



**BUSINESS ENVIRONMENT  
ACTIVITY**

# **STUDY ON THE ROLE OF LOCAL GOVERNMENT IN ECONOMIC DEVELOPMENT AND MACROECONOMIC STABILITY – THE CASE OF MACEDONIA**

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**Prepared by:**

**CENTER FOR ECONOMIC ANALYSES (CEA)**

**Team:**

**Mr. Marjan Nikolov, MSc.  
Mr. Aleksandar Stojkov, MSc.**

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## BUSINESS ENVIRONMENT ACTIVITY

**This report is prepared with support of the USAID Business Environment Activity. The Business Environment Activity is financed by the US Agency for International Development to sustain the achieved momentum in the economic sector and strengthen the enabling environment for doing business in Macedonia in order to encourage business formation and growth and address the issue of high unemployment.**

**Within its activities to increase capital investments in country and increase access to finance for municipalities the Business Environment Activity conducted trainings activities in the capital budgeting and financing of capital projects through loans and public private partnerships. As a constituent part of the activities the Business Environment Activity subcontracted the Center for Economic Analysis to expand the macroeconomic model by including the sub national government to assess its effect on the macroeconomic stability.**

**This model should be used by the policymakers and analysts as a tool in estimating the flows in the national economy and potential impact of the local reforms and policy changes on the overall national economy.**

**Tatjana Lukanovska  
Senior Financial Sector Advisor  
USAID Business Environment Activity**

**Dear Reader,**

**I hereby present the model research, conducted under the auspices of the project “*Study on the role of local government in economic development and macroeconomic stability - The case of Macedonia*”.**

**This report explains how fiscal decentralization may carry risks in terms of sizeable horizontal fiscal imbalances across sub-national governments, which may fuel inflation or increase macro-vulnerability. Even so, policymakers have usually embarked on some form of transfer of fiscal authority from central to local governments without sound assessment of the effects on macroeconomic stability. Therefore, an investigation of these relations in the context of further fiscal decentralization in Macedonia is highly desirable.**

**I sincerely hope that the study will meet your expectations and will lay the foundations of our further cooperation.**

**Yours sincerely,**

**Marjan Nikolov, MSc**

**President of CEA**

General information about CEA

Logo:



Address:

**CENTER FOR ECONOMIC ANALYSES (CEA)**

Bul. Jane Sandanski 63/3,  
1000 Skopje Macedonia

Tel: + 389 (0)2 24 44 766

Mob: + 389 70 834 636

TIN: 4030003479278

Reg. 5763061

Account number:

Stopanska Banka AD Skopje  
Account number: 200000856268559

Web page and e-mail:

[www.cea.org.mk](http://www.cea.org.mk)

[www.lsg-data.org.mk](http://www.lsg-data.org.mk)

[info@cea.org.mk](mailto:info@cea.org.mk)

**List of Abbreviations:**

BEA	<i>Business Environment Activity</i>
BoP	<i>Balance of Payment</i>
CEA	<i>Center for Economic Analysis</i>
CEA Macro	<i>Center for Economic Analysis Macro Model</i>
CES	<i>Constant Elasticity of Substitution</i>
CPB	<i>Central Planning Bureau</i>
CPS	<i>Cumulated Production Structure</i>
EAR	<i>European Agency for Reconstruction</i>
GFS	<i>Government Finance Statistics</i>
GoM	<i>Government of Macedonia</i>
LGU	<i>Local Government Units</i>
MMC	<i>MicroMacro Consultants</i>
NBRM	<i>National Bank of the Republic of Macedonia</i>
SNA	<i>National Accounts</i>
Un C&M	<i>University Sts Cyril and Methodius</i>
USAID	<i>United States Agency for International Development</i>

## **“STUDY ON THE ROLE OF LOCAL GOVERNMENT IN ECONOMIC DEVELOPMENT AND MACROECONOMIC STABILITY - THE CASE OF MACEDONIA”**

### **1. EXECUTIVE SUMMARY**

1. Empirical examinations of the role of local government in economic development and the impact of fiscal decentralization on macroeconomic stability have been scarce;
2. Fiscal decentralization may carry risks in terms of sizeable horizontal fiscal imbalances across sub-national governments, which may fuel inflation or increase macro-vulnerability;
3. Cross-country experiences reveal that there is no systematic relationship between fiscal decentralization and long-term economic growth. More precisely, the degree of fiscal decentralization does not affect long-term economic growth and this is in line with the existing body of empirical literature;
4. We examine the link between fiscal decentralization and economic growth by focusing on the magnitude of growth-conducive expenditure, i.e. the local government investment;
5. We assessed the capital investment needs of the Macedonian local government by examining their strategic documents and by taking into account the requirements in accordance with the environmental horizontal legislation;
6. We didn't take the effect of the second phase of the fiscal decentralization as we wanted to simulate the pure effect of the local government investment on the economic growth and inflation. The definition of macroeconomic stability in this research is assessing the fluctuation of economic growth and inflation;
7. Investment-induced increases of local government budgets in Macedonia are expected to exhibit only short-term impact on real GDP growth (increase of the real GDP growth rate by 1.29 percentage points in 2008, 0.32 percentage points in 2009 and 0.11 percentage points in 2010);
8. Given the relatively low degree of revenue and expenditure decentralization in Macedonia this would lead to mild increase of the domestic inflation rate (0.1 percentage points *per annum*);
9. We conclude that under these assumptions there is no risk to the macroeconomic stability. However, debt-financed increases of local government expenditure can promote excessive spending and rapid accumulation of debt if not regulated properly. In this research, we have neglected such supply-side consideration of the investment-led increase of expenditure of sub-national governments in Macedonia. This urge the Government to make additional simulations on the supply side consideration of the investment-led increase of expenditure;
10. Due to the relatively high import content of most investment projects in Macedonia, the increased local government capital expenditure would induce moderate growth of real imports of goods and services (increased imports of

- goods and services (in real terms) by 1.66 percentage points in 2008, 0.39 percentage points in 2009 and 0.13 percentage points in 2010);
11. Our cross-country empirical results are fully consistent with the simulated effects of permanent investment-led increase of local government budgets by 93.3 Millions of EUR, as the growth-conducive effects wipe out after the third year.

## 2. SCOPE OF THE PROJECT

Empirical examinations of the role of local government in economic development and the impact of fiscal decentralization on macroeconomic stability have been scarce.<sup>1</sup> To our best knowledge, none of the existing empirical studies have dealt with the decentralization challenge in Macedonia. Fiscal decentralization may carry risks in terms of sizeable horizontal fiscal imbalances across sub-national governments, which may fuel inflation or increase macro-vulnerability. Even so, policymakers have usually embarked on some form of transfer of fiscal authority from central to local governments without sound assessment of the effects on macroeconomic stability. Therefore, an investigation of these relations in the context of further fiscal decentralization in Macedonia is highly desirable.

One of the approaches in examining the link between fiscal decentralization and economic growth is to focus on the magnitude of growth-conducive expenditure, i.e. the local government investment. The challenge for Macedonia is to increase both private and public investment to support economic growth and modernize its infrastructure while maintaining a stable macro-economic environment. The local government units (further on: LGUs) and municipal companies will play a critical role in this context, as they are responsible for undertaking a substantial portion of the infrastructure investments required.

Whether increased LGU capital expenditure would significantly influence medium-term economic growth or affect macroeconomic stability in Macedonia is a matter of empirical resolution. There a number of possible approaches in assessing such role of local government for the economic development and macro stability. Our methodology rests on the magnitude of expected (or planned) increase of LGU capital expenditure taking into account the alternative sources of financing of their investment needs. Given the scarce information on the medium-term fiscal framework of LGUs in Macedonia, we relied on the official estimates of LGU investment needs. In the next step, we examined whether the estimated investment needs, if fully implemented, would bring higher rates of economic growth and/or exhibit any significant influence on macroeconomic stability in Macedonia.

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<sup>1</sup> The full list of studies exploring the impact of fiscal decentralization encompasses: Prud'homme, 1995; McLure, 1995; Sewell, 1996; Ter-Minassian 1997, Fornasari, Webb, and Zou, 2000; Tanzi, 2000; Martinez-Vazquez and McNabb, 2001; Ebel and Yilmaz, 2002; and Martinez-Vazquez and McNabb, 2005.

### 3. THE IMPACT OF LOCAL GOVERNMENT CAPITAL EXPENDITURE ON ECONOMIC GROWTH AND MACROECONOMIC STABILITY IN MACEDONIA

#### 3.1. Assessment of the investment needs of Macedonian municipalities

Information on medium-term investment needs of Macedonian municipalities is very scarce. Our methodology rests on analysis of the development strategies and action plans of 13 Macedonian municipalities (Berovo, Demir Hisar, Delcevo, Gostivar, Skopje, Kicevo, Kocani, Kumanovo, Radovis and Konce, Resen, Strumica, Veles and Vinica) that decided to publicize and /or share with us their data and documents and we thank them all.

Their number of inhabitants represents nearly half of the total Macedonian population. However, only 7 out of 13 municipalities have defined medium-term capital expenditure framework with explicit estimates of their fiscal needs. Table 1 presents the details on municipal investment needs. Most projects are focused on improvement of the infrastructure, employment creation, agricultural and tourism development, support of local businesses and entrepreneurship, social inclusion activities, etc. Since their strategic documents refer to different medium-term horizons, we calculated the estimated annual investment needs for these areas.

**Table 1- Assessment of the annual investment needs of 7 Macedonian municipalities**

No.	Municipality	Types of investment projects	Annual investment needs (in mln EUR)	Estimated investment needs in the development strategy (in mln EUR)	Available funds (in mln EUR)	Population	Official sources
1.	Berovo	63 projects in infrastructure, sustainable development, education and training	4.16	20.81	4.10	13941	Sustainable Development Strategy 2007 - 2011
2.	Demir Hisar	40 projects for tourism development, small and medium enterprises, infrastructure, agriculture, social services, institutional strengthening	0.77	3.09	-	9497	Strategic and Action Plan for Local Economic Development 2006-2009
3.	Delcevo	43 projects in business climate improvement, tourism, agriculture, urban development, education and civil sector strengthening	-	-	-	17505	Strategic Plan for Local Economic Development 2007-2012

4.	Gostivar	Reduction of employment, education, environment, infrastructure, economic development	-	-	-	81030	Strategic Plan for Development 2007-2011
5.	City of Skopje	261 projects in economic development, export promotion, FDI promotion, strengthening competitiveness.	-	-	-	506,926	Strategic Plan for Local Economic Development 2006 - 2009
6.	Kicevo	Tourism, natural resources protection, enhancement of private sector competitiveness, local infrastructure	0.27	1.09	0.50	30138	Strategic Plan for Local Economic Development 2005-2009
7.	Kocani	68 projects for improvement of the education, agricultural development, tourism development	8.12	40.61	-	38092	Strategic Plan for Local Economic Development 2003-2007
8.	Kumanovo	Employment creation, foreign investment promotion, infrastructure, reduction of grey economy, environment protection	-	-	-	105484	Strategic Plan for Local Economic Development 2006-2008
9.	Radovis i Konce	7 priority projects in healthy food protection, education, infrastructure, culture, health and employment creation	-	-	-	31780	Strategic Plan for Local Economic Development 2007-2011
10.	Resen	Projects for improved environment, infrastructure, local business support, agricultural development, tourism development	0.88	5.30	-	16825	Strategic Plan for Local Economic Development 2007-2012
11.	Strumica	94 projects for improvement of infrastructure, education, tourism, industry, business climate, etc.	25.09	150.52	0.28	54676	Strategic Plan for Local Economic Development 2006-2011
12.	Veles	Job creation, social inclusion, education	337.28 (0.08 actual figure for 2006)	6745.61	-	55108	Economic Development Study 2001-2020

13.	Vinica	Environment protection, local business support, agricultural development, tourism development, trade facilitation	-	-	-	14200	Strategic Plan for Local Economic Development
<b>Reported investment needs</b>			<b>376.6</b>	<b>6,967.0</b>	<b>4.9</b>	<b>975,202</b>	
<b>Revised investment needs</b>			<b>39.4</b>	<b>226.4</b>			

Source: Municipal websites and information provided upon authors' request.

These estimates are significantly higher than the actual capital expenditure for 2006 (see Table A2 in the Appendix). For instance, the assessed annual investment needs of the Municipality of Veles are three times higher than the consolidated local government budgets in Macedonia! Although this figure is pulled out from the official documents, we decided to exclude it as an outlier and instead, used the amount of actual capital expenditure in 2006 (0.08 Millions of EUR).

It is a conventional fact that LGU investments are well below what is required to meet EU infrastructure standards over the pre-accession period. Currently, most of local infrastructure is obsolete and a large amount of effort is required for its replacement and modernization. Services such as water, sewage and solid waste systems involve large unit costs. To increase the level of such services will require considerable investments. It is evident that large part of development, replacement, and renewal of local assets will need to be financed out of LGU budgets. EAR-funded project on strengthening the capacity of the Ministry of Environment and Physical Planning has prepared estimates for meeting the capital and operational costs of the investments required to comply with European Union directives and policies in the “heavy investment” areas of environmental management. Within this project, the indicative estimates for the cost of accession in the heavy investment areas have been estimated. Table 2 presents the assessed additional investment needs for environmental protection.

**Table 2- Assessment of the additional investment needs for approximation of Macedonia, Romania and Bulgaria to EU environmental legislation  
(In millions of EUR and per capita in EUR)**

<i>Investment areas</i>	<i>Macedonia</i>		<i>Romania</i>		<i>Bulgaria</i>	
	Millions of EUR	Per capita (EUR)	Millions of EUR	Per capita (EUR)	Millions of EUR	Per capita (EUR)
Urban waste water treatment, sewerage	229	113	1,385	63	2,056	267
Large combustion plants	274	136	402	18	1,627	211
Municipal waste management, landfills	80	40	n/a	n/a	n/a	n/a
Municipal waste management, other installations	120	59	n/a	n/a	n/a	n/a

IPPC-air emissions	381	187	806	36	3,261	424
<b>TOTAL</b>	<b>1,084</b>	<b>537</b>	<b>10,593</b>	<b>475</b>	<b>6,944</b>	<b>902</b>

Source: EAR 2002-2003 and WB 2005.

If we assume that Macedonia may achieve full compliance with the EU environment legislation in twenty years, then the annual investment needs for environmental protection would be approximately 54.2 Millions of EUR.

### 3.2. Combining the investment needs of Macedonian municipalities

In the next step, we combine the LGU assessments of the investment needs with the official estimates for environment-related capital expenditure in order to quantify the aggregate investment needs by Macedonian municipalities on annual basis. These estimates are solely demand for capital-determined, implying that at this stage of the analysis, the available funds for their funding are not taken into account. Table 3 summarizes the estimated investment needs (on annual basis) of the Macedonian local government units.

**Table 3 - Assessment of the annual investment needs by the Macedonian municipalities**

<i>Investment needs (in Millions of EUR)</i>	<i>2006 Actual data</i>	<i>2008-2017 Annual estimate</i>
<b>Annual investment needs of Macedonian municipalities</b>	<b>3.78</b>	<b>97.07</b>
<i>Reported annual investment needs</i>	<b>0.31</b>	<b>39.4</b>
Berovo	0.01	4.16
Veles *	0.08	0.08
Demir Hisar	0.02	0.77
Kicevo	0.07	0.27
Kocani	0.02	8.12
Resen	0.05	0.88
Strumica	0.06	25.09
<i>Capital formation needs of the remaining municipalities in 2006</i>	<b>3.47</b>	<b>3.47</b>
<i>Costs of gradual compliance with the EU environmental legislation</i>	-	<b>54.2</b>

Obviously there is stark discrepancy between actual capital expenditure and assessed investment needs. Demand-side driven need for capital formation in Macedonian LGUs amounts 97.07 Millions of EUR (equivalent to 5.95 Billions of Denars), which represents 73.3% of the consolidated local government budgets in Macedonia in 2006. In the existing budgeting practice in Macedonia, such budget requests have been deflated by factor 4 or even more by the Ministry of Finance.

Even so, it is recommended and informative to check whether the realization of the demand-driven investment needs would exhibit significant influence on the real GDP growth and the inflation, the latter being an indicator of the macroeconomic stability.

