

THE IMPACT OF THE GLOBAL FINANCIAL CRISIS IN THE MACEDONIAN`S ECONOMY

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ABSTRACT

Recently, the global economy was experiencing the worst financial crisis in the last '80 years. Macedonia as a small and opened economy did not remained immune from the negative effects of the crisis. Therefore the main purpose of this paper is to examine empirically the impacts of financial crisis on the main macroeconomic indicators. For testing the structural changes of macroeconomic variables between the two time periods, the crisis period and outside it, the method of least squares (OLS) is used incorporating an artificial variable (dummy) for the period of crisis. The data used consist of quarterly time series from the first quarter of 1998 to the second quarter of 2013. As crisis period is considered the period from the fourth quarter of 2008 to the first quarter of 2010. The empirical results reveal that the budget balance, exports, the current account balance and private transfers undergo significant structural changes during the crisis period. Deepening of the budget deficit during the crisis has provided positive effects in mitigating the negative consequences. The fall of exports is estimated to have decreased the real GDP by 0.88% during the crisis period. The deepening of the current account deficit is estimated to have decreased the real output by 0.35%. While lower private transfers have reduced the real GDP by 0.58%. Thus, the empirical results indicate that the global financial crisis caused negative impacts on Macedonia's macroeconomic performance.

Key words: Global financial crisis, crisis period, impacts, macroeconomic indicators

1. INTRODUCTION

Many scientists have offered their theories about how financial crises arise and develop, what are the causes, their effects and ways to prevent it, but have not yet reached a consensus on these issues, thus financial crises are still a common occurrence in the world economy (see, Collins & Kincaid, 2003; Reinhart & Rogoff, 2008, 2009; Leaven & Valencia, 2008; Allen et al. 2009; Gorton & Ordonez, 2012).

Macedonia is a small country with an open economy that depends on economic developments of external sites. Based on this its economy was not immune to the negative effects of the global financial crisis. It was affected especially in the external accounts, industrial production, budget liquidity and financial liquidity by a reduction of demand for exports, reduction of capital incomes and remittances inflows. Therefore the aim of this paper is to empirically examine the impact of financial crisis on the main macroeconomic indicators. Indicators that will be analyzed are: real economic growth, GDP per capita, foreign direct investment, government budget balance, unemployment rate, inflation, terms of trade, current account balance, exports, net foreign assets, the monetary aggregate M2, loans, remittances and private transfers. Also having in mind the crisis in the euro zone this paper also examines its impact on GDP per capita of Macedonia.

The empirical results of this paper show the negative impact of the crisis on certain macroeconomic indicators, thus the same will have a special significance for macroeconomic policy makers of the Republic of Macedonia, because studies in this subject are scarce.

2. A BRIEF REVIEW OF ECONOMIC DEVELOPMENT OF RM

Macedonian's economy is characterized by relatively slow growth (see Table 1). Realized rates of economic growth are not satisfactory in terms of strengthening the country's economy and raising the standards of living of the population. Regarding other indicators, low inflation is maintained through prudential monetary policy (fixing the domestic currency against the euro), while unemployment is still high (31% in 2012). Unlike some more advanced

transition countries, the country did not experience large capital inflows from the developed economies.

Table 1. Selected macroeconomic indicators, average for periods.

| | 1995-2003 | 2003-2012 | 1995-2012 |
|---|-----------|-----------|-----------|
| Real GDP growth (in %) | 1.4 | 3.4 | 2.4 |
| Inflation (average) | 4.1 | 2.4 | 3.3 |
| Unemployment rate | 33.5 | 34.0 | 33.8 |
| Budget balance (central government and funds in % of GDP) | -1.6 | -1.3 | -1.5 |

Source: NBRM; author`s calculations

3. LITERATURE REVIEW

Scholars in the field of global financial crisis have divergences, but all agree on one thing that the negative effects of the recent crisis will be severe and cannot be predicted how long it will be finished.

Gardo and Martin (2010) have analyzed the impact of the financial crisis in the countries of Central, Eastern and Southeastern Europe with a particular attention to EU member states, which have not yet adopted the euro. They analyzed the impact of the crisis on different segments of the financial market saw that the exchange rate has been hit by the crisis, the stock market has also suffered huge losses. There was also an impact on capital flows with different intensity depending on the host country and the type of capital inflows.

Bartlett and Prica (2012) emphasize that South Eastern European countries were hit by the crisis with different intensity. They concluded that countries that were EU members were more affected by the crisis, especially through foreign loans and investments. Also severely affected

by the crisis were those that had shown greater prosperity in the transition process, and to countries policies have been inclined towards saving but with varying degrees of success in reducing the budget deficit.

Studies on this subject from the domestic researchers are scarce. (Bexheti, 2010) points out that since the financial market of the Republic of Macedonia as well as of the region are not developed enough and are not functioning significantly with secondary financial instruments, the financial crisis did not impact directly on the sector but indirectly through the collapse of the real economy.

According to Ristevski (2010) Macedonia's economy has been hit by the global financial crisis and the most vulnerable groups of the crisis are unemployed and those living below the poverty line. The number of poor increased by 35,000 persons in 2009 compared with a year ago. He also notes that in Macedonia lacks performance evaluation of the implemented government policies, strategies, programs and projects, since independence until now.

4. METHODOLOGY AND EMPIRICAL RESULTS

4.1. Methodology and data

For analyzing the effects of crisis on key macroeconomic variables and on overall economic activity, ie real GDP of the Republic of Macedonia, in this paper we use the method of least squares (OLS) by incorporating a dummy variable that takes the value 1 for the period of crisis and takes the value zero for the rest of period. Models with dummy variables can be used to judge whether structural changes have occurred between the two different time periods. So these models have more to do with the verification of structural changes, from one period to

another, or verify the stability of the parameters of a regression over a period of time, compare with another period of time.

Also in this work there will be performed a series of tests to measure the stability of data and models respectively. Analysis and processing of data is done through software package Stata 12.

The data used in the empirical part consists of quarterly time series from the first quarter of 1998 until the second quarter 2013 (1998q1-2013q2). The data are mainly provided by the State Statistical Office (SSO), Ministry of Finance (MF) and the Central Bank of the Republic of Macedonia (NBRM).

4.1.1. The theoretical framework of the econometric model

To test the impact of crisis on the overall economic activity, we built a model with a dummy variable and a quantitative variable, namely a certain macroeconomic indicator.

The general pattern is given in the following:

$$Y = \alpha_1 + \alpha_2(D) + \beta_1X + \beta_2(DX) + u \quad (1)$$

Where with α_1 is marked the intercept (constant); with α_2 the differentiating intercept; β_1 is the slope coefficient that measures the marginal effect of changing Y as a result of changes in X; while β_2 is the differentiating coefficient that indicates the difference between the slope coefficient of the function outside the crisis period and the slope coefficient of the function during the crisis period. With 'u' is presented the error term, or stochastic factor that is supposed to be with zero conditional mean and constant variance, ie $E(u_i) = 0$ for each period t. Also, in the model is included the interaction variable between the dummy and a quantitative variable X (macroeconomic variable). The dummy variable is the divisive period:

- $D=1$ if the data belong to the period of crisis
- $D=0$ if the data belong to the period out of crisis

To see the implications of the model (1) and under the assumption that $E(u_i) = 0$, will be obtained :

$$E(Y_i|D_i = 0, X_i) = \alpha_1 + \beta_1 X_i \quad (2)$$

$$E(Y_i|D_i = 1, X_i) = (\alpha_1 + \alpha_2) + (\beta_1 + \beta_2)X_i \quad (3)$$

4.1.2. Analysis of stationary

To avoid the spurious regression results, will be presented step by step the way of detecting the stationarity of variables for real GDP and other key macroeconomic variables (the budget balance; exports; current account balance; M2 monetary aggregate; foreign direct investment; remittances; loans; terms of trade, inflation, and unemployment rate) using two tests: Dickey-Fuller (DF) test and Philips-Perron (PP) test as follows:

With Y_t is presented the test variable at time t , while with Y_{t-1} the relevant variable in the period $t-1$ and t variable represents the trend.

$\Delta Y_t = \delta Y_{t-1} + u_t$; Y_t has random walk

$\Delta Y_t = \gamma_1 + \delta Y_{t-1} + u_t$; Y_t has random walk with significant movement

$\Delta Y_t = \gamma_t + \gamma_2 t + \delta Y_{t-1} + u_t$; Y_t has random walk with significant movement around a stochastic trend

Hypothesis:

$H_0: \delta = 0$ (Variable is not stationary)

$H_1: \delta \neq 0$ (Variable is stationary)

If the null hypothesis is accepted, it means that the data contain unit root, thus the series are not stationary. We continue the procedure by taking the first or second difference until the

variables become stationary. In this case we say that the variables are of the order I (1), I (2), respectively.

If the null hypothesis is rejected, then the alternative is accepted, it means that the time series does not contain unit root and the series are stationary of order I (0).

4.2. Data and description of variables

The data used in the empirical part consists of quarterly time series from the first quarter 1998 to the second quarter 2013 (1998q1-2013q2). As the crisis period in the paper is considering the period from the fourth quarter of 2008 to the first quarter of 2010. The table below describes the data and sources for each of them.

Table 2. Description of data and data sources

| Variable | Abbreviation | Description | Source |
|------------------------------------|--------------|---|-----------|
| Real economic growth | GDPG | The growth rates of real GDP (%) | SSO |
| GDP per capita | GDPC | GDP per capita, base year 2005=100 | SSO |
| The current account balance | CAB | The current account balance (ně % of GDP-sě) | NBRM, SSO |
| Budget balance | GOVB | The central government budget balance (in % of GDP) | MF, SSO |
| Unemployment rate | UNEMP | Unemployment rate (in % of GDP) | SSO |
| Foreign Direct Investments | FDI | Foreign direct investments, net (in % of GDP) | NBRM, SSO |
| Inflation | INF | Increasing the overall price level in % | NBRM, SSO |
| Exports | EXP | Exports of goods and services (as % of GDP) | SSO |

| | | | |
|------------------------------|---------|---|-----------|
| Net foreign assets | NFA | Net foreign assets of the banking overall system (in % of GDP) | NBRM, SSO |
| Monetary aggregate M2 | M2 | M2 (in % of GDP) | NBRM, SSO |
| Loans | TLOANS | Total loans (in % of GDP) | NBRM, SSO |
| Terms of trade | TOT | Changes in the relative prices of exports and imports, base year 2005 = 100 | NBRM |
| Private transfers | PTRANSF | The amount of official and private transfers, net (in % of GDP) | NBRM, SSO |
| Remittances | REMIT | Remittances , net (in % of GDP) | NBRM, SSO |

4.3. The empirical results

4.3.1. Results from the analysis of stationary

Before evaluating regression models we have done testing of stationary of variables through the Augmented Dickey-Fuller (ADF) test and Philip-Perron (PP), based on the methodology explained above. The results are given in the table below:

Table 3. Analyses of stationary of time series

| Variables | Test | t-statistics | p-value | t-statistics | p-value | |
|-----------|-------|--------------|---------|----------------------|---------|----------|
| | Level | | | The first difference | | Decision |
| GDPG | ADF | -2.579 | 0.179 | -3.633** | 0.031 | I(1) |
| | PP | -2.915 | 0.281 | -4.327* | 0.000 | |
| GDPC | ADF | -1.060 | 0.730 | -3.215** | 0.016 | I(1) |
| | PP | -1.451 | 0.696 | -5.920* | 0.000 | |
| CAB | ADF | -3.107** | 0.025 | - | - | I(0) |
| | PP | -6.072* | 0.000 | - | - | |
| GOVB | ADF | -2.700 | 0.513 | -4.098* | 0.010 | I(1) |
| | PP | -2.891 | 0.718 | -6.530* | 0.000 | |
| UNEMP | ADF | -1.914 | 0.325 | -3.568** | 0.046 | I(1) |
| | PP | -1.977 | 0.296 | -7.618* | 0.000 | |
| FDI | ADF | -3.157** | 0.038 | -3.800* | 0.002 | I(0) |
| | PP | -7.341* | 0.000 | -8.102* | 0.000 | |
| INF | ADF | -1.872 | 0.632 | -3.924* | 0.003 | I(1) |
| | PP | -1.926 | 0.418 | -7.412** | 0.000 | |
| EXP | ADF | -1.107 | 0.426 | -3.234** | 0.032 | I(1) |
| | PP | -1.968 | 0.324 | -4.551* | 0.000 | |
| NFA | ADF | -3.540 | 0.013 | - | - | I(0) |
| | PP | -2.991 | 0.018 | - | - | |
| M2 | ADF | -1.740 | 0.325 | -3.843* | 0.002 | I(1) |
| | PP | -1.977 | 0.296 | -7.618* | 0.000 | |
| NLOANS | ADF | -0.198 | 0.938 | -3.100** | 0.032 | I(1) |
| | PP | 0.397 | 0.981 | -3.102* | 0.020 | |
| TOT | ADF | -2.245 | 0.190 | -3.924* | 0.003 | I(1) |
| | PP | -2.926 | 0.118 | -7.412 | 0.000 | |
| PTRANSF | ADF | -1.467 | 0.550 | -3.639* | 0.005 | I(1) |
| | PP | -1.977 | 0.296 | -7.618* | 0.000 | |
| REMIT | ADF | -2.601 | 0.092 | -3.340** | 0.013 | I(1) |
| | PP | -2.912 | 0.076 | -8.102* | 0.000 | |

Note : ** represents the rejection of null hypotheses in the 5% level of significance. The critical value is - 2.926,

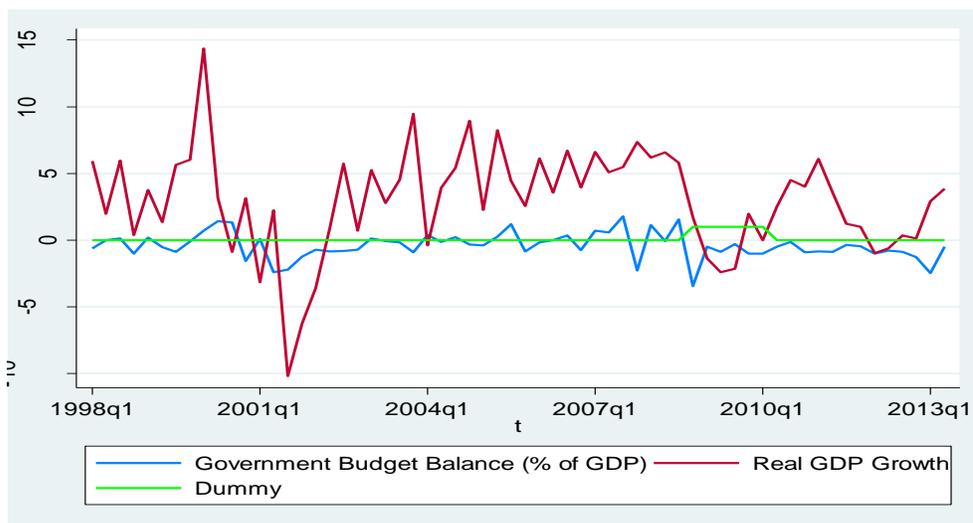
* represents the rejection of null hypotheses in the 1% level of significance. The critical value is -3.577.

