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ESTIMATING CROWDING OUT EFFECT OF THE GOVERNMENT BORROWING ON THE PRIVATE CREDIT: EVIDENCE FROM THE MACEDONIAN BANKING SECTOR

Milan Eliskovski [16]
National Bank of the Republic of North Macedonia,
m_eliskovski@yahoo.com; EliskovskiM@nbrm.mk

Abstract

The relationship between the government borrowing and banