ISSN 1392 – 2785 Inzinerine Ekonomika-Engineering Economics(4). 2009
ECONOMICS OF ENGINEERING DECISIONS

Modelling of the Effect of the Public Sector Borrowing on the Lithuanian Economy

Zaneta Karazijiene

Kaunas University of Technology
K. Donelaicio str. 73, LT-44029, Kaunas, Lithuania zaneta.karazijiene@ktu.lt

During the last two decades many countries of the world faced rather strong tendency of the public debt increase. In many European countries, including the USA, very similar circumstances occurred, when the government debt increased during the last decade. In the past such high growth of debt level was characteristic only to wars or economic depressions. The level of a certain country's public debt is mostly determined by the general economic situation of the country and its perspectives. On the other hand, one of the recent and most important issue, faced by many countries, is the effect of the government debt on the economic and social life.

Trying to achieve more effective and faster economic development, the government usually borrows in domestic and foreign markets. The academic society discusses the role of the public debt in economics: how the borrowed funds should be used; how much can a government borrow? It is important to determine the place and role of the public debt in the Lithuanian economy and evaluate how borrowing effects the growth of the economy.

Currently, the financial markets are closely observing the state budget deficit because it shows how much of financing the government needs at a certain time and how much the rate of the national debt has increased. The analysis of the budget deficit provides information on how effective is the mobilization of the domestic means and on how the state expenses are being managed. All that enables us to decide about state's borrowing demands. They also point out that the main causes of the budget deficit may be tax collection from income, too high expenses or ineffective control.

The governmental borrowing does not cause damage to the economy if only the opportunities provided by debt are used in an optimal way. The aim of this article is to determine a possibility to forecast the limits of the national debt acceptability, knowing the forecasted actual GDP growth and the value of the budget deficit. It is important to learn what level of the fiscal deficit is acceptable to the state and how it could be managed under certain economic conditions. In making a choice for the criteria needed to determine the acceptable level of the budget deficit, it is indispensable to make a notice of the possibility to apply those criteria, e.g. in analyzing and forecasting.

Keywords: *debt, debt management, budget, deficit, government policy and regulation.*

Introduction

The major focus of this article is on a number of factors that determine the acceptability of the national debt as well as its optimal and effective management. Borrowing is one of the easiest methods for the governments to cover the budget deficit, though the government borrowing made in attempt to support the development of the economy cannot be seen as separate from the state fiscal and monetary policy. The article analyzes the interaction between the national debt and the budget deficit. Within the framework of the mathematical model covered in detail, the author proposes the evaluation of the debt limits of the Lithuanian government by drawing on principle economic variables.

The current growth of the debt of the state of Lithuania (GDP %) shows that more and more means of the state budget are allocated to cover the old debts instead of investing into education, social sphere or other projects. All this leads to conclude that the country operates at the expense of the economic growth. As the debt of Lithuania continues to grow, the economy of the country is going to evolve into the state of long-term stagflation since more resources that could be allocated for developing the economy, will be eventually redirected to service the debt payment. The high state budget deficit (3 % in 2008) shows that the means that could have been allocated for growing the economy are in fact used to maintain consumption. Therefore, it might be concluded that the borrowed means are not used effectively in Lithuania.

Foreign authors analyze the rate of borrowing on a national level as well as the causes and effects by exploring the experience of their own countries. It is noteworthy to say that scientists such as Douglas (1998), Elmendorf (1998), Mankiw (1998), Graham (2000), Thompson (1996) and in particular Krugman (1994, 1998) have paid great attention to the issue of national debt. The research of the latter scientist focuses on the dynamics of the federal debt by the US government in a great detail. It also analyses a whole set of the measures undertaken to minimize the debt. The Russian economists Vavilov (1997, 1999), Trofimov (1999) give an extensive overview of national debt since Russia has inherited the debts of the former USSR. The influence that the national debt and the budget deficit exerted on the economy of Russia is reflected upon in the research of such scientists as Zamkov (1997, 1998), Druzik (1997), Chakamada (1997, 1998), Sarkisjanc (2000), Fediakina (1991, 1994, 1998). Such scientists as Keynes (1978), Fisher (1993), Samuelson (1991), Federenko (1994), have been analyzing the causes and effects of the national debt. However, all the research lacks some systematic and generalizing analysis of the national debt, which would allow looking at the issue beyond the country-specific context.

Some of the aspects of borrowing by the government of Lithuania are studied in the works by Danileviciute

(1996, 2000), Jankauskas (1997), Maldeikiene (1997), Petrauskas (1996, 1997) Staniulyte (2000). The growth of the borrowing rate and its influence on the economy have been analyzed in greater detail in works of Daugis (2000), Leontjeva (1995, 1998), Starkeviciute (1998, 1999, 2000), Veselka (1998, 2000). Some of the acceptability criteria of the national debt and budget variables have been examined in the works by Stankaitiene (1998). All authors just softly touch the problems connected with government debt. Although, each year Ministry of Finance issues the statement that includes all statistical data connected with government borrowing and puts some forecast info according to incoming financial year. But still it can be seen that the analysis of Lithuanian government borrowing policy is not stressed strong enough.

The governmental borrowing does not cause damage to the economy if only the opportunities provided by debt are used in an optimal way (Rutkauskas, 1998). The paper reflects upon the *scientific problem* – that is, a possibility to model the limits of the national debt acceptability, know the forecasted actual GDP growth and the value of the budget deficit. It is important to learn what level of the fiscal deficit is acceptable to the state and how it could be managed under certain economic conditions. In making a choice for the criteria needed to determine the acceptable level of the budget deficit, it is indispensable to make a notice of the possibility to apply those criteria, e.g. in analyzing and forecasting.

The aim of the article – to evaluate government's borrowing influence on the Lithuanian economy by modeling interaction between budget deficit, government's debt and GDP growth.

The object of the article – government debt.

In this article the following **research methods** have been employed: the analysis and summation of scientific literature, mathematical modeling and analysis of statistical rates.

Management of debt and economic policy

The state has a quite considerable influence on the macroeconomic processes through performance of various regulative and management functions. The main purpose of the authorities is to ensure economic and political stability. The state also must improve microeconomic corporate capacities by ensuring efficiency of the institutions providing resources and promoting higher quality and efficient use of resources (Navickas and Malakauskaite, 2008). The national debt is a primary and complex task that determines the state economy, political changes, the international reputation and many other factors (Thompson, 1996). Moreover, it is an important source of the state income as it can partially change taxes and serve as a finance source for covering the fiscal budget deficit of the state. During the recent years the changes of social – economic situation have been fast, however, according to individual macroeconomic indexes Lithuania is still significantly below the average of EU countries (Tamosiuniene, Sidlauskas and Trumpaite, 2007). Quite frequently governments have not enough financial resources for active economic growth. In 25 members of EU the medium of the governmental debt ratio with GDP was 58.7 % (see Figure 1). In comparison with a year of 2005 for all states of EU the borrowing issue varies differently. The most diminished debt is in Greece – 10.1% (from 104.6 % to 94.5 %). That's obvious, in order to achieve the best results all countries have to forecast the state's borrowing policy.

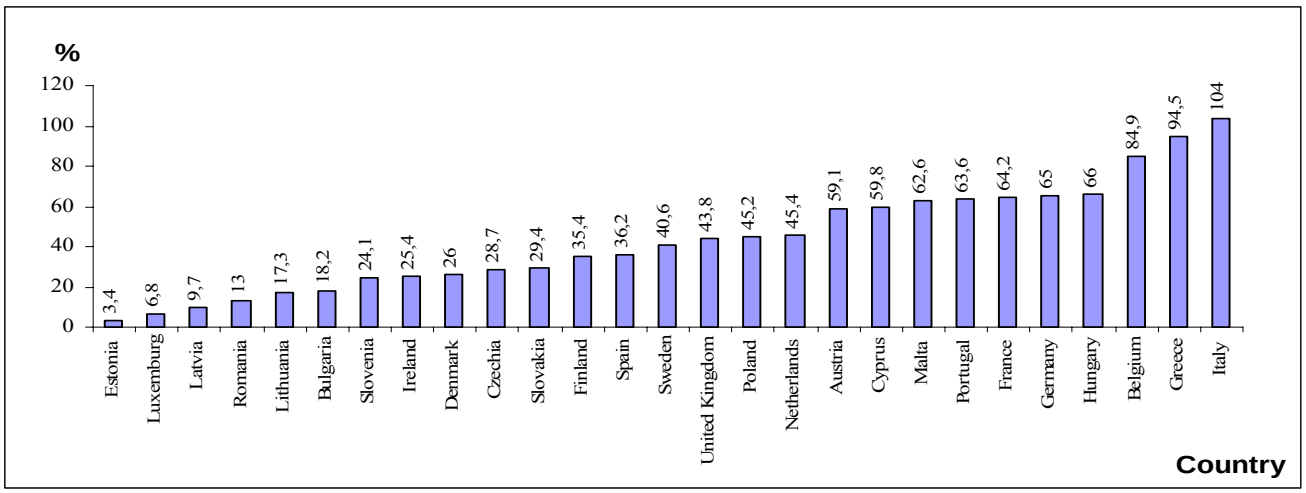

Figure 1. Debt Relative to GDP in the EU Member States, End of 2007, %
Source: http://epp.eurostat.ec.europa.eu

In many cases the possibilities for business development depend on larger financial resources, which may be problematic to form own sources, especially in developing countries. Therefore both economically developed countries and developing countries struggle actively for investment flows. As a rule, the most effective methods are employed in order to create an environment which is attractive for investments and for business development (Kindsfaterienė and Lukaševičius, 2008).

Public sector borrowing requirement increases the national debt of the country – the outstanding gross government debt (Daoglas, Elmendorf and Mankiw, 1998). Debt includes government securities held by non-bank private sector, bank sector and foreign sector. While the

securities are eagerly purchased and held, the national debt may not be finally redeemed, and, on the contrary, continue growing. However, the national debt, in some degree, burdens the economy due to the obligation to pay interest (Sundararajan, Dattels and Blommestein, 1997). To evaluate the extent of the public debt management costs in Lithuania, one should take into consideration such significant indicator as the ratio of interest paid for the government debt and the general government revenue.

The central government debt management costs mostly cover the costs of state borrowing. The costs are subject to approval in the national budget under a separate programme, and they are formed of interest paid on the public debt to residents and non-residents, commission fees, other payments for borrowing in the domestic and foreign markets, payments to credit rating agencies, etc. In 2007 public debt management costs reached 711 m, LTL including interest for credits received by the state and government securities in circulation.

Interest payment constitutes a part of current expenditure of the government, and higher interest payments are to lead either to increased income taxation or to greater public sector borrowing requirement, which, in its turn, produces even heavier national debt (Colander, 2008). The acceptable value of the budget deficit in the long run is assessed terms of the ability to keep the variables of the fiscal policy stable. The state offering high interest rates can sell its securities in the short-run though in the case of failure the cost of servicing the national debt will increase in the future, the budget deficit will consequently increase and the government credibility will decrease (Missale, Giavazzi and Bengino, 2002).

