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UDC 336.27(497.7)"2004/2011"

DEBT-TO-GDP RATIO AND THE RATE OF INDEBTEDNESS OF THE REPUBLIC OF MACEDONIA

Krste Shajnoski, PhD[1]

Abstract

Even after a long usage, the indicator Debt-to-GDP ratio of the public debt has been arousing opposing views in terms of its importance in assessing the rate of indebtedness of a particular country or groups of countries. Hesitations are being caused by cases in which countries with lower Debt-to-GDP ratio run into debt crisis whereas those with higher Debt-to- GDP ratio have no problem with discharging the public debts.

At the end of 2012, the indicator signifying the ratio of the public debt to GDP in the Republic of Macedonia stood at 30%. The announcement that the Government plans to get into debt of new 300 million euros, has caused 'a storm' at the Parliament upon handing down the budget of 2013. The Government defended the move to indebtedness, pointing out that the above mentioned per cent turns the country to low-indebted countries and according to this, it has a margin for new debts whereas the Opposition has objected to this asserting that such a move leads the country into reaching a debt crisis. There have arisen diametrically opposing views on the same fact.

In this supplement, we would deal with the importance of Debt-to-GDP ratio; we would explain why countries with very high Debt-to-GDP ratio have less problems with the servicing of public debt than countries with low Debt-to-GDP ratio and in that context, we would deal with the ratio of indebtedness of the Republic of Macedonia.

Key words: *Debt-to-GDP ratio, public debt, Gross External Debt, rate of indebtedness, ability to service obligations*

JEL classification: E6

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1. Introduction

Although it has always been important how much the Government may incur debts and for what purposes, in order to be able to service the obligations promptly, the use of Debt-to-GDP ratio has acquired a meaning of criterion (upper limit), which must not be passed, as a condition for joining the countries – members of the Union in a zone with unique currency i.e. in the euro zone. The frequency of the use of the indicator Debt-to-GDP ratio has increased the last few years, during the biggest financial and economic crisis after the II World War, especially after the debt crisis in the euro zone and in the developed capitalistic countries.

From the numerous reviews of the countries according to the Debt-to-GDP ratio, it clearly flows that there is no point of determining any percentage as a unique criterion for separate groups of countries, especially for those at a different level of development and at a global level. Processes can be conducted, but they don't have any sense and cannot serve for drawing conclusions about the rate of indebtedness of a particular country in relation to another one according to their Debt-to-GDP ratio. Greece, with a lower Debt-to-GDP ratio, has got into a difficult debt crisis, whereas Japan with a higher one, still has no problems with the servicing of obligations. Or, France and Germany have approximately the same Debt-to-GDP ratio, but the burden of the public debt can be felt more in France than in Germany. The USA have already registered public debt in the amount of 100 % of GDP, but, objectively, there should be no problems with the servicing of obligations, if the political conflicts, in reference to the determination of a new limit of getting the country into debt, are surpassed.

The fact that the Debt-to-GDP ratio cannot be determined as a unique criterion according to which the countries will be compared in terms of the rate of their indebtedness, does not mean that the Debt-to-GDP ratio has no importance in assessing the rate of indebtedness of separate countries within a fixed period. The Debt-to-GDP ratio is an indicator of the economy's "health". The public Debt-to-GDP ratio reflects the "health" of governmental finances, whereas the total Debt-to-GDP ratio reflects the "health" of the entire economy, and not in relation to other

countries, but in reference to the factual capabilities of the country to service the obligations towards abroad in due time. They depend on:

- whether the debts are discharged by one's own currency as it is a case of countries whose currencies are kept as currency reserves by other countries,
- what is the relation between the debt within the national currency and the debt within the foreign currencies like,
- what is the feedback between the debt and the growth like, especially the one between the debt and the growth of currency inflows, because the more rapid growth of debt, leads to its increasing and to worsening the opportunities of discharging it,
- under what conditions, the borrowings are taken out (interest rate, conditions - terms, grace periods),
- whether the country is a member of the Monetary Union in which there is solidarity in surpassing certain problems, including the debt crises.

There can also be listed other conditions that result from the specifics of separate countries, but they are significant for assessing the rate of their indebtedness.

2. The Debt-to-GDP ratio shows the state of debt towards GDP

In the listed conditions can also be recognized individual characteristics of separate countries, but they are also general characteristics in that respect that they represent an advantage or weakness for separate countries.

The countries whose currencies are kept as currency reserves by other countries (the USA, the Euro Zone, Japan, Great Britain) theoretically, have limitless possibilities to accumulate debts, but practically, they also have to pay attention to keep the trust of their creditors. If the trust is endangered, especially because of decreasing the value of reserve currencies, the foreigners will cease to finance the debts of the countries whose currencies are falling at a faster pace than those of some other countries. In such a case, it is probable that the creditors will start to

free themselves from the governmental bonds more intensively, and will cause undesirable consequences at the bonds' market. Therefore, they can accumulate debts considerably more than the other countries, but not as many as they want, if they don't like to take a risk of trust crisis in their own currency, as a result of what, they would lose the privileges which arise from the fact that their national currency performs the function of a global one. The large differences in the height of the Debt-to-GDP ratio between separate countries are due to the fact whether the debt of a particular country is more in national currency than in foreign currencies. Considering the servicing, the countries whose debts are denominated in a national currency, are in more favourable situation. In order to repay the obligations in one's own currency, there can be printed suitable amounts of national money, whereas in order to discharge the obligations in foreign currencies, it is necessary to perform economic activities that will generate into satisfying the currency inflow. However, this does not mean that each government may increase the debt in national currency without limits. Governments are restricted in their wishes by the assessment of home investors about the profitability of buying state bonds and the trust in making the anticipated profit. If the exaggerated state indebtedness in national currency causes inflation within the country, the trust and interest in state bonds reduce, and as a result of this, the possibilities for further indebtedness in home currency are reducing too.

Quite a suggestive example is the situation in Japan. It has a rate of indebtedness that exceeds even 200 % of GDP, but, it has no problems with the payment of state debts that arrive to be paid. " The door-handle ", among the other things, shows that the main part of its debts is in yen (home indebtedness – 94 % of Japan bonds are kept by investors within the country's frames), and not in foreign currencies, for whose payment, it should be earned through export of goods and services. However, there is no doubtfulness that the growth of home indebtedness is based upon the successful economic relations between the country and abroad. Japan still has surplus balance out of its exchange with foreign countries (trading and capital), so that it can service the debts towards abroad on time. However, for the sake of truth, it should be said that the high public debt starts to worry the

Japanese, given the fact that the last year the country marked the first trading deficit after 1980, whereas the budget deficit continues to increase itself. In the last five years, the surplus in the current account reduced of almost 6 % of GDP in 2007 to only 1 % nowadays. By decreasing the level of household saving and with chances of new fiscal deficit, the current account will be negative soon, forcing Japan to sell its debts to foreign purchasers. [2]

It is clear that the repayment of debt can also be made by printing yen, but that brings into question the stability of the economy and national currency. Among the other things, and of course, thereby, the rating agency Moody's has reduced the long-term rating of the state debt of the country.

Of main importance in the assessment of the particular country's indebtedness rate, is the feedback between the debt and the economic growth, especially between the debt growth and the growth of currency inflows. This opens two questions: about the use of funds borrowed by governments[3], and about the origin of the funds. If they are spent for current needs for a longer period, their influence upon the economic growth is unimportant. As a consequence to this, there will be registered worsening of the Debt-to-GDP ratio. If, however, the borrowed funds are used for building productive and infrastructural capacities, they will contribute to the enhancing of economic performance, and the indicator Debt-to-GDP ratio will improve itself.

The feedback between the debt and the growth is quite important even from the aspect of the borrowed funds' origin. Serious problems arise when the debt, which is provided by abroad, increases constantly, and the growth of currency inflows is slower than the debt growth. Such discrepancy leads to increasing the

[2] Feldstein: The Wrong Growth Strategy for Japan, project Syndicate, Jan. 17, 2013, http://www.project-syndicate.org/commentary/the-wrong-growth-strategy-for-japan-by-martin-feldstein

[3] The professor Robert Skidelsky states: „Government deficits incurred on current spending for services or transfers are bad, because they produce no revenue and add to the national debt. Deficits resulting from capital spending, by contrast, are – or can be – good. If wisely administered, such spending produces a revenue stream that services and eventually extinguishes the debt; more importantly, it raises productivity, and thus improves a country's long-run growth potential."(http://www.project-syndicate.org/commentary/good-and-bad)

burden of debts' discharge, worsening the conditions of indebtedness and decreasing the possibilities of new debts.

In reference to the previous condition, of great importance are also the conditions under which the borrowings are taken out from the foreign countries (interest rate, conditions – terms, grace periods). This is especially important for the less developed countries. They have need of additional accumulation in order to accelerate their growth so that they can reduce the gap in the level of development. If the borrowings are with low interest and longer terms, it means that those countries can show higher absolute amounts of debt, i.e. higher Debt-to-GDP ratio, and at the same time not to endanger the possibility for servicing the obligations.

Out of the listed conditions, it arises that it is impossible to find two countries that would have the same Debt-to-GDP ratio having equal importance in the countries' rate of indebtedness. As a result of this, it is rightly to say that even when the ranges for qualifying the rate of indebtedness are determined according to Debt-to-GDP ratio (low, middle, high), the burden of separate countries' indebtedness is not determined. According to Debt-to-GDP ratio, there are only determined groups of countries arbitrarily. The countries with lower Debt-to-GDP ratio cannot count on increasing the indebtedness, only because of their classification into low-indebted countries. Mathematically viewed, such expectations are even justifiable. However, here, mathematics causes misapprehension. The possibility for getting into debt the countries, whose currencies do not perform a reserved function, does not depend on the affiliation in such arbitrarily determined groups. It cannot be talked about the (re-) indebtedness of a country that is out of the euro zone, by comparing the contracted upper limits of the budget deficit and of the state members' public debt. The things, which apply to the state members, do not apply to the countries, which are out of the euro zone. They cannot count on the benefits that the state members obtain by the functioning of the unique market and monetary system. They cannot count on solidarity when consolidating the actual debt crisis into which they could fall, as it happened to several countries in the euro zone several years ago. The main part of the burden of discharging debts, however, falls to the country - debtor, besides such support. That means that there are not

unlimited the possibilities as well, and their upper limit cannot be a benchmark of the possibilities for getting into debt the countries out of the euro zone.

There can also be listed other conditions that arise from the specifications of separate countries, but they are important for assessing only the rate of their indebtedness (structural problems within the economy, qualification of labour power, the level of democracy in the society etc.). For small and insufficiently developed countries such as the Republic of Macedonia, with liberalized capital account, the assessment of indebtedness rate, besides the Debt-to-GDP ratio of the public debt, should include the Debt-to-GDP ratio of the Gross External Debt.

3. The upper limit of indebtedness determines the ability of financing the mature obligations

It is obvious that the analyses of comparing the height of Debt-to-GDP ratio cannot be a benchmark of Macedonia's upper limit of indebtedness. As a small and insufficiently developed country and out of the larger integrated systems, its upper limit of indebtedness determines its economic and financial ability of servicing the mature obligations towards abroad in due time. For now, with indebtedness rate of 30 % of the GDP, the public debt does not manifest itself as a specific problem. The country succeeds to service it promptly. However, there are indications that the state of indebtedness towards abroad is worsening. At the same time, the deficit in the budget has been increasing constantly for several years, and from -0.5% of GDP in 2006, it fetched -3.5% of GDP in 2012. The same is predicted for 2013 as well.

The last five years, the debt of the country has grown with faster pace than the growth of GDP. The economic growth and its maintenance are becoming dependent upon the growth of the debts, and they cannot increase themselves infinitely if there are not generated conditions for their servicing out of the GDP's growth. This trend shows that the borrowed funds are not used efficiently, i.e. they are not in function of increasing the growth, but they are used, above all, for the current expenditure.

Table 1

Motion of the GDP and the public debt in the Republic of Macedonia in million euros

	2004	2005	2006	2007	2008	2009	2010	2011
Gross Domestic Product	4.442	4.814	5.231	5.965	6.720	6.677	6.944	7.403
Total debt of the central government	1.583	1.648,8	1.673,4	1.430	1.386,7	1.596,9	1.710,6	2.088,8
-External debt	993,2	1.245,4	1.025,2	877,2	921,2	1.105,3	1.173,8	1.582,1
-Internal debt	589,8	603,5	648,2	552,8	465,5	491,7	536,8	506,8
Average export	1.345	1.642,9	1.914	2.472,2	2.692,6	1.920,9	2.492,8	3.036

Source: Ministry of Finance of the Republic of Macedonia, debt of the Central Government (consolidated) to 31.12.2011 inclusive.

From table 1, it can be calculated that during the period from 2007 to 2011, the GDP of the Republic of Macedonia, was increasing by an average rate of 4.4%, whereas the total public debt was increasing by 7.9%, and the external debt by a rate of 12.5%. At the same time, the export was increasing only by 4.2% per year.

Even more direct signal of worsening the state of indebtedness towards abroad is the rapid deficit growth of the current account of the balance of payment. With the continuation of this trend, the conditions for new indebtedness are getting worse, and the possibilities for prompt servicing of obligations towards abroad, are getting endangered. Thus, the possibilities for further indebtedness of achieving more rapid development are getting endangered, as well.

Table 2

Balance of the current account of the balance of payment of the Republic of Macedonia in milion euros

	2004	2005	2006	2007	2008	2009	2010	2011
Balance	-361,8	-122,5	-23,4	-421,2	-862,2	-457,1	-143,6	-224,3
-net goods	-914,3	-858,5	-1.001,5	-1.181,0	-1.762,5	-1.559,6	-1.447,8	-1.681,8
-net services	-45,6	-29,2	17,4	28,3	9,3	16,5	36,8	98,1
-net income	-30,1	-88,1	-21,2	-280,8	-94,4	-47,3	-99,9	-120,8
-net current transfers	628,2	853,3	981,9	1012,4	985,5	1133,3	1367,3	1480,2

Source: National Bank of the Republic of Macedonia, annual data of Macedonia's balance of payment

Within the analyzed period, the deficit is constantly present in the current account with specific oscillations. That mostly contributes to the growth of deficit in the exchange of goods and the outflow of foreign currencies, above all, on the basis of the transfer of the profit, made in Macedonia. The services are improving the balance of the current account of the balance of payment, except in the first two years when they show deficit. The net current transfers have the most important influence on decreasing the current account deficit. They are in constant growth. The average annual rate of growth is 11.3%. They also cover a large part of the deficit of goods' exchange. In 2005, the surplus in the current transfers covered almost 100% of the deficit in the goods' exchange, and in 2011 – 88%. The inflow is, therefore, decreasing, and it should not be expected the balancing of the current account to rely on the growth of money order of our employees abroad. It is good that, for now, they narrow the gap in the foreign trade exchange. However, it is bad that it cannot last long. Indeed, till now, no one said that we will export employees so that they can send us foreign currencies to fulfill the import needs, and no one states that Macedonia is a destination that, with an inflow of foreign capital, can provide satisfactory growth dynamics. It is needed a strategy of relying, above all, on its own power, i.e. a strategy into which the export will be a motor of the economic growth and of balancing the foreign relations.

For insufficiently developed country such as the Republic of Macedonia, in conditions of liberalization of the current and capital account of the balance of

payments (declared denar's convertibility), it is important the information of the Gross External Debt of the country. The actual non-prompt payment of the mature obligations, on the basis of the public debt, has the same repercussions of the economy as does the non-prompt servicing of the public debt.

Table 3

Motion and structure of the total external debt of the Republic of Macedonia in milion euros

	2004	2005	2006	2007	2008	2009	2010	2011
Gross External Debt of R.M	2.080,2	2.528,2	2.503,4	2.841,1	3.304,2	3.780,4	4.105,7	4.846,6
-public	1.211,4	1.487,9	1.270,4	1.057,4	1.109,9	1.324,9	1.424,3	2.060,2
-private	868,7	1.040,3	1.233,1	1.783,1	2.194,2	2.455,5	2.709,5	2.814,6
Gross External Debt % of GDP	46,8	52,5	47,9	47,6	49,2	56,4	58,2	64,6

Source: National Bank of the Republic of Macedonia, annual report of 2011

From the presented data, it can be seen that the Gross External Debt of the Republic of Macedonia is in constant growth. However, the intensity has been increasing the last several years. In the period 2007 – 2011, the Gross External Debt has been increasing by an average rate of 11.3%, and the public debt by rate of 14.3%.

With the last indebtedness in the foreign countries for financing the budget deficit of the country in 2013, the rate of indebtedness will increase, and if it is not achieved growth of the export and growth of currency inflow, on the other grounds, it is possible further worsening of the possibilities of prompt servicing of the debt, i.e. that will cause a need for new debts. The discrepancy between the dynamics of the public debt's growth and the possibilities of its servicing increases considerably, if it is taken into account the total external debt of Macedonia (both the public and private). With about 5 billion euros, it has already reached the level of 63.3% of the GDP, and according to this indicator, the country's already numbered in the group of "high" indebtedness. This is also indicated in the October quarterly report of the National Bank of the Republic of Macedonia (2012). Given the fact that the information of the low public debt was most often collected from thence, the given information should be reckoned as a warning of the danger to which the Macedonian economy is exposed. The debts of the private sector, ultimately, upon their

discharge, shall be borne by the currency inflow, i.e. by the currency reserves of the country. Every debtor has a right to buy an adequate amount of foreign currencies at the currency market in order to cover his obligations. If the offer is less than the demand, as it is going to happen more often because of the growth of the deficit in the current account, there will have to come to interventions by the Central Bank, to decreasing of the currency reserves or to new indebtedness, and in the end, to correction of the value of home currency.

As a consequence of the more intensive growth of debt, the country has already demonstrated practice of indebtedness abroad, because of discharging mature debts by now. That is a situation which cannot last long, particularly, because almost several years the debt has been increasing more rapidly than the growth of the GDP and of the export, i.e. than the possibilities for attaining currency inflow, which will service the discharge of the increased debt. This means that even at the current level of "low" indebtedness, it should be taken into account the dynamics of indebtedness in relation to the possibilities for servicing the debts towards abroad, i.e. the efficiency in the use of the borrowed funds. With the last indebtedness of the country in the amount of 250 million euros from Deutsche Bank, it was paid off the formerly emitted bond of 175 million euros.

The mentioned adverse trends in the growth of the public and total external debt of the Republic of Macedonia, undermine the easiness of the bearers of the macroeconomic policy in the country in relation to the country's indebtedness; not from a view that it should not get into debts further away, but the subsequent indebtedness abroad to be in function of achieving effects that will improve the developing performance of the economy, particularly the currency inflows, and not to satisfy the final expenditure. It should be avoided the shifting of the burden of the public external debt at the expense of the future generations (that should return the debts incurred for more comfortable living and governing).

The listed trends, which suggest worsening of the rate of indebtedness of Macedonia, extort reassessment of the macroeconomic policy. Because the country has an objective need of additional accumulation from abroad in order to accelerate

the economic growth, the macroeconomic policy has to avoid the adverse trends threatening with possible difficulties in the servicing of obligations towards abroad. At the same time, of main importance is the change of the monetary strategy of targeting the exchange rate of the denar and the development of export-oriented developing strategy. It is obvious that if nothing changes, the country will face a debt crisis for whose solving, there have to be taken numerous measures (increasing of debts, cutting wages and other income, reducing the number of administrative employees), for which it is said that the country has evaded, as a result of the successful macroeconomic policy, whereas the countries in the euro zone, which incur large debts, apply them. In a more strained situation, it is not even excluded the "naked" devaluation; unless we are prepared for a new developing strategy in which the rate will be determined at a real level and irrespective of the fact whether it is fixed or fluctuating, we will insist to keep it stable.

4. Conclusion

An identical Debt-to-GDP ratio of the public debt of different countries does not mean an identical rate of indebtedness of the countries, i.e. an identical level of qualifying for servicing the public obligations. The Debt-to-GDP ratio of the public debt only shows the state of the debt to the GDP in a given country. It depends on several factors whether the Debt-to-GDP ratio of the public debt is maintainable or not. In the most favourable situation are the countries whose currencies perform the function of international reserves, but they are not unlimited or without great risks, when borrowing funds from abroad. The other countries, among which the Republic of Macedonia too, have constantly to proportion their upper limit of indebtedness with the economic capacity and to service the mature obligations in due time. That means that it has to be established permanent relation between the dynamics of the economic growth, which depends largely on the commitment of funds from abroad, and the inflow of currency funds, necessary for servicing the total external debt.

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PUBLIC DEBT, DEFICITS AND ISSUES WITH EXCESS DEBT

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Blagoja Nanevski, PhD[5]

Abstract

This paper presents a short and long-run analysis of the economic effects of public debt and budget deficits, whilst connecting unconventional public debt connected issues to the global current economic conditions. Short-term budget deficits are relatively desirable, while the long-term effects of deficit accumulation blend into the effects of public debt accumulation. The long-term economic effects of high public debt levels are crowding out investment, causing unemployment and increased inequality. While some of the mechanisms of dealing with high public debt levels don't have their place in the classical economic literature, they are a part of the anticrisis mechanisms of indebted countries.

Key words: *public debt, deficits, short-run, long-run, odious debt, monetizing public debt*

JEL classification: H62, H63

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1. Introduction

In the economic literature the issues of debt and deficits are correlated to the global economic conditions. During economic expansions, maximizing the rate of GDP growth and improving and maintaining high living standards are the most abundant titles of journal articles. It is only during economic recessions that the issues of high levels of debt, deficits, and the economic consequences they bring resurface.

Debt, as an economic term has two meanings. If used wisely and moderately it can improve welfare. If the borrowed funds are used for productive causes, that will bring higher returns and eventually increase GDP growth.[6] However, if the incurred debt is used for nonproductive causes, when the obligations mature it can create repayment problems. Usually when the government debt is a repayment concern, the taxpayers bear the consequences.

Since the commencement of the economic crisis, the EU and Eurozone member states face tremendous pressures from the financial markets in their quests for lowering the public debt levels. The overall debt of the 17 member states part of the Eurozone in 2007 was 59% of GDP. In 2011 the overall public debt levels rose to 82,5% of GDP. The budget deficit of the Eurozone member states was 0,9% of GDP in 2007. In 2011 the budget deficits rose to 4,4% of GDP.[7] Understanding the importance and the implications of the terms public debts and deficits is of crucial importance for maintaining a sustainable economic future for the Eurozone member states, especially in periods of economic downturn.

The paper presents the short and long-run economic effects of the accumulated budget deficits and high public debt levels. Additionally the paper covers unconventional economic issues connected to high public debt levels. Parts 2 through 4 offer a general notion about budget deficits and public debt, and provide an in-depth analysis of their economic effects. is presented. Part 5 offers an insight

[6] Ceccheti, S. G, Mohanty, M. S., Zampolli, F., "The Real Effects of Debt", September 2011, The Bank of International Settlements (BIS)
[7] Eurostat Database, www.ec.europa.eu/eurostat

into unconventional policies in combating high debt levels. Part 6 introduces the concept of odious debt.

2. The Economic Reasoning Behind Budget Deficits

The conventional wisdom holds that budget deficits crowd out capital, lower the living standards for future generations, and reduce national income.[8] Budget deficits occur in case the government is unable or unwilling to balance the net receipts and net expenditures. Budget deficits aren't troublesome as an economic phenomenon. They are the result of a bookkeeping technique. However persistent, and especially constantly increasing budget deficits have a negative effect on the key macroeconomic parameters.

Government deficits present a stock, while debt is a flow.[9] Government deficits aren't hazardous to the economy in the short run, however their accumulation leads to rising debt levels, which ultimately may lead to an economic recession.