### **3.3. Empirical estimation of the effects of increased capital expenditure in the LGU budgets**

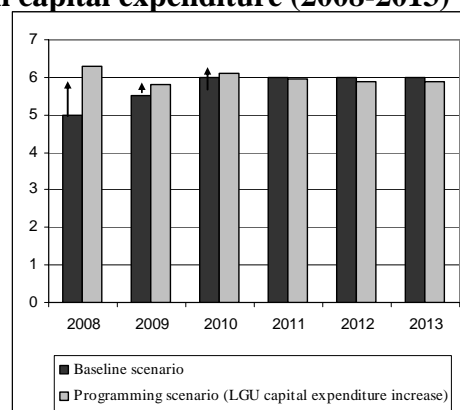
In the next step, we assess the implications of the increase of local government capital expenditure by 5,950 Millions of Denars per year, an amount that reflects the estimated annual investment needs in the previous section. For the time being, we refrain from the analysis of the supply side, i.e. the available funds for financing such increase in the local government capital expenditure.

We exploit the analytical framework of the CEA Macro model, developed with financial support from USAID and technical support from Dutch macroeconomic experts (see Appendix A3 for detail elaboration of the main features of the model).

A permanent annual increase in capital expenditure in LGU budgets by 5,950 Millions of Denars (equivalent to 97.07 Millions of EUR) from 2008 onwards would generate the following effects in the Macedonian economy:

- Permanent increase of the inflation rate by 0.1 percentage points in medium term;
- Increase of the real GDP growth rate by 1.29 percentage points in 2008, 0,32 percentage points in 2009 and 0.11 percentage points in 2010 (see Graph 1)

**Graph 1 - Real GDP growth effects of permanent increase in capital expenditure (2008-2013)**



Source: CEA Macro model medium-term forecasts.

- More precisely, if the baseline scenario for the rate of real GDP growth in Macedonia in 2008 is 5%, one can expect that increased capital expenditure in the local government budgets would lead to plausible rate of growth of 6.29%! The initial increase would exhibit only short-term impact on real GDP growth in 2008-2010, as it is forecasted to disappear from 2011 onwards.
- Increased imports of goods and services (in real terms) by 1.66 percentage points in 2008, 0.39 percentage points in 2009 and 0.13 percentage points in 2010, because of the relatively high import content of many investment projects.
- Widened current account deficit, on average, by 1.25 percent of GDP, because of the lower sensitivity of exports and much stronger response of the import demand.

The underlying assumption is that the investment projects would be implemented in line with the municipal capital budgeting plans, without significant delays and within the estimated costs. Another important limitation of the simulation of macroeconomic effects is that it does not take into account the sector structure of local government capital expenditure.

#### **3.4. Debt- or tax-financed increase of capital expenditure?**

So far, we have neglected the supply-side consideration of the investment-led increase of expenditure of sub-national governments in Macedonia. Local government capital expenditure can expand, in general, through:

- Balanced budget expenditure increases, or
- Debt-financed budget expenditure increase.

Balanced budget expenditure increase implies that either: (i) local tax revenue are increased in proportion with the envisaged increases of capital spending, or (ii) there are substantial cost savings on other expenditure items that would neutralize higher local government investment. The latter scenario of cutting spending is simply inapplicable in Macedonian circumstances, given the very limited degree of expenditure management and low share of sub-national government expenditures.

Debt-financed increases of local government expenditure (sub-national vertical imbalance in favor of the Macedonian LGUs) can promote excessive spending and rapid accumulation of debt. If belatedly monitored, large-scale local government budget deficits may undermine the stabilization efforts of the central government and constrain its ability to pursue certain macroeconomic objectives. Hence, short-term macroeconomic management considerations call for effective limits on LGU budget deficits (Ter-Minassian, 1997). Additional problem associated with the debt-financed increases of local government investment is the adverse effect on intergenerational equity over the

longer run. Accumulation of substantial debts by the Macedonian municipalities implies increased obligations for future tax payers.

There are a number of alternative approaches for control of LGU borrowing. The following discussion about Macedonia follows the taxonomy developed by Ter-Minassian 1997 and presentation for the Ministry of Finance's Public debt management Department developed by Nikolov 2006.

1. reliance on market discipline;
  - a. Markets should be free and open (government should not be in a privileged position)
  - b. Efficient market. Adequate information on the outstanding debt of the LGU and repayment capacity should be available to the supply side of the market
  - c. No bailouts in case of default
  - d. Information requirements for coverage, quality and timeliness
  - e. Short sighted politicians related to the electoral cycle and the no responsiveness to early warnings by the financial market
2. cooperation by different levels of government in the design of debt control
  - a. Limits on the indebtedness of LGU not set by law or central Gov. but set through negotiation process between the levels of Gov.
  - b. LGU actively involved in the process of formulation of macroeconomic objectives and fiscal parameters and finally the specific limits are then agreed
  - c. This approach promotes dialogue, raise consciousness and facilitate information exchange across levels of Gov.
  - d. Works in countries with a culture of relatively well established fiscal discipline
3. rule-based approaches
  - a. Standard rules set in the constitution or laws
  - b. Setting limits on absolute indebtedness, purpose (for example golden rule-for investment purpose only), debt service, types of borrowing (for example not allowed to borrow from the NB)
  - c. Advantage of being transparent and evenhandedness
  - d. Avoiding bargaining across level of Gov. and preserving macroeconomic management soundness by avoiding short-term political factors
  - e. These rules lack flexibility (in Romania for example they are about to change twice: were absolute indebtedness was 20 % of revenues, rose to 25 % and now will go to 30 %)
  - f. Might motivate future reclassification of expenditures to escape current budget balance requirements, building arrears out of the debt ceilings, creation of entities that are kept off-budget

- g. Rules-based controls thus, require clear accounting system that limits off-budget operations, comprehensive definition of what constitutes debt, setting modern Gov. financial management system, timely and reliable data-reporting
4. Administrative controls.
- a. Setting of time limits on the overall debt of individual LGU
  - b. Review and authorization of borrowing operations (example is the Commission in Romania but only administratively to check the documents)
  - c. Beside ex-ante authorization of proposed borrowing there is ex-post monitoring of the financial operations (should the Commission for monitoring the development of the system for financing of LGU in Macedonia do this?)

Given all that:

- 1. Reliance on market discipline in Macedonia is unlikely to be appropriate because, of not well developed capital market, market is not efficient, lack of market discipline
- 2. Cooperation in the design of debt controls might end up in a political factors overweighting the sound financial management practice
- 3. In terms of transparency the rules-based approach is preferable

One alternative, whereby the private sector undertakes to provide services of public nature, is the Public Private Partnership – PPP experience. Best practices calls for each element of risk to be allocated to the party which is best equipped to manage it so that the risk can be minimized altogether. Of course that there are risks like confusing the value for money solution with the cheapest solution for investment project but setting a system in Macedonia could challenge the tariff reform, changes in the corporate structure, management and operations, improved legal framework, private sector participation and last but not least political acceptance.

The next table illustrates the pros and cons of different sources of financing LGU projects.

**Table 4. Sources of financing of infrastructure projects**

Source	Pros	Cons
Own resources	Cheap	Less predictable, rarely sufficient
Grants from EU and central governments	Cheap	Restriction on the use of funds, slow pace of approval, strict control

MFO loans	Long-term, grace periods, amortizing repayment	Foreign currency risk, restrictions on the use of funds
Domestic bank loans	Local currency	Short-term, restricted capacity
Bonds	Diversity of investors, liquidity, depth of markets	Expensive depending on size, bullet repayments
Own sources or borrowings of enterprises	No direct costs	Contingent liabilities and more expensive
PFI/PPP deals	No direct costs, more effective private sector provision of services	Long-term agreement with concessionaires, off-balance sheet risks
Investment banks and funds for LGU	Deposit risk attenuation, lower interest rate, possibility of contributing to capitalization of the bank, LGU could provide guarantee with their current revenues as well, the Bank can provide consulting services to the LGU as an auxiliary service	Possible mix between having a role in the capitalization process and possibility of being granted a loan i.e. political interference, Local development fund could prove counter-productive to the objectives of sound, private credit market development.

Source: “*The future of local government finances: Case studies from Bulgaria, Romania and Macedonia*” - Nikolov 2006.

On the supply side Municipalities may be interesting entities for banks but with reserve, as the financial statements quality within each municipality needs carefully to be checked (which initially will make municipalities less attractive for the banks).

Apart from the banking sector, the capital market in Macedonia shows deepening as well as an increment of awareness in the broader population about the advantages of investing in securities. However, the corporate governance issues have to be reflected in the practice as well in order to increase confidence in the capital market issuers and institutions. At the moment, the securities law does not make any specific or additional requirements for the municipalities as potential issuers of debt (in a form of municipal bonds). The main obstacle for the supply/investors would be:

- untrustworthy financial statements of the municipalities
- lack of transparency and accountability in the local governance
- lack of skillful staff within the municipalities for long term financial planning
- lack of good ideas/projects to be financed with limited possibility to forces the revenues from the investment
- the investment plans at economic scale (small municipalities)

**4. CROSS-COUNTRY ANALYSIS OF THE LINKAGES BETWEEN FISCAL DECENTRALIZATION AND ECONOMIC GROWTH**

**4.1. Operational measures of decentralization**

It is widely recognized that the derivation of precise definition of the degree of fiscal decentralization, particularly for international comparison purposes, is a complex task. The most widely used measure of the degree of fiscal decentralization has been the share of local government expenditure (revenue) in the general government budget expenditure (revenue). The main source of data has been the Government Finance Statistics (GFS), produced by the International Monetary Fund on annual basis. The GFS yearbook offers comparable estimates of the revenue and expenditure at different levels of government by function and economic type. We will use the term *revenue / expenditure decentralization* as reference to these definitions.

However, some local government expenditures are funded by the central government and are not subject to autonomous decisions by the sub-national governments. Therefore, sub-national revenue and expenditure share in total government revenue/spending (or aggregate measures) overestimates the actual degree of fiscal decentralization. Given these limitations, where possible, we include other definitions of the degree of fiscal decentralization that take into account local autonomy and discretion in expenditure and taxation. These alternative definitions will correct for the degree of central government control over local tax rates and tax bases and use *disaggregated revenue / expenditure decentralization* definitions.

More precisely, we adopt the following six operational definitions of fiscal decentralization:

**(1) Expenditure decentralization measure (1)**

Sub-national share of expenditures (LSG expenditure in percent of consolidated central government budget expenditure)

$$\frac{C.II[Loc] - C.3.2[Loc] - C.7.1.1[Loc] + C.II[Pro] - C.3.2[Pro] - C.7.1.1[Pro]}{C.II[Cen] - C.3.2[Cen] - C.7.1.1[Cen] + C.II[Pro] - C.3.2[Pro] - C.7.1.1[Pro] + C.II[Loc] - C.3.2[Loc] - C.7.1.1[Loc]}$$

Variable	Series Name	Sub-Series Name
cii_cen_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	CENTRAL GOVT, CONSOLIDATED ACCOUNTS
C32cen_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	CENTRAL GOVT, CONSOLIDATED ACCOUNTS
c771_cen_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	CENTRAL GOVT, CONSOLIDATED ACCOUNTS
cii_prop_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	STATE OR PROVINCIAL GOVERNMENT
C32_prop_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	STATE OR PROVINCIAL GOVERNMENT
c771_prop_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	STATE OR PROVINCIAL GOVERNMENT
cii_loc_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	LOCAL GOVERNMENT
C32_loc_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	LOCAL GOVERNMENT
c771_loc_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	LOCAL GOVERNMENT

## (2) Expenditure decentralization measure (2)

Sub-national share of expenditures (LSG expenditure in percent of GDP)

$$\frac{C.II[Loc] - C.3.2[Loc] - C.7.1.1[Loc] + C.II[Pro] - C.3.2[Pro] - C.7.1.1[Pro]}{GDP}$$

Variable	Series Name	Sub-Series Name
cii_loc_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	LOCAL GOVERNMENT
C32_loc_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	LOCAL GOVERNMENT
c771_loc_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	LOCAL GOVERNMENT
cii_prop_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	STATE OR PROVINCIAL GOVERNMENT
C32_prop_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	STATE OR PROVINCIAL GOVERNMENT
c771_prop_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	STATE OR PROVINCIAL GOVERNMENT
wdi_gdp	GDP (constant Local currency units)	TOTAL ECONOMY

## (3) Revenue decentralization measure (1)

Sub-national share of own-source revenue (LSG own-source revenue in percent of consolidated central government own-source revenue)

$$\frac{A.II[Loc] + A.II [Pro]}{A.II[Loc] + A.II [Pro] + A.II [Cen]}$$

Variable	Series Name	Sub-Series Name
aii_cen	TOTAL REVENUE (A.II; OR A.III + A.VI)	CENTRAL GOVT, CONSOLIDATED ACCOUNTS
aii_prop	TOTAL REVENUE (A.II; OR A.III + A.VI)	STATE OR PROVINCIAL GOVERNMENT
aii_loc	TOTAL REVENUE & GRANTS (A.I; OR A.II + A.VII)	LOCAL GOVERNMENT

## (4) Revenue decentralization measure (2)

Sub-national share of own-source revenue (LSG own-source revenue in percent of GDP)

$$\frac{A.II[Loc] + A.II[Pro]}{GDP}$$

Variable	Series	Sub-Series
aii_prop	TOTAL REVENUE (A.II; OR A.III + A.VI)	STATE OR PROVINCIAL GOVERNMENT
aii_loc	TOTAL REVENUE & GRANTS (A.I; OR A.II + A.VII)	LOCAL GOVERNMENT
wdi_gdp	GDP (constant Local currency units)	TOTAL ECONOMY

## (5) Revenue decentralization measure (3)

Sub-national share of tax revenue (LSG tax revenue in percent of consolidated central government tax revenue)

$$\frac{A.IV[Loc] + A.IV[Pro]}{A.IV[Loc] + A.IV[Pro] + A.IV[Cen]}$$

Variable	Series Name	Sub-Series Name
aiv_cen	TAX REVENUE (A.IV)	CENTRAL GOVT, CONSOLIDATED ACCOUNTS
aiv_prop	TAX REVENUE (A.IV)	STATE OR PROVINCIAL GOVERNMENT
aiv_loc	TAX REVENUE (A.IV)	LOCAL GOVERNMENT

#### (6) Revenue decentralization measure (4)

Vertical imbalance

$$A.18[Loc] + A.18[Pro]$$

$$C.II[Loc] - C.3.2[Loc] - C.7.1.1[Loc] + C.II[Pro] - C.3.2[Pro] - C.7.1.1[Pro]$$

Variable	Series Name	Sub-Series Name
a18_prop	GRANTS FROM OTH LEVELS OF NATL GOVT (A18)	STATE OR PROVINCIAL GOVERNMENT
a18_loc	GRANTS FROM OTH LEVELS OF NATL GOVT (A18)	LOCAL GOVERNMENT
cii_prop_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	STATE OR PROVINCIAL GOVERNMENT
C32_prop_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	STATE OR PROVINCIAL GOVERNMENT
c771_prop_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	STATE OR PROVINCIAL GOVERNMENT
cii_loc_	TOTAL EXPENDITURE (B.I; OR C.II; OR C.III + C.IV)	LOCAL GOVERNMENT
C32_loc_	TRANSFERS TO OTH LEVELS OF NATL GOVT (C3.2)	LOCAL GOVERNMENT
c771_loc_	DOM CAP TRANSFERS TO OTH LEVELS OF NATL GOVT (C7.1.1)	LOCAL GOVERNMENT

#### 4.2. Empirical estimation of the effects of fiscal decentralization on economic growth

We construct Barro-type growth model, which encompasses the key economic and demographic factors of economic growth: the initial per capita income, the average years of schooling, population growth, relative price of investment and trade openness. Additionally, we introduce different operational definitions of expenditure and revenue-based decentralization to check if they exhibit any consistent influence on the growth of GDP per capita. The period of analysis refers to 1970-2005 thus, long run effect, and the sample of countries consists of 26 economies from the region of Europe.

**Table 5 - Sample of countries under investigation**

<i>Group of countries</i>	<i>Countries</i>
EU-15	Austria, Belgium, Great Britain, Germany, Greece, Denmark, Italy, Portugal, France, Finland, The Netherlands, Sweden and Spain.
Central and Eastern Europe (incl. the Baltic States)	The Czech Republic, Estonia, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Hungary.
South-Eastern Europe	Albania, Bulgaria, Macedonia, Croatia and Romania.