Therefore, it may be assumed that the government, seeking to manage the national debt, is partially interested in minimising taxes. We are herein considering two related factors:

- First, as the actual revenue is growing, more taxes are collected without even raising the tax rate. Consequently, the richer a country is, the easier it finds paying interest on the debt.
- Second, the actual national debt amount and the ratio of the interest on the national debt and the nominal GDP represent a better measure of the said burden on the economy than the debt itself.

Naturally, where the government expenditure causes increase in the actual revenue and/or greater inflation, the interest payments decrease.

Nevertheless, presence of the national debt creates another problem for the government. Previous securities issues mature and become due sooner or later. They should be replaced by the new ones on a regular basis to refinance the existent national debt. Each financial year, representatives of the government have to sell securities for the amount so that to meet the current public sector borrowing requirement and to cover the value of the securities of the old issue to be paid for (Graham, 1995).

As a result, there may be offered two options. First, it is expedient for the government to sell long-term securities instead of the short-term ones to postpone payment and reduce the refinancing rate. Second, representatives of the government must consider the nature of the debt to prevent substantial payments at a time.

The Government of Lithuania has never had budget surplus, the state debt thus is growing every year. Government debt management costs are expected to go up in the future (Galinaityte, 2007). At the start of 2008 international credit rating agencies Fitch and Standard & Poor's reduced the perspective of the Lithuania's borrowing rating. Consequently, more and more taxpayers' money will have to be put in the state debt management, yet the state debt will have to be anyway redeemed at some point of the time. One of the sources of the state debt redemption could be cutting of the gross public expenditure, however, due to self-explanatory reasons (willingness of politicians to please the electorate) use of the said measure is hardly possible. Thus increase of taxes and/or further debt growth is the most realistic measure. Taking into consideration the perspectives of budget expenditure, the government should reduce the number of irrational, inefficient and often non-transparent programmes finances by taxpayers' monies, and, while evaluating the budget revenue, it should reject various tax incentives which cause loss of considerable budgetary amounts (e.g., over 400 m, LTL in 2008). The said measures would allow reduction the gross public debt, as well as ensuring higher quality of public expenditure.

Modeling opportunities for the state borrowing requirement

In the modern economy the main market factors are regulated by the market itself. This notwithstanding, the state still plays an important role in the economy and the market could hardly efficiently exist without the interference on the part of the state. The state should take regulative actions in the areas, where free market is unable on its own to handle issues for the benefit of the public in a fast and effective manner. Before taking a decision in respect of implementation of one or another regulative measure, detail analysis and evaluation of its possible effect is needed (Ginevicius and Bruzge, 2008). Loan capital and investment made with the help of it, grant strategic competitive often are the elements supplementing each other: growth in investment results in the growth of loan capital and vice versa (Norvaisiene, Stankeviciene and Krusinskas, 2008).

The relationship between debt policy and valuation has been extensively analyzed in the finance literature; within a Modigliani-Miller framework, the consensus is that valuation is affected by whether debt is managed actively or passively, and that for finite projects with time varying risky cash flows, it is appropriate to use a weighted average discount rate for valuation only if it is assumed that debt is actively managed. The relationship between debt policy and valuation is re-examined. In particular, it is shown that, under one of the most plausible forms of passive debt policy, valuation using a simple weighted average discount rate is in fact possible (Appleyard and Dobbs, 1997).

Looking for some solutions of the theory of the tasks, the probability is interpreted as a reasonable belief that the event occurred. This interpretation of probability is called subjective. It is widely used in the analysis of the concept of uncertainty in order to create the experimental

economics theory (Martisius and Martisius, 2008). Chakamada (1997) argues that it is indispensable to relate the debt to the budget deficit whilst analyzing national debt. *The budget deficit* is the surplus of the national expenditure during the fiscal year in contrast to income. *The budget surplus* is an opposite phenomenon – namely, the state income exceeds its expenses. According to Krugman (1997), the structural deficit (or the positive structural budget balance) is the deficit, which could be positioned within the current system of income and expenses under the conditions of total employment (or in other words, when the factual GDP equates with the potential GDP).The author emphasizes that the value of structural deficit (in per cent off GDP) is much more stable in terms of time than the value of factual deficit, though their average values become equal in the long run. Therefore, in analyzing the value of the acceptable budget deficit in the long run, it is indispensable to assess structural deficit and determine its long-term effects. The problem as to the application of the structural deficit index arises when special calculation is needed, and eventually an error of calculation may occur when assessing the potential GDP.

In the framework of this model, the author is going to depart from the cyclical fluctuations of the economical juncture, which have a crucial effect on the budget-tax policy and, eventually, the value of the budget deficit in the short-run. The starting point will be a certain value of the whole budget deficit. The analysis of the interaction between the debt and deficit growth during a certain period will enable us to determine the long-term and short-term effects of the budget-tax policy in question.

The model is based on a few assumptions:

The value of the nominal GDP Y_t grows at the constant annual rate p, %.

The total budget deficit (namely, payment in percentage due to the national debt and the main debt) H_t annually stands at q % off GDP. Thus (Zamkov, 1997):

$$h_t = \frac{H_t}{Y_t} = \frac{q}{100} = const \quad . \tag{1}$$

If the initial level of GDP Y_0, the nominal GDP (Y_t) in the year t will be equal to the following:

$$Y_t = Y_0 \left(1 + \frac{p}{100}\right)^t . \tag{2}$$

The budget deficit H_t in the year t will be equal to the following:

$$H^t = \frac{Y_t\ q}{100} = \frac{Y_0\ q}{100} \left(1 + \frac{p}{100}\right)^t . \tag{3}$$

The national debt D_t (at its nominal value) is equal to the accumulated sum of the budget deficits until the year t inclusively. According to Zamkov (1997), if the initial value of the national debt is equal to D_0, the relation between the national debt and GDP in the year t is accordingly equal:

$$d_t = \frac{D_t}{Y_t} = \frac{D_0}{Y_0\left(1 + \frac{p}{100}\right)^t} + \frac{q\left(1 + \frac{p}{100}\right)\left(\left(1 + \frac{p}{100}\right)^t - 1\right)}{p\left(1 + \frac{p}{100}\right)^t} \tag{4}$$

Drawing this formula, it becomes clear that when it is p<0 (namely, constant decrease of the nominal GDP), the relation between the debt and the deficit comes closer to $+\infty$, and thus exceeds any level required (eventually, the level that is maximum when the country is still able to service its debt). When p=0 (namely, GDP is not growing, yet it is not decreasing either), both the national debt and its share relative to income increase to no limit under the same conditions. Therefore, as long as the economy does not start growing, it will not be possible to put the assumptions of the model to practice. When it is p>0 (namely, the nominal GDP increases), the ratio between the national debt and GDP within the model slowly reaches a certain (determined) stable level. Thus it may be summarized that the value of the initial debt decreases as $t \to \infty$ (Zamkov, 1997):

$$\lim_{t \to \infty} d_t = \lim_{t \to \infty} \frac{D_t}{Y_t} = \frac{q\left(1 + \frac{p}{100}\right)}{p} . \tag{5}$$

It may be concluded that as the ratio between the national debt and income does not change, the determined level of the budget deficit (GDP %) can be sustained in the long run. In order to achieve this, it is necessary to identify the means of financing the budget deficit that would be non-inflationary and to allocate the means within the budget to service the national debts.

To summarize the above, it may be pointed out that by making appropriate changes and adapting the mathematical model proposed by Zamkov (1997), the following issues related to the management of the national debt may be solved:

- To identify the acceptable level of the budget deficit (GDP %) in accordance with the obligatory level of the national debt (GDP %) and the forecast of the GDP growth.
- To identify the level of the national debt (GDP %) in accordance with the determined level of the budget deficit (GDP %) and the forecast of the GDP growth.
- To identify the acceptable rate of the economic growth in accordance with the forecasted level of the budget deficit (GDP %) and the acceptable level of the national debt (GDP %).
- To determine the period during which the determined values could be achieved.

The result of the analysis show how important is long-term relationship between the variables of the budget-tax policy and the economical growth. These interdependent relations are often undermined in solving the issues related to the value of the budget deficit and the methods of financing it.

The case study of the debt incurred by the state of Lithuania

Since the public sector consists of the central government, local government and state enterprises, the public borrowing requirement can be broken into some relevant parts:

- central government borrowing requirement;
- local government borrowing requirement;
- state-owned enterprises borrowing requirements.

Despite the limitation of financial possibilities, needs of society in the context of global and regianal changes are constantly growing (Skietrys, Raipa and Bartkus, 2008). At the beginning of 1990s the countries of Central and Eastern Europe started crucial changes of their political and economic system. They orientated their efforts to create a free market economy that would mean joining the group of other European countries (Savrina and Grundey, 2008). The borrowed funds were used in order to finance these changes. At the end of 2008th the general government debt consisted of the central government debt of LTL 17374.8 million, local government debt of LTL 1236.5 million and debt of social security funds LTL 85.9 million. In 2008th the central government debt increased by LTL 678.8 million, local debt – LTL 362.8 million, and debt of social security funds - LTL 62.1 million (Table 1).

Table 1

National debt according to a sector in Lithuania

	31 December 2006		31 December 2007		31 December 2008	
	LTL million	%	LTL million	%	LTL million	%
GENERAL GOVERNMENT DEBT	14938.7	100	16698.0	100	17374.8	100
Central government debt	14236.0	95.3	15800.6	94.6	16052.4	92.4
Debt social security funds	47.5	0.3	23.8	0.2	85.9	0.49
Local government debt*	655.2	4.4	873.7	5.2	1236.5	7.11

* *Data on local government debt is indicated herein in the consolidated form, i.e. less loans issued by the government*
Source: Data of the Lithuanian Ministry of Finance

At the end of 2008 the general government domestic debt was LTL 6213.5 million (over the year it increased by LTL 742 million), and it represented 38.8 % of the general government debt. At the end of the year the general government foreign debt amounted to LTL 11161.3 million (over the year it diminished by LTL 65.3 million) and it accoounted for 64.2 % of the general government debt.

A successfully functioning financial sector is an important condition for the growth of economy in every country. However, how and through which segments of the financial system economic processes and their results are influenced, on what other factors of environment such influence depends, are still open questions, as the development of economy of every country as well as the development of the financial system also have their specific features (Lakstutiene, 2008).

The process of borrowing in Lithuania is to perform the following functions:

- To increase the revenues of the state as they are not sufficient in the context of the current fiscal policy and economy.
- Whether the means of financing is the fiscal budget deficit of the state.

Taking into account the debt of European countries, primarily we have to focus on the rate of the debt growth. Countries using different methods try to reduce its debts. Unfortunately, not all of them do that successfully. Lithuania is among those countries that had successfully reduced its debt from 28.32% GDP (2001) to 15.6% GDP (2008).

Thus, drawing on the mathematical model covered in detail, will further analyze the effect that the debt incurred by the state of Lithuania makes on the economy. The case study is divided into models A and B.

A. *By using the determined (requested) economical values, model A aims at determining the following aspects*:

1. The acceptable level of the budget deficit.
2. The limits of the national debts.
3. The required rate of the actual GDP growth.

Under the requirements of the Maastricht Treaty, the budget deficit of the countries entering the European Monetary Union should not exceed 3 % of GDP (h^r_t); the national debt should not exceed 60% of GDP (d^r_t) (Economic Survey of Europe in 1994-1995, 1995). In attempt to maintain these relative values in the long-run, it is indispensable to set a certain (determined) rate of the actual GDP growth which is calculated by applying the formula (5). The GDP growth – $0.6 = 3\ (1+p^r / 100) / p^r$ calculated by following the requirements of the Maastricht Treaty, here is of the value $p^r = 5.26\%$. This is quite a high rate of the GDP growth both for developed countries and countries in transition.

Thus after the mentioned mathematical model has been applied, it is possible to calculate the required rate of the actual GDP growth (p^r), so that the actual budget deficit % GDP (q) and the national debt % GDP in the year t (d^r_t) had no negative influence on the economic growth of the country (see calculation in Table 2).

The results derived are helpful to show that with the actual debt value, Lithuania needed very high rates of GDP growth (higher than it is indicated in the Maastricht Treaty) for its economy to function – e.g., in 2002 it needed the rate to stand as high as 10.4%, though it was only 6.4%. Those calculations show, that having low budget deficit, the growth of GDP might be insignificant. For example: in 2006 the budget deficit was 0.3% GDP, thus we needed the growth in just 1.7% of GDP.

We have to pay attention to the year of 2008, when the budget deficit was very high, and the growth of GDP declined. In that situation the state borrowing makes negative impact on the economy.

Table 2

National debt, budget deficit and the required rate of the GDP growth in Lithuania

Year	National debt % GDP	Budget deficit % GDP	The actual GDP growth during the year	The required rate of the GDP growth
1996	23.2	2.5	-8.4	10.2
1997	21.1	1.0	-1.1	5.0
1998	22.4	1.3	2.7	6.3
1999	28.3	0.3	-4.2	1.1
2000	28.3	1.7	2.3	6.5
2001	22.9	2.0	6.4	9.6
2002	22.3	2.1	6.8	10.4
2003	21.2	2.0	9.7	10.4
2004	19.5	1.4	6.7	7.7
2005	18.7	0.5	6.4	2.8
2006	18.4	0.3	7.5	1.7
2007	17.0	1.0	8.9	6.3
2008	15.6	3.2	3.0	25.8

Source: compiled by the author

Several models of action have to be constructed in order to reach the optimal solution for Lithuania.

Shall we determine the limit that the national debt % GDP and the budget deficit % GDP should not exceed and calculate the actual rate of GDP growth so that the debt would not cause negative effects on the state economy (see the results in Table 3). The results of the given estimate show that under the conditions of high budget deficit, it is necessary to have very high rates of the actual GDP growth. Since the state borrows quite rapidly, we can assume the debt level to rise to the former 18% of the GDP. As we might see, having the budget deficit of 1%, we should provide 5.8% growth of GDP rates. In the time of the growth of economy it would be possible, but now we can say that the borrowing will have a negative impact on the Lithuanian economy.

The mathematical calculations provide the means whereby the state budget deficit; the national debt and the rates of GDP growth may be easily related to one another. Therefore the use of such model can be helpful in better planning and modeling the limits of the national debts and negative effects of national debts. It may be also useful for specifying the values the state wants to achieve so that the national debt would not influence the economy in a negative way.

The objective of model A has been to determine the acceptable values of the national debt, the budget deficit and the actual GDP growth. In model B, we shall determine the period needed for the state to achieve the values determined and estimated in model A.

B. The objective of model B is to determine the period needed to achieve the fiscal indices.

Shall we assume that the objective is to minimize the level of the national debt from 15.6 % GDP to the level required when other values such as budget deficit % GDP, the actual rate of GDP growth, the current debt % GDP are known, and to predict how much it will take for the state to achieve the values it needs (estimate in Table 4).

The given results are helpful to prove, that once the state wants to minimize its debt within a few years from 15.6 % GDP to 14 % GDP, (when the growth of GDP is 4 % within a year), it should have the balanced budget. This model is very much acceptable for Lithuania.

Table 3

State loan, budget deficit and actual required rate of the GDP growth in Lithuania

State loan GDP %	Budget deficit % GDP	Actual required rate of GDP growth %
18	3	20.0
18	2	12.5
18	1	5.8
17	3	21.4
17	2	13.3
17	1	6.3
16	3	23.1
16	2	14.3
16	1	6.6
15.6	3	23.8
15.6	2	14.7
15.6	1	6.8

Source: compiled by the author

Table 4

Calculation of the period needed to achieve the fiscal indices in Lithuania

State loan % GDP	Year option	Actual GDP growth %	Budget deficit % GDP
14	1	4	0.09
14	2	4	0.33
14	3	4	0.41
15	1	4	0.42
15	2	4	0.5
15	3	4	0.53
15.6	1	4	0.6
16	1	4	0.71
16	2	4	0.66
17	2	4	0.97
18	1	4	1.21
18	2	4	0.93

Source: compiled by the author

The governments of European countries should pay more attention to the relationship between the national debt and GDP growth, which would enable the states to better plan the demand for the borrowed means without exceeding the set limits because the increase in debt shows that the limits of net borrowing for financing the forecasted budget deficit are not sufficient to minimize the negative influence of the state debt to the economy (Stuopyte and Guzavicius, 2008).

Today, far too often, the data needed by policy makers to make better decisions is available but inaccessible. Policy makers are faced not only with overlapping and uncoordinated data sources, but also with the absence of common terms of reference and means of representing these data (Gatautis, Kulvietis and Vitkauskaite, 2009). The model used in research has been helpful to show how the national debt is dependent on the budget deficit and the actual rate of GDP growth. A more detailed case study carried on the basis of the theoretical and practical framework suggested in the paper may be of help in developing the appropriate policy (strategy) of the borrowing level in various countries.

Conclusions

To summarize the discussion of the issue, it may be argued that by applying the mathematical model presented in the third part and by drawing on the estimate given in

the fourth part of the paper, the method of solving the issues related to managing the national debts has been identified:

1. The estimation of the acceptable level of the budget deficit (GDP %) in accordance with required level of the national debt (GDP %) and the forecast of GDP growth has been made. The results of the given estimate show that once the state aims at keeping the national debt at 15.6 % GDP during 2 years when the actual rate of GDP growth is 4 %, the state budget deficit should be at very low 0.6 % GDP level.
2. The required rate of the economy growth on the basis of the forecasted level of the budget deficit (GDP %) and the acceptable level of the national debt (GDP %) was determined. The given results show the actual rates of GDP growth in Lithuania have been too low for balancing with the actual debt and budget deficit at that time. In 2004 the level of the national debt was 19.50% GDP, and the budget deficit was 1.4% GDP. In attempt to avoid the negative effect that the actual national debt might cause on the economy, it was necessary to ensure the actual rate of GDP growth stood at 7.73% while in fact it stood at only 6.7%. It is noteworthy to state that from 1996 to 2004, inclusively, the economy of Lithuania had not met the required rates of the actual GDP growth, though in 1999 fairly low rates of the actual GDP growth at 1.08 % were needed. The situation changed in 2005-2007, when the real growth of GDP in Lithuania increased and the budget deficit significantly lowered.
3. The period was determined during which the required values could be achieved. The given estimate shows that the state of Lithuania should ensure a quite low-budget deficit. If there is an objective to minimize the debts from 15.6% GDP to 14% GDP during two years, the rates of the actual GDP growth should stand at 4% per year, and the budget deficit should not exceed 0.33% GDP.
4. The Government argues that the state debt is acceptable, or is even too small, since the state debt (government debt making 19 per cent of GDP) is remarkable lower than the criterion set in Maastricht – 60 per cent of GDP. Nevertheless, the arguments are unsubstantiated, as:
5. First, one should keep in mind that after the collapse of the Soviet Union Lithuania inherited no debts – debts occurred in the period of independence. Lithuania should be compared with the post-soviet area rather than with the West European countries.
6. Second, the Maastricht's criterion determines the maximum debt limit, thus the argument that the state debt meets the criterion does not give the grounds to claim that the state debt burden is admissible.
7. It should be noted that it is expedient for the government to sell long-term securities instead of the short-term ones to postpone payment and reduce the refinancing rate. Furthermore, representatives of the government must consider the nature of the debt to prevent substantial payments at a time.
8. After the issue of the loan acceptability has been solved, it is possible not only to opt for one or another direction of borrowing policy but also to determine the effect that the debt causes on the economy within the context of the developing macroeconomic surrounding and to define the borrowing strategy to meet the new objectives raised.

References

1. Appleyard, T., & Dobbs, I. M. (1997). Under Active and Passive Debt Management Policy. *Journal of Business Finance & Accounting*, *3*(24), 481-496.
2. Хахамада, И. (1997). Государственный долг: структура и управление, *Вопросы экономики*, No. 4.
3. Douglas, A., Elmendorf, W., & Mankiw, N. G. (1998). *Government debt*. Harvard University Press, Cambridge, Massachusetts.
4. Colander, D. C. (2008). *Macroeconomics*. New York: McGraw-Hill/Irwin.
5. Федякина, Л.Н. (1998). *Мировая задолженность: теория и практика*. Дело и Сервис, Москва.
6. Feldstein, W.G. & John, K. S. (1994). International Transfers and the Accumulation of Wealth. *Journal of Economic Perspectives*, 8, 145-160.
7. Galinaitytė, E. Valstybės skolos dar didės. Vilnius: *Laikas*, 2007 m. lapkričio 9-15 d., 4.
8. Gatautis, R., Kulvieits, G., & Vitkauskaite, E. (2009). Lithuanian eGovernment Interopeability Model. *Inzinerine Ekonomika-Engineerin Economics*(2), 38-48.
9. Ginevičius, R., & Bruzgė, Š. (2008). Išlaidų ir naudos analizės taikymo galimybės valstybės priimamoms reguliavimo priemonėms vertinti. *Verslas: teorija ir praktika*, 3, 180-189.
10. Graham, F. C. (1995). Government Debt, Government Spending and Private Sector. *American Economic Review* 95(12), 1348-1356.
11. Kindsfateriene, K., & Lukasevicius, K. (2008). The Impact of the Tax System on Business Environment. *Inzinerine Ekonomika-Engineerin Economics*(2), 70-77.
12. Krugman, P. A. (1997). Model of Balance of Payment. *Journal of Money, Credit and Banking*. No. 11.
13. Lakstutiene, A. (2008). Correlation of the Indicators of the Financial System and Gross Domestic Product in European Union Countries. *Inzinerine Ekonomika-Engineerin Economics*(3), 7-18.
14. Martisius, S. A., & Martisius, M. (2008). Information Society and Statistics. *Inzinerine Ekonomika-Engineerin Economics*(5), 16-23.
15. Missale, A., Giavazzi, F., & Bengino, P. (2002). How is the Debt Managed? Learning from Fiscal Stabilizations. *Scandinavian Journal of Economics*. 3 (104), 443-469.
16. Navickas, V., & Malakauskaitė, A. (2008). Nauji makroekonominės politikos svertai: klasterių fenomenas. *Verslas: teorija ir praktika*, Nr. 4, 245-252.
17. Norvaisiene, R., Stankeviciene, J., & Krusinskas, R. (2008). The Impact of Loan Capital on the Baltic Listed Companies' Investment and Growth. *Inzinerine Ekonomika-Engineerin Economics*(2), 40-48.
18. Rutkauskas, A. V. (1998). Finansų rinkos ir institucijos. Vilnius: Technika.

19. Savrina, B., & Grundey, D. (2008) The impact of economic receptiveness to economic development of Central and Eastern European countries. *Transformations in Business & Ecconomics,7(*2), 20-33.
20. Skietrys, E., Raipa, A., & Bartkus, E. V. (2008). Dimensions of the Efficiency of Public – Private Partnership. *Inzinerine Ekonomika-Engineerin Economics* (3), 45-50.
21. Stuopyte, Z. & Guzavicius, A. (2008) The forecast of the state admissible borrowing limits: the case of Lithuania. *Transformations in Business & Ecconomics, 7*(2), 130-141.
22. Sundararajan, V., Dattels, P., & Blommestein, H. J. (1997). *Coordinating Public Debt and Monetary Managemen*t, International Monetary Fund. Washington.
23. Замков, О. О., (1997). Бюджетный дефицит, государственный долг и экономический рост. *Вестник Московского университета*, No. 6, 2.
24. Thompson, A. C. (1996). *Macroeconomics*. Addison-Wesley publishing company, Boston.
25. Tamosiuniene, R., Sidlauskas, S., & Trumpaite, I. (2007). EU structural support and its impact on Lithuania's progress. *Journal of business economics and management*. *3*(8), 177-187.
26. *Valstybės skolos ir skolinimosi apžvalga* (2007). Lietuvos Respublikos Finansų ministerija: Valstybės skolos valdymo departamentas.

Žaneta Karazijienė

Valstybinio sektoriaus skolinimosi įtakos Lietuvos ekonomikai modeliavimas

Santrauka

Valstybės finansai – tai ekonominių piniginių santykių, atsirandančių valstybei sudarant, skirstant ir naudojant jai reikalingus piniginius išteklius, sistema. Išsivysčiusių valstybių finansų sistema apima valstybinius ir vietinius biudžetus, valstybės įmonių finansus ir vyriausybinius specialiuosius fondus. Valstybės finansų sistema parūpina lėšų didėjančioms valdymo, karinėms, taip pat socialinėms, kultūrinėms ir kt. išlaidoms, ir, be abejo, valstybės skoloms padengti.

Kai valstybės išlaidos tampa didesnės nei pajamos, šį skirtumą valstybė būna priversta dažniausiai dengti skolintomis lėšomis. Dėl tokio skolinimosi atsiradę valstybės įsiskolinimai ir kiti finansiniai įsipareigojimai valstybės vardu formuoja valstybės skolą. Valstybės skolinimasis nedaro žalos ekonomikai, jeigu optimaliai naudojamasi skolos galimybėmis. Šio straipsnio tikslas – matematiniu modeliavimu įvertinti valstybės skolinimosi įtaką Lietuvos ekonomikai. Straipsnyje pagrindinis dėmesys skiriamas priemonių kompleksui, sąlygojančiam valstybės skolinimosi poreikį ir skolos optimalų ir efektyvų valdymą. Analizuojama valstybės skolos ir biudžeto deficito tarpusavio sąveika ir matematinis modelis, kuriuo remiantis kiekviena šalis, taip pat ir Lietuva, gali prognozuoti skolinimosi poreikį neviršijant nustatyto (metų pradžioje patvirtinto) valstybės biudžeto deficito.

Lietuvoje, kaip ir daugelyje Rytų Europos ir kitų regionų besivystančių šalių, kuriose vyksta dinamiški ekonomikos pertvarkymo procesai, nuolat susiduriama su lėšų šiems procesams finansuoti trūkumu. Dėl objektyvių priežasčių esant ribotiems finansiniams ištekliams šių valstybių viduje, labai svarbią įtaką stiprinant jų finansines sistemas, aprūpinant jas būtinomis lėšomis turi valstybės skolinimasis. Skolos valdymo politika neatskiriama bendrosios šalies ekonominės politikos dalis. Tokia politika ir ūkio pertvarkymo priemonių įgyvendinimas, griežtas skolinimosi ribojimas ir tvirtas skolos limitų laikymasis skatina investuotojus labiau pasitikėti šalimi, didina investicijas, be to, šalis gali pigiau skolintis užsienyje. Šalies skolinimasis yra ir socialinės ekonominės politikos priemonė.

Šiuo metu finansų rinkos labai atidžiai seka valstybės biudžeto deficitą, nes jis parodo, kiek vyriausybei atitinkamu metu reikia finansavimo ir kokiu mastu didėja valstybės skola. Iš biudžeto deficito analizės duomenų gaunama informacija apie vidaus išteklių poreikį ir jų mobilizavimo efektyvumą bei valstybės išlaidų valdymą. Taip pat iš šių duomenų patvirtiname tai, kad pagrindinės biudžeto deficito priežastys gali būti pajamų surinkimo problemos, pernelyg didelės išlaidos ar netinkama kontrolė.

Kadangi valstybinį sektorių sudaro centrinė vyriausybė, vietinės valdžios ir valstybės įmonės, tai valstybinis skolinimosi poreikis gali susidėti iš šių dalių:

- centrinės valdžios skolinimosi poreikio;
- vietinės valdžios skolinimosi poreikio;
- valstybinių įmonių skolinimosi poreikių.

Centrinės valdžios skolos valdymo išlaidas daugiausia sudaro skolinimosi valstybės vardu išlaidos. Šios išlaidos yra tvirtinamos valstybės biudžete pagal atskirą programą. Jas sudaro mokamos palūkanos už skolą valstybės vardu rezidentams ir nerezidentams, komisiniai mokesčiai, kitos išmokos už skolinimąsi vidaus ir užsienio rinkose, mokesčiai kredito reitingų agentūroms ir t. t.

Palūkanų mokėjimas sudaro vyriausybės einamųjų išlaidų dalį. Dėl padidėjisių palūkanų mokesčių turi padidėti pajamų apmokestinimas arba turi padidėti valstybinio sektoriaus skolinimosi poreikis, o dėl to – nacionalinė skola.

Taigi galime teigti, kad vyriausybė siekdama valdyti nacionalinę skolą iš dalies suinteresuota minimizuoti mokesčius. Straipsnyje analizuoti du susiję veiksniai:

- Pirma, kadangi realiosios pajamos auga, daugiau mokesčių surenkama net nedidinant mokesčių normos. Taigi kuo turtingesnė šalis, tuo lengviau jai sumokėti skolos palūkanas.
- Antra, reali nacionalinės skolos apimtis ir palūkanų už ją santykis su nominaliuoju BVP yra geresnis minėtos naštos ekonomikai matas negu pačios skolos apimtis.

Žinoma, jeigu dėl vyriausybės išlaidų didėja realiosios pajamos ir (arba) didėja infliacija, tai palūkanų mokesčių našta mažėja.

Tačiau dėl nacionalinės skolos atsiranda sudaro dar viena valdžios problema. Buvusios vertybinių popierių emisijos anksčiau ar vėliau „subręsta" ir turi būti apmokėtos. Jos turi būti nuolat keičiamos naujomis, kad refinansuotų egzistuojančią nacionalinę skolą. Kiekvienais finansiniais metais valdžios atstovai turi parduoti vertybinių popierių už tiek, kad padengtų einamąjį valstybinio sektoriaus skolinimosi poreikį ir senos laidos apmokėtinų vertybinių popierių vertę.

Taigi atsiranda dvi galimybės. Pirma, vyriausybei tikslinga parduoti ilgalaikius, o ne trumpalaikius vertybinius popierius, kad atitolintų apmokėjimą ir sumažintų refinansavimo normą. Antra, valdžios atstovai turi apmąstyti skolos pobūdį, kad išvengtų didelių išmokėjimų vienu metu.

Šiuo metu ypač tikslinga analizuoti biudžeto balansą ir atitinkamą valstybinio sektoriaus skolinimosi poreikį laikotarpiais, kurie apima ekonomikos ir greito, ir lėto augimo ciklus. Dėl šios priežasties įvertinimais dažnai siekiama nustatyti, koks valstybinio sektoriaus skolinimosi poreikis turėtų būti įvairiais metais. Tam galima naudoti matematinį modeliavimą, kuriuo apsidraudžiama nuo ekonomikos konjunktūros ciklinių svyravimų, turinčių lemiamą poveikį biudžeto mokesčių politikai ir atitinkamai, biudžeto deficito dydžiui trumpuoju laikotarpiu. Modelis apima kelias prielaidas: nominaliojo BVP apimtis auga pastoviu metiniu tempu; bendras vyriausybės biudžeto deficitas (tai ir procentų išmokėjimas dėl valstybės skolos, ir pagrindinė skola) kasmet sudaro tam tikrą % nuo BVP. Straipsnyje pateikiamas ir analizuojamas matematinis modelis, kuriuo galima spręsti šiuos su valstybės skolos valdymu susijusius uždavinius:

- pagal būtiną palaikyti valstybės skolos lygį (BVP %) ir BVP augimo prognozę nustatyti priimtiną biudžeto deficito lygį (BVP %);
- pagal nustatytą biudžeto deficito lygį (BVP %) ir BVP augimo prognozę, nustatyti valstybės skolos lygį (BVP %);
- pagal numatomą biudžeto deficito lygį (BVP %) ir priimtiną valstybės skolos lygį (BVP %) nustatyti reikiamą ekonominio augimo tempą;
- nustatyti laikotarpį, per kurį galima būtų pasiekti nustatytus parametrus.

Raktažodžiai: *skola, skolos valdymas, biudžetas, deficitas, vyriausybės politika ir reguliavimas.*

The article has been reviewed.

Received in June, 2009; accepted in October, 2009.

DOI: 10.5755/j01.ee.64.4.11603