As the standard definition goes, deficit is defined as the difference between total current government spending and total current government revenue. Macroeconomic textbooks present the identity (1) as the main relation between the public debt and the deficits.[10]

$$D_t = G_t - T_t \qquad (1)$$

This is called primary deficit.

$$B_t = B_{t-1} + D_t \qquad (2)$$

From Identity (2) we can derive the equation for current debt levels:

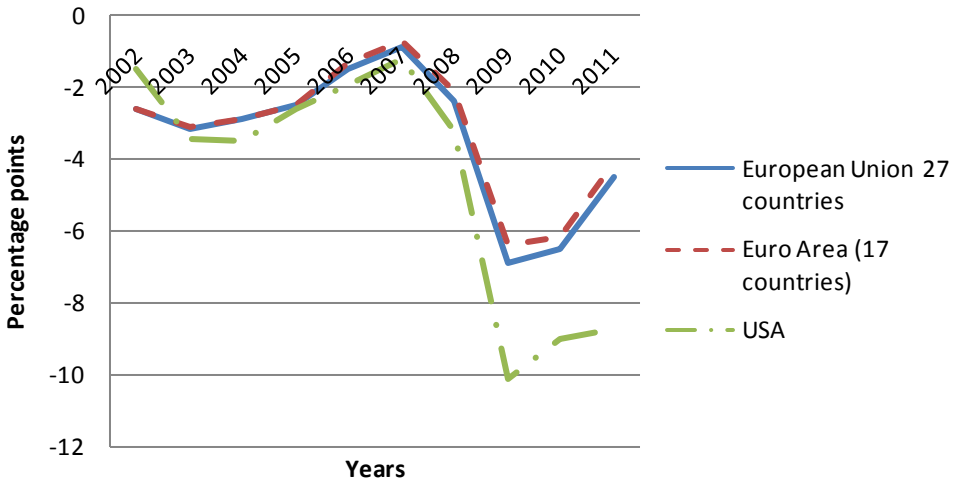
[8] Ball, L., Elmendorf, D.,W., Mankiw, N., G, "The Deficit Gamble", 1995, NBER, Working Paper No. 5015
[9] Atanasovski, Z., "Public Finance", 2004, Faculty of Economics, Skopje, pg. 297
[10] Hagen, v. J., Wolff, B., G., "What do Deficits tell us About Debt? Empirical Evidence on Creative Accounting with fiscal rules in the EU", Series 1: Studies of the Economic Research Centre, No 38/2004

$$B_t = B_{t-n} + \sum_{n-1}^{t=0} D_{t-i} \quad (3)$$

$$SFA_t = (B_{t-1} - B_t) - D_t \quad (4)$$

The calculation performed in equation (4) is called a debt-deficit adjustment. Temporary debt-deficit adjustments tend to cancel out over time. However persistent adjustments should give causes for concern.[11] Identity (4) shows that a positive debt-deficit adjustment occurs when the public debt rises more in period (t) - (t-1) than the budget deficit in period (t). High and persistent debt-deficit adjustment levels point to an inconsistent and dubious mechanism of calculating budget deficits.

Figure 1: Government deficits (% of GDP)



Sources: Eurostat Database, The Whitehouse (Office of Management and Budget)

In Figure 1, the cyclical pattern of the budget deficits of the EU-27, Eurozone-17 countries and the USA is evident. The three curves follow a similar pattern, gradually repairing budget deficits during economic expansions, while sharply declining since the start of the economic crisis, with a slow signal of recovery. The reasons behind the larger budget deficit incurred by the USA are the three episodes of quantitative easing conducted by the Federal Reserve Bank in the past 5 years.

[11] Ibid

On the other hand, the EU and Eurozone member states are combating the recession by adopting an austerity policy, with some expansionary elements that has yet to be proven effective. Part of the large deficit increase is due to the effect of the automatic stabilizers of the economy.[12]

In analyzing the effects of budget deficits on the economy it is important to distinguish between the short-term and long-term effects. Additionally what is even more important the changes in the short and long-run tend to be contradictory. In the short-run government deficits have no effect on macroeconomic indicators. This implies that a higher budget deficit should be encouraged. Higher budget deficit stimulates the economy, since it can be achieved either through higher government spending, or through lower government revenues (taxes). Either way, it increases aggregate demand and stimulates the economy.

Identity (3) offers the standard view of the long-term effects of government deficits. The accumulation of government deficits leads to a persistent increase in the level of debt. This in turn has plenty adverse effects on the economy. As we will see later on in this paper there is a possibility, outside of conventional wisdom, to use the previously mentioned short-run strategy of dealing with deficits, and increase the standard of living without any long-run problems.

3. Public Debt Persistence – Depression Economics

A number of advanced and developing countries are having troubles at the moment maintaining and lowering the debt levels. The economically prosperous past 3 decades, with only sporadic shocks to the global economy, lead to a surge in economic growth. In order to use the momentum stimulate higher economic growth, countries entered the financial markets and borrowed funds extensively. Capital flows moved from the countries with excess to the countries with a shortage of capital. The debt levels rose to historic high levels, uncharacterized during

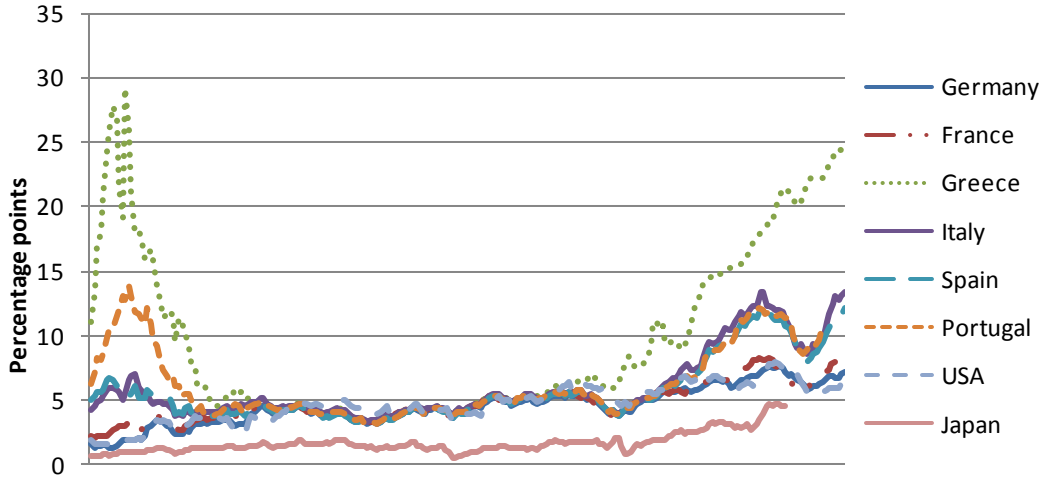
[12] Dolls, M., Fuest, C., Peichl, A., "Automatic Stabilizers and the Economic Crisis: US vs. Europe",(2010), NBER, Working Paper No. 16275

peacetimes before. This lead to the resurrection of the Minky Moment which caused borrowers to trust this flow of economic prosperity and not realize some of the bad loans they've made.[13]

Once the Great Recession hit the world economy, global economic conditions changed significantly. A number of banks bankrupted and the taxpayers eventually carried the burden of supporting the economic recovery. High public debt levels cause an increase in the bond spreads of the indebted countries, depending on the type of public debt incurred. Domestic public debt has a lower effect on the foreign financial markets country performance than external public debt.

Increasing levels of debt create a phenomenon called debt overhang. Krugman (1988) defines debt overhang as a situation where the debt repayment falls short of the contractual value of the debt. A hypothesis developed by Rogoff and Reinhart (2010,2012) drawn from extensive empirical research, points to a debt overhang level of 90% as being critical for a country. Public debts beyond this level are unsustainable and the risk of default is pretty high.

Figure 2: Long-term bond rates (10 year bonds)

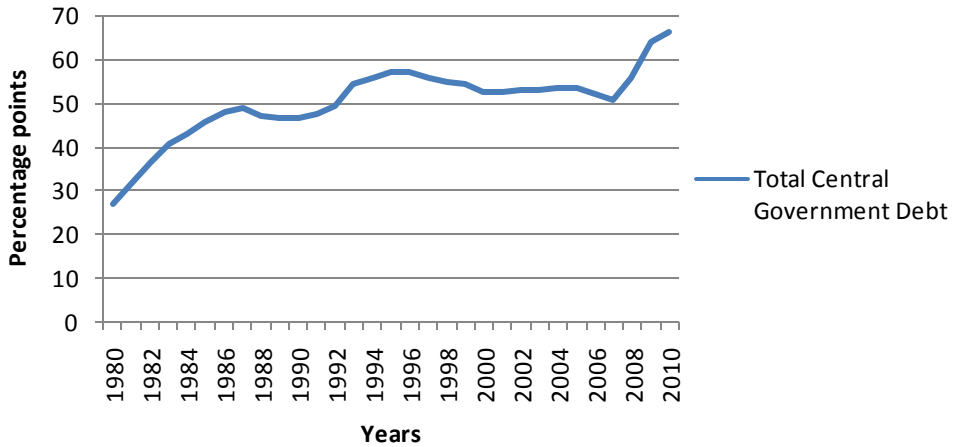


Source: ECB, Statistical Data Warehouse, www.sdw.ecb.europa.eu

[13] "Beyond the Minsky Moment – What We've Been, Why we Can't Go Back, and the Road Ahead for Financial Reform", April 2012, Levy Economics Institute of Bards College

Figure 2 presents the monthly long-term bond rates of 8 countries from January 1993 until January 2013. The curves are correlated, and follow similar patterns, since the bond markets and prices are influenced by the same factors globally. The long-term bond rates are determined as a sum of short-term bond rates and investors expectations of future interest rates. As seen from the graph long-term bond rates spike twice during the past 20 years: during the 1993-1994 period and after 2007 during the economic recession. The 1993-1994 bond market rally occurred because of several factors. First there was a sequence of previous events: 1987 stock market crash, the 1990 Gulf war and the 1992 European exchange rate mechanism turbulence.[14] Besides these pre-occurring events, at the beginning of 1994 several apparently unrelated events occurred that caused investors to lose their confidence in the bond market: investors began to question Japanese programme of acquiring Japanese government bonds; USA Federal Reserve Bank tightened its monetary policy by 25 basis points, with reports that the tightening will continue; the breakdown of Clinton-Hosokawa open trade negotiations; the markets responded negatively to the decline of the discount rate while the repo rates remained unchanged.[15]

Figure 3: Public Debt (% of GDP, 15 countries)



Source: OECD Database

[14] Borio, E. V. C., McCauley, N. R., "The anatomy of the Bond Market Turbulence of 1994", BIS Working Paper No.32

[15] Recent Developments in Bond Markets, A Report to the Ministers and Governors by the Chairman of the Group of Deputies, April 1994

Figure 3 presents the Total central government debt (% of GDP) of 15 OECD member countries.[16] The 15 countries are chosen based on the data available. The omission of several highly indebted countries from this analysis is due to the lack of suitable data. We took simple averages in the period of 1980-2010 and calculated the average central government indebtedness of the OECD member countries. A noticeable upward trend points to the fact that government debt has increased overall in the past twenty years. However the rate of debt increase varies from one period to the next. In the 1980's the debt levels increased rapidly. This period was characterized by economic expansion, and increased debt levels weren't worrisome at all, in fact they lead to higher economic growth for the indebted countries. In the early 1990's a period of deleveraging occurred, when countries had efforts to lower their debt levels. Then the average debt levels remained constant for a decade, finally reaching their lowest point in the pre-crisis periods. Now this is extremely important point, illustrated by this graph and debated by economists. Some economists argue that the pre crisis central government debt levels for the countries that are hit the hardest from this economic crisis were low on average. It is since the beginning of the crisis and the investor pressures that these debt levels skyrocketed. Spain's central government debt level was extremely low, only 33,7%, while Italy's debt level was 98%. Although high, this is close to the hypothesis of debt overhang levels, which holds that debt above 90% decreases economic growth drastically, and increases the probability for default.[17] Since the recession started in the first two years (as presented on the graph) government debt increased significantly.

4. The Economics Effects of Public Debt

Debt creates many adverse effects on the economy, if it is above some threshold value. Minor, sustainable levels of debt have both positive and negative effects on

[16] The 15 countries are: Australia, Austria, Belgium, Denmark, Germany, Iceland, Italy, Japan, Korea, Mexico, Netherlands, Portugal, Spain, Sweden, United States.
[17] Reinhart, M. C., Reinhart, R. V., Rogoff, S. K., "Debt Overhangs: Past and Present",(2012), NBER, Working Paper no. 18015
Reinhart, M. C., Rogoff, S. K., "A Decade of Debt",(2011), NBER, Working paper no. 16827

the economic performance of the economy. Borrowing increases present consumption, thus creating an intertemporal effect. This is why most of the models analyzing different types of debt, have intertemporal characteristics. A rise in public debt, will eventually make future generations richer in human and productive capital, while a transfer from future to present consumption can raise society's intertemporal welfare. Additionally debt creates liquidity benefits, in the forms of easier credit conditions for households and companies, and in this way crowding in private investment.[18]

However, the accumulation of debt has its risks. As debt levels rise, borrowers become increasingly vulnerable to income changes, as their main source for repayment of the debt obligations. Consider the example of a highly-leveraged company. If a company has a leverage level of 95%, if the price of its assets falls by more than 5%, the company is experiencing severe defaulting problems and insolvency. The same is true for public debt. Even a mild shock to an indebted economy can produce severe default problems. Once investors realize these issue, they will demand higher interest rates as a compensation for the higher risk, and eventually if the debt problems grow further, they will stop lending to the particular economy.

When analyzing the effects of debt, a similar pattern is utilized as in the analysis of the effects of deficit. The analysis is conducted both in the short and long run.

In the short – run the economy is Keynesian.[19] The government in the short-run can increase the debt by increasing the government deficit. Let's consider that the government decides to keep government spending constant, and decrease the tax rates. This will leave a larger sum of money in the hands of the households and companies, so it will increase aggregate spending and demand in the economy. The increase in aggregate demand raises national income. Higher national income

[18] Michael Woodford, 1990. "Self-Fulfilling Expectations and Fluctuations in Aggregate Demand," NBER Working Papers 3361, National Bureau of Economic Research
[19] Elmendorf, W.,D., Mankiw. N. G., "Government Debt", NBER, Working Paper 6470

maximized the utilization of production capacities in the economy.[20] So the Keynesian view encourages higher levels of debt in the short-run.

In the long-run the economy is neo-classical. In the long-run only the supply of factors of production, and their productivity affect the national income. The Private Sector Budget Constrain is given by:

$$Y = C + S + T \quad (5)$$

GDP when presented as an identity of four types of spending is presented as follows:

$$Y = C + I + G + NX \quad (6)$$

$$S = Y - C - G \quad (7)$$

This identity states that national saving must equal investment in a closed economy.

Combining (6) and (7) yields:

$$S + (T - G) = I + NX \quad (8)$$

Identity (8) states an obvious fact. In an open economy, the national saving must equal the sum of investment and net exports.

$$CA = EX - IM \quad (9)$$

The current account must equal the negative of the capital account, thus:

$$CA = NFI \quad (10)$$

Substituting (10) in (8) gives us:

$$S + (T - G) = I + NFI \quad (11)$$

This identity identifies the uses of national saving for investment purposes domestically or in foreign countries. If a government deficit (a decrease in (T-G)) occurs, the identity can be satisfied in three ways: Private savings should increase,

[20] For additional references to the Keynesian school of economic thought refer to Keynes, J. M. "The General Theory of Employment, Interest and Money", 1936

or domestic investment may decline, or foreign investment may decline. Reduced domestic investment means lower output, increased unemployment, and increased poverty. Reduced foreign investment means lower levels of capital owned by domestic residents abroad. An important point is that reduced foreign investment doesn't automatically lead to a decline in net exports.[21] Krugman and Obstfield give a mathematical description of why this isn't regularly the case:[22]

$$S^p = I + CA - S^g \quad (12)$$

$$S^g = G - T \quad (13)$$

$$CA = S^p - I - (G - T) \quad (14)$$

What this identity shows is that as government deficit rises, and private saving and investment remain unchanged, the current account surplus decreases. However if $\Delta S^p = \Delta(G - T)$, then the current account balance will remain unchanged. So twin deficits do occur, however it is not a rule that happens always under every circumstance.

Government debt affects monetary policy. Higher debt levels lead to higher interest rates, which in turn force the Central Bank to act and lower interest rates through expansionary measures. In the long run, this increases inflation. Persistent government debt in the long run increases the inequality in society, because of the intertemporal transfer of wealth. Additionally long-term government debt leaves the country vulnerable to economic crisis.

[21] This is known in the economic theory under the term "twin deficits". For more literature on this subject check: "Understanding the Twin Deficits: New Approaches, New Results",(2005) FRBSF Economic Letter, No.2005-16; Frankel,J., "Could the Twin Deficits Jeopardize US Hegemony",(2006), Journal of Policy Modeling

[22] Krugman,P., Obstfield, M.,"International Economics",(2003), 6th Edition, Pearson

5. Public Debt, the Central Bank and Inflation

The quantity and term structure of the government bonds issues are conditioned by several macroeconomic factors. Debt issues affect the price level, interest rates, macroeconomic policy and the rate of economic growth. The Stability and Growth Pact signed by all EU Member States, and its Reform of 2005, included criteria for establishing a fiscal policy in each state that will keep the budget deficits to a 3% threshold, and the debt/GDP at 60%.[23]

The Central Bank, as an independent institution in the financial system, is responsible for regulating the quantity of money in the economy, and keeping the economic conditions stable. In the case of government bonds there is no such institution that independently monitors the indebtedness; the decision-making power is solely in the hands of the Ministry of Finance.

The main task of the Central Bank is to regulate the quantity of money in the economy and adopt policies that will ensure long-term currency stability. The majority of Central Banks successfully complete the task of creating and maintaining stable price levels and currency stability. There have been examples in the past and in the present of Central Banks which under government influence print additional quantities of money in order to achieve growth and lower the debt levels through increasing inflation. These episodes have proven fatal for the economies which took large periods for economic recovery. This is why the independence of the functioning of the Central Bank is crucial for maintaining successful financial system.

The "Age of inflation" term was constantly under review in the 1950's and 1960's, while economists feared that post-World War II prosperous economic periods could be disrupted if inflation was not properly tamed.[24] The global economy in the past two decades faces the "Age of issuing government debt" and all the consequences caused from irresponsible behavior and accumulation of debt.

[23] Todorovic,M., Bogdanovic, J., "The European Union Debt Crisis and the Eurozone's Survival", 2011, Ed. 8, pg. 165-180

[24] Sennholz, H. F., "Age of Inflation", 1979, Western Islands, ISBN 0882792342

The monetary and fiscal policies should be simultaneously conducted in order to ensure economic stability and prosperity. The consequences of the public debt are different depending on the term structure of the debt. The effects differ additionally based on the purpose of utilization of these borrowed funds. Negative consequences occur when the borrowed funds are used for covering budget deficits and present consumption.

The debt levels have a number of various effects depending on whether the public debt is domestic or external. Currently the United Kingdom and Japan have high public debt levels, but owed mostly to domestic investors and a sovereign currency and monetary policy. Bearing in mind that the interest rates are formed in the domestic markets, the government bond rates are less vulnerable to foreign financial market pressures. On the other hand the countries that owed money to foreign creditors and didn't have their own sovereign monetary policy suffer enormous consequences from the economic recession. Greece faced liquidity problems, as there was no demand for their government bonds, thus making them highly dependent on debt restructuring packages and foreign aid. Spain and Italy reached government bond rates of around 7%, which caused market panic, since levels above this threshold value weren't sustainable for these two economies.

6. Extreme levels of debt

Extremely high levels of debt can occur both to advanced and emerging market economies. The adverse effects of short and long-run accumulation of public debt were discussed in the previous parts. In the next two parts the research is broadened to include additional views, rarely present in conventional macroeconomic literature concerning public debt and deficits.

Extreme debt levels usually crowd out capital, create unstable political situation, sometimes decrease net exports, increase inflation, increase unemployment, cause deadweight losses from additional taxation of the economic

sectors. However drastic sanctions of dealing with extreme levels of debt will only place additional pressure on the economic performance.

One such measure in monetizing the public debt, which refers to the concept of covering high debt levels by printing money. This is the main cause for hyperinflation. Printing money, with no excess demand will cause higher inflation. This will lower the debt amounts paid in the domestic currency; however the debts paid in a foreign currency will remain unchanged. Additional printing of money will put additional inflationary pressures. Once entering an inflationary spiral of this kind, it will require lot of suffering and years of lost economic progress in order to restore normal inflationary expectations.

In recessionary economic periods, highly indebted countries are more vulnerable to a debt crisis. However which country will be affected remains at the power and estimation of the financial markets. One important factor that leads to higher resistance at high debt levels is the organization and structure of the economy. Some economies, despite entering into a debt crisis have developed industries; developed financial markets, sovereign fiscal and monetary policy and stable political conditions. These countries, despite the debt crisis, gain the investor's confidence that they will be able to work out a path to lower their debt levels. Even if they don't provide immediate results, the investors tend to remain confident that the debt levels they have, are still sustainable based on the economic performance and potential of these countries.

Another concept connected with debt, and fundamental for the economic literature is the Ricardian equivalence. The Ricardian argument is opposite to the short-term analysis of debt we proposed in Part III. It states that short-run government policy of enhancing economic growth through increasing the budget deficits will not increase consumption and growth. This argument postulates that lower taxes today (an increase in the budget deficit) will only lead to higher taxes in the future. If consumers are aware that lower taxes today, will lead to increased taxation tomorrow, when the deficit will have to be decreased, they will not increase consumption today. In fact they will save, so that they can cope with the tax

increases in the future. This will depress the economy both in the short and long-run. (Barro, 1974)

7. Odious Debt

Since the beginning of the many wars in the 20th and 21st Century, a new legal framework for dealing with debt has been developed. One of the first authors to ever address the concept of debt as "odious" is Sack (1927, 1929) stating that if a regime indebts certain country for their own needs to remain on power, not for the wellbeing of the State, and without the consent of the people in the country, than this debt is considered odious debt. Other authors characterize odious debts as incurred by developing world countries, which are irresponsibly spent (Khalfan et al, 2003). However there is evidence that even before the invention of the concept as such, there were war debts incurred by developed countries that were later on restructured or forgiven.

The classical types of odious debt are hostile debts and war debts.[25] Hostile debts are debts incurred in peacetimes. These debts typically characterize with borrowing by the regime in order to "win over the people", and strengthen its power by offering popular policy measures that fail to pass the necessary social cost-benefit analysis. The war debts are debts incurred for funding military actions, and the victorious countries are unwilling to repay the debts.

There have been numerous cases throughout history in which the case for odious debt has been invoked by different states in practice:

- Probably the earliest case of odious debt was the refusal of the USA to pay pre-annexed debt obligations to the State of Texas in 1844, which were paid on pro rata basis later on in 1855.

[25] Howse, R., "The Concept of Odious Debt in Public International Law", (2007), No. 185

- After the Revolution in 1917, the new Soviet Government refused to repay the previous debt incurred by the Tsar, considering it to be individual debt, and thus odious (Sack 1929:68)
- In 1922, Costa Rica Enacted a law with which it refused to repay the loans to the Royal Bank of Canada, that were incurred by the previous dictatorship regime of Federico Tinoco, thus invoking for the first time the concept of odious debt in relation to a private company (in this case a Bank). This spurred a series of controversies and different opinions about the righteousness of this move. Meron et al (1957) state that in order for the debt to be considered odious, there has to be an approval from the jurisdictions of both states in question. Another view connected to this case is that the concept of odious debt is flexible enough to include debt that is only partly odious (Buchheit et al 2006).
- One of the most recent events where odious debt was invoked was after the government of Saddam Hussein in Iraq was overthrown. Adams (2004) states that all debts connected to financing a dictatorship regime and military actions should be considered odious, and thus forgiven. USA eventually did overthrow the debt obligations from Iraq, but not because of being illegitimate, instead because of long-term sustainable debt issues. However this is considered to be more of a political decision, having the same outcome.

Economic Implications of Odious Debt

The Economic Implications of a legal decision to claim certain debt obligation as odious imposes additional aspects to the classical economic view of the concept of debt. Debt as such isn't essentially a bad concept. The causes and uses of the funds acquired through debt determine the usefulness of the debt.

A country providing funds to another country is giving up of its present consumption in order to increase its future consumption. A country can be a lender if it has extra funds to lend, and lending them to another country is safer than placing

them in the financial markets. The extra funds are acquired through additional saving by its residents. Increased saving today means increasing future investment and consumption, thus increasing the economic growth additionally. Now if a country lends its savings to another country, and the debtor eventually refuses to pay them back, this means that the lender has willingly or unwillingly given up of these funds both in the present and in the future. Thus the concept of odious debt lacks conventional economic reasoning, and thus it is not acceptable in the economic theory as such.

The odious debt as such has implications on the debtor country as well. A country that refuses to pay its debt for whatever reason is not considered reliable anymore. As we have previously discussed the positive aspects of debt, it is important to note here that the country's accession to foreign financial markets is limited (if it is even present in the first place). Its companies are also put under the loop and regarded pessimistically in all foreign deals that they participate. Thus it is a huge process of restructuring and restoring faith of the markets, before such countries return to the global economic scene.

8. Conclusion

Debt is merely a financial instrument, allowing the borrowing of sums of money utilized for various purposes. The economic effects of debt arise from its purposes. If it is used for productive causes, the debt causes an inter-temporal increase in the transfer of wealth from the present to the future generation. However non-productive debt utilizations causes adverse effects to the economy.

Budget deficits are stock, while the public debt is a flow. The yearly increase in public debt is a result of the net change in budget deficits. The government in the short-run can increase the debt by increasing the government deficit. By keeping government spending constant and decreasing the tax rates, a larger sum of disposable income will be left in the hands of households and businesses.

In the long-run the accumulation of public debt crowds out investment and capital, lowering the consumption and investment levels of future generations, while raising unemployment levels. The long-run non-economic effects of public debt include political instability, adoption of unconventional policies in battling the debt levels, and inequality.

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ALTERNATIVE MODELS FOR A RETAIL BANKING PRODUCTS DEVELOPMENT – THE CASE OF BANKING SECTOR IN REPUBLIC OF MACEDONIA

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Abstract

In recent years, Macedonia's banking sector exhibits a significant increase in non-performing loans. Fundamental reasons of these movements can be placed on the large loans to corporate customers, which showed decreased volume of business activities as a result of the global crisis and its impact on the domestic economy.

High individual amounts to large companies, initiated different approach into bank credit activities. Banks started to shift their focus from corporate lending activities to retail clients e.g. households, in order to avoid credit risk through greater diversification of the loan portfolio. At the same time, the household appear as the largest source of funds for banks, accounting for 70,6% of total deposits of nonfinancial entities.

This paper in its primary focus analyze the impact of several external and internal variables such as: net wages in the service sector, net wages in the construction sector, net wages in industry sector and other variables, on core banking retail products. The results, reached through the application of alternative models, should give adequate answers to the banks, in order to make appropriate adjustment of credit and deposit product for their retail customers

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The paper responds to the questions for identifying the sectors with opportunities for market expansion and recognizing the products and services for introduction. At the same time, alternative models enable more accurate design of future developments in the case of retention of the existing mode of action.

The paper concludes that alternative models are useful, but they should not be implemented solely. Their implementation should be in combination with other banking classical tools and models.

***Key words**: Alternative models; loans; deposits; retail customers; banks; new retail products development .*

JEL classification: G21

1. Introduction

Last few years, banking sector in Republic of Macedonia has seen significant growth in all segments of the financial business. Banks carry out their activities within the traditional banking, whereas complex banking products and services almost doesn't exist. Consequently, the main risk to banks remains the credit risk, while key opportunities to deal with it and in the same time for the profit rate retention, there can be mentioned: cost optimizations strategies for operational bank activities and diversification of the loan portfolio (primarily from corporate to retail customers).

Here, the emphasis will be placed on diversification of the loan portfolio from corporate sector to the retail sector. At the same time the considerable attention is focused on the depositary activities of the banks in the retail sector via analyses of statistical time series data provided by relevant sources. The goal is achieved through setting econometric models as alternative models for a retail banking products development.

In the current business environment, the banks in Republic of Macedonia, mostly concentrate on the internal operating factors. Internal analyzes undoubtedly

indicate the quality of running business and provide useful information for the management. On the other hand, they are mostly used for the calculation of the market share, which is a key criterion for the position of individual banks compared to their competitors. Frequently, market share is calculated through the rate of participation in the total amount of loans and deposits to/from retail and corporate clients, whereas a smaller number of banks carried out a more detailed analysis segmented by individual products and services, depending on the available databases. Market share in conjunction with the internal indicators of success and profitability are basic parameters on which are created strategic plans for designing products and services for different target group of customers.

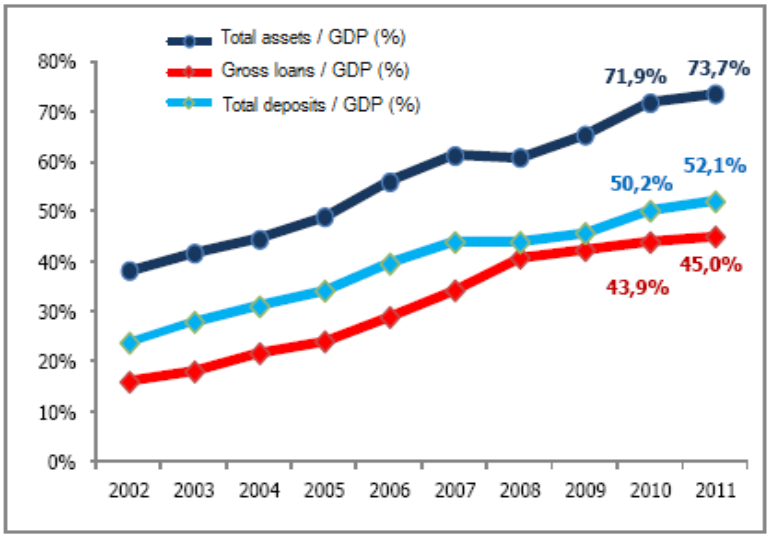
This paper, by designing alternative models clarifies the effects of external factors on individual bank retail loan and deposit products. Alternative models allow separation of variables via their significance on banking products, which obtain useful recommendation's for bank management. Focusing on the most appropriate target group of customers, we believe that alternative models would result in designing better products and services in retail banking in Republic of Macedonia.

2. The share of retail banking products and their trends into Macedonian market

In a period when the level of intermediation has seen a global downward trend, in Republic of Macedonia has tended to increase. Such movement can be seen through Graph 1.

Graph 1

Financial intermediation level (degree) of the banking system in Republic of Macedonia



Source: National bank of Republic of Macedonia, www.nbrm.mk. [28]

Based on the data presented via the Graph 1, we conclude that the level of financial intermediation of the banking sector, expressed through the rate of share of total assets, rate of share of gross loans and total deposit share rate, continuously occupy the majority of gross domestic product of the country. However, this amount is much lower compared to level of financial intermediation in most EU Member States, where these parameters are dramatically higher.[29] Hence, we conclude that Macedonian market is open for acquision for new products development in the area of lending and deposit activities.

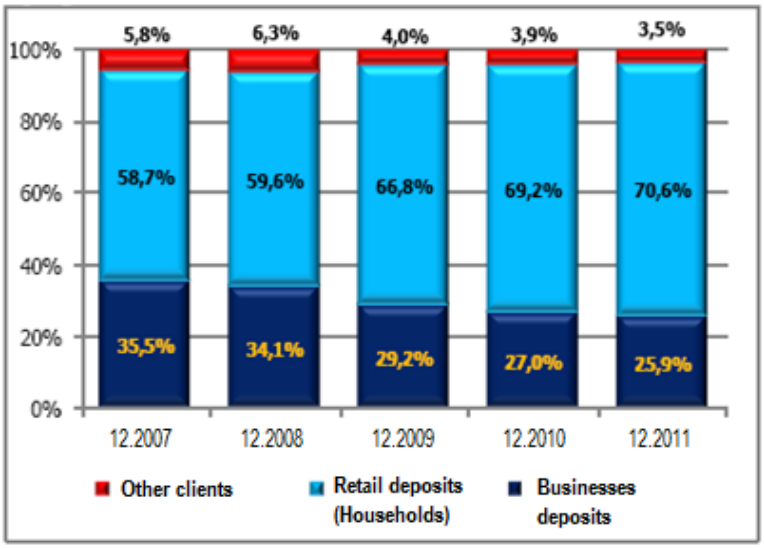
If we perform a more detailed analysis of deposit banking products for the retail customers in recent years, one can conclude the tendency of significant growth, both in absolute terms as well as the rate of participation in the total

[28] The calculation of NBRM is based upon the data obtained by the commercial banks in the national economy.
[29] For example, in Germany, in 2011, the rate of total assets/GDP was 332, 2%, gross loans/GDP was 266,8% and total deposits/GDP was 96,5%. For more detailed data for other comparisons, please check internet pages: www.nbrm.mk, www.ecb.int, www.ecb.eu and www.imf.org.

deposits of the banking sector. The trend participation rate can be seen through the Graph 2.

Graph 2

Sectored structure of the deposits of non-financial entities



Source: National bank of Republic of Macedonia, www.nbrm.mk.[30]

Based on the data presented via Graph 2, we conclude that the trend of retail deposits increased its share in total deposits of non-financial entities, from 58, 7% in 2007 go 70,6% in 2011. The increased rate of share of deposits from this source indicates high level of trust in the banking system, which presents a basic indicator for the stability of financial institutions in the national economy, especially in the period of global financial crises and downward trend of financial intermediation in a number of economies worldwide.

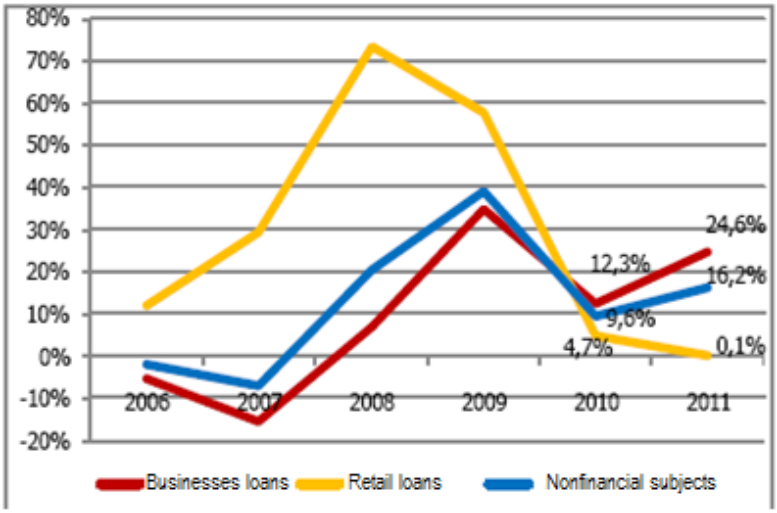
Finally, to recognize the need of development of new banking products, it is necessary to examine the performance of households and companies via analyze of the trend of repayment of loans in statistically representative period. The analyses of

[30] The calculation of NBRM is based upon the data obtained by the commercial banks in the national economy.

performance are particularly important for determination of the entities that have adequate credit potential and in the same time are least risky for the banks. Some of the movements in this area could be analyzed through Graph 3.

Graph 3

Annual grown rates of non-performing loans



Source: National bank of Republic of Macedonia, www.nbrm.mk.[31]

Presented Graph 3, clearly indicate that non-financial companies are the key factor for the increase of bank non-performing loans. On the other hand, the rates of change in the retail non-performing loans are minor (0,1%). Here, once again we can confirm the need of credit portfolio diversification from corporate to retail loans. Identifying the key parameters that influence demand for loans in the retail sector, should be an imperative for every individual bank in the national economy.

[31] The calculation of NBRM is based upon the data obtained by the commercial banks in the national economy.

3. Identification of external variables that effect on retail banking products

Core banking products for clients are represented by loans and deposits. Banks credit activities are primary based on individual creditworthiness of borrowers, while the level of deposits depends on the need of current operations and their accumulation is based upon an interest rates, brand and market position of each bank separately. Moreover, the retail clients are not analyzed on sector level as in the case of corporate clients.

In order to analyze development of new credit and deposit retail products we constituted two models. Initially, the external variables that affect dependent variables (banking products) should be identified. Earlier, it was mentioned that the banks currently place emphasis on internal variables and therefore, in these models emphasized external independent variables and their expected effects reached through the individual models.

As independent variables influencing on the loans to retail clients could be identified:

1. External independent variables – net wages paid by sectors employment

    a. Net wages in industry sector – in the case of the banking sector in Republic of Macedonia, this variable is constituted by net amount of income (disposable income) of persons engaged in this sector;

b. Net wages in the service sector – this variable includes the amounts of net income (disposable income) of persons engaged in the service sector;

c. Net wages in the agriculture sector – this variable includes the amounts of net income (disposable income) of persons engaged in the agriculture sector.

2. As internal independent variables may be listed:
   a. Accrued interest on domestic value (MKD) retail loans
   b. Accrued interest rates on foreign currency retail loans.

On the retail deposits, would be tested the same external independent variables, while as internal variables may be listed:

a. Interest rates on domestic value (MKD) retail deposits;
b. Interest rates on foreign currency retail deposits.

The individual impact of the identified variables would be determined through the application of regression analysis. Via regression analysis could be obtained relevant information about the statistically significance of independent variables on dependent one. At the same time, if statistical significance is found, we can determine if independent variables are right proportional or reverse proportional in terms of the dependent variable.

Identified independent external and internal variables are expected to affect retail loans as follows:

1. Net wages in industry sector – it is uncertain how the movement of this variable would effect on demand for consumer loans. The need of financing through bank loans can be substituted with increase of disposable income on

one side, but on the other hand, the growth of net wages in this sector is possible to contribute the need of additional funding for increased spending.

2. Net wages in agriculture - it is uncertain how the movement of this variable would effect on demand for consumer loans.

3. Net wages in the service sector – it is uncertain how the movement of this variable would effect on demand for consumer loans.

4. Accrued interest on consumer loans in domestic currency (MKD) – it is expected that an increase in amount of calculated interest would lead to an increase amount of retail loans, while lowering amounts would lead to reduction in the demand for retail loans.

5. Accrued interest on foreign currency retail loans – it is expected that an increase in amount of calculated interest would lead to an increase amount of retail loans, while their reduction is expected to lead to a reduction in the demand for retail loans.

6. Interest rates on domestic currency (MKD) retail deposits – it is expected that an increase in interest rates would lead to an increase in retail deposits in domestic currency, while lowering rates would lead to a reduction of retail deposits in domestic currency.

7. Interest rates on foreign currency retail deposits – it is expected that an increase in interest rates would lead to reduction of retail deposits in domestic currency, while lowering rates would lead to increase amount of retail deposits in domestic currency.

Above mentioned independent variables were considered to affect the category of retail loan and deposit products. To recognize the influence of the individual

factors, in the following part of this paper are presented and tested econometric models. The tests were made on the available data for Macedonian banking sector which are integrated in the individual analyzes.

4. Setting econometric models for core retail products as depended variables

In this section, the econometric analysis would be done on statistical data of Macedonian banking sector and their processing would be presented via statistical and mathematical form. During the processing of the data, new models would be created. Of particular importance in those activities is identification of internal and external variables that have statistical significance on retail products.

The first model refers to the testing of above variables on the dependent variable represented by retail consumer credit product, while in the second model the variables are tested on retail deposits in domestic currency (MKD). Subject of the observations are data for the banking sector in Republic of Macedonia for the period 01.01.2010 – 30.06.2012. The data are obtained from the web site of the National bank of Republic of Macedonia (www.nbrm.mk). For adequate hypothesis test performing, it is necessary to establish suitable econometric models. Here, both models would be tested by applying the least square method.

The first model whereas dependent variable occur consumer retail loans, could be presented via following formula:

$$y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + u$$

$b_0 - b_5$ - denote the coefficients of the variables used in the testing of regression model

x_1 = NET WAGES IN THE INDUSTRY – the disposable income of persons engaged in industry sector

x_2 = NET WAGES IN SERVICES – the disposable income of persons engaged in services sector

x_3 = NET WAGES IN AGRICULTURE - the disposable income of persons engaged in agriculture sector

x_4 = ACCRUED INTEREST ON C.R.L. IN MKD – Accrued interest on consumer loans in domestic currency

x_5 = ACCURED INTEREST ON C.R.L. IN F.C.- Accrued interest on consumer loans in foreign currency

u = CTOHASTIC ERROR – random error.

The retail deposits denominated in domestic currency present the dependent variable in the second model. In this model as internal independent variables would be identified:

A) Interest rates on deposits denominated in domestic currency (MKD);

B) Interest rates on deposits denominated in foreign currency.

The second model whereas dependent variables occur retail deposits denominated in domestic currency (MKD), could be presented via following mathematical formula:

$$y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + u$$

All external variables are identical to the previous model, except following internal parameters:

$x_4 =$ INTEREST RATES ON R.D. IN MKD – Interest rates on retail deposits in domestic currency

$x_5 =$ INTEREST RATES ON R.D. IN F.C. - Interest rates on retail deposits in foreign currency

The results of the tests of alternative models for a new retail banking products development are presented in the following section.

5. Results from tests and their analysis

This section of the paper presents the results obtained through the tests of alternative models. The multiple regression result about the impact of independent variables on consumer retail loans, as well as the impact on retail deposits in domestic currency, are presented via Table 1 and Table 2.

Table 1

Results of regression analysis of the independent variables impact on consumer retail loans for the period 01.2012 – 30.06.2012

Dependent Variable: CONSUMER RETAIL LOANS
Method: Least Squares
Date: 12/25/12 Time: 21:10
Sample: 2010M01 2012M06
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NET WAGES IN INDUSTRY	1.187082	0.372817	3.184088	0.0040
NET WAGES IN SERVICES	0.594751	0.292675	2.032123	0.0534
NET WAGES IN AGRICULTURE	0.201491	0.401352	0.502031	0.6202
ACCRUED INTEREST ON C.R.L. IN MKD	15.40688	2.644826	5.825290	0.0000
ACCURED INTEREST ON C.R.L. IN F.C.	176.2954	54.33318	3.244711	0.0034
C	-41039.86	8729.586	-4.701237	0.0001

R-squared	0.960358	Mean dependent var	26821.10
Adjusted R-squared	0.952099	S.D. dependent var	3339.462
S.E. of regression	730.8838	Akaike info criterion	16.20324
Sum squared resid	12820586	Schwarz criterion	16.48348
Log likelihood	-237.0486	Hannan-Quinn criter.	16.29289
F-statistic	116.2833	Durbin-Watson stat	1.949089
Prob(F-statistic)	0.000000		

Source: Own calculations obtained via E-Views 7 usage, based upon the time series data for the banking sector, published by National Bank of Macedonia.

Before analysis of individual data categories presented through Table 1, based on the calculations in presented in the same table, could be assembled following formula:

$$y = -41039.86x_0 + 1.187082x_1 + 0.594751x_2 + 0.201491x_3 + 15.40688x_4 + 176.2954x_5 + \\ + u$$

Individual values of the coefficients in the equation have the following meaning:

1. The coefficient b_0 = -41039.86 represents the value of the stretch.
2. The coefficients b_1, b_2, b_3, b_4 and b_5 represents the impact of independent variables on the dependent variable "CONSUMER RETAIL LOANS". In the present case, they all have a positive impact and are right proportional with dependent variable y.

The coefficient of determination R^2 presents the percentage of conditionality of dependent variable (CONSUMER RETAIL LOANS) of the independent variables in the model. Via the value of R-Squared (0.960358) presented in Table 1, we could conclude that the amount of CONSUMER RETAIL CREDITS is more than 96% determined by the presented independent variables.

From the data presented in Table 1, we could verify that the value of F statistics (116.2833) is greater than the critical value of F statistics (0.000000). It could be concluded that the hypothesis for common statistically influence of dependent variables on dependent variable (i.e. total amount of consumer retail loans in domestic currency) is acceptable.

Regarding the values of t statistics presented in Table 1, which determines the individual significance of the independent variables on the dependent one, we conclude that the values of coefficients t_{b1}, t_{b2}, t_{b4} and t_{b5}, are statistically significant for the dependent variable "CONSUMER RETAIL LOANS".

As the last step in the analysis of the calculations presented in Table1, should be the elaboration of the value of Durbin-Watson statistics. This value in the first model (Table 1) is 1.949089, [32] which means that there is not significant autocorrelation in the model. After autocorrelation check, we conclude that the model could be classified as a relevant sample of linear regression model. The results of the second that was subject to testing are presented in Table 2.

[32] The acceptable value of Durbin-Watson statistics is the range from 1.8 to 2.2.

Table 2

Results of regression analysis of the impact independent variables on retail deposits in domestic currency for the period 01.2012 – 30.06.2012

Dependent Variable: D(TOTAL AMOUNT OF DEPOSITS IN MKD)
Method: Least Squares
Date: 01/15/13 Time: 23:40
Sample (adjusted): 2010M02 2012M06
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NET WAGES IN INDUSTRY)	-0.076406	0.476834	-0.160235	0.8741
D(NET WAGES IN SERVICES)	0.734062	0.305219	2.405037	0.0246
D(NET WAGES IN AGRICULTURE)	-0.366920	0.438952	-0.835900	0.4118
D(INTEREST RATES ON R.D. IN MKD)	3716.443	1757.286	2.114877	0.0455
D(INTEREST RATES ON R.D. IN F.C.)	-5002.549	4603.571	-1.086667	0.2884
C	1374.957	251.2245	5.473021	0.0000

R-squared	0.287954	Mean dependent var	1273.966
Adjusted R-squared	0.133161	S.D. dependent var	1126.769
S.E. of regression	1049.069	Akaike info criterion	16.93118
Sum squared resid	25312536	Schwarz criterion	17.21407
Log likelihood	-239.5022	Hannan-Quinn criter.	17.01978
F-statistic	1.860257	Durbin-Watson stat	1.436174
Prob(F-statistic)	0.140760		

Source: Own calculations obtained via E-Views 7 usage, based upon the time series data for the banking sector, published by National Bank of Macedonia

The results obtained during the testing of the second model were under expected. This conclusion is primarily due to the coefficient of determination R^2, which shows low conditionality of the dependent variable (TOTAL AMOUNT OF RETAIL DEPOSITS IN MKD) of the independent variables in the model. Via R-

squared value (0.28794) presented in Table 2, we could conclude that the dependent variable is only about 29% determined by the presented independent variables.

At the same time, the Durbin-Watson statistics with value of 1.436174 is out of the proper range, suggesting the possibility of existence of significant autocorrelation in the model. Therefore, this issue will be focus on some future research.

6. Conclusions

The development of retail banking products is directly connected to different independent variables from internal and external nature. The proper identification of importance of each sector of employment is not important only for market share increasing in the retail area, but also for establishing a link between the retail and corporate bank clients, particularly in periods of economic crisis and increasing trend of non-performing loans.

Opportunities for linking the various retail customers with corporate clients through a variety of banking products and services, creates further opportunities for improvement of loan portfolios. Alternative models allow banks to identify most important internal and external variables from statistical point of view in the retail area and to focus of their adequate integration via development of better products and services. The number of new models that could be designed is practically unlimited.

In model whereas dependent variable occurs consumer retail loans it was concluded that net wages in agriculture sector, do not significantly affect the dependent variable from statistical point of view. From these results, arises the conclusion that banks could exploit opportunities for expansion of operations for these groups of potential clients, via development a new or modification of some of the actual products and services. However, this conclusion requires more detailed

analysis and consideration of other opportunities for those potential customers, in combination with other banking tools and models.

The results of the tests of the independent variables in the model presented via accrued interest on consumer retail loans in domestic and foreign currency, were expected, but not in such high level of impact. These could lead us to two possible conclusions:

1. Actual retail customers refinance their loans with more credits which lead to lower disposable own assets on short to middle term. On middle term, this trend certainly would lead to high debt on retail customers and possibilities of non-performing loans for the banks. Although this could be connected via previous conclusion about the insignificance of net wages in industry and agriculture and concentration of the new loans in service's sector, which means that in Macedonian banking sector the level of concentration could be high more than the standard values.[33]
2. Banks obtain new retail customers and their portfolio of consumer retail loans have a growing trend during the analyzed period.

Finally, it could be concluded that banks in Republic of Macedonia should make some adjustments to its offer of retail products and services with more specifically segmentation according the specific characteristics of individual groups of clients. The alternative models are useful toolkit in achieving of the goals. Banks could and should tailor them according to their own business strategy and position, but in combination with traditional models in order to reach more appropriate results.

The conclusion about the second model wouldn't be elaborated more detail in this paper, because of the need of its upgrade with more variables. This model should initiate a future research on this topic.

[33] This conclusion could be confirmed through the Herfindal index of concentration.

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CONVERGENCE OF A TRANSITION ECONOMY TO EMU – A CASE STUDY OF SLOVENIA

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Abstract

The paper analyses the process of growth and convergence of the Slovenian economy before and after EMU accession. This small and relatively open economy has long been considered the model economy regarding its' successful transition management and the accession into the European monetary union. But after the bailout of several peripheral EMU economies, it is the sixth economy that has entered crises and recession. Strict nominal Maastricht criteria have slowed down economic growth and convergence in the process of EMU accession. Euro introduction has worsened Slovenia's competitive position leading to increased level of debt that brought Slovenia from model EMU economy to one of the peripheral indebted EMU economies that endangers the sustainability of the euro zone itself.

Key words: *Slovenia, EMU, convergence*

JEL Classification: F15, F43, E42

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1. Introduction

We use the example of Slovenia in order to perceive the growth and convergence process of a less developed country on it's path to the monetary union.

Slovenia was long been considered the model economy regarding the entrance into the European monetary union. But after the bailout of Greece, Portugal, Ireland, Spain and Cyprus it was the sixth economy whose debt position has worsened. The adverse economic shock has also hit this small export-oriented economy, and after some recovery in 2010, the recession is back leading to recession, worsened competitive position of the economy and increased debt putting a high pressure on the Slovenian financial system.

The development model of the Slovenian economy before the accession in EU was characterized with promotion of the investment consumption transformed into export. The well managed flexible exchange rate had a great supporting role for the competitiveness of the Slovenian economy. Investments in fixed capital as well as in R&D were provided mainly trough domestic sources in the first period of transition, due to the underdevelopment of the capital market and the slow and gradual capital account liberalization. In the second period of transition, FDI were a primary source of investment elevating the process of transformation of the Slovenian economy, but the stock of FDI is much smaller than in other post communist countries. The investment and competitiveness policies led to positive growth rates in the whole process of transition as well as in the period after accession in the European Union until the crises when it became obvious that EMU is being split on two groups of economies - net creditor, i.e the more advance core EMU economies, and net debtor i.e. the peripheral converging economies which poses high pressure on the existence of the euro zone. Since the unified monetary policy requires similar structure and level of development of the member states, an important question is how has the euro introduction affected growth and convergence process of the less developed EMU economies.

2. The development model of the Slovenian economy in the transition period

At the beginning of the process of transition, the development model of the Slovenian economy was based on the investment demand transformed into exports. The export demand, as a crucial factor of economic development in the first decade of transition, was a result of a set of macroeconomic policies aiming at gradual stabilization and transformation towards market economy. At this period, flexible exchange rate policy played important role in preserving the competitiveness of the Slovenian industry. Most of the investments came from domestic sources due to the underdevelopment of the capital market as well as the slow liberalization of capital account. This concerns the fixed capital investment (75% of which were from domestic sources), as well as for R&D investments (90% of which were from domestic sources)[35]. Foreign capital flows in any form was negligible until the nineties, so that the development model of the Slovenian economy was based on its' own resources and the undertaken domestic initiatives.

OECD stated the following reasons for the lower level of FDI in the Slovenian economy[36]:

- Small domestic market;

- FDI restrictions form the Slovenian National Bank due to the appreciations pressures of the foreign capital inflows on the Slovenian tolar while having a positive balance of payments;

[35] Domadenik, P. and Prasnikar, J. (2004): "Enterprise Restructuring in the First Decade of Independence", in Mrak. M. et.al, *Slovenia-From Yugoslavia to the European Union*, The World Bank, Washington, pp.254-255

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- The process of privatisation in the form of internal voucher privatisation that was performed relatively slowly than in the other economies from Central Europe that prevented making strategic partner relationship with the foreign investors;

- The political instability and the administrative barriers to foreign capital inflows;

- The low flexibility of the labour market and the workers' friendly legislature;

- The slow privatization of the public sector capacities.

During the second period of transition, FDI mainly in the form of mergers and acquisitions had a role in the process of transformation of the Slovenian economy. Nowadays, 70% of the economy is being privatised, but the transformation process is not over, especially in the banking and the energy sectors.

The biggest investors in the Slovenian economy are EU economies (83,3%), of which Austria (49,1%), Switzerland and France. The most attractive sectors for FDI have been financial intermediation (44,4%) and wholesale trade without motor vehicles (7,5%), as well as pharmacy with 2,5%[37]. Total flows of FDI in the service sector reached 73,3% in 2009, however there is evident growth of FDI flows in industry, as well. Since 2008, FDI in real estate were also present.

[37] EUROSTAT, http://epp.eurostat.ec.europa.eu/portal/page/portal/balance_of_payments/data/database

Table 1: EViews results of OLS regression analyses of the impact of FDI on GDP in Slovenia for the period 1992-2008

Dependent Variable: GDP__CURRENT_US$
Method: Least Squares
Date: 03/27/11 Time: 23:00
Sample: 1992 2008
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.78E+10	2.64E+09	6.735307	0.0000
FOREIGN_DIRECT_I	15.44418	3.303977	4.674422	0.0003

R-squared	0.592947	Mean dependent var	2.64E+10
Adjusted R-squared	0.565810	S.D. dependent var	1.19E+10
S.E. of regression	7.87E+09	Akaike info criterion	48.51993
Sum squared resid	9.28E+20	Schwarz criterion	48.61796
Log likelihood	-410.4194	F-statistic	21.85022
Durbin-Watson stat	1.227966	Prob(F-statistic)	0.000299

Source: Own calculations based on World Bank data, available at: http://data.worldbank.org/

Examining the impact of the FDI on GDP states that the 1 dollar increase in the FDI has led to 15 dollars increase in GDP for the period 1992-2008.

Table 2: EViews results of OLS regression analyses of the impact of FDI on the service sector in Slovenia for the period 1992-2008

Dependent Variable: SERVICES__ETC___
Method: Least Squares
Date: 03/27/11 Time: 23:03
Sample: 1992 2008
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.08E+09	1.54E+09	5.885837	0.0000
FOREIGN_DIRECT_I	9.087474	1.927981	4.713468	0.0003

R-squared	0.596956	Mean dependent var	1.41E+10
Adjusted R-squared	0.570086	S.D. dependent var	7.00E+09
S.E. of regression	4.59E+09	Akaike info criterion	47.44263
Sum squared resid	3.16E+20	Schwarz criterion	47.54065
Log likelihood	-401.2623	F-statistic	22.21678
Durbin-Watson stat	1.244781	Prob(F-statistic)	0.000277

Source: Own calculations based on World Bank data, available at: http://data.worldbank.org/

Since most of the investments flew into the financial sector, we analysed the relationship between FDI and services, in order to obtain the impact that FDI had on the restructuring of the economy. The relationship is positive and significant. The relationship between FDI and industry is also positive, even though the impact of foreign capital on the productive sector of the economy is insignificant.

Table 2: EViews results of OLS regression analyses of the impact of FDI on the industry sector in Slovenia for the period 1992-2008

Dependent Variable: FOREIGN_DIRECT_I
Method: Least Squares
Date: 03/27/11 Time: 23:07
Sample: 1992 2008
Included observations: 17

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.28E+08	2.51E+08	-2.101609	0.0529
INDUSTRY__VALUE_	0.133381	0.028667	4.652726	0.0003

R-squared	0.590699	Mean dependent var	5.54E+08
Adjusted R-squared	0.563412	S.D. dependent var	5.95E+08
S.E. of regression	3.93E+08	Akaike info criterion	42.52833
Sum squared resid	2.32E+18	Schwarz criterion	42.62635
Log likelihood	-359.4908	F-statistic	21.64786
Durbin-Watson stat	1.965269	Prob(F-statistic)	0.000313

Source: Own calculations based on World Bank data, available at: http://data.worldbank.org/

According to the FDI data of Slovenia for the period 1992-2009, the accession of Slovenia into EMU in 2004 as well the accession in EMU in 2007 had a significant influence on the foreign capital growth that contributed to changes in the productive structure of the economy towards increase of share of the service sector in the gross domestic product.

3. The process of convergence in the Slovenian economy

Nominal convergence

Slovenia had successfully managed the challenge of nominal convergence imposed by the Maastricht criteria that are mandatory for EMU accession. The *convergence of the interest rates*, that is most important for conveying the unified monetary policy in EMU, was accomplished by the coordination of the monetary

policy of the Bank of Slovenia, with the fiscal policy and in the entire period after it's independence from former Yugoslavia until EMU accession. While the correlation of the long-term government interest rates between Slovenia and EMU in the period 1999-2003 (a period before EU accession) has been 0,53, for the period after adoption of the ERM mechanism in 2004 until 2010 the correlation has increased to 0,86 that was a sign for increased readiness for adoption of the unified monetary policy.

In order to accomplish the criteria for *inflation convergence*, the following measures have been used: antiindexation, decrease in the inflation expectations, decrease in taxes and regulated prices that have been a cause for the supply shocks and the strict budget control[38]. However, after the introduction of the euro in the Slovenian economy, the correlation of the Slovenian inflation with the EMU inflation has decreased and Slovenian economy exhibited increased inflation rate.

The biggest share of the *public debt* accumulated before the period of independence until 1996 was a result of the process of reconstruction of the big banks and enterprises, whereas in the second period of transition, the government was indebted in order to build or modernize the infrastructure. The structure of public debt has been more favorable than in the first period of the transition due to the issue of favorable securities with lower interest rates. Until the crises, Slovenia has been a country that has relatively low public debt. However, the public debt, as a result of the deteriorated budget balance reached 38% from GDP in 2010.

The *convergence of the budget deficit* was a result of reduction of expanses in a combination of the decrease in the inflation rate and interest rates, desindexation and reduction of debt financing, so that the budget deficit in 2003 was 2.7% of GDP. Accessing EU has been followed by three types of pressures on the budget balance[39]: at first the methodology was changed; then new budget pressures have been made due to outflow of sources to the EU common budget. The third

[38] Mramor, D. (2010), "Fiscal policy adjustment and coordination of macroeconomic policies", in Bole, V. and Mac Kelar, L. (ed.), *From Tolar to Euro*, Center of Excellence in Finance, Ljubljana, pp.85-99
.

[39] Ibid.

pressure was the increase in the regulated prices that resulted in a distortion of the relative prices.

In the period from EU and ERM2 accession, the budget deficit decreased to 1,5% of GDP as a result of the reform of the pension system, decrease in the wage costs and increased tax revenues as a result of the tax reform. The crises led to increase in the budget deficit to -6% of GDP.

Until the entrance in the ERM2 mechanism, the managed floating *exchange rate policy* was created in coordination with the fiscal policy that stimulated the structural reforms. Several reforms have also been implemented in the field of foreign exchange market including the reform on the foreign asset market that enabled free access of the banks, enterprises and households on the exchange rate market. This policy has been successful for providing macroeconomic stability and simultaneous movement towards market economy by preserving the external competitiveness of the domestic production.

Slovenia entered the ERM2 mechanism immediately after EU accession in 2004 at an exchange rate of 239,64 tolars for euro. The ERM2 mechanism provided great stability for the exchange rate with only marginal fluctuations around the central parity. These policy has been elevated by the Central Bank's monetary policy by its' policy for keeping the tolar's interest rates close to euro's interest rates. The decision for quick introduction of the euro was due to the permanent circulation of euro bills through Europe that made the transition period more difficult to perform. Another reason was the danger from exchange rate attack due to the transition from a flexible exchange rate to the ERMS2 mechanism.

Slovenia has long been considered a model country regarding EMU accession due to the skillful and quick accomplishment of the nominal Maastricht criteria. In sum, the undertaken measures for quick accomplishment of the Maastricht criteria were the following:[40]

- Increased role of the fiscal authorities for demand management;

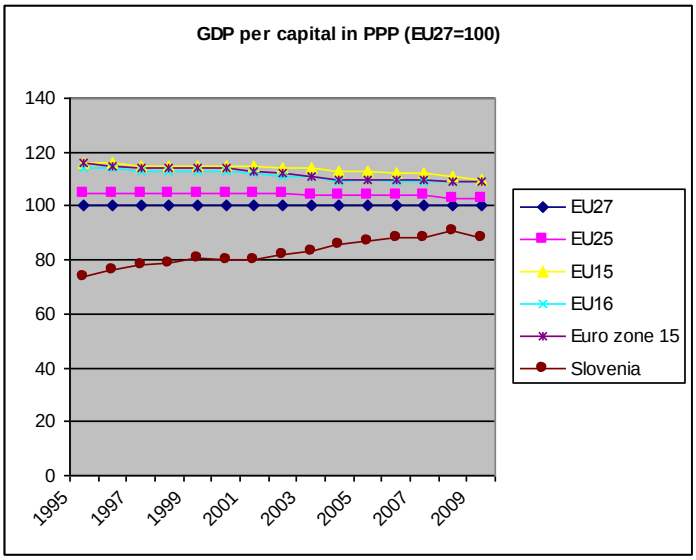
[40] Rant, Anrej (2010),C "Program fro the introduction of the euro", in Bole, V. and Mac Keller, Landis, (ed.),*From Tolar to Euro*, Center of Excellence in Finance, Ljubljana, pp.101-111

- Wage control as a support to competitiveness;
- Implementation of structural reforms for development of competitive domestic market;
- Credit growth control in order to manage possible financial risks.

Real convergence

Until the European crises, Slovenian GDP has steadily converged towards GDP of EU27. GDP per capita is about 50% compared to the biggest trade partner Germany.

Chart 1: GDP per capita in PPP (EU27=100)



Data source: EUROSTAT, available at:
http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

De Grauwe and Schanbl[41] have pointed to the fact that that the nominal convergence has real economic costs and that there is a conflicting relationship

[41] De Grauwe, P. and Schnabl, G. (2004): "Nominal versus real convergence with respect to EMU accession", European University Institute Working Papers, RSCAS No 2004/20, available at: http://www.eui.eu/RSCAS/WP-Texts/04_20.pdf

between these two type of convergence mainly due to the emergence of the Balassa-Samuelson effect in a converging economy. Since there is no indication that the nominal criteria for EMU accession will be changed or relaxed, the process of real convergence in such institutional arrangement is relevant for the future enlargements with the transition economies.

In order to test the thesis of the conflict between nominal and real convergence for the Slovenian economy, we analyzed the growth i.e. the speed of convergence in various periods of the development of the Slovenian economy, by using the Barro and Sala-i-Martin approach. There are two types of convergence in the theory. At first, the conditional or β convergence that is based on the hypothesis that the less developed economies tend to grow faster than the developed ones disregarding the characteristics of the economies was calculated. A regression analysis that estimates the growth of per capita product of a certain period of time on the initial level of per capita product was performed. The other type of convergence i.e. is the σ convergence is measured by the standard deviation, but sometimes, it is measured using the coefficient of variation, a method that was used in this research. If the standard deviation or the coefficient of variation between the less developed economy and the benchmark economy or group of economies decrease, there is a process of convergence of the economy towards the more developed one, or a group of more developed economies.

In order to measure the speed of convergence in periods of different relations with the EMU (pre -EU accession, EU and ERM2 accession and then EMU membership) and we have divided the analyzed period of convergence of the Slovenian economy regarding the phase of it's integration within the European Union. These phases of integration also differ regarding the applied monetary and fiscal policy measures. The first period (1992-2003) is a period starting with Slovenian independence, until the entrance in the ERM2 mechanism. The period from 2004-2006 is the period under the ERM2 mechanism, whereas the last period from 2007-2010 is the period after introduction of the euro. The convergence during the entire analyzed period (1992-2010) has also been measured. This approach would help us answer the question

weather the imposition of the nominal criteria to be fulfilled have hampered growth prospects and what have been the effects of adopting the euro as a currency of Slovenia on it's growth and convergence process.

Period 1992-2010

$$\log(Y_{2010/1992}) = 1,01465 - 0,66649 \log Y_{1992} \qquad R^2 = 0,99$$

Period 1992-2003

$$\log(Y_{2003/1992}) = 0,73179 - 0,47551 \log Y_{1992} \qquad R^2 = 0,99$$

Period 2004-2006

$$\log(Y_{2006/2004}) = 0,32934 - 0,21392 \log Y_{2004} \qquad R^2 = 0,99$$

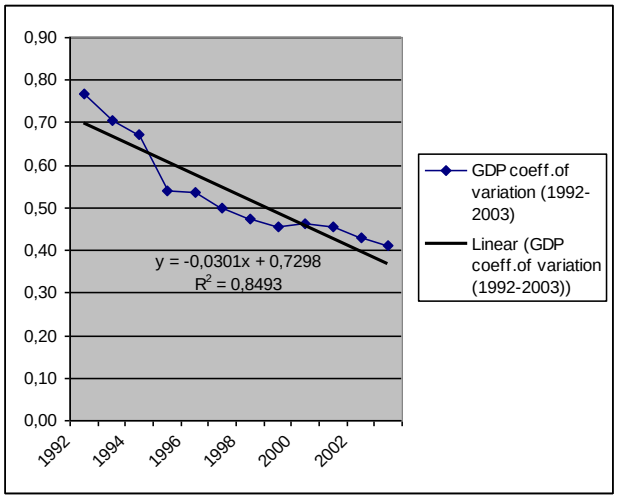
Period 2007-2010

$$\log(Y_{2010/2007}) = -0,139230 + 08440 \log Y_{2007} \qquad R^2 = 0,99$$

According to the estimated results, the speed of convergence in the whole period has been robust of about 66%. The speed of convergence was the highest until adoption of the ERM2 mechanism, whereas the last period after the entrance in the European Union was followed by divergence of the growth rates from the core European countries.

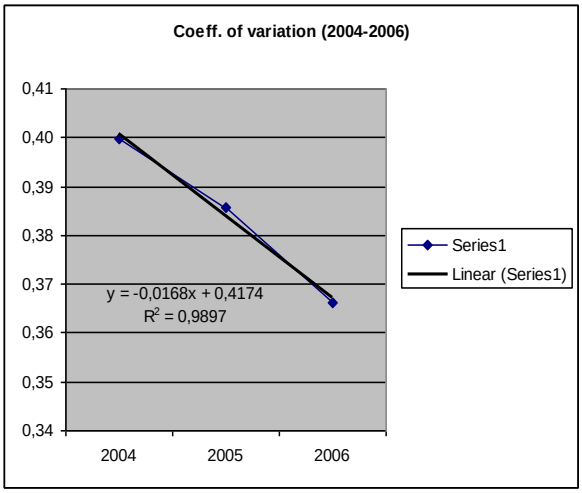
Compatibly, the unconditional convergence measured by the coefficient of variation confirms stronger trend of fall in the dispersion of GDP between Slovenia and EMU for the first period of analyses whereas, slower in the second period and growth after the beginning of the crises that points to the adverse economic shocks with the core EMU countries (Charts 2,3 and 4).

Chart 2: GDP Coefficient of variation between Slovenia and EMU for the period 1992-2003



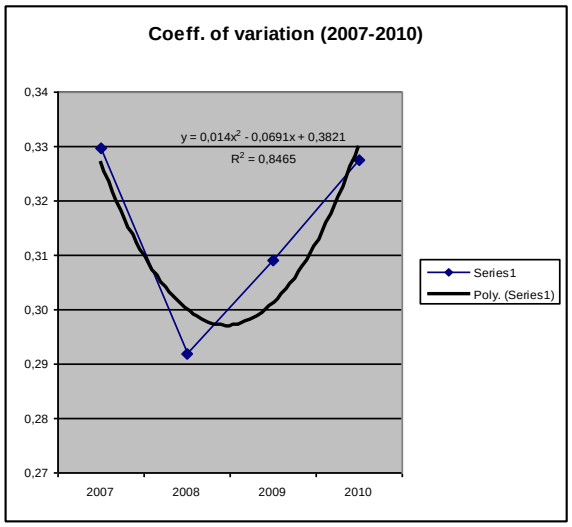
Source: Own calculations based on Word Bank data, available at: http://data.worldbank.org/

Chart 3: GDP Coefficient of variation between Slovenia and EMU for the period 2004-2006



Source: Own calculations based on Word Bank data, available at: http://data.worldbank.org/

Chart 4: GDP Coefficient of variation between Slovenia and EMU for the period 2007-2010



Source: Own calculations based on Word Bank data, available at: http://data.worldbank.org/

4. Economic performances after introduction of the euro currency

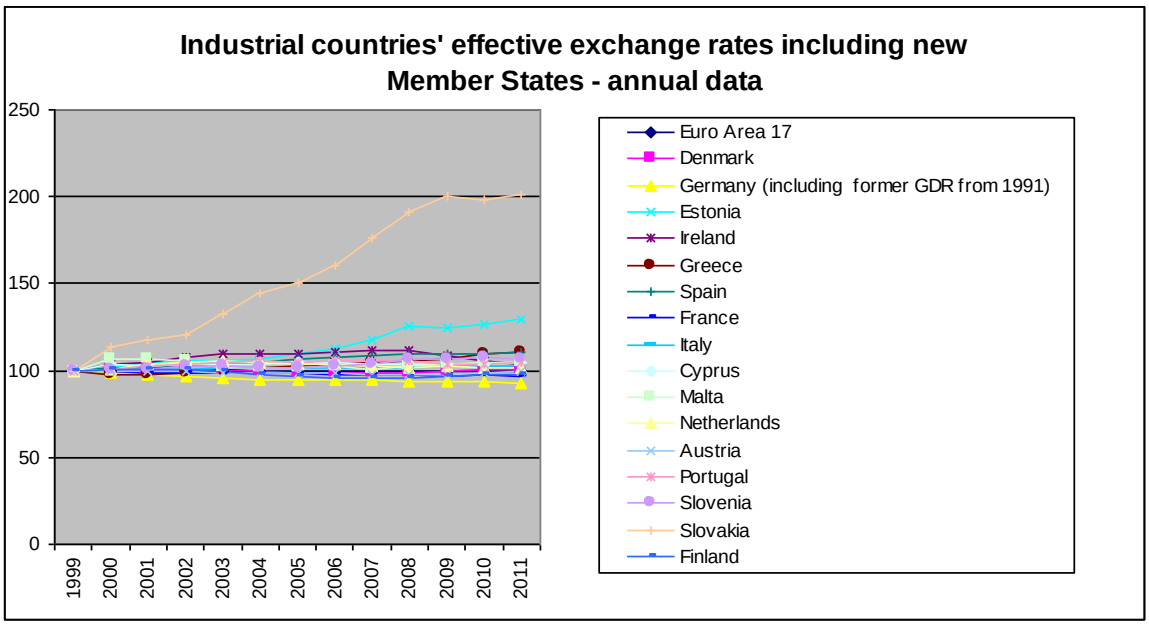
After euro introduction, the growth of the Slovenian economy was mainly result of increase in investments (FDI), the investments in the transport infrastructure the balanced budget as well as export. However, despite the export growth, import growth has greatly increased that led to deterioration of the current account and increased foreign debt. The relatively high inflation rates in Slovenia could not be explained only with the increase of food and energy prices. The inflation expectations had a major role in increase of the inflation, as well the labor market inflexibility that prevented amortization of the price inflation preventing the anti inflation measures of the monetary policy. It is evident, that after introduction of the euro, the competitiveness of the Slovenian economy has deteriorated.

The divergence of the Slovenian economic growth from the core European countries poses the question of the impact of the introduction of the euro on the basic source of growth, i.e. the export competitiveness of the Slovenian economy. Cost competitiveness has widely deteriorated recently. The bilateral real exchange

rate that is part of the EURO currency has been analyzed and it shows continuous appreciation after 1999, as in the other EMU economies that face crises.

The real exchange rate appreciation that can be explained with the existence of the Balassa-Samuelson (Tina Žumer, 2002) effect led to worsened external position and increase in the current account deficit of -3763 million dollars (-6,68% from GDP) in 2008 and consolidated government debt of 39% of GDP in 2011, high unemployment, recession and need of international bailout. Austerity measures have been imposed in 2012 as in the other indebted economies.

Chart 5: EMU countries effective exchange rates, annual data (1999-2011)



Data source: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

5. Conclusion

The process of convergence of the Slovenian economy toward EU an EMU in the first period of transition was robust and led by the well coordinate macroeconomic policies towards preserving external competitiveness of the economy. The growth process in this period has been fuelled by investment from

domestic sourced. After capital account was liberalized, FDI had an important role in restructuring of the economy in the second period of transition.

The speed of convergence has been higher in the period before entrance in the ERM2 mechanism and euro adoption. This can be explained by the conflict relationship between nominal and real convergence. Real exchange rate that is part of the bilateral exchange rates that compose the euro currency has appreciated and inflation has steadily increased. The result was worsened external balance and increased debt. Herewith, from a model country of EMU accession, Slovenia is nowadays ranked among peripheral euro countries whose position and growth prospect in EMU is being questioned. Profound structural measures should be undertaken within the EMU in order to help the converging economies within EMU restore their competitiveness and growth and herewith ensure the sustainability of the monetary union itself.

Slovenia's example could also serve as a case study for future EMU enlargements. The current economic crises questions the endogenity of the OCA theory as presented by Frankel and Rose[42] that the less developed economies within the monetary union would catch-up the developed economies as a result of the process of integration. The opposite is even more relevant if there is a strong Balassa-Samuelson effect in the EMU accession economy that would either hamper the achievement of the Maastricht criteria, that even now after the cries are not subject of a revision, or it would undermine growth prospects of the economy.

Therefore, for perspective EMU economies, a in-depth analyses for the existence of the Balassa-Samuelson effect and their preparedness for EMU according to OCA criteria should be done, so that the new incomers do not range into the group of less developed, uncompetitive and peripheral economies with strong negative effects on the monetary union and herewith the sustainability of the entire EU project.

[42] Frankel, J. A. and Rose, A. K. (Jul., 1998): "The Endogenity of the Optimum Currency Area Criteria", *The Economic Journal*, Vol. 108, No. 449, pp. 1009-1025

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MACEDONIA'S SUSTAINABLE COMPETITIVE PERFORMANCE

Slagjana Stojanovska, PhD[43]

Abstract

The main goal of this paper is to analyze, compare and summarize the weak and strong points of the Macedonian sustainable competitiveness on the basis of a document review. Specifically, this review was conducted with the goal to identify factors, indicators, policies, measures, legislation and regulations that are directly or indirectly related to sustainable competitiveness concept (competitiveness and both sustainable components, social cohesion and environment). Based on the different background and performance, comprehensive outlook for sustainable competitive concepts and strengths and weaknesses of the Macedonian sustainable competitiveness are provided. The performed analysis presents that conceptual social cohesion and environment in Macedonia are very well covered, but with partial activities. Therefore, it is necessary to conduct additional research focused on progress of the national sustainable competitive performance.

***Key words**: Sustainable Competitiveness Concept, Environment, Social cohesion, Competitiveness*

JEL classification: Q01, Q5, O1, O5

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1. Sustainable Competitiveness Concept

The concept of sustainable competitiveness is the result of integration of both, sustainability concepts and competitiveness concepts. In the recent decades significant efforts are made to devise methods and metrics for both concepts. With regards to sustainable concept one such effort is ,,triple bottom line accounting"[44]. This concept draws attention to companies and countries to take into account environmental, social and financial or economic performance. Also, it suggests to achieve economic development and social cohesion through efficient use of resources in a manner that will protect environment. Hence, concept of *sustainable* development is defined as development that satisfies the needs of the present without compromising the ability of future generations to meet their own needs. [45] By contrast of this reasoning, competitiveness concept equated with productivity and focuses on the drivers of economic prosperity. In line with this, the concept of *competitiveness* is defined as the set of institutions, policies, and factors that determine the level of productivity of a country.[46] To measure the national competitiveness a Global Competitiveness Index (GCI) is developed. It indicates areas of strengths upon which economies can build.

In recent years, after a series of dramatic events and trends, economies in the world recognized that the existing economic model affects the social and environmental sustainability and they have a causal relation. For example, economic growth contributes to improved living conditions, but this human activity has made air and water pollution and continuously destroys natural resources, due to their profit goals. The growth of population affects the increased consumption, and with it demands for water, energy and other resources are increasing. This interaction

[44] The phrase *triple bottom line* was first introduced in John Elkington's 1998 book entitled *Cannibals with Forks: The Triple Bottom Line of 21st Century Business.*
[45] http://www.un-documents.net/wced-ocf.htm, Our Common Future, Report of the World Commission on Environment and Development, World Commission on Environment and Development (WCED), 1987. Published as Annex to General Assembly document A/42/427
[46] According The World Economic Forum (WEF) definition, see at www3.weforum.org/.../WEF_Global**Competitiveness**Report_2012-13, p. 51

reflects on the unequal income, different socio-economic opportunities, increase of youth unemployment and less skilled employees.

As a result of increased knowledge for impacts of the existing economic growth model and identification of the natural environment and the cohesive societies as important components of economic performance, the World Economic Forum (WEF) developed a new concept called Sustainable Competitiveness. According to this, S*ustainable competitiveness* is defined as a set of institutions, policies, and factors that determine the level of productivity of a country while ensuring the ability of future generations to meet their own needs.[47] This is emerging area of research. To understand better mentioned components and their relationships Sustainable Competitiveness Index (SCI) is developed. The new index should be a measure of national sustainable competitive. On this basis, all economies should take actions of progress and a higher level of sustainable prosperity. Better national sustainable competitive performances ensure an advantage over countries that neglect this concept. Capturing of SCI is discussed in continuation of the paper.

2. Sustainable Competitiveness Index Framework

The framework of Sustainable Competitiveness Index (SCI) is composed of almost all variables already captured by the Global Competiveness Index (GCI)[48], important over the short to medium term and a number of *new variables,* important over the longer term (e.g., demographics, social cohesion, and environmental stewardship) which affect the national productivity and are essential for a sustainability perspective. SCI is an analytical tool for measuring and assessing "*the*

[47] The definition was first published in GCR 2011-2012, WEF 2011, p. 54
[48] The GCI is a comprehensive index that takes into account 12 pillars, or drivers, of competitiveness: institutions, infrastructure, macroeconomic environment, health and primary education, training and higher education, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation, whish are important over the short to medium term.

set of institutions, policies and factors that make a nation remain productive over the longer term while ensuring social and environmental sustainability". [49]

As Figure 1 shows, SCI framework contains five sub indexes:[50] human capital, market conditions, technology and innovation, policy environment and enabling conditions, and the physical environment. Few *new pillars* are placed: social cohesion, environmental policy, resource efficiency, management of renewable resources, and environmental degradation. In order to better understand the drivers that determine sustainable competitiveness as well as the variables that affect the national sustainable competitiveness below is their detailed structure.

Figure 1: The Sustainable Competitiveness Index framework

SUBINDEX 1	SUBINDEX 2	SUBINDEX 3	SUBINDEX 4	SUBINDEX 5
Human capital	**Market conditions**	**Technology and innovation**	**Policy environment and enabling conditions**	***Physical environment***
Health and primary education	Labor market efficiency	Technological readiness	Institutions	*Resource efficiency*
Higher education and training	Financial market development	Business sophistication	Infrastructure	*Management of renewable resources*
Social cohesion	Market size	Innovation	*Macroeconomic environment*	*Environmental degradation*
	Goods market efficiency		*Environmental policy*	

Note: The pillars that incorporate variables not already included in the GCI are italicize
Source: The Global Competitiveness Report 2011-2012, World Economic Forum, p. 55

Figure 2 presents the *human capital subindex,* which includes three pillars: health and primary education, higher education and training and social cohesion. Each pillar is composed of a number of individual variables. Here, new category is health and primary education and social cohesion. The second pillar includes indicator that has separate enrollment rates for male and female. The separation of this indicator by gender should show whether the economy educate boys and girls equally. The third pillar, social cohesion, should provide a sense of demographic trends. It includes:

[49] Blanke, J., et al (2011) p. 54, also available at http://www.weforum.org/content/pages/sustainable-competitiveness
[50] Blanke, J., et al. (2011), p. 55-61

extent of informal economy, expected dependency ratio, Gini index and youth unemployment. Through this subindex sustainable competitiveness is focused on both, economic performance and social development and cohesion because productivity of each country depends on healthy and well-educated workers who are able to adapt quickly to their changing environment and evolving needs of the production system.

Figure 2: Structure of the Human Capital Subindex

SI	Pillars	Variables	
Subindex 1 **HUMAN CAPITAL**	**Health and primary education**	**A. Health** Business impact of malaria Malaria incidence Business impact of tuberculosis Tuberculosis incidence Business impact of HIV/AIDS	HIV prevalence Infant mortality Life expectancy **B. Primary education** Quality of primary education Primary education enrollment rate
	Higher education and training	**A. Quantity of education** *Secondary education enrollment rate, males* *Secondary education enrollment rate, females* Tertiary education enrollment rate **C. On-the-job training** Local availability of research and training serv. Extent of staff training	**B. Quality of education** Quality of the education system Quality of math and science education Quality of management schools Internet access in schools
	Social cohesion	*Extent of informal economy* *Expected dependency ratio*	*Gini index* *Youth unemployment*

Note: The figure is created according the data of GCR, WEF 2011, p. 69. The pillars and variables not already included in the GCI are italicize

The detailed structure of *Market conditions subindex* is shown in Figure 3 *and* Figure 4 shows *Technology and innovation subindex.* The variables are same as in GCI. They are critical for both short term and long term national productivity and competitiveness.[51] The first *subindex* measures efficiency of goods, labor, and financial markets as well as market size. Second *subindex* includes three key pillars: technological readiness, business sophistication, and innovations. It shows how able the economies are to innovate and how they harness the latest technologies. Highly innovative countries are those that are moving towards the most appropriate innovations and technologies and those likely include green technologies.

[51] Browne, C., Geiger, T**.,** (2011), p. 75-83

Figure 3: Structure of the Market Conditions Subindex

SI	Pillars	Variables	
Subindex 2 **MARKET CONDITIONS**	**Labor market efficiency**	**A. Flexibility**	Extent and effect of taxation
		Cooperation in labor-employer relations	**B. Efficient use of talent**
		Flexibility of wage determination	Pay and productivity
		Rigidity of employment	Reliance on professional management ½
		Hiring and firing practices	Brain drain
		Redundancy costs	Female participation in labor force
	Financial market development	**A. Efficiency**	Restriction on capital flows
		Availability of financial services	**B. Trustworthiness and confidence**
		Affordability of financial services	
		Financ. through local equity market	Soundness of banks
		Ease of access to loans	Regulation of securities exchanges
		Venture capital availability	Legal rights index
	Market size	**A. Domestic market size**	**B. Foreign market size**
		Domestic market size index	Foreign market size index
	Goods market efficiency	**A. Competition**	*2. Foreign competition*
		1. Domestic competition	Prevalence of trade barriers
		Intensity of local competition	Trade tariffs *
		Extent of market dominance	Prevalence of foreign ownership
		Effect. of anti-monopoly policy	Business impact of rules on FDI
		Extent and effect of taxation	Burden of customs procedures
		Total tax rate*	Imports as a percentage of GDP
		Number of procedures required to start a business	**B. Quality of demand conditions**
		Time required to start a business	Degree of customer orientation
		Agricultural policy costs	Buyer sophistication

Note: The figure is created according the data of GCR, WEF 2011, p. 69-70. All pillars and variables are already included in the GCI

Figure 4: Structure of the Technology and Innovation Subindex

SI	Pillars	Variables	
Subindex 3 **TECHNOLOGY AND INNOVATION**	**Technological readiness**	**A. Technological adoption** Availability of latest technologies Firm-level technology absorption FDI and technology transfer	**B. ICT use** Internet users Broadband Internet subscriptions Internet bandwidth Fixed telephone lines ½ Mobile telephone subscriptions
	Business sophistication	Local supplier quantity Local supplier quality State of cluster development Nature of competitive advantage Value chain breadth	Control of international distribution Production process sophistication Extent of marketing Willingness to delegate authority Reliance on professional management ½
	Innovation	Capacity for innovation Quality of scientific research institutions Company spending on R&D University-industry collaboration in R&D	Government procurement of advanced technology products Availability of scientists and engineers Utility patents Intellectual property protection

Note: The figure is created according the data of GCR, WEF 2011, p. 70. All pillars and variables are already included in the GCI

The Figure 5 shows the *policy environment and enabling conditions subindex.* It includes three pillars: institutions, infrastructure, and the macroeconomic environment. In this subindex two new categories are added: Macroeconomic environment and Environmental policy. Macroeconomic environment pillar includes annual government budget of five-year average, in order to get a picture of longer-run fiscal management soundness.

Figure 5: Structure of the Policy Environment and Conditions Subindex

SI	Pillars	Variables	
Subindex 4 **POLICY ENVIRONMENT AND ENABLING CONDITIONS**	**Institutions**	**A. Public institutions**	Transparency of government policymaking
		1. Property rights	*5. Security*
		Property rights	Business costs of terrorism
		Intellectual property protection ½	Business costs of crime and violence
		2. Ethics and corruption	Organized crime
		Diversion of public funds	Reliability of police services
		Public trust of politicians	**B. Private institutions**
		Irregular payments and bribes	*1. Corporate ethics*
		3. Undue influence	Ethical behavior of firms
		Judicial independence	*2. Accountability*
		Favoritism in decisions of government officials	Strength of auditing and reporting standards
		4. Government inefficiency	Efficacy of corporate boards
		Wastefulness of government spending	Protection of minority shareholders' interests
		Burden of government regulation	Strength of investor protection
		Efficiency of legal framework in settling disputes	
		Efficiency of legal framework in challenging regulations	
	Infrastructure	**A. Transport infrastructure**	Available seat kilometers
		Quality of overall infrastructure	**B. Energy and telephony infrastructure**
		Quality of roads	Quality of electricity supply
		Quality of railroad infrastructure	Fixed telephone lines * ½
		Quality of port infrastructure	Mobile telephone subscriptions
		Quality of air transport infrastruc.	
	Macroeconomic environment	National savings rate	Country credit rating
		Interest rate spread	*Government budget balance (5-year average)*
		Government debt	
	Environmental policy	*Stringency of environmental regulation*	*No. of ratified international environmental treaties*
		Enforcement of environmental regulation	*Eco-region protection*

Note: The figure is created according the data of GCR, WEF 2011, p. 70-71. The pillars and variables not already included in the GCI are italicize

In addition to the mentioned three pillars, a new pillar called environmental policy is added. It includes four new indicators which measure the extent to which economies have instituted the types of policies necessary to protect the environment from degradation, as the stringency of the government's environmental regulations, as well as the extent to which they are actually enforced. This also included a measure of the number of key international environmental treaties. The variable indicates the country's level of engagement with environmental issues and thus its willingness to become involved in international efforts toward addressing global environmental challenges. The fourth indicator, eco-region protection includes the percentage of

land that has been designated as a protected area and a measure of national commitment to ensuring the protection of natural capital for sustaining competitiveness.

Figure 6: Structure of the Physical Environment Subindex

SI	Pillars	Variables
Subindex 5 ***PHYSICAL ENVIRONMENT***	***Resource efficiency***	*Agricultural water intensity* *Energy intensity* *CO2 intensity*
	Management of renewable resources	*Access to improved drinking water* *Marine trophic intensity* *Forest cover change*
	Environmental degradation	*Air pollution* *Water stress index*

Note: The figure is created according the data of GCR, WEF 2011, p. 71. This is now pillar which incorporate variables not already included in the GCI and are italicize

Finally, a new subindex called *Physical environment* in CSI is introduced. As Figure 6 shows three pillars are integrated: resources efficiency, management of renewable resources and the environment degradation. The resource efficiency pillar targets to measure the extent to which countries use the existing resources in an efficient manner. For this purpose three variables should be measured: agricultural water intensity in order to understand the extent to which the agricultural sector is efficient in its use of water; energy intensity in order to understand the extent to which efficient energy is used and the last variable CO2 intensity of energy used at the national level, which should measure the emissions of CO2 through the consumption of solid fuel in an economy.

Second pillar, management of renewable energy measures how well countries are faring in terms of ensuring that their resources (such as wood or fish can be replenished naturally with the passage of time) will continue to be available into the future. This pillar includes: the percent of the population with access to improved drinking water in the country; the extent to which marine fisheries in the country are increasing, stable, or declining, and the annual change to the forest cover measured in the percent of total land area that is afforested (or deforested), over time.

The last pillar, measures the extent to which countries provide (or not) a healthy physical environment and reflect the state of a healthy and productive workforce well as the ability of economic sectors to go towards the future. The pillar includes two variables, air pollution and water pollution in individual economies. Air pollution is measured by looking at particular matter concentration. Pollution water is measured through the water stress index i.e. the degree of oversubscription of a country's water supply.

3. Vulnerability of Macedonia's competitiveness

Last decade, according to the ranking list of GCR, Macedonia's competitiveness shows progress. Out of 101 countries analyzed in 2003, Macedonia held the

81 place; in 2004, it held the 84th place in a group of 101 countries, while in 2005 it was ranked at the 85 place in a group of 117 countries. In 2011 of the total 142 countries was ranked at 79 place[52] while in 2012 at 80th place of 144 countries in GCI ranking[53].

Now, the traditional GCI takes into an account the number of sustainable factors (factors of environmental and social sustainability), previously explained in the detailed structure of Sustainable Competitiveness Index (SCI). The impact of sustainable factors can increase or decrease the national competitive results. This may significantly change the competitive position of a country on a GCR ranking. Countries with strong sustainable performance will be better ranked versus countries with poor sustainable performance. This vulnerability of level of national competitiveness is noticed by score of adjusted GCI. This means that score of the adjusted GCI or SCI will go up or down depending on the country's sustainable performance.

[52] See http://www3.weforum.org/docs/WEF_GCR_CompetitivenessIndexRanking_2011-12.pdf
[53] See http://www3.weforum.org/docs/CSI/2012-13/GCR_Rankings_2012-13.pdf

Table 1: Adjustment to the GCI scores by sustainability indicators

Country/ Economy	GCI 2012–2013 (Score from 1 to 7)		Social sustainability– adjusted GCI**	Environmental sustainability – adjusted GCI†	Sustainability-adjusted GCI††
	Rank*	Score	Score	Score	
Switzerland	1	5.72	6.83	6.87	6.85
Macedonia	80	4.04	3.66	3.64	3.65
Croatia	81	4.04	3.84	4.20	4.02
Greece	96	3.86	3.59	3.82	3.71

Note: Only the 79 countries covered by this exercise are included in the table of GCR 2012.

Table 1 confirms this logic. For example, GCI 2012 for Switzerland has score 5.72, but based on the impact of social and environmental factors score 6.85 is obtained. This country leads the SCI ranking due to implementation of best environmental policies, well managed renewable resources, effective use of resources in the economy, and sound social cohesion. Opposite of this example, Macedonia's competitiveness has score 4.04, but when both sustainable components are included the score is decreasing to 3.65. Although these results are still preliminary they give a general sense of country sustainable policies and activities and national sustainable perspective.

In Macedonian national environmental policy several important strategic documents, are defined, those are: National Strategy for Environmental Approximation (NSEA), National Environmental Action Plan (NEAP), National Environmental Investment Strategy (NEIS) 2009-2013, Waste Management Strategy (WMS) 2008-2020, National Waste Management Plan (NWMP) 2009-2015. Other important strategies to implement above mentioned policies are the following: National Strategy for Sustainable Development 2009-2030, Industrial Policy of the Republic of Macedonia 2009-2020, Energy Efficiency Strategy to 2020, Strategy for utilization of renewable energy sources in the Republic of Macedonia 2020, National Strategy for Development of Small and Medium Enterprises 2002-2013 and National Strategy for Organic Agriculture 2008-2011.

Then, laws and standards applied in the industry sector are: Environmental Law[54], Law on air quality[55], Water Law[56], Law on Waste Management[57]. Macedonian

[54] Official Gazette of RM no.53/05, 81/05, 24/07

companies also implement international standards such as: ISO 14001:2004, EN 16001, ISO 9001. While the EU certificates for biological / organic products and the Certificates of European ECO markings refer only to several types of products and services, such as detergents, food and tourist accommodation[58].

In view of the aforementioned, Macedonia should improve numerous environmental gaps. For example, the country needs to conduct an energy audit in SMEs and they should initiate energy efficiency in their companies; to organize a structure for Eco-Management and Audit Scheme (EMAS) and to inform the public about the possibilities of the scheme; to accredit national certification body; to introduce a national eco-label for all product; to introduce mandatory packaging waste management; etc.[59]

For increasing the social cohesion Macedonia makes some efforts, but not enough to reduce the present differences and inequalities among the population. One study claims that the public policies and programs aimed at tackling poverty and social exclusion in Macedonia in 2011 did not bring any major changes and innovations in the system. [60] As positive event is the adoption of the National Employment Strategy of the Republic of Macedonia – 2015[61], which contains a special chapter dedicated to the social inclusion and fight against poverty. This strategy is fully harmonized with the guidelines and priorities of the European Strategy for Smart, Sustainable and Inclusive Growth - Europe 2020. The strategy framework captures policies and measures related to other social problems as what is the employment of unemployed young people, women and long-term unemployed and education.

[55] Official Gazette of RM br.92/07)
[56] Official Gazette of RM no. 4/98, 19/00, 42/05, 87/08)
[57] Official Gazette of RM No.68/04, 71/04, 107/07 and 143/08
[58] Official Gazette of RM no. 146/09
[59] The GREEN project (project goal - improving the environmental performance of SMEs in Europe) available at www.**green**-eu.net/.../CountryFactSheet%20Maced
[60] Report on Poverty and Social Exclusion in the Republic of Macedonia for 2011, MPPS, June 2012 p. 11, available at http://www.mpps.org.mk/images/stories/publikacii/PUB-Report-poverty-social-exclusion-RM-2011_ENG.pdf
[61] Available at http://www.konkurentnost.mk/StrateskiDokumenti/Nacionalna%20strategija%20za%20vrabotuvanje.pdf

4. Conclusion

World Economic Forum in 2011 promoted new economic growth model for all counties of world through promotion of the new Sustainable Competitive Concept. The new concept was developed on the basis of the traditional competitive concept and has added the two well-known sustainable components, social and the environment. These sustainable components have a great impact on national competitiveness. The adjusted Global Competitive Index confirms their impact also called Sustainable Competitive Index (SCI). In addition, SCI gives a general sense of vulnerability of national competitiveness. Macedonia's example showed that national competitiveness began to decline under the influence of factors of sustainable components, and the result of adjusted Sustainable Competitive Index confirms that.

Although SCI results are preliminary, they still very authentically reflect the level of Macedonian sustainable competitiveness. The findings in this paper indicate that in the last decade the country has had progress on a matter of competitiveness. In terms of sustainable components, social cohesion and environmental concept are covered. The country has reached a high level of transposition of EU technical legislation into national legislation and on this basis has built new strategies, policies, and measures. But lack of administrative capacity, limited access to financial resources and lack of public awareness about the environment is the biggest challenge for them to be implemented. Then, country needs to overcome the challenges associated with the employment of unemployed young people, women and long-term unemployed to increase its low social cohesion. Hence, it can be concluded that Macedonia in the coming years needs to overcome challenges associated with sustainable components and also with issues of competitiveness. In other words, the time has come when all countries and hence Macedonia will ensure its competitiveness in a sustainable manner.

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15. Official Gazette of RM

UDC 332.146.2:330.53

ACCOUNTING MODELS FOR MEASURING GLOBAL SUSTAINABLE DEVELOPMENT

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Abstract

Sustainable development addresses the issues of sustainability in economic growth, environmental protection and social equity. The choice of measurement system for sustainability is difficult, because a perfect system would have to include the various aspects of sustainable development, and be imposed on a global level. Analytical and accounting systems are used in measuring sustainable development, the former more favourised in the past. One of the major advantages of accounting systems as sustainability measurement tools are the possibilities for assigning monetary values to non-monetary aspects, and constructing viable cost-benefit systems for evaluation and monitoring of sustainable development. The lead models in this classification include the core system of United Nations' System of National Accounts (SNA) as the initial accounting measurement system, the System of Environmental-Economic Accounting (SEEA) and the National Accounting Matrix with Environmental Accounts (NAMEA), which is more of a hybrid approach. The underlying problem of these measurement systems is obviously the application of national accounts globally. But since 2012, the implementation of a decade-researched central framework of the SEEA has become a global model. However, the prescription of a central framework, SEEA or other, is not a sign of implementation of the same. More has to be done in order to provide implementation of such a system, and more explicitly incorporation the social component.

Keywords: *Sustainable development, accounting systems, sustainability measurement, SEEA.*

JEL classification: *Q56*

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1. Introduction

Since 1987, sustainable development has been broadly defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[63] Since then, much has been discussed on the subject of sustainable development, its areas, its promotion, preservation and progress. However, it can be agreed that there is yet much to be done in this field.

Usually, sustainable development is defined as a threefold concept, addressing the issues of sustainability in economic growth, environmental protection and social equity[64]. However, the three issues of sustainability vary immensely, thus needing various implementation and measurement approaches. Therefore, one of the main difficulties when analyzing sustainable development stems from the issue of diverse angles of sustainable development. In this sense, measuring sustainable development in a system is rather complex, since the three aspects of sustainable development require separate measurement approaches. Measuring systems are different; they vary from one interested organization to the other, from nation to nation. It is difficult to choose one system for measuring sustainability, mostly because of the various aspects of sustainable development and the different approaches to "success rates" of each aspect. However, beside analytical measurement systems, accounting systems have been lately adjusted to be used in measuring sustainability. One of the major advantages of accounting systems as sustainability measurement tools are the possibilities of assigning monetary values to non-monetary aspects, and constructing viable cost-benefit systems for evaluation and monitoring of sustainable development. Thus, an accounting system can serve to not only measure, but also monitor sustainable development and provide constructive remarks and suggestions for the future.

[63] World Commission on Environment and Development, Our common future, pp.8, 1987.
[64] Kee et De Haan, Accounting for Sustainable Development, 2007.

However, additional problem occurs with the measurement frame of sustainable development, regardless of the choice of measurement tools and systems. Is sustainability a measurable dimension? And if so, can sustainable development be measured on a global level? Sustainability is not equally approached in the world, which is the first sign of problems in defining sustainability measurement. But sustainable development on local or national level is not the fulfillment of the main purpose of sustainable development. Can the possibility of achieving future generations' needs be measured on a local/national scale?

2. Measuring sustainability

The term "sustainable development" is said to originate from the famously dubbed Bruntland Report (*Our common future),* a 1987 report of the UN World Commission on Environment and Development[65], although the main idea has been present in many older discourses, especially on the subject of emerging socio-economic disparities in the 1970s. Still, the official and most popular definition of sustainable development is drawn from the well-known report, stating that "sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[66] And under this definition, the goal towards sustainable development has become paramount for developed and developing countries worldwide, for almost three decades now. The measurements of progress towards sustainability have been many, such as the Dow Jones sustainability index, the OECD set of indicators or the EU list of structural indicators, to name but a few. However, the unique measurement system has yet to be discovered. What is more important, the adjustments for implementation of such system globally are deemed to be hard to achieve, even if such a system can be made. The two main issues in measuring sustainability are linked to the core concept of sustainable development itself – the

[65]United Nations World Commission on Environment and Development, *Our Common Future (The Brundtland Report)*, 1987.
[66]Ibid, p.8
6Bebbington, J., *Sustainable development: A review of the international development, business and accounting literature*, pp.3, 2000.

three aspects of it, and its global impact. Bebbington states that: "sustainable development is used to motivate various political, legal and economic initiatives which seek to resolve the social, environmental and economic problematique which as occupants of our planet we currently face."[67] With this statement, the problems of measuring sustainable development are enclosed, as well as the great importance of yet establishing a viable and successful unified measurement system. The fact that the aspiration towards sustainability is the core of all socio-economic, legal and political changes lately, underlines the uttermost need of using a measurement system which provides correct and usable evaluation and monitoring. The different aspects of sustainable development (social, environmental, economic) point to the problem of constructing a cost-benefit measurement system, which will be able to measure non-monetary aspects, as well as monetary aspects of sustainable development. One of the key issues is the effect of the underlying economic system on the environment and the social aspect. The main problem arises when economic development collides or goes against the other two aspects. All these issues must be revised and resolved in order to achieve an establishment of a unified system used worldwide, with actual and usable results for future generations.

Such systems seem to be unattainable at the moment, but still, there are systems in practice that measure sustainability. Sustainability measurement systems are usually classified as either analytical or accounting systems. Analytical systems presently are used more than accounting systems, mostly because of their simplicity, although both types of systems have their own benefits and disadvantages.

Analytical measurement systems are particularly useful when highlighting the cause-effect relationship between economic and environmental development. One of the most up-to-date issues in sustainable development is the relation between economic and environmental development, specifically the cost of sacrificing one to the other. This is the main reason analytical systems have been popular in measuring sustainability. One of the primary and basic analytical measurement

models is the Pressure-State-Response measurement model (P-S-R), with its commonly used variations model: Driving Force-Pressure-State-Impact-Response (DF-S-I-R) used by the European Union Environment Agency, Driving Force-State-Response (DF-S-R) used by the United Nations Conference on Sustainable Development (UNCSD), and many similar variations of the P-S-R model used by different national and international agencies. Another, more recent measurement tool in the family of analytical measurement models is the Resource-Outcome Indicator, which is close to the accounting measurement systems.

On the other hand, accounting systems for measuring sustainability are recently uncovered in this discipline. The older versions include frameworks for economic statistics, rather than accounting indicators, but the very same are currently replaced by improved accounting models. The lead models in this classification include the core system of United Nations' System of National Accounts (SNA) as the initial accounting measurement system, the System of Environmental-Economic Accounting (SEEA) and the National Accounting Matrix with Environmental Accounts (NAMEA), which is more of a hybrid approach. The underlying problem of these measurement systems is obviously the application of national accounts globally.

It can be instantly observed that even within the same original measurement system, multitudes of variations are used by different agencies, depending on their individual approach. This is the essence of the definition of and need for one, unified measurement system for sustainable development.

3. Accounting models and sustainable development

The essence of accounting models for measuring sustainability has been the combination of monetary and biophysical accounts[68], in order to present non-monetary values in monetary terms, and vice versa. It has to be stated that this

[68] Wackernagel, M. et al, Accounting for sustainable development: Complementary monetary and biophysical approaches, OECD Roundtable on Sustainable Development November 2001, 2001

component is merely vaguely addressed in analytical measurement systems, which makes accounting systems more applicable in the future. The trade-off or monitoring of the biophysical and monetary values applies to almost all aspects of sustainability. Monetary values are measured in terms of wealth and assets vital to an economy, thus satisfying the economic aspect of sustainable development. Biophysical assets, the non-monetary component of accounting systems, represents the natural resources that are the focus of the environmental aspect of sustainable development. At first glance, it seems that the social aspect is omitted in the equation, although some experts argue that the improvement of social development is based on the equal economic-environmental development.

The economic aspect of the accounting models for measuring sustainability is generally concerned with the change in national wealth per capita. It is the only source of *weak sustainability*[69] monitoring within such systems. The economic aspect seems to be easy to measure, since it deals with easily definable values, at least at first sight. Information on wealth per capita is easily calculated, easy to access and verify. But, deepening the analysis for actually usable results is the goal to most accounting measurement systems. In such terms, national wealth is merely a surface indicator, which needs to be combined with more vital indicators. Net domestic savings is more often taken as an economic, monetary indicator. Moving to *strong sustainability* measurement, the economic aspect is measuring the *net effects* of national wealth less net natural resource depletion or environment degradation. But assigning monetary values to the rate of environmental degradation or resources depletion is a difficult issue. A significant problem of the model is the assigning of

[69] Strong sustainability is defined as a fundamental examination of the relationship between man, environment, and society, constantly subjected to criticism of the current socio-economic establishments, providing for a new order establishment as to achieve sustainable development in the long run. Weak sustainability philosophy on the contrary, is concerned with the prevention of socio-environmental catastrophe, which would endanger the future existence of humanity. The crucial difference between the philosophies of weak and strong sustainability is that the former sees man as the center of the idea of sustainable development, and strives to adjust just as much as necessary for its existence, whereas the latter sees man as a part of the environment, with the environment's priorities in focus. There are many sources of discourse on these philosophies: Bebbington, J et Thompson, I., Business Conceptions of Sustainability and the Implications for Accountancy, London:ACCA, 1996.; Redclift, M., Sustainable development: exploring the contradictions, London: Methuen, 1987.; Turner, K., Sustainable Environmental Economics and Management: Principles and Practice, London:Belhaven Press, 1993.

values to depletable resources. How can one assign monetary value to the ozone layer, and calculate sustainability as such, given its non-recurring, but vital role in the life of this and future generations?

Because of this issue, environmental questions are largely addressed in either non-monetary or combined indicators. However, one of the most important indicators is based on economic theory as much as it is based on environmental issues: the demand and supply indications, present in any accounting model of measuring sustainability. The notable idea is the rate at which demand surpasses supply, since this is the current global situation. This stated, demand in these models is actually human consumption, whereas supply is the Earth's current bio-capacity[70]. A decade ago, the excess consumption over bio-capacity has been 1.3, meaning that for the current population, the environment requires 1.3 years to regenerate and replenish, for a yearly consumption of the human population. Ten years later, the rate is doubled, and increasing. And the most striking problem, which is even excluded from the equation, is the waste of non-renewable resources, by actions such as deforestation, freshwater use-up, carbon dioxide accumulation etc. The demand/supply index is worthwhile for alarming authorities, even without taking these issues into calculation. Therefore, accounting models can yet contribute to the alertness and effectiveness of authorities towards sustainability improvement.

A current trend in the reporting and measuring sustainability seems to be the involvement of accountants in the construction of viable measuring models. Monitoring sustainability is becoming a public agency task worldwide, with public accountants as significant portion of the monitoring teams[71]. Therefore, it is understandable that measurement models based on accounting slowly, but surely start to replace analytical measurement models.

[70] Wackernagel, M. et al, Accounting for sustainable development: Complementary monetary and biophysical approaches, OECD Roundtable on Sustainable Development November 2001,pp.3, 2001.
[71] Williams, B. et al, The role of accountants in sustainability reporting – A local government study, 6th APIRA Conference, 2010.

The need for accounting-based models and accountants involved in measuring sustainability is by no means new or innovative. Since the early 1990s, this idea has been sawn through sustainability experts' opinions[72]. But the process of introduction and implementation of such systems has been a slow one, continuing even today. The local authorities and governments, nationally assigned to monitoring sustainable development and thus creating effective policies, are the first milestone in introducing accounting models for measuring sustainability. Developed countries are slowly accepting and implementing this approach, on a national or local level, depending on the circumstances. One of the most recent and most rapidly introduced approaches has been the local government sustainability measurement model in Australia, which has been implemented with over 50% success rate[73]. The viewpoint of over 63.3% of Australia's local government officers has shown that implementing accounting systems is beneficial. Australian local government is also one of the first places where the key role of accountants in measuring sustainability has been outlined. It is argued that financial understanding and experience will be the essence of the evolution of sustainability measurement models based on accounting systems[74].

Pioneer of the full implementation of accounting models for the measurement of sustainability are the governmental and business organizations in the United Kingdom. According to a 2005 research in the UK on this topic, accounting systems adjusted for the purpose of measuring sustainability, have been considered beneficial, as long as they could be separately constructed, and deliberately distinguished from regular financial accounting and reporting systems[75]. However, opposed to the Australian example, UK's local authorities implementing these types

[72] In: Deegan, C. et al, A survey of Australian accountants' attitudes on environmental reporting, Accounting Forum, 19, 2/3, pp.143-145, 1995. and Bebbington, J. et al, Accountants' attitudes and environmentally sensitive accounting, *Accounting and business research*, 24, 4, pp.109-120, 1994.

[73] Williams, B. et al, The role of accountants in sustainability reporting – A local government study, 6th APIRA Conference, 2010.

[74] Tarrant, D., Is green the new black?, In the Black, 78, 9, pp.36-39, 2008.

[75] Ball, A., Environmental accounting and change in UK local government, *Accounting, Auditing and Accountability Journal,* 18, 3, pp.346-373, 2005.

of systems were up to 32% only, at least until 2005[76]. Since then, it has been noted that the implementation of accounting models for measuring sustainability, as well as involving accountants in the process, needs to be improved in order to create better monitoring of sustainable development in local government units. However, UK corporations and profit organizations have gone one step further, implementing accounting systems such as full cost accounting, reinvented in order to measure the threefold goals of sustainable development. British Petroleum has been implementing a combination of full costing accounting and SAM since 2006 to align its goals with the general goals of sustainable development[77]. It is still perceived by some as a trend towards superficial approach of good corporate governance and social responsibility, but it is amendable that corporations at least begin to implement a system which will eventually contribute to the environment and society as much as it contributes to companies' profits and economic development.

As it can be seen, accounting systems and indicators for measuring sustainability are already being implemented on national level, with significant rate of implementation in developed countries. But the main problem with any measurement and monitoring system is that it fails to show the whole image of the situation – the global impact seems to be omitted.

4. Global sustainability – can a unified accounting system be applied?

Whereas to be successful, sustainable development needs to occur on a global level, it is difficult to measure sustainability worldwide. There are many problems with the global approach. Primarily, sustainable development does not progress equally anywhere in the world. The social, environmental and economic presets vary from country to country, thus making the measurement frames vary as well. However, local sustainability effects hold little meaning in the sustainable

[76] Telford, B. Environmental accounting in UK local authorities: The results of a national survey, *Journal of Finance and Management in Public Services*, 5, 1, 2005.
[77] Bebbington, J. Accounting for sustainable development performance, Research executive summary series, CIMA, London: The Chartered Institute for Management Accountants, 2006.

development philosophy. Therefore, measurement of sustainability effects on a local level fails to achieve the global goal of sustainable development, at least in the short run.

The reasons for "avoiding" a unification of the system have been previously outlined, but are mainly concerned with the different aspects and approaches to measuring sustainability on a local level. One of the main drawbacks of establishing a global measurement system is the distribution and measurement of wealth, considering that current accounting models identify "national wealth" as a sustainability indicator (economic, monetary). The main foundation of the monetary aspect of measurement and monitoring systems is the national wealth, as a vital component of the economic vitality in a system. Therefore, global measurements in such terms are difficult to tailor.

It is widely argued why a global sustainability measurement system is necessary versus why it is impossible to encompass the big picture. However, lately significant efforts are made towards construction of a global system for measuring and monitoring sustainability and policy recommendations. In 2012, a joint effort of the European Commission, the Food and Agriculture Organization, the International Monetary Fund, OECD, UN and World Bank has come up with a renewed and updated, global, unified SEEA-CF (System of Environmental-Economic Accounting Central Framework)[78], a specific framework for monitoring sustainability progress and recommending future actions. This represents a great step towards the unification of monitoring sustainable development, and a significant one as well. It has been the result of nearly a decade of research and adjustments of the SEEA, NAMEA, SNA and national approaches. Now, the SEEA central framework is expected to augment the effectiveness of monitoring sustainability worldwide.

[78] European Commission, Food and Agriculture Organization, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank, System of Environmental-Economic Accounting Central Framework, UN Statistical Commission, 2012.

Before even discussing the flaws of a global measurement system for sustainable development, one has to concentrate on the missing value from the system: the social component. It has been previously mentioned that some experts believe the social component is accounted for, by covering all economic and environmental aspects. But if social aspects are looked for in the model, such as population increase, education expenditures (as a part of the net domestic savings indicator, which are not accounted as beneficial, but merely expenditure), quality of life, the social component is not really taken into consideration. Although formally omitted, some of these aspects are appended to the models, in the form of plotting population growth against declining wealth, in order to measure social effects and recommend future policies.[79] However, the next step is incorporating the social component more thoroughly, in order to better measure sustainable development.

Another issue that arises from the implication of any measuring framework, SEEA included, is the position of measuring strong sustainability. Strong sustainability is mainly connected to the measurement of biophysical accounts, especially the rate at which human population leaves mark on renewable and non-renewable resources. It is encompassed in the SEEA system, as the *environmental* portion, but it can be argued that the *strong* issue is still not measured in absolute terms. Yet, it has to be mentioned that the environmental (and non-monetary, to some extent) component is the main advantage towards globalizing an accounting framework for sustainability measurement. The environmental question of sustainability is a global one, surpassing national borders and man-made boundaries. Therefore, as much as this aspect lags in the measurement of strong sustainability, it still contributes largely to the globalization and unification of the measurement model of sustainable development.

But these are not the only and uttermost setbacks of the new SEEA central framework. The publication of a central accounting framework for measuring sustainable development is only the beginning of the process of effective global

[79] Wackernagel, M. et al, Accounting for sustainable development: Complementary monetary and biophysical approaches, OECD Roundtable on Sustainable Development November 2001,pp.3, 2001.

monitoring and measurement of sustainable development. The process is more difficult than that – the implementation of the SEEA framework globally is what follows. Although international organizations, such as the UN, European Commission, World Bank and OECD are the primary users of this framework, its output should be used by national authorities for effective policy-making towards sustainable development. The open question is how international organizations, many of which have no legislative power over national authorities, will persuade national authorities worldwide to use the SEEA framework as guidelines for future public policies, which will strive towards a higher percentage of sustainability.

5. Conclusions

In the end, it can be concluded that one unified measurement system for the global rate of sustainable development is difficult to attain. A viable measurement system would have to be able to integrate the three sustainability dimensions: economic, environmental and social, with the recommendation of the most sustainable trade-off between them. Therefore, such a system will have to be based on a sound conceptual foundation. Additionally, the indicators which would be selected would have to be base on thorough worldwide research, and for construction of such a system, a significant amount of observation is needed, which can be a timely process, in a matter where time is of the essence. Indicators involved in the "perfect" measuring system will have to encompass key information in the development (economic, environmental, and social) globally. And most importantly, the system imagined would have the most needed output – viable recommendations for policy makers for the future.

Accounting systems are far from the "perfect" definition of sustainability measurement systems presently. However, they evolve with time, and can be easily adjusted, with the evolution of national and international accounting systems. The core requirement of the imagined sustainability measurement system is the introduction of global, instead of segmented measurement of sustainable development. As accounting standards and practices, in general terms, begin to be

more internationalized, the idea of a unified global measurement system is not so far, if the system is based on the accounting system to be introduced worldwide. Accounting is a systematic discipline, which will be able to classify both monetary and non-monetary values of sustainable development within a unique framework. Moreover, with the current trend of converging accounting standards, the unification of a sustainability measurement system is not so far-fetched. With the recent SEEA central framework publishing, this idea becomes reality. However, there is more to be done on the subject, given that the globalization of sustainability models is yet at its beginning. The conceptualization of a central measurement and monitoring framework is far from the global implementation of one. Therefore, the global promoters of sustainable development need to take a stand for the implementation of such a framework worldwide, convincing national authorities to start using such a framework. But even with such action the implementation process would be on its start – the commitment to implement a central monitoring framework and the usage of its outputs for policy recommendations for the future is vital. This is not an issue that can or should be enforced upon national authorities, it is a necessity for a better future, which needs to be recognized and acted upon globally.

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EVIDENCE ON DETERMINANTS OF INNOVATION

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Abstract

Innovation and differentiating products are crucial for companies to remain competitive in the market. Companies that innovate are more efficient. The evidence shows that innovation may lead to higher productivity, growth of sales and growth of employment. The main focus of the paper is to find evidence on innovation in transition countries. In this paper we provide evidence on determinants of innovation using logit estimation for transition countries. Our results suggest that R&D, financing possibility and internet are possible determinants for innovation.

Key words: *innovation, R&D, predictor*

JEL classification: L

1. Introduction

The questions we want to answer are what determines firm to innovate? We find that competition has positive impact on innovation. The focus of the study are Central and East European countries and the study is very important because they are countries that used to have central planning and therefore we want to examine whether this emerging economies respond same as developed countries. At the first section we provide the literature review on innovation, on the next section we follow with the description of the dataset; we continue with the model and the estimation results and at the last part we conclude.

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2. Literature review

Studying innovation and determinants of innovation is very important and it is beneficial both for management (innovation may lead to lower production cost) and for customers (providing more choice). "Innovative activity has a positive spillover in that all firms innovate on the same quality frontier and innovations push the frontier forward" (Lentz and Mortensen, (2008) p.1319).

"Most firms in emerging markets are engaged in activities far from the technological frontier and entrepreneurs innovate not just through original inventions but also by adopting new means of production, new products and new forms of organization" (**Ayyagari** et al (2007) p.2). They test whether innovation is the channel through which financial development affects growth. Their results find positive relationship between external finance and innovation also that foreign financing is associated with more innovation. They find that state owned firms are less likely to innovate. Also that firms owned by individuals are more prone to innovating than firms owned by financial institutions. Foreign competition is positively related to innovation. Firms that are run by experienced managers tend to innovate more. They note that human capital investment is important for innovation. They conclude that higher competition and good governance may lead to greater innovation.

Heshmati and Pietola (2004) use CIS Swedish DATA for time period 1996-98. Their definition of innovation is positive innovation input and positive innovation sales. They use one step generalized tobit model for innovation and 3SLS. They find negative relationship between size and inefficiency. Industries with intensive production factors are less efficient than industries with average production factors. Also innovation, productivity and temporarily hired labor are enhancing efficiency. Their estimates show that larger firms and firms that innovate are more efficient. They also find differences in efficiency of sectors. They find evidence on positive link between innovation and productivity growth at firm level. According to their results positively influence the decision to invest in innovation: profitability, knowledge

intensity, size, investment intensity, export share and labor and capital intensive production technologies. They note that innovation on input and the process of innovation impacts the innovation output. Their results suggest two-way positive causal relationship between the innovation output and productivity growth among the innovative firms.

Buddelmeyer et al (2006) use data that consists of Australian firms for the time period 1997-2003 and note that since is difficult to measure the success of innovation the relationship between innovation and firm survival is ambiguous.