Table 6 presents the results from the panel data regression (static model with fixed effects).

**Table 6 - Panel data model (static, fixed-effects)**

Dependent variable: <b>Average five-year growth of GDP per capita (PPP)</b>		
Log GDP per capita	<b>-9.30</b>	<b>-9.14</b>
<i>t-stat</i>	(-4.94) ***	(-3.47) ***
Average years of schooling	<b>1.26</b>	<b>1.27</b>
<i>t-stat</i>	(3.33) ***	(2.38) **
Population growth	<b>-0.25</b>	<b>0.37</b>
<i>t-stat</i>	(-0.28)	(0.33)
Relative price of investment	<b>-5.02</b>	<b>-5.48</b>
<i>t-stat</i>	(-1.77) *	(-1.80) *
Trade openness	<b>6.74</b>	<b>9.11</b>
<i>t-stat</i>	(3.46) ***	(3.61) ***
Expenditure decentralization (LSG / GG expenditure)	<b>-0.01</b>	
<i>t-stat</i>	(-0.32)	
Expenditure decentralization (LSG expenditure / GDP)		<b>-0.02</b>
<i>t-stat</i>		(-0.18)
F-statistic	F(6,58) = 5.41	F(6,43) = 6.28
Number of observations	86	70
Number of countries	22	21
R-sq	0.4167	0.4535
***, ** and * indicate 1%, 5% and 10% level of significance		

The two measures of fiscal decentralization are separately introduced in the model specification. Expenditure decentralization measures, expressed either as a ratio of local government budget expenditure and consolidated (general) government budget expenditure or LSG expenditure in terms of GDP, do not display statistically significant impact on long-term economic growth. This should not be surprising, since it is in consistent with the findings of the other empirical studies (Martinez-Vazquez and McNabb, 2001; and Ebel and Yilmaz, 2002).

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**ANNEX 1. TABLES**

**Table A1 - Consolidated Local Government Budgets (2003-2006),  
In millions of Denars and in millions of EUR**

<b>Local Government Finance</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
	<i>In millions of Denars</i>				<i>In millions of EUR</i>			
<b>Total LSG Revenue</b>	<b>4388</b>	<b>4871</b>	<b>5559</b>	<b>8114</b>	<b>71.6</b>	<b>79.4</b>	<b>90.7</b>	<b>132.6</b>
Tax revenue	2888	3196	3293	3520	47.1	52.1	53.7	57.5
Personal income tax		0	100	203	0.0	0.0	1.6	3.3
Other tax revenue		3196	3193	3317	0.0	52.1	52.1	54.2
Non-tax revenue	156	310	189	1132	2.5	5.1	3.1	18.5
Capital revenue	50	83	6	85	0.8	1.4	0.1	1.4
Transfers and grants	1294	1282	2071	3376	21.1	20.9	33.8	55.2
<b>Total LSG Expenditure</b>	<b>4109</b>	<b>4741</b>	<b>2491</b>	<b>4895</b>	<b>67.1</b>	<b>77.3</b>	<b>40.6</b>	<b>80.0</b>
Salaries and allowances	545	563	698	1202	8.9	9.2	11.4	19.6
Goods and services	1460	1324	1554	3461	23.8	21.6	25.4	56.6
Current transfers	279	195	3	0.2	4.6	3.2	0.0	0.0
Interest payments	8	3	0	0	0.1	0.1	0.0	0.0
- on non-resident debt	0	0	0	0	0.0	0.0	0.0	0.0
- on domestic debt	0	0	0	0	0.0	0.0	0.0	0.0
- on other levels of govern.	0	0	0	0	0.0	0.0	0.0	0.0
Capital expenditure	1816	2656	236	233	29.6	43.3	3.9	3.8
Purchase of capital assets	1788	2643	236	233	29.2	43.1	3.9	3.8
Capital transfers	28	13	0	0	0.5	0.2	0.0	0.0
<b>LSG overall balance</b>	<b>280</b>	<b>130</b>	<b>3068</b>	<b>3218</b>	<b>4.6</b>	<b>2.1</b>	<b>50.1</b>	<b>52.6</b>
<b>LSG Financing</b>	<b>-280</b>	<b>-130</b>	<b>-3068</b>	<b>-3218</b>	<b>-4.6</b>	<b>-2.1</b>	<b>-50.1</b>	<b>-52.6</b>
<i>Inflows</i>	-251	-114	-728	-950	-4.1	-1.9	-11.9	-15.5
Domestic borrowing	-251	-114	-728	-950	-4.1	-1.9	-11.9	-15.5
Bank borrowing	51	45	14	14	0.8	0.7	0.2	0.2
Other domestic financing	-302	-184	-742	-964	-4.9	-3.0	-12.1	-15.8
Sale of securities		25	0	0.2	0.0	0.4	0.0	0.0
Foreign borrowing			0	0	0.0	0.0	0.0	0.0
<i>Outflows</i>	30	15	2340	2268	0.5	0.3	38.2	37.1
Repayment of principal	28	15	2340	2268	0.5	0.3	38.2	37.1
Equity	1.3	0	0	0	0.0	0.0	0.0	0.0

**Table A2 - Capital expenditure of Macedonian municipalities in 2006**  
**In millions of Denars and in millions of EUR**

Municipality	In Millions of		Municipality	In Millions of	
	Denars	EUR		Denars	EUR
<b>Republic of Macedonia</b>	<b>232.69</b>	<b>3.78</b>			
1 Skopje-Grad	49.78	0.81	45 Mavrovo-Rostuse	0.68	0.01
2 Aracinovo	0.00	0.00	46 Negotino	2.40	0.04
3 Berovo	0.54	0.01	47 Novo Selo	0.76	0.01
4 Bitola	8.53	0.14	48 Bosilovo	2.35	0.04
5 Novaci	0.39	0.01	49 Ohrid	15.33	0.25
6 Bogdanci	0.00	0.00	50 Debarca	0.72	0.01
7 Dojran	0.26	0.00	51 Pehcevo	0.00	0.00
8 Bogovinje	1.95	0.03	52 Petrovec	0.00	0.00
9 Brvenica	0.19	0.00	53 Zelenikovo	1.08	0.02
10 Valandovo	0.37	0.01	54 Prilep	7.68	0.12
11 Veles	4.62	0.08	55 Krivogastani	0.11	0.00
12 Cashka	2.03	0.03	56 Probistip	0.76	0.01
13 Vinica	1.04	0.02	57 Radovis	2.38	0.04
14 Vrapciste	3.31	0.05	58 Konce	0.69	0.01
15 Gevgelija	5.01	0.08	59 Rankovce	0.08	0.00
16 Gostivar	3.14	0.05	60 Resen	2.83	0.05
17 Debar	7.23	0.12	61 Rosoman	0.02	0.00
18 Centar Zupa	2.00	0.03	62 Gradsko	0.19	0.00
19 Delcevo	0.91	0.01	63 Sopiste	0.00	0.00
20 Demir Hisar	1.10	0.02	64 Studenicani	1.48	0.02
21 Demir Kapija	0.45	0.01	65 Struga	38.48	0.63
22 Dolneni	1.75	0.03	66 Vevcani	0.00	0.00
23 Zelino	0.01	0.00	67 Strumica	3.45	0.06
24 Ilinden	2.58	0.04	68 Vasilevo	0.45	0.01
25 Jegunovce	0.19	0.00	69 Sveti Nikole	0.84	0.01
26 Kavadarci	6.37	0.10	70 Lozovo	0.04	0.00
27 Kicevo	4.39	0.07	71 Tearce	0.56	0.01
28 Vranestica	0.00	0.00	72 Tetovo	6.69	0.11
29 Drugovo	0.59	0.01	73 Cucer-Sandev	0.31	0.01
30 Zajas	0.18	0.00	74 Stip	3.38	0.05
31 Oslomej	0.20	0.00	75 Karbinci	0.08	0.00
32 Plasnica	0.14	0.00	76 Saraj	0.00	0.00
33 Kocani	1.00	0.02	77 Gazi Baba	3.38	0.05
34 Zrnovci	0.02	0.00	78 Gjorce Petrov	1.76	0.03
35 Oblesevo-Cesinovo	0.17	0.00	79 Karpos	0.65	0.01
36 Kratovo	5.61	0.09	80 Centar	3.64	0.06
37 Kriva Palanka	0.17	0.00	81 Suto Orizari	0.26	0.00
38 Krusevo	0.12	0.00	82 Kisela Voda	3.81	0.06
39 Mogila	0.15	0.00	83 Cair	0.67	0.01
40 Kumanovo	6.10	0.10	84 Aerodrom	0.54	0.01
41 Staro Nagoricane	0.16	0.00	85 Butel	0.01	0.00
42 Lipkovo	0.14	0.00			
43 Makedonska Kamenica	0.46	0.01			
44 Makedonski Brod	0.79	0.01			

## ANNEX 2. ON THE MAIN FEATURES OF THE CEA MACRO MODEL

### *Introduction*

CEA Macro-MK is an empirical macroeconomic model of Macedonia. The August 2007 version is the fruit of the co-operation between Macedonian economists from Sector for Economic Policies and Regulatory Reform of the Secretariat General of the Government of Macedonia (GoM), Center for Economic Analyses (CEA), Department of Economics, Faculty of Law, University Ss Cyril and Methodius (Un C&M), and National Bank of Macedonia (NBRM), and Dutch economists from Micromacro Consultants (MMC), based on CEA Macro models of other countries like the Netherlands, Poland, EU15, Indonesia, etc. This appendix briefly explains the background of the model: the organisation in several sheets, the consistency framework, the forecasting part and the main behavioural equations. An important role in this model played competitiveness: thanks to increase of productivity and decrease of taxes the domestic inflation is low and this stimulates exports, and then disposable income, followed by increase of consumption and investments. And thanks to the growth of exports, investments and consumption GDP goes up. The model is running till 2013, but many coefficients are still preliminary.

Recently CEA upgraded the CEA Macro model further with a LSG Module thus, giving more estimation flexibility to simulate wider policy measures at local level as well.

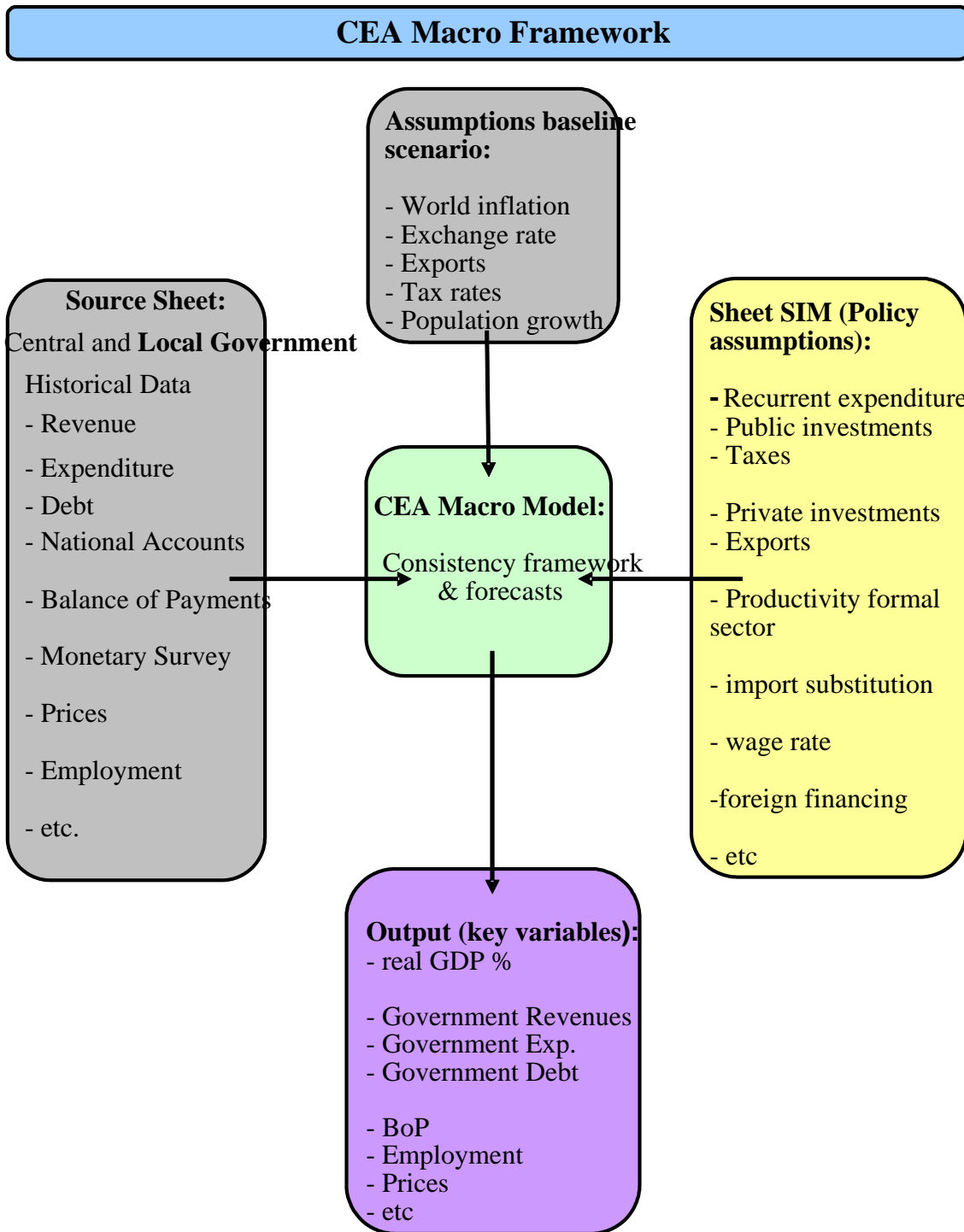
### *CEA Macro Methodology*

The methodology of *CEA Macro* consists of constructing a combined instrument: a macroeconomic database and an analytical framework that uses the data from the database. The construction of this combined instrument is in most projects achieved through close co-operation of local staff expertise of local institutions (Ministries, Statistical Office, and Central Bank) and international consultants' expertise of data and instruments for economic analyses in a market economy. The first, preliminary version of CEA Macro Macedonia was made by MMC and then discussed and improved in many workshops with Macedonian economists.

The interdependency of institutional development and economic policy for achieving economic and social development is generally recognized. Many countries have adopted adjustment/transition programs that not only change the structure of the economy, but also the role of the institutions. However, a common misconception is that changing a country's economic focus necessarily translates into the elimination or marginalization of government and social structures. The experience of the Netherlands demonstrates that this is not the case. The Central Planning Bureau of the Netherlands (CPB) is an independent government agency established 60 years ago by Dr. Tinbergen. The CPB's charter is to formulate, analyze, monitor and forecast different policy scenarios in a well-developed market economy. It has played a central and rather unique role in the Dutch economic policy formation. In particular, it contributed to the building of a consensus

about economic policy between the government and the main social institutions (e.g., labor unions and employers' organizations).

*CEA Macro* is methodology to construct an integrated data, forecasting, and simulation model based on the core of the macro models of the CPB and the experience to combine that knowledge with the needs of other countries. In this section we use the name for the methodology as well as for the resulting model. It is a so-called aggregate demand, aggregate supply model (AD-AS model) that combines modern macroeconomic theory with pragmatic modeling. It is easily adapted to fit the institutional and behavioral relationships in other countries.



Features of CEA Macro

*CEA Macro* is integrated data, forecasting, and simulation model designed to run also on Microsoft Excel. *CEA Macro* data-model produces a comprehensive and consistent survey of the macro economy in the form of the National Accounts (SNA 1993) of a country, not only the National Accounts in a narrow sense, but and consistent with that, prices, an overview of the labor market, the monetary sector, and the public sector. Specifically the data model produces information on the following:

- macro economy;
- balance of payments transactions;
- government expenses and revenues and deficit;
- national income and expenditure;
- prices;
- monetary indicators;
- labor market indicators; and
- other key economic indicators.

The quality of the data is assured through a set internal definitions and parameters that compensate for data irregularities and therefore produce consistent results. This makes *CEA Macro* a powerful and easy tool for the integration of data from different sources, for discussing the consistency requirements between these data sources, and for getting a quick overview of the current state of affairs in the overall economy. In addition to being a data model, *CEA Macro* is also a forecasting and simulation model. As such, it can make simulations, forecasts and medium- and long-term scenarios. These calculations may serve as a base for forecasting the budget and for discussing macro economic policy issues.

Clearly, *CEA Macro* has to be adapted for different countries because data, institutional development, and economic progress vary by country. This is also the reason we stress local staff participation (institutes like Ministry of Finance, Planning, National Bank, Statistical Office) in the construction of *CEA Macro* because they have the best knowledge of the local conditions. Involving local staff also serves the overall goal of involving more people in the discussions about how the economy operates and how it may be directly or indirectly influenced by policy. Our experience suggests that this overall goal is achieved naturally in the *CEA Macro* approach, because the use of a spreadsheet allows for an immediate and transparent relationship between the verbal discussions, the modeled equations and the modeling output.

### ***Theory behind the behavioral equations in brief***

As also noted above, behavioral variables are calculated on the basis of other variables in the spreadsheet and behavioral coefficients. The values of the behavioral coefficients are based on a combination of time series analysis, economic theory, feasibility of model results, and comparative studies. In the case of developing economies, historical research must be augmented with these latter components because the development process affects

behavioral relationships, causing a structural change in the time series. Where possible evidence from other countries is used to calibrate local statistics.

Below is a discussion of the most important behavioral equations, and their significant explanatory variables. See the Flow Diagram for the relations between variables and the box with 12 main behavioral equations for an overview of the formulas and levels of the preliminary coefficients.

- **Consumer behavior.**  
Consumption is determined by intertemporal optimization. In that case consumption is determined by the real disposable income, wealth and interest rate. Since data on wealth was not available, we left out wealth and interest rate from the equation, but we make a difference between the consumption rates of income from labor and remittances on the one hand and profit income from the other hand. The change in the value of consumption is a function of net disposable income of wage earners and profits.
- **Investment behavior.**  
Many investments theories are available (accelerator theory; neo-classical investment theory; vintage theory; adjustment cost models; Tobin's q; the finance approach; Keynesian approach; supply factors). However in practice it is quite difficult to find a theory with high forecasting capacity. So for the time being we use a rather simple investment function: Investments in industries are a function of gross value added of industries (accelerator) and profit rate.
- **The export function**  
Exports are the foreign demand for Macedonian products. If we assume that the rest of the world has a CES utility function, then the growth of Macedonian exports are determined by the growth rate of relevant trading partners and the difference in domestic and international inflation: The change in the quantity of exports is a function of the change in world trade, the difference between export and import prices and production capacity. At this moment in CEA Macro-MK test version we only brought a macro export equation, but we think that we need a special micro block of the export sector, in which we model each of the most important export products separately.
- **The demand for imports function.**
- For the production of final output of the private sector (Consumption +Investments +Exports) domestic value added as well as imports is needed. The share of domestic value added to imports will change if domestic inflation differs from international inflation. The direct plus indirect import intensity of different final demand categories (C, I, E) can differ, but because a Cumulated Production Structure (CPS) Matrix of Macedonia is not available, we cannot take into account these differences. In empirical studies it is often found that the elasticity of imports to final output is higher than 1. This may be explained by a trend towards internationalization. This gives the next equation: The change in the quantity of imports is a function of real final output and the difference between internal and external inflation.

- **Prices.**  
In a market economy with many competing firms the marginal prices will follow marginal costs (the combination of wage costs, import costs and capital costs). However if the capacity utilization rate changes, the profit margin will change and the marginal price might differ from the marginal cost price. On top of that will export prices be sensitive to foreign competitors' prices. Because we have yet no good figure for the utilization rate, we neglect that factor for the time being. Concerning the consumer price we take also the change in indirect taxes as one of the costs components: The change in the consumer price is a function of the change in costs and the change in the indirect tax rate.
- **The export price**  
The export cost price is not only a function of import prices and wage costs. The export prices also will be affected a lot by international competitors' prices.
- **The investment price**  
The change in the price of investment goods is a function of the change in costs.
- **Wage determination**  
The changes in the wage rate can be explained by a process of bargaining. In this process the employers are most interested in gross wage costs and employees (individuals and trade unions) in net real wages. The change in strength of employers versus employees is given by the change in the unemployment. (Phillips curve effect). So the components in the wage equation are the consumption price, the labor productivity and the change in unemployment and the change in direct tax pressure.
- **Employment**  
If we assume that the production of the value added takes place in a CES production function with capital and labor, the employment will follow the production growth minus productivity increase minus the growth of wages cost compared to other costs (with for the time being the consumer price as indicator). Because the labor intensity of several components of final output differs, we have to include differences in labor intensity, but because a CPS matrix of Macedonia is not available, that is left out. But we made a start to also introduce production capacity. (For the time being 85% weight to production and the remaining 15% to production capacity. So the growth of employment in industries is a function of growth of the final output and real production capacity and the labor productivity and relative wage costs.
- **Unemployment**  
The change in unemployment rate is the result of changes in supply and demand. However both supply and demand changes do not influence for 100% the unemployment. On the supply side the “discouraged worker effect” has to be taken into account. Also on the demand side a change in demand will fully affect the unemployment figure because not all unemployed are registered, and if employment increases, new employed are also recruited from this labor reserve. So the change in unemployment rate is a function of some part of change in demand for labor and the increase in labor supply.
- **The exchange rate is exogenous, given the policy of NBRM.**

- **Money Supply**

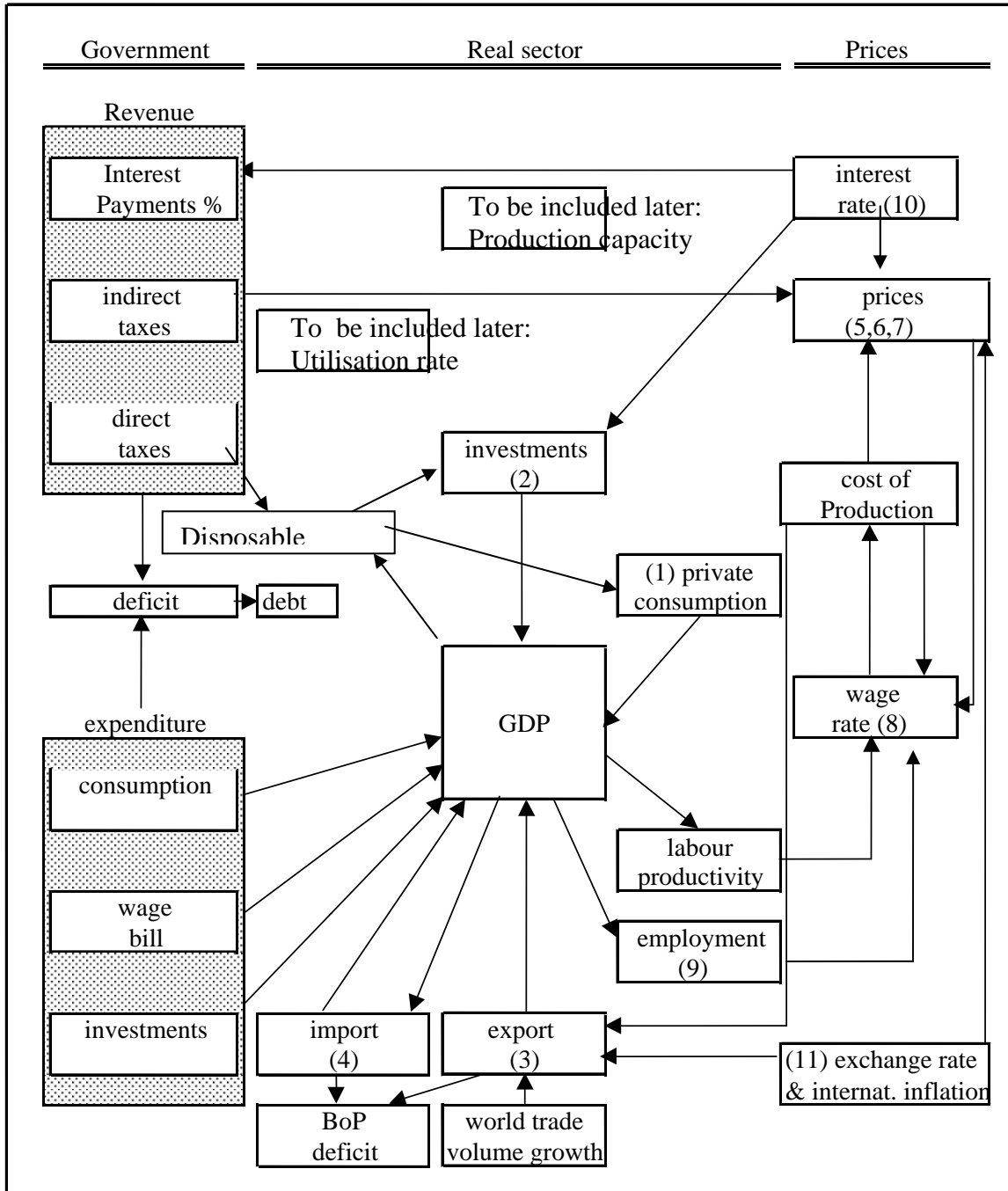
For the time being we assume that NBRM will accommodate the need for additional money as far as it comes from real GDP growth (and we assume that NBRM takes last years real GD growth as indicator) and an inflation target. So money growth is set equal to real GDP growth and an inflation target.

During the workshops in September 2003 and August 2007 several experts of MMC have discussed the theory behind these and other equations. The flexible approach of CEA Macro includes starting with a simple version, and ending in a sophisticated framework as in the case of the macro models for the Netherlands for example.

**List of main behavioral equations in CEA Macro-Mk-2007**

<p>Components of GDP: (lags not mentioned)</p> <ol style="list-style-type: none"> <li>1. Consumption: changes with net disposable income (95% net household income including remittances from abroad, 70% profits) (lags)</li> <li>2. Private investments volume growth: <math>16\% * \text{gross value added of enterprises at market prices} + 0,3 * (\text{return on investment minus the real interest rate}) * \text{value of invested capital} + ?\% \text{ of public investment}</math></li> <li>3. Export volume % change: <math>0,5 * \text{relevant world trade growth} - 0,9 * (\text{export price minus world market price in denars})</math></li> <li>4. Import volume % growth: <math>1,05 * \text{real final demand growth, reweighted for import intensity} + 0,1 * (\text{consumption price minus import price})</math></li> </ol> <p>Prices:</p> <ol style="list-style-type: none"> <li>5. Consumption price % change: <math>0,47 * \text{import price} + 0,34 * (\text{wage rate minus trend in Labor productivity}) + 0,19 * \text{consumer price (lagged) as indicator for capital costs} + 100\% \text{ change in indirect tax pressure.}</math></li> <li>6. Export price % change: <math>(1 - 0,36) * (0,47 * \text{import price} + 0,34 * (\text{wage rate minus trend in Labor productivity})) + 0,19 * \text{consumer price last year} + 0,36 * \text{world trade price in denars (lagged)}</math></li> <li>7. Investment price % change: <math>0,47 * \text{import price} + 0,34 * \text{wage costs minus trend in Labor productivity} + 0,19 * \text{consumer price last year}</math></li> <li>8. Wage rate businesses: <math>2,5 + 1 * \text{consumer price (half year lag)} + 0,3 * \text{Labor productivity trend} - 0,05 * \text{unemployment rate} - 0,5 * \text{increase in the unemployment rate} + 0,6 \text{ change in direct tax pressure}</math></li> </ol> <p>Employment</p> <ol style="list-style-type: none"> <li>9. Employment businesses % change: <math>-1 * \text{change in Labor productivity trend} + 0,85 \text{ real production growth} + 0,15 * \text{real growth in production capacity} - 0,1 * \text{real wages}</math></li> <li>10. Unemployment rate increases with 60% of growth supply minus demand</li> </ol> <p>Monetary variables:</p> <ol style="list-style-type: none"> <li>11. Exchange rate: fixed rate of Denar to Euro since 1998</li> <li>12. Money supply: increases with real GDP growth +2%</li> </ol>
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*Flow diagram of CEA Macro-MK*



*Semi-Behavioral equations*

The institutional or semi-behavioral equations reflect the current institutional setting of the country. Some of the most important equations of this type are:

- Import duties are a function of the value of imports and the average import duty rate.
- Taxes on consumption are a function of value of consumption and the VAT rate of the preceding year.
- Direct taxes on industries are a function of disposable profit income and the profit tax rate.
- Direct personal income tax is a function of disposable income and profits.

The behavioral and institutional equations allow to perform bookkeeping and more economic analysis. The set of these equations in *CEA Macro* is normally purposefully limited. Of course, one may expand this set in any direction based on the questions to be addressed by the model, such as a more detailed breakdown of medium term budgetary projections.

### ***Simulations***

The test version of CEA Macro-MK already contains a sheet SIM. If you bring a number there, for example wages in 2004 5 % higher then in the base line, after pushing F9 (recalculation) you can see immediately in sheet model (look in rows part Key Variables, columns in part Deviation of Baseline) the effects in deviation of the base line for all main variables for the years 2004-2007. This is a way to analyze the effects of:

- Exogenous on the economy (as higher international trade, higher international inflation)
- Internal shocks (like wage impulse)
- Effects of policy measures (as lower tax rates, lower government employment)

One can also use the model to construct scenarios (packages of partial changes).

### ***The LSG module in the CEA macro model***

With the fiscal decentralization process the municipalities obtained increased competencies in the local economic development and increased responsibilities in the social, education and health areas. With undertaking of new competencies the municipalities become directly responsible to provide services to their citizens and foster local businesses. In that regard, it becomes essential to better understand the role of the local self-government in planning the economic development and their influence over overall national economy. This especially becomes true when the LSG will start to generate debt in order to reach the targets of their capital investment plans. Thus, the central government will need to make policy decisions that will require input as of the role of the local government in Macedonia on macroeconomic stability, economic growth, regional imbalances etc.

### Data

For the purpose of building the LSG module we took the budget data for the LSG in Macedonia for the period of 2000 – 2006. The source of data is the Ministry of Finance, reclassified according to the IMF methodology on the Government Finance Statistics (GFS). The budget items presentation is illustrated in the next table:

**Table A3 - LSG budget categories in accordance with the GFS classification**

<b>Total LSG Revenue</b>	<b>Total LSG Expenditure</b>
Tax revenue	Wages and allowances
<i>Personal income tax</i>	Goods and non-labour services
<i>Other tax revenue</i>	Current transfers
Non-tax revenue	Interest payments
Capital revenue	- on non-resident debt
Transfers from other levels of government	- on domestic debt
	- on other levels of government
	Capital expenditure
	Acquisition of capital assets
	Capital transfers
<b>LSG overall balance</b>	
<b>LSG Financing</b>	
<b>Inflows</b>	<b>Outflows</b>
Domestic borrowing	Repayment of principal
<i>Bank borrowing</i>	
<i>Sale of securities</i>	
<i>Other domestic financing</i>	
Foreign borrowing	

### Linkages with the core CEA macro model

We linked the LSG data so that it is a part of the general government and not the market sector. In this way, the LSG sector becomes implicitly incorporated into the behavioral equations of the core CEA Macro model.

The following corrections were taken in the model for the LSG module forecasting.

Balance of non-tax revenue of general government (row 138) now includes LSG data
Direct taxes on households within general government data (row 141) now includes LSG data
Net material consumption (row 143) now includes LSG data

Public investment (row 144) now includes LSG capital expenditure
Wages and salaries (row 145) now includes the wage bill of LSG
Profit income (row 146) now includes interest payments by LSG

The effects of domestic borrowing of the LSG can be simulated in the SIM in % change year on year
The effects of foreign borrowing of the LSG can be simulated in the SIM in % change year on year
The effects of sale of securities by the LSG can be simulated in the SIM in % change year on year

Interest payments on non-resident debt in row 103 depends on the long-term interest rate
Interest payments on domestic debt in row 104 depends on long-term interest rate
Interest payments on other levels of government in row 105 depends on the short-term interest rate

***Transmission mechanisms of the LSG impact to the economy***

It was assumed that the LSG debt will add to the gross government debt. Moreover, the general government budget balance now includes the LSG budget balance, which is in line with the international standards. In this way the transmission mechanisms from the core model and their impact on the economy now include the LSG government actions as well.

Row 123 on gross government debt in Start model
Row 141 LSG budget balance in Start model
Row 145 formula updated with LSG budget balance