Based on the Dickey- Fuller and Philips-Perron tests, the stationary variables of order I(0) are: Current Account Balance (CAB), Foreign Direct Investment (FDI) and Net Foreign Assets (NFA). While all other variables are non stationary in the level, but they are transformed to stationary by taking the first difference.

4.3.2. Results of regression models

In this part are given the empirical results of regression models. In the chart below are displayed the growth of real GDP, government budget balance and the dummy variable. From the graphical presentation can be noticed the economic recession from the fourth quarter of 2008 to the first quarter of 2010 and later the economy begins to recover until the first quarter of 2012. As a consequence of euro zone debt crises two quarters of 2012 are also in recession. The chart shows the deepening of budget deficit during the crises period.

Figure 1. Government Budget Balance and Real GDP growth



Source: Statistical Office of Macedonia and processing by authors

Model 1 represents the relationship between real GDP growth, budget balance and dummy variable and the interaction between budget balance and dummy variable.

Model 1:

$$GDPG = 3.79 + 1.4GOVB - 5.45D - 0.249D \cdot GOVB$$

t statistika (7.42) (2.69) (-2.39) (-1.66)

$$R^2 = 0.48 ; F(3, 58) = 4.51$$

Based on the regression results all coefficients are statistically significant. Since the coefficient of dummy variable and interaction variable are statistically significant as well as F statistics that shows the significance of regression is statistically significant, imply that there is a difference between the two examined periods (out of the financial crisis and during the financial crisis).

The t statistics show that budget balance is statistically significant at the 1% level, dummy variable in the 5% level and interaction variable in the level of 10%. The positive sign before the coefficient of budget balance (GOVB) shows that the budget balance has yielded positive results in real GDP growth during the period. However, the negative sign before the dummy variable indicating that crisis has impacted negatively on the budget balance, ie increasing the budget deficit during the crisis period.

Although $\beta_1 + \beta_2 = 1.4 - 0.249 = 1.151$, this shows that increasing the budget deficit during the crisis period has had a positive effect in reducing the economic recession of the country by 1,151% during the crisis period. This highlights the fact that Government anti-crisis packages have given positive results in reducing the negative consequences of the crisis.

In model 2 we express the relationship between real GDP growth, foreign direct investment (FDI) and dummy variable and the interaction between FDI and dummy variable.

Model 2: The impact of crisis on the foreign direct investments (FDI) and real GDP growth

$$GDPG = 3.79 + 0.05FDI - 3.13D - 1.11D \cdot FDI$$

t statistika (5.18) (0.17) (-1.18) (-0.30)

$$R^2 = 0.08 ; F(3, 58) = 1.72$$

Based on the results of regression, coefficients are not statistically significant. Since the coefficient of dummy variable and interaction variable are not statistically significant, as well as F statistics that shows the significance of the regression also is not statistically significant, this means that between the two periods there are not structural changes. In this case we fail to reject the null hypothesis explained above in the theoretical framework of the model.

Model 3: The impact of the crisis on the monetary aggregate M2 and real GDP

$$GDPG = 2.07 + 0.043M2 - 4.3D - 0.26D \cdot M2$$
$$t \text{ statistika} \quad (1.45) \quad (1.05) \quad (-2.53) \quad (-1.64)$$
$$R^2 = 0.21 ; F(3, 48) = 3.47$$

The results of model 3 indicate that the coefficient of M2 monetary aggregate is not statistically significant. Since the coefficient of dummy variable and interaction variable are statistically significant means that there is a difference between the two periods analyzed (out of financial crisis and during the financial crisis). Regarding the signs before the coefficients are consistent with expectations. So M2 has a positive impact on GDP growth throughout the period, but not significant, while negative sign before the dummy variable indicates that the crisis has impacted negatively on the monetary aggregate M2, and consequently this has adversely affected the growth rate of real GDP. According to the definition of M2, the crisis has negatively affected the deposits in domestic currency and foreign currency.

Model 4: The impact of crisis on credits and real GDP growth

$$GDPG = 3.18 + 0.0057TLOANS - 14.96D + 0.261D \cdot TLOANS$$
$$t \text{ statistika} \quad (2.56) \quad (0.14) \quad (-0.15) \quad (-0.11)$$
$$R^2 = 0.08 ; F(3, 48) = 1.68$$

Based on the results of the regression, the coefficients are not statistically significant. Thus could be concluded that between the two time periods there are no structural changes. In this case we accept the null hypothesis.

Model 5: The impact of the crisis on terms of trade and real GDP growth

$$GDPG = 13.6 - 0.1TOT - 53.17D + 0.48D \cdot TOT$$

t statistika (0.99) (-0.75) (-0.84) (-0.79)

$$R^2 = 0.09 ; \quad F(3, 48) = 2.02$$

The results of the regression show that also in this model the coefficients are not statistically significant. So there are no structural changes between the two time periods. Even in this case we accept the null hypothesis.

Model 6:

$$GDPG = -1.04 + 0.04EXP - 0.57D - 0.92D \cdot EXP$$

t statistika (-1.27) (2.13) (-1.67) (-1.60)

$$R^2 = 0.50 ; \quad F(3, 58) = 4.28$$

The results of this model indicate that all regression coefficients are statistically significant. Since the coefficient of dummy variable and interaction variable are statistically significant, there is difference between the two examined periods. So, for every 1% increase in exports, the real GDP will grow by 0.04%. However, the negative sign before the dummy indicates that the crisis has negatively affected the exports of RM and growth. On the basis of the equation (3) (see

the theoretical framework of the model), by summing coefficients: $\beta_1 + \beta_2 = 0.04 - 0.92 = -0.88$, means that real GDP is reduced by 0.88% during the crisis period as a result of the decrease of exports during that period.

Model 7: The impact of the crisis on private transfers and real GDP growth

$$GDPG = 1.34 + 0.05PTRANSF - 1.31D - 0.63D \cdot PTRANSF$$

t statistika (0.75) (1.75) (-2.29) (-1.95)

$$R^2 = 0.18; \quad F(3, 48) = 4.34;$$

Private transfer's coefficient is statistically significant at the 10% level of significance. For every 1% increase in private transfers the real GDP increases by 0.05%. Since the coefficients of dummy and interaction variable are statistically significant implies that there is a structural difference between the two analyzed periods analyzed. As for the signs before the coefficients, the negative sign before the dummy indicates that the crisis has impacted negatively on private transfers, and consequently this has adversely affected the growth rate of real GDP.

By summing coefficients: $\beta_1 + \beta_2 = 0.05 - 0.63 = -0.58$, the real GDP is reduced by 0,58% as a result of lower private transfers during the crisis period.

In the following is given the impact of the crisis on the current account balance (CAB)

Model 8:

$$GDPG = 2.95 - 0.299CAB - 4.03D - 0.05D \cdot CAB$$

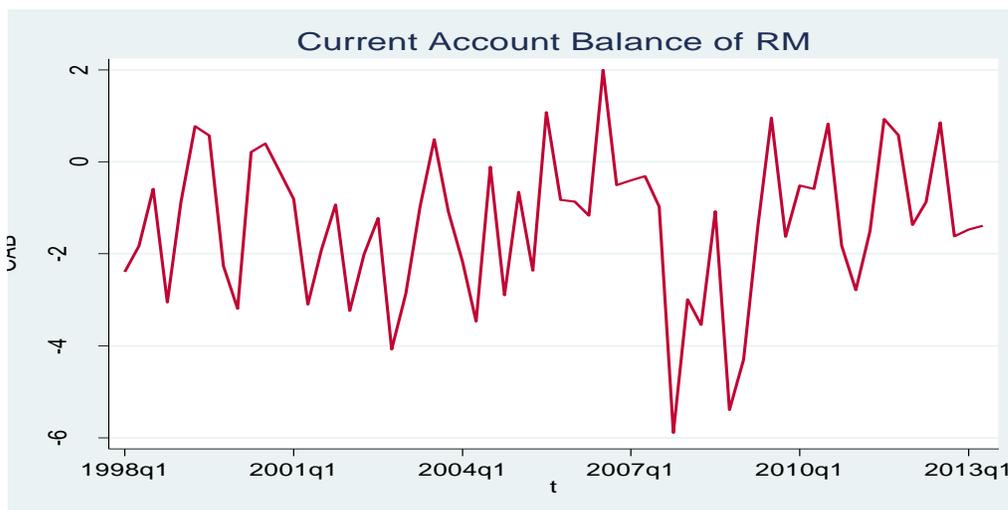
t statistika (4.42) (-1.88) (-1.8) (-2.06)

$$R^2 = 0.29; \quad F(3, 48) = 4.14;$$

Looking at the regression's results of the model 8, the coefficient of the current account balance is statistically significant at 10% level of significance. For every 1% increase of current account balance, real GDP decreases approximately by 0.3%. Since the coefficients of dummy and interaction variable are statistically significant implies that there is a structural difference between the two periods.

By summing coefficients: $\beta_1 + \beta_2 = -0.299 - 0.05 = -0.349$, the real GDP is reduced by 0.349% as a result of the deepening of current account deficit during the crisis period. In the following figure we present the development of the current account deficit over years

Figure 2. Current account balance of RM over years



Source: **NBRM and processing of data by the authors**

Similarly regressions were performed for other variables described in the previous section such as remittances, unemployment rate, inflation, net foreign assets and was estimated that there is no structural change between the period of crisis and out of the global financial crisis period, as dummy variables and interaction variables resulted statistically not significant.

Also in this part is conducted a regression model which include two dummy variables, one referring to the global financial crisis and the other to euro zone crisis, as well as macroeconomic variables as explanatory variables. In this model as the dependent variable is taken the GDP per capita of RM.

As period of euro zones crisis we get the period (2011q1-2012q4), it is remarked as D2, while for the period of global financial crisis is taken previous considered period (2008q4-2010q1) and is remarked with D. Following pattern emerged from the regression results.

$$\begin{aligned}\log(GDPC) = & -0.184 + 0.027 \log(EXP) + 0.001 \log(FDI) + 0.073 \log(M2) \\ & + 0.02 \log(PTRANSF) - 0.021(INF) - 0.025 \log(UNEMP) \\ & - 0.048 \log(TLOANS) + 0.022 \log(REMIT) - 0.002(CAB) + 0.0054(GOVB) \\ & - 0.024 \cdot D - 0.025 \cdot D2\end{aligned}$$

The regression results indicate that the global financial crisis and the euro zone crisis had a negative impact on GDP per capita of Republic of Macedonia, as both D and D2 dummy variables are statistically significant, respectively.

In the model, as explanatory variables are used all macroeconomic variables described in the previous section, while statistically significant resulted only exports, M2, private transfers, loans and government budget balance.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis, separately for each variable, we come to the conclusion that structural changes have occurred in the government budget balance, exports, the current account balance and private transfers, while all other macroeconomic variables resulted statistically insignificant. Deepening of the government budget deficit during the crisis has provided positive effects in mitigating the negative consequences. The fall of exports is estimated to have decreased the real GDP by 0.88% during the crisis period. The deepening of the current account deficit is estimated to have decreased the real output by 0.35%. While lower private transfers have reduced the real GDP by 0.58%.

The estimated results of the multiple regression explore that the financial crisis and the euro zone debt crisis affected negatively the GDP per capita of RM.

However the study is subject to limitations and shortcomings for generating stable estimates and conclusions, because the crisis cannot be considered as finished. In addition, for examining the structural changes a long period of time must be considered. But nevertheless, the results of this study have a special importance for completion the economic literature, because studies in this area are scarce.

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