Aghion et al (2002) provide evidence that in transition countries old firms innovate because of agency problem while new firms innovate because of competitive pressure. They suggest that hard budget constraint, competition and access to external finance may lead to more innovation and growth in companies in transition countries.

Harrison et al (2008) assess the relationship between innovation and employment. Their evidence suggests that innovators have higher employment growth than noninovators, also sales growth and productivity is higher for innovators. Their evidence is on manufacturing and service and they make a distinction between process innovation and product innovation. The evidence they provide may suggest that transition countries should boost innovation because of the expectation that it may lead to higher employment.

3. Data

The Business Environment Survey (BEEPS) collects and assess data on private enterprise and business development. There have been four rounds of the survey starting from:

- the first round (1999-200) which covered 4000 enterprises in 26 countries

- the second round (2002) which covered 6500 enterprises in 27 countries
- the third round (2002) which covered 9500 enterprises in 28 countries
- the fourth round (2008-2009) which covered 11 800 enterprises in 29 countries

As we can see the geographic coverage and sample size increases from the first round to the last round. The data provided from BEEPS are comparable and may be used to assess how the business environment has changed through time.

Countries that are cover in BEEPS (round four) are: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Former Yugoslav Republic of Macedonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Poland, Romania, Russia, Serbia (including Kosovo under UNSCR 1244), Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine and Uzbekistan. The sample is reliable according to sample selection criteria for all countries except Albania where was used stratified random sampling. The sample frame was obtained from official sources in each specific country and enterprises in BEEPS 2005. The target number of interviews was reached in most of the countries (Belarus, Kyrgyz and Croatia had larger discrepancies between the target and realized interviews).

4. Model and results

Binary response models are widely used in economics. Whenever our dependent variable is a binary choice variable the model we chose to estimate is from the probability models. Most commonly used for this type of models are probit and logit.

We will show the differences between two types of probability model.

The general mathematical expression for these models is as follows:

1) probit: $\Pr(Y = 1|X) = \phi(X'\beta)$

The model for the probit is as follows:

$Y_{it} = \beta_{0it} + \beta_{1it} + u_{it}$

Where $Y_{it} = 1$ if $Y_{it} > 0$ and $Y_{it} = 0$ if otherwise

2) Logit $logit\,(\mathbb{E}[Y_i|X_i] = logit\,(p_i) = \ln\left(\frac{p_i}{1-p_i}\right) = \beta X_i$ or respectively as a latent variable model

$y^* = \beta_0 + x\beta + e$, where
$y = 1[y^* > 0]$
$y = 0[y^* \leq 0]$

The link function in probit models is the inverse normal cumulative distribution while in the logit model is the logit transformation. Logistic distribution is leptokurtic relative to the normal distribution,

Hahn and Soyer examine how the links in multivariate binary response models can be distinguished respectively the multivariate link function and random effects model. They note that when there are extreme independent variable levels than the ability to distinguish between probit and logit is maximized. They try to find differences and compare logit and probit models using 4 conditions:

1) Nonextreme independent variable level; moderate dependent variable correlation
2) Nonextreme independent variable level; high dependent variable correlation
3) extreme independent variable level; moderate dependent variable correlation
4) extreme independent variable level; high dependent variable correlation

They also compare the differences once the sample size is small and larger. They find that in small sample the probit model may slightly perform better. When the sample is larger they find superiority in the logit model.

Biernes (2008) discuses how the logit model is interpreted while the formulation Verhulst named it as logistic regression:

$$P(t) = \frac{\exp(\alpha + \beta t)}{1 + \exp(\alpha + \beta t)}$$

The difference between probit and logit is that probit uses a normal distribution whereas logit model binomial distribution. These models are models of quantitative answer.

The evidence that we want to provide in the rest of the paper is finding variable which may be indicators for the pobability to innovate. The hypothesis that we want to test is whether R&D, sales, power outages, access to finance, internet and skilled labor increase/decrease the probability that a company's introduces a new product which is our proxy for innovation.

The model that we are estimating is innovation as a function of variables:

Innovation= f (internet, access to finance, competition with unregistered firms, quality certification R&D, labor)

Considering that the nature dataset provides information about FP from YES or NO answer, in the model that will be estimated it will take a binary form, therefore we will apply the logit model. We will use the logit model in order to see what are the possible effects of dependent variables in case that the binary dependent variable (innovation) takes a value of 1 in cases that the company introduces new product and zero otherwise. In the following part we will describe the variables that we consider to have an impact on the outcome of our binary dependent variable and which were available from the dataset.

Being a binary dependent (dichotomous) variable INNOVATION is analyzed using maximum likelihood estimation; explicitly in our model we will use logit[81] regression. Wooldridge (2006) suggests that we cannot express the logit model with formulas because of the nonlinear nature, thus we express our dependent variable as a function of independent variables.

[81] We can also apply the probit model but since we get similar results we estimate only using logit. These models allow predicting the probability that an employee is part of a particular scheme as a nonlinear function of the independent variables.

The definition of innovation is the introduction of a new product. Our dependent variable is binary and the model we choose to estimate is logit we are also going to look at the marginal effects. The dependent variable is a dummy variable indicating whether the company has introduced a new product or not.

Having internet broadband means more access to the new technology to new developments in the competition world. So we are expecting that companies that have high speed broadband have higher probability to innovate. We do not have information on our dataset whether they are using efficiently the internet broadband. The information that we have is just whether they have internet broadband or not.

R&D investment means that the company is incentivizing development and research which is core for innovation. Therefore we expect that the probability to innovate will increase as a result of R&D investment. The dataset provides two variables for R&D investment: the amount of R&D investment and the other variables is whether they are engaged in R&D investment or not. When looking at summary statistics we chose to use the question whether they engage in R&D or not since it is answered for more observations.

Access to finance- we expect that firms that find access to finance as a major obstacle will probably innovate less than companies that do not have obstacle in access to finance. Innovating is a costly process in the first stages until the product is introduced to the market. Innovation may be explained by the availability of financial resources.

(Skilled) Employees- we expect that the probability to innovate will increase if we have more skilled labor. We have chosen to check for the skilled labor since when we looked at the obstacles of businesses inadequate labor force is one of the major problems for Macedonia and Albania and therefore we include this variable on the estimation for these countries.

Quality certification is a source of knowledge. We expect that companies that have quality certification are more prone to innovate.

The results we obtain for estimating logit model are presented in the following table:

Innovation	Coefficient	Stan.error	Z	P>|z|	95% confidence intervals	95% confidence intervals
Internet	0.745	.0764	9.75	0.000	.595	.894
Access to finance	0.183	.0743	2.47	0.014	.037	.328
compete_un-d	0.287	.0751	3.83	0.000	.140	.435
Quality certification	.103	.102	1.00	0.315	.-098	.3044
RandD	1.378	.111	12.31	0.000	1.159	1.598
Labor	0.0005	.000	2.24	0.025	.000	.000
_cons	-.798	.074	-10.73	0.000	-.944	-.652

According to the results these variable are statistically significant and increase the probability to innovate in companies in Central and East European countries the availability of internet broadband; if access to finance is not major obstacle than the probability to innovate increases, also if they compete with unregistered companies the probability to innovate increases; if companies are engaged in R&D investment also as expected have greater probability to innovate than companies that do not invest in R&D. Labor is statistically significant but the coefficient is very small.

```
Logistic model for innov

                    True
Classified |         D            ~D |       Total
-----------+--------------------------+-----------
     +     |      1171           627 |        1798
     -     |       610           948 |        1558
-----------+--------------------------+-----------
   Total   |      1781          1575 |        3356

Classified + if predicted Pr(D) >= .5
True D defined as innov != 0
--------------------------------------------------
Sensitivity                     Pr( +| D)   65.75%
Specificity                     Pr( -|~D)   60.19%
Positive predictive value       Pr( D| +)   65.13%
Negative predictive value       Pr(~D| -)   60.85%
--------------------------------------------------
False + rate for true ~D        Pr( +|~D)   39.81%
False - rate for true D         Pr( -| D)   34.25%
False + rate for classified +   Pr(~D| +)   34.87%
False - rate for classified -   Pr( D| -)   39.15%
--------------------------------------------------
Correctly classified                        63.14%
```

Crostabulation of observed and predicted outcomes, where one predicts a positive outcome if the probability is 0.5 or more and a negative outcome otherwise suggests that we predict correctly 63% of cases. We have also calculated the odd ratio and the marginal effects (but they are not reported). In order to check for robustness of results we estimate the following model:

Innovation= f (R&D, compete with informal sector, overdraft, credit, internet broadband, labor)

The definition of innovation is the introduction of a new product. In the model we want to examine whether having a credit or an overdraft will impact the probability to innovate and the results are shown in the table below:

Innovation	Coefficient	Stan.error	z	P>|z|	95% confidence intervals	95% confidence intervals
RandD	1.341415	.1119629	11.98	0.000	1.121972	1.560858
compete_un~d	.2997765	.074807	4.01	0.000	.1531575	.4463954
Overdraft	.1709618	.0828047	2.06	0.039	.0086676	.3332559
Credit	.343998	.0792181	4.34	0.000	.1887334	.4992625
Internet	.6594205	.0778668	8.47	0.000	.5068045	.8120366
Labor	.0004604	.0002219	2.07	0.038	.0000255	.0008954
_cons	-.8487865	.0710511	-11.95	0.000	-.9880441	-.7095288
/lnsig2u	-7.460654	10.26453			-27.57875	12.65745
sigma_u	.023985	.1230973			1.03e-06	560.4404
Rho	.0001748	.0017943			3.20e-13	.9999895

As we can see from the results variables such as R&D, competition against unregisters firms, overdraft, credit and internet increase the probability to innovate. All the variables are statistically significant and increase the probability to innovate; again the coefficient of labor is relatively small.

When regressing for the first and the second round the "Likelihood ratio chi square" suggests that they are well fitting model. Logit estimation uses maximum likelihood estimation method. Now we will focus on the second round BEEPS.

We are estimating using maximum likelihood method and also calculate the marginal effects. In our estimation we change the sample and in the following tables we will present the variables and whether they are statistically significant.

We estimate for two countries Albania and Macedonia:

Dependent variable: innovation Independent variables	Sample n=250 Albania& Macedonia BEEPS 1 &2	Sample n=24 Albania& Macedonia BEEPS 1	Sample n=226 Albania& Macedonia BEEPS 2
Amount R&D			
Sales			
Power outages			
Access to finance	Statistically significant		
Internet	Statistically significant		Statistically significant
Skilled labor			

We add another independent variable: quality certification and get the following results:

Dependent variable: innovation Independent variables	Sample n=226 Albania& Macedonia BEEPS 2
Amount R&D	
Sales	
Power outages	
Access to finance	
Internet	Statistically significant
Skilled labor	
Quality certification	Statistically significant

The sign of all significant variables are positive. As the results suggest is that internet broadband and quality certification are statistically significant. Thus even in the case of Albania and Macedonia having internet broadband will increase the probability to innovate. Also firms that have quality certification tend to innovate more.

5. Conclusion

Reviewing the literature and evidence for innovation in transition we may conclude that innovation may be beneficial for customers, employees, companies and in the macroeconomic persprective it may increase employment. That is why the research on the topic is broad and an ongoing area of interest. Our estimation suggests that possible determinants that may increase the probability to innovate are: competition, internet broadband, R&D investment and access to finance. Thus if we want to encourage innovation we suggest the encouragement of the latter.

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MARKET VALUE OF THE FIRMS AND R&D INVESTMENT: THEORETICAL OVERVIEW AND EMPIRICAL ESTIMATION FOR THE PANEL OF COUNTRIES

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Abstract

The aim of this paper is to investigate the issue of R&D investment and the market value of the firm. This idea dating back from Arrow paper, later developed by Paul Romer, but in the area of economic growth. Zvi Griliches (1979), first introduced the production function, which later would be used in a vast literature from this area. In the theoretical section of this paper we are describing Tobin's original model, and Abel's (1984) model, this models relates Tobin's quotient with intangible assets of the company. In the empirical part we develop cross-section time series model (Feasible Generalized Least Squares Model), for a panel of countries in Europe including UK and Turkey, in total of 11 panels. Later we test that model by estimating the marginal effects of R&D investment with Tobin's q on a small economy such as R. Macedonia. The results exert positive and statistically significant relationship between market value of the firms and R&D investment.

Keywords: *Tobin's q, R&D, knowledge absorption, FGLS, replacement value, market value*

JEL Classification: *D92*

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1. Introduction and literature survey

In this paper we examine the issue of R&D investment and the market value of the firm. R&D investment is different than other ordinary investment, according to Hall and Lerner (2009)[84], fifty percent or more of R&D spending is on salaries of highly educated scientist and engineers. The idea comes from Arrow (1962)[85], but the Arrow introduced growth model in which the per capita growth rate depends on the capital per worker and the average of the stock of capital of other workers[86]. In the empirical literature form this area one significant contribution is the paper by Connolly and Hirschey (2005), when comparing the R&D effect on Tobin's Q they find positive and statistically significant relationship across sample of manufacturing and non-manufacturing firms, and the found evidence which statistically significant and positive influence of R&D on Tobin's q[87].Earlier Connolly and Hirschey (1984)[88], considered relation between market structure, R&D and profits. And the find positive effect of R&D on profit, but also negative R&D concentration interaction effect[89]. As we said earlier with the Arrow paper (1962), and later Romer (1990), research and development expenditures have been valued in economic growth perspective (Warusawitharana, 2008)[90]. Also the same production that Zvi Griliches (1979)[91], used is vastly used in this literature, the functional form is as follows: $Y = F(K, L, T, u)$, here *K* and *L* are labor and capital inputs, and *T* is a measure of the current state of technical knowledge, and u are all unmeasured determinants of

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Contribution of Research and Development to Productivity Growth

output and productivity. James Tobin (1978), also explains that q is a measure of profitable investment opportunities. Later Zvi Griliches and Cockburn (1988), relate the value of the firm with Tobin's q, as follows:

$V = q(\tan gible \;\; capital, \text{int} \, angible \;\; capital)$, so in this paper[92], q is related also to intangible capital. Megna and Klock (1993)[93], also examined the contribution of R&D stocks of the firms in semi-conductor industry, and find positive externalities of own R&D stock of the firms as well as the rivals stock of R&D on Tobin's q, but rivals patents negatively influenced Tobin's Q, this reveals that patents and R&D are distinctive measure of intangible assets, because patents are marketable and R&D are just initiative. Hall (1998)[94], introduced Cobb-Douglass production form with Tobin's q:

$$bV_t(TA, IA) = q_t TA^{\sigma t - at} IA_t^{at}$$

(1)

Here TA are tangible assets, and IA are intangible assets. Intertemporal elasticity of substitution is given by σ , symbol. While in logarithms this function is presented by the following functional form:

$$\log bV_t = \log q_t + \sigma_t \log TA + \alpha_t (\log IA/TA)$$

(2)

[92] Cockburn, Iain & Griliches, Zvi, (1988). "Industry Effects and Appropriability Measures in the Stock Market's Valuation of R&D and Patents,"American Economic Review, American Economic Association, vol. 78(2), pages 419-23, May

[93] Megna, P. and Klock, M. 1993. The Impact of Intangible capital on Tobin's q in the Semiconductor Industry, *The American Economic Review* 83(2): 265 – 269.

[94] Hall, B.,(1998), Innovation and market value, University California Berkeley

Later Hall, Thoma, and Torrisi (2007)[95], explain that the functional form of intertemporal maximization with several capital goods it's hard to derive, and most of the literature relies on the assumption that market valuation equation takes log-linear, or log-log presentation. Hall, Thoma, and Torrisi (2007), make a distinction between knowledge capital and physical assets. Adaptive multiplicative separable function can be written as follows (Damianova, 2005)[96]:

$$bV_t = \left(TA_t\right)^{\beta_1} \sum_{\theta=1}^{T} (IA_{t-\theta})^{\beta_2,\theta}$$

(3)

Here θ is the time lag, denoting that production of knowledge capital is different than production of physical capital since it involves projects with durations of several years.

Tobin's q, the market value of the firms

Tobin's q is an indicator of the limit for the lowest market value of enterprises. Tobin's q is calculated as the rate between the market value of the enterprise and the cost of replacement assets in the assets. It is the quotient of the market value of a capital (activity, share or real capital) and reproduction costs for the specified capital. Enterprises, activity or shares are normally being purchased when the costs of purchase are lower than the initial construction costs-costs.

Anyone who wants to invest in the financial market is using this coefficient. At the beginning it was believed that Tobin's q is an indicator of the impact of interest rate of consumer's behavior and enterprises in the financial market. The higher value of Tobin's q the greater the investment opportunities. If increasing the value of

[95] Bronwyn H. Hall & Grid Thoma & Salvatore Torrisi, 2007. "The market value of patents and R&D: Evidence from European firms,"NBER Working Papers 13426, National Bureau of Economic Research, Inc

[96] Damianova,K., (2005), The Conditional Value of R&D Investments**,** National Centre of Competence in Research Financial Valuation and Risk Management

Tobin's q, the financial power of the consumers, population and the state, in general is increasing. Increased financial power on the one side, causes an increase in the consumption.

Lower Tobin's q means reducing investment consumption and reduce investment in research and development. Ideally, the market value of the enterprise and the cost of replacement capital will be equal or nearly equal, while it maintains a state of equilibrium. When Tobin's q is 1 there is a balance between the cost of the use of assets and profits. The market value of existing enterprises is expressed by the capital cost of replacing the existing relationship with Tobin's q ratio. According to this, the value of Tobin's q ratio should be at least 1. When the value of Tobin's q ratio is more than 1, recommend additional investment because profit is higher than the cost price for the use of invested assets. At the same time, smaller than 1 Tobin's q ratio shows that the cost invested by enterprises in the capital cannot be effected and the market value of the company would be lower than the invested assets.

In view of these enterprises, perhaps in this case it is best enterprises to reduce the costs through the sale. Tobin's q ratio is applied as a reliable indicator for assessing the market value of enterprises. But the assessment of the future activities of the enterprises is the best Tobin's q ratio is applied in combination with other indicators.

R&D and market value of the firm

R&D investment create "intangible" capital, and this affects the valuation of the company by the investors. Market value of the firm we treat as indicator for the success of the company, but only partial (Griliches, 1981)[97]. We use here the "definitional" model by Zvi Griliches:

[97] Griliches, Z. (1981), 'Market value, R&D and patents', *Economics Letters*, 7 (2), 183-187

$$MV = q(TA + IA)$$

(4)

Here MV represents the market value of the firm (equity plus debt), which is equal to q (which represents the current market valuation coefficient of the company's assets), multiplied by TA which represents tangible assets, plus IA intangible assets. From the expression above we have following $q = \frac{MV}{(TA + IA)}$ that is the expression for Tobin's Q (quotient).Here we state that, IA –intangible assets are the "stock of knowledge" of the companies. The reason why in the q-theory, Q>1, Q can be above 1, is because of the Intangible assets of the company. For the early Keynesians it was important, what is the position of the current cash flow and liquid assets, as a major determinants of investment (Akerlof, 2007)[98]. But later Modigliani -Miller, same as the other existing contemporary literature, assumed that the firm's financial position, is not important in investment decision, i.e. investment is independent of current cash flow and liquidity position. In the original paper by Tobin (1969), firms should invest up to the point where marginal costs of a new unit of capital is the valuation of such a unit capital in the market (Akerlof, 2007). Tobin like in neoclassical growth theory assumes some natural rate of growth y_n, and the equation $y_k * K = sY$, where s, is the savings ratio (marginal propensity to save), Y is the real income, marginal efficiency of the capital stock is $\overline{R}$, and $\overline{R} = rK$, where r is the interest rate or return of the capital stock. In such a case q=1, and investment equals saving. While Tobin defines $\overline{R} = rq$, in Tobin's paper q is the market price of existing capital goods, so $rq = rK$, i.e. $q = K$, so the firm should invest up to the point where the marginal unit of capital is equal to valuation of such a unit of capital in the stock market. So investment is independent of finance situation of the firm.

[98] Akerlof, George,(2007),Missing motivation in macroeconomics,*American Economic Review*, 2007, vol. 97, issue 1, pages 5-36

In his interpretation of Keynesian LM curve Tobin introduced $\frac{\overline{R}}{q}$ as the speed of investment that should be equal in equilibrium with $\frac{r}{K}$, or $\frac{\overline{R}}{q} = \frac{r}{K}$. Later on in 1977 paper, Tobin defines marginal efficiency of capital as follows:

$$V = \int_0^{\infty} E(t) e^{-\overline{R}t} dt$$

(5)

Here V are the cost of capital(replacement value) and E(t) are the expected future earnings, we use the formula for integration by parts[99] , and replace $u = tE$, $dv = e^{-t\overline{R}} \quad dx$,or $du = E^* \quad dt$, $v = -\frac{e^{-t\overline{R}}}{\overline{R}}$,we replace, $\int udv = -\frac{tE^* e^{-t\overline{R}}}{\overline{R}} - \int -\frac{E^* e^{-t\overline{R}}}{\overline{R}} dt$,for the second half of the equation $\int -\frac{E^* e^{-t\overline{R}}}{\overline{R}} dt$,if we replace $u = -t\overline{R}$,we should find a equation for $du = -R \quad dt$,i.e $\frac{du}{-R} = dt$,now if we replace $\int -\frac{E^* e^{u}}{\overline{R}} * -\frac{1}{\overline{R}} du$,if we simplify the integrand $\int \frac{E^* e^{u}}{\overline{R}^2} du$,now if we substitute for u ,we solve $\frac{E^* e^{-\overline{R}t}}{\overline{R}^2} + C$,if we substitute in the formula for integration by parts $-\frac{tE^* e^{-t\overline{R}}}{\overline{R}} - \frac{E^* e^{-\overline{R}t}}{\overline{R}^2} + C$,now to evaluate the integral we evaluate the upper solution from lower solution. We multiply upper bound solution by the expression, and then we subtract down bound solution.

$$-(\infty)\frac{tE^* e^{-\infty\overline{R}}}{\overline{R}} - \frac{E^* e^{-\overline{R}\infty}}{\overline{R}^2} - \left[-(0)\frac{tE^* e^{-0\overline{R}}}{\overline{R}} - \frac{E^* e^{-\overline{R}0}}{\overline{R}^2} \right] \quad (6)$$

[99] $\int_0^{\infty} f(t)g'(t) \quad dt = f(t)g(t) - \int_0^{\infty} f'(t)g(t) \quad dt \quad \int udv = uv - \int vdu$

When we simplify $-\frac{E(\overline{R}e^{-\overline{R}}+e^{-\overline{R}}-1)}{\overline{R}^2}$ .Now Tobin (1977) presents market value of capital goods of the firm and the expression is presented in the following expression:

$MV = \int_0^{\infty} E(t)e^{-rt}dt$,E(t) is constant, then $V = E/\overline{R}$, and $MV = E/r$, consequently $\frac{MV}{V} = \frac{R}{r}$,this is the expression for out quotient Q. Tobin extends model to macroeconomics (IS-LM) model defining the investment function , which is a change in capital as follows, $\frac{\Delta K}{K} = f(q-\bar{q})+y_n$, $\bar{q}$ is some normal value of q, i.e. q=1, while y_n is the natural growth rate. And if $q=\bar{q}$,then $\Delta K = y_n K$,which represents net investment[100].Now since we explained market valuation models for the firm , will add up R&D to see the causality between the two. Abel (1984), did set up a model of market value of the firm and R&D. Abel (1984)[101] uses Bellman value function[102], for the market value of the firm.

$$MV(T_t, p_t) = \max_{L_t, \overline{R}_t} E_t \left[p_t L_t^{\alpha} T_t^{1-\alpha} - wL_t - a\overline{R}_t^2 + \beta V(T_{t+1, p_{t+1}}) \right] \quad (7)$$

Here E_t is conditional dynamic expectation, here $T_t^{1-\alpha}$ is the technology, which is accumulated to produce output, $\overline{R}$ again is the marginal efficiency of capital, but yet it is some R&D activity, here $a\overline{R}_t^2$ are R&D expenditures. Here, wL_t are the wages of the workers that influence the cash flow of the company, p_t is the price of the output, and $p_t L_t^{\alpha} T_t^{1-\alpha} = \pi$ is the profit of the firm. Abel used the Bellman equation to derive the expression for Tobin's q.

