0.03	0.22	55	2003-07
Dlog (real consumption expenditure)						
0.09**	0.21	0.00	0.02	0.03	112	1995-2007
0.15**	0.05	-0.02	0.03	0.06	55	2003-07
Dlog (real capital expenditure)						
0.29***	2.03***	-0.06**	0.04	0.24	112	1995-2007
0.31***	2.21***	-0.06*	-0.001	0.29	55	2003-07

Note: *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels respectively.

Table 6. Panel Regression Results, Nominal Expenditure and Absorption Gap

	C	log(Output gap)	Log(Public Debt(-1))	Legelec	R-squared	Number of observation	Time
log(nominal total expenditure/GDP)							
	-1.22***	-0.16	0.09***	0.02	0.35	86	1995-2007
	-1.33***	0.001	0.12**	0.02	0.42	65	2003-07
log(nominal primary expenditure/GDP)							
	-1.17***	-0.12	0.07***	0.02	0.21	86	1995-2007
	-1.29***	0.03	0.09***	0.03	0.30	65	2003-07
log(nominal social expenditure/GDP)							
	-2.61***	-0.73**	0.20***	0.01	0.45	86	1995-2007
	-2.8***	-0.52	0.26***	0.02	0.51	65	2003-07
log(nominal compensation to employees/GDP)							
	-1.53***	-0.60	-0.06	0.05	0.03	86	1995-2007
	-1.54***	-0.66	-0.07	0.06	0.03	65	2003-07
log(nominal consumption expenditure/GDP)							
	-1.53***	-0.60	-0.06	0.05	0.04	86	1995-2007
	-1.54***	-0.66	-0.07	0.06	0.02	65	2003-07
log(nominal capital expenditure/GDP)							
	-3.42***	2.15***	-0.002	0.02	0.20	86	1995-2007
	-3.21***	1.69***	-0.05	0.01	0.25	65	2003-07

Note: *, **, and *** denote significance at 10 percent, 5 percent, and 1 percent levels, respectively.

We tested for endogeneity by estimating the relationship between revenue/expenditure and output/output gap using the two-stage least square procedure. The results are reported in Table 7. Given that the coefficients do not change sign and are all significant, we conclude that endogeneity has not been an issue for these countries. A simple granger causality test also shows that while real GDP or output gap granger cause expenditure/revenue, public expenditure/revenue does not granger cause GDP growth. This is line with the findings of Ilzetzki and Vegh (2008) which conducts a battery of endogeneity tests to see whether for developing countries output growth is affected by fiscal policy and concludes negatively.

Table 7. Testing for Endogeneity

	<i>Regressor: Output gap 1/</i>		<i>Regressor: Real Output 1/</i>	
	OLS	2SLS	OLS	2SLS
Dependent Variable				
Real Expenditure Expenditure/GDP	0.89***	1.12**	0.68**	1.17**
Real Revenue Revenue/GDP	-0.24	0.25	0.52**	1.34*
	0.78***	1.37*		
	0.84***	1.25*		

1/ Real output and output gap are instrumented by trade-weighted GDP growth of partner countries.