[100] Tobin J, and Brainard W.C.(1977), *Asset Markets and the Cost of Capital*, Cowles Foundation Paper 440
Reprinted from Private Values and Public Policy, Essays in Honor of William Fellner, North-Holland, 1977
[101] Abel,B,Andrew (1984),, "R & D and the Market Value of the Firm: A Note". In R & D, Patents and Productivity, edited by Zvi Griliches, (1984), 261 - 269.
[102] Bellman equation has been used in economics amongst others also by Edmund Phelps, Robert Lucas, Sargent and others.

$$q_t = \frac{MV(T_t, p_t) - E_{t-1}MV(T_t, p_t)}{MV(T_{t-1,\, p_{t-1}})}$$

(8)

Here E_{t-1} are the expectations from the past period, but E_{t-1} is multiplied by the present value of the firm, meaning that excess return are uncorrelated with any past information (Efficient market hypothesis).

Methodology and data

Data we use here are from World Bank data site[103]. Tobin's is derived quotient from market value to the replacement cost of capital, their ratio. This is known as Tobin's (1969)[104]. In the next table we present the value of Tobin's q for the selected European countries including United Kingdom and Turkey.

Table 1 Tobin's q for the selected countries

Tobin's q													
year	**Austria**	**Belgium**	**Cyprus**	**Denmark**	**France**	**Germany**	**Greece**	**Italy**	**Luxembourg**	**Slovenia**	**Switzerland**	**Turkey**	**United Kingdom**
1993	1	1.04	1.01	1.03	1.04	1.02	1	1	1.1	0.96	1.07	1.06	1.09
1994	1	1.04	1.02	1.03	1.04	1.02	1.01	1.01	1.12	0.95	1.07	1.04	1.09
1995	1	1.04	1.05	1.03	1.04	1.02	1.01	1.01	1.11	0.89	1.08	1.03	1.09
1996	1	1.04	1.04	1.04	1.04	1.02	1.02	1.01	1.11	0.92	1.08	1.04	1.1
1997	1.01	1.05	1.04	1.05	1.05	1.04	1.03	1.03	1.12	0.97	1.1	1.07	1.1
1998	1	1.08	1.05	1.05	1.07	1.05	1.07	1.05	1.12	0.98	1.11	1.04	1.1
1999	1	1.06	1.09	1.06	1.08	1.06	1.11	1.06	1.12	0.98	1.11	1.09	1.11
2000	1	1.07	1.08	1.06	1.08	1.06	1.09	1.06	1.12	0.99	1.12	1.07	1.11
2001	0.99	1.06	1.09	1.05	1.08	1.05	1.07	1.05	1.1	0.99	1.11	1.06	1.1
2002	1	1.05	1.07	1.04	1.06	1.03	1.06	1.04	1.1	1.01	1.1	1.03	1.09
2003	1.01	1.05	1.06	1.05	1.07	1.04	1.06	1.04	1.11	1.02	1.1	1.06	1.1
2004	1.03	1.06	1.05	1.05	1.07	1.04	1.06	1.04	1.11	1.03	1.1	1.03	1.09
2005	1.04	1.06	1.06	1.06	1.07	1.04	1.07	1.04	1.11	1.02	1.11	1.04	1.1
2006	1.06	1.07	1.1	1.07	1.08	1.05	1.08	1.05	1.13	1.04	1.12	1.04	1.1
2007	1.06	1.07	1.12	1.07	1.08	1.05	1.08	1.04	1.15	1.06	1.11	1.05	1.1
2008	1.01	1.03	1.05	1.03	1.05	1.03	1.03	1.01	1.1	1.02	1.09	1.01	1.07
2009	0.99	1.05	1.03	1.05	1.06	1.03	1.01	1	1.12	1.02	1.11	1.05	1.09
2010	1.01	1.06	1.04	1.07	1.06	1.04	1.02	1	1.11	1.02	1.11	1.05	1.09

[103] http://search.worldbank.org/data?qterm=royalty&language=EN&format=
[104] J.Tobin, (1969). "A general equilibrium approach to monetary theory". *Journal of Money Credit and Banking* **1** (1): 15–29

Variables that we use to get the ratio between market value and replacement cost of capital are:

Table 2 variable description

Name of the variable	Variable label
Market capitalization of listed companies (current US$) (also known as market value)	Market capitalization (also known as market value) is the share price times the number of shares outstanding. Listed domestic companies are the domestically incorporated companies listed on the country's stock exchanges at the end of the year. Listed companies does not include investment companies, mutual funds, or other collective investment vehicles. Data are in current U.S. dollars.
Adjusted savings: consumption of fixed capital (current US$) (Replacement value)	Consumption of fixed capital represents the replacement value of capital used up in the process of production.
Royalty and license fees, payments (BoP, current US$) (knowledge absorption)	Royalty and license fees are payments and receipts between residents and nonresidents for the authorized use of intangible, nonproduced, nonfinancial assets and proprietary rights (such as patents, copyrights, trademarks, industrial processes, and franchises) and for the use, through licensing agreements, of produced originals of prototypes (such as films and manuscripts). Data are in current U.S. dollars.

Tobin's q in the table for European countries, Turkey and UK we get from the quotient

$$q = \frac{\text{Market value of the instaled capital}}{\textit{Replacement cost of the capital}} = \frac{\text{Market capitalization of listed companies}}{\text{Adjusted savings: consumption of fixed capital}} \qquad (9)$$

Then afterwards in the econometric section we introduce variable Royalty and license fees, payments (BoP, current US$), this is very important variable, it represents knowledge absorption or R&D investment for the firms, so we test it

empirically to see how it influences value of the firms. In the econometric model specification we use following regression (functional form):

$$Tobin's \quad q_{i,t} = \beta_0 + \beta_1 \log(knowledgeabsorption)_{i,t} + \varepsilon_{i,t}$$

(10)

We use cross-section- time series model, i.e. panel model, data are gathered through time t, for the panels i. Than later we use the same functional form but in cross-section terms adjusted for Macedonia only.

Descriptive statistics

In this section we publish the descriptive statistics for the 11 panels of countries. The table is given next, the values are for Tobin's q and Royalty and license fees, payments. Here we announce that we used logarithms to adjust the values of market value and replacement cost of the companies[105], and knowledge absorption of the companies. That is to avoid measurement errors.

Table 3 Descriptive statistics

Variable	*Observations*	*Mean*	*Std. Dev.*	*Min*	*Max*
Tobin's q	*198*	*1.061465*	*0.037177*	*0.99*	*1.15*
R&D	*194*	*20.2958*	*1.950381*	*15.90016*	*23.59306*

For the table we can see that the Tobin's q is moving around 1. That is if the market solely reflected the recorded by the accountants' value of the company, Tobin's q would be around 1.if the value of Tobin's q>1, that means that market is overvaluing the company, and that the company can issue shares and with the revenues to invest in capital. In case q<1, that means that market is undervaluing the company, and market value is less than recorded value of the company. Form the table for Tobin's q quotient in the methodology section; we can see that Slovenia in the 1990's form 1993 to the year 2000 had Tobin's q less than one. That is

[105] See Appendix 1 adjusted market values of the companies and replacement cost of capital.

Slovenia had been also transition country, from 1991 (when declared independence) to 2001, and Slovenia joined EU in 2004. Given in the table below are average Tobin's q values for the selected countries.

Table 4 Average Tobin's q ratio for the selected countries

Average Tobin's q ratio for the selected countries												
Austria	**Belgium**	**Cyprus**	**Denmark**	**France**	**Germany**	**Greece**	**Italy**	**Luxembourg**	**Slovenia**	**Switzerland**	**Turkey**	**United Kingdom**
1.0117	1.0544	1.0583	1.0494	1.0622	1.0383	1.0489	1.03	1.1144	0.9928	1.1	1.0478	1.0956

On the next tables we present the marginal effects of knowledge absorption, Tobin's q. Marginal effect is found mathematically with a following expression (just for the knowledge):

$$\frac{\partial y}{\partial x} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

(11)

This is prediction f with only one argument. Marginal effect of x is partial derivative with respect to x variable.

Table 5 Marginal Tobin's q ratio for the selected countries

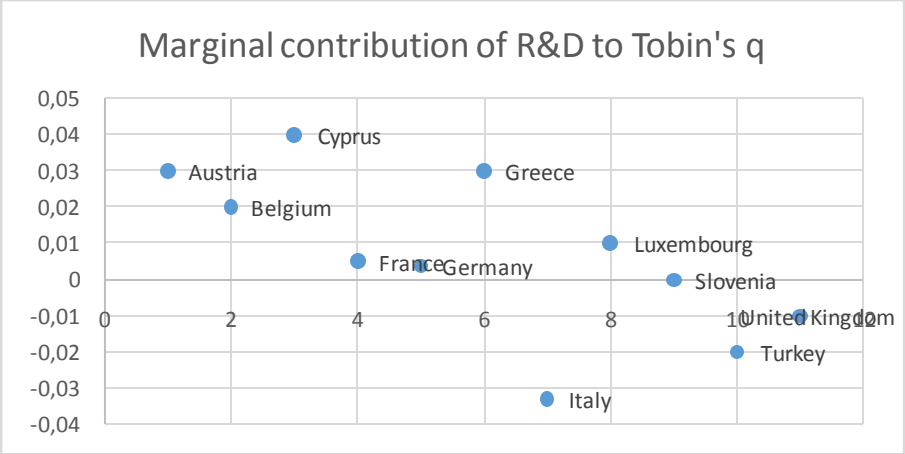
Marginal Tobin's q ratio for the selected countries							
	Austria	*Belgium*	*Cyprus*	*France*	*Germany*	*Greece*	*Italy*
R&D	*0.03*	*0.02*	*0.04*	*0.005*	*0.003821*	*0.03*	*-0.033*
p value	*0.01*	*0.00*	*0.05*	*0.796*	*0.837*	*0.053*	*0.045*

Table 5 continued

Marginal Tobin's q ratio for the selected countries				
	Luxembourg	*Slovenia*	*Turkey*	*United Kingdom*
knowledge absorption	*0.01*	*0.00*	*-0.02*	*-0.01*
p value	*0.558*	*0.53*	*0.208*	*0.635*

Marginal effect counts for the effect of additional investment in R&D (knowledge absorption).On the next picture, graphically it is depicted marginal contribution of R&D to Tobin's q.

Graph 1 Marginal contribution of R&D to Tobin's q.



RESULTS

Econometric estimation

We use panel data sample, with 198 observations divided in 11 panels. Panel has a cross-section and time dimension (1993-2011). Because of the difference variance that panels have, we decided that OLS is not efficient estimator. Alternatively we can use FGLS (Feasible Generalized Least Squares). This estimator is applied when

variances of the observations are unequal (i.e. when there is heteroscedasticity). In such a case OLS technique can be misleading and lead to biased inferences.

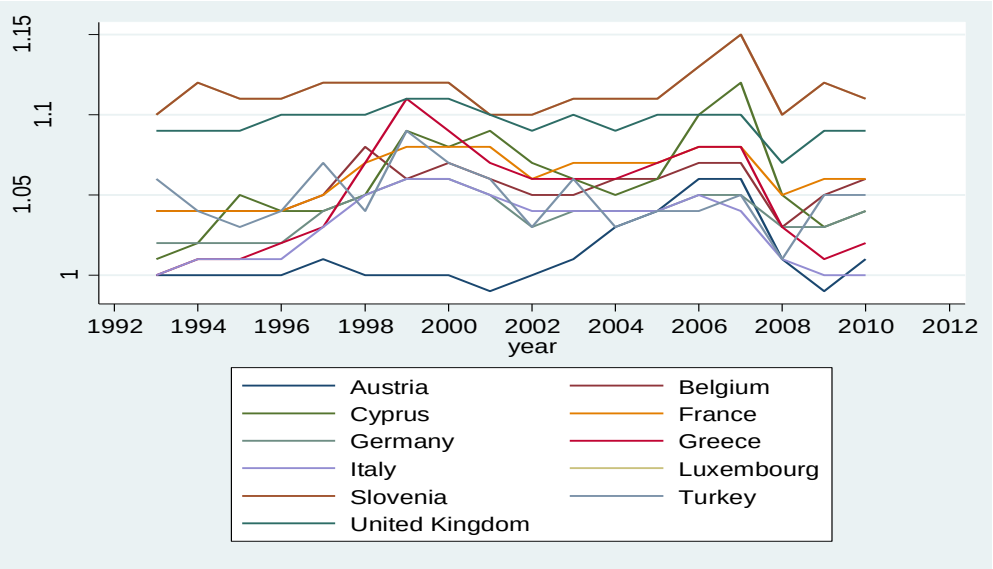
Table 6 FGLS estimation with country effects

Tobin's q	*Coefficient*	*Standard error*	*P value*
knowledge absorption	*0.005*	*0.002*	*0.027*
Countries			
Belgium	*0.042*	*0.008*	*0.000*
Cyprus	*0.064*	*0.010*	*0.000*
France	*0.045*	*0.007*	*0.000*
Germany	*0.017*	*0.008*	*0.029*
Greece	*0.043*	*0.007*	*0.000*
Table 6 continued			
Italy	*0.015*	*0.007*	*0.021*
Luxembourg	*0.112*	*0.008*	*0.000*
Slovenia	*0.115*	*0.008*	*0.000*
Turkey	*0.042*	*0.007*	*0.000*
United Kingdom	*0.074*	*0.008*	*0.000*
Constant	*0.914*	*0.044*	*0.000*
Panels	*Homoskedastic*		
Number of observations	*183*		

*Austria I benchmark country

From the above table we can wee that R&D investment and Tobin's q, i.e. value of the firm divided by the replacement cost are in positive and statististically significant relationship. Coefficient on knowledge absorption is of small size (0.005), but highly significant which is positive for its economic interpretation. On the next graph it is presented Tobin's q for the selected countries and is movement from 1992 to 2012.Compared to the benchmark country Austria all of the countries in the sample

Graph 2 Tobin's q for the selected countries



Macedonian companies Tobin's q

Because in Macedonia stock exchange was established in 1995 Macedonian companies do have market valuation data since 1996 onwards. In the next table data will be presented for the market value of the total Macedonian companies listed on the stock exchange, and replacement value of the capital. Table Macedonian companies market value (stock exchange listed), Replacement value, Tobin's q and knowledge absorption.

Table 7 Replacement value of capital, market value of capital, Tobin's q and R&D of Macedonian companies

	Replacement value	*Market value*	*Tobin's q*	*Knowledge absorption*
1996	*8.68*	*7.99*	*0.92*	*6.45*
1997	*8.77*	*6.90*	*0.79*	*6.35*
1998	*8.72*	*6.90*	*0.79*	*6.38*
1999	*8.73*	*6.88*	*0.79*	*6.74*
2000	*8.71*	*6.85*	*0.79*	*6.75*
2001	*8.72*	*7.66*	*0.88*	*6.74*
2002	*8.76*	*8.26*	*0.94*	*7.01*
2003	*8.92*	*8.56*	*0.96*	*6.84*
2004	*8.99*	*8.62*	*0.96*	*6.97*
2005	*9.02*	*8.81*	*0.98*	*7.02*
2006	*9.01*	*9.04*	*1.00*	*6.94*
2007	*9.14*	*9.43*	*1.03*	*7.29*
2008	*9.19*	*8.92*	*0.97*	*7.40*
2009	*9.22*	*8.96*	*0.97*	*7.31*
2010	*9.00*	*9.42*	*1.05*	*7.25*
2011	*8.50*	*9.40*	*1.11*	*7.39*

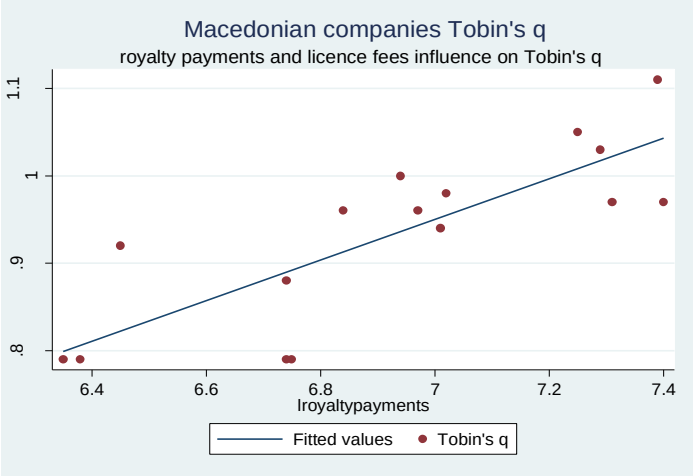
Since 2006, Tobin's q for Macedonian companies is close to 1 or >1.before that it was lower than 1, also Macedonian company since 1996 continuously increase their R&D investment (knowledge absorption).

Table OLS regression Tobin's q and knowledge absorption

Tobins q	***Coefficient***	***Pvalue***
Knowledge absorption	*0.23*	*0.000*
Constant	*-0.68*	*0.050*
R squared	*0.6507*	
Functional form (pvalue)	*0.74*	

Form the above equation OLS model, we can see that increase in knowledge absorption by 1%, increases Tobin's q quotient by 0.23 percentage points. This relationship is statistically significant at all levels of conventional significance (pvalue=0.000). Functional form also shows that if we reject the null of no omitted variables bias, we will make Type I error. Next we depict graphically Royalty payments and license fees trend with Tobin's q of Macedonian companies listed on Macedonian stock exchange.

Graph 3 R&D and Tobin's q of Macedonian companies



Conclusion

From this paper we concluded that there exist positive and statistically significant relationship between Tobin's q and investment in R&D, or as we name it, knowledge absorption, according to the Global Innovation Index 2012[106].This is one of important conclusions from this paper.

[106] http://www.globalinnovationindex.org/gii/

Appendix 1 Market values of the companies and replacement cost of capital

REPLACEMENT VALUE													
year	Austria	Belgium	Cyprus	Denmark	France	Germany	Greece	Italy	Luxembourg	Slovenia	Switzerland	Turkey	United Kingdom
1993.00	24.06	24.16	20.42	23.83	25.83	26.41	23.17	25.73	21.49	21.12	24.53	23.05	25.51
1994.00	24.12	24.25	20.53	23.90	25.87	26.47	23.25	25.76	21.58	21.27	24.60	22.93	25.56
1995.00	24.28	24.43	20.71	24.06	25.99	26.63	23.44	25.82	21.75	21.95	24.73	23.12	25.67
1996.00	24.27	24.44	20.71	24.08	25.99	26.61	23.51	25.92	21.75	22.01	24.69	23.16	25.70
1997.00	24.16	24.34	20.67	24.01	25.89	26.49	23.46	25.87	21.65	21.97	24.53	23.17	25.77
1998.00	24.19	24.37	20.71	24.04	25.91	26.50	23.48	25.90	21.70	22.04	24.56	23.25	25.82
1999.00	24.18	24.38	20.73	24.05	25.90	26.48	23.46	25.89	21.73	22.04	24.56	23.27	25.86
2000.00	24.09	24.29	20.64	23.95	25.83	26.37	23.38	25.80	21.70	21.95	24.51	23.29	25.85
2001.00	24.10	24.29	20.67	23.97	25.85	26.37	23.44	25.82	21.73	21.96	24.56	23.21	25.84
2002.00	24.19	24.37	20.79	24.06	25.95	26.44	23.55	25.93	21.73	22.05	24.65	23.49	25.93
2003.00	24.40	24.60	21.01	24.28	26.16	26.62	23.91	26.15	21.92	22.23	24.81	23.62	26.05
2004.00	24.53	24.75	21.18	24.41	26.31	26.73	24.07	26.29	22.11	22.37	24.90	24.55	26.23
2005.00	24.57	24.80	21.27	24.44	26.36	26.76	24.12	26.34	22.15	22.42	24.93	24.74	26.25
2006.00	24.62	24.88	21.36	24.49	26.43	26.79	24.19	26.40	22.26	22.48	24.95	24.84	26.33
2007.00	24.75	25.02	21.50	24.64	26.57	26.92	24.34	26.53	22.42	22.65	25.04	25.06	26.46
2008.00	24.87	25.15	21.66	24.75	26.70	27.01	24.48	26.64	22.61	22.81	25.19	25.19	26.35
2009.00	24.85	25.12	21.63	24.69	26.66	26.95	24.56	26.61	22.60	22.78	24.99	25.00	26.24
2010.00	24.69	24.90	21.82	24.52	26.59	26.84	24.41	26.36	22.81	22.54	25.06	25.20	26.46
MARKET VALUE													
year	Austria	Belgium	Cyprus	Denmark	France	Germany	Greece	Italy	Luxembourg	Slovenia	Switzerland	Turkey	United Kingdom
1993.00	24.07	25.08	20.70	24.46	26.85	26.86	23.23	25.64	23.69	20.20	26.33	24.35	27.77
1994.00	24.13	25.16	21.01	24.72	26.84	26.88	23.43	25.92	24.07	20.20	26.37	23.80	27.82
1995.00	24.20	25.38	21.65	24.75	26.98	27.08	23.56	26.07	24.14	19.56	26.80	23.76	27.97
1996.00	24.25	25.51	21.58	25.00	27.11	27.23	23.91	26.28	24.21	20.31	26.72	24.13	28.19
1997.00	24.30	25.64	21.42	25.26	27.24	27.44	24.25	26.57	24.25	21.21	27.08	24.84	28.32
1998.00	24.25	26.23	21.69	25.32	27.62	27.72	25.11	27.07	24.29	21.62	27.26	24.24	28.50

1999.00	24.22	25.94	22.66	25.38	28.02	27.99	26.04	27.31	24.31	21.50	27.26	25.45	28.71
2000.00	24.12	25.93	22.19	25.40	28.00	27.87	25.43	27.37	24.25	21.66	27.40	24.97	28.58
2001.00	23.92	25.83	22.55	25.20	27.79	27.70	25.18	26.99	23.89	21.77	27.16	24.58	28.40
2002.00	24.19	25.57	22.33	25.06	27.60	27.26	24.95	26.90	23.93	22.25	27.04	24.25	28.25
2003.00	24.73	25.88	22.29	25.52	27.94	27.71	25.39	27.14	24.34	22.69	27.31	24.95	28.53
2004.00	25.18	26.33	22.31	25.74	28.08	27.81	25.55	27.39	24.64	22.99	27.44	25.31	28.67
2005.00	25.55	26.39	22.61	25.91	28.20	27.83	25.70	27.41	24.66	22.79	27.57	25.81	28.75
2006.00	25.98	26.71	23.49	26.17	28.52	28.12	26.06	27.66	25.10	23.44	27.82	25.81	28.96
2007.00	26.16	26.68	24.11	26.35	28.65	28.38	26.30	27.70	25.84	24.09	27.87	26.38	28.98
2008.00	25.00	25.84	22.80	25.60	28.03	27.73	25.23	26.98	24.92	23.19	27.48	25.49	28.25
2009.00	24.70	26.29	22.33	25.95	28.31	27.89	24.73	26.48	25.38	23.19	27.70	26.14	28.66
2010.00	24.94	26.32	22.65	26.17	28.29	27.99	25.01	26.49	25.34	22.97	27.84	26.45	28.76
2011.00	25.13	26.16	21.77	25.91	28.08	27.80	24.24	26.79	24.94	22.57	27.56	26.03	28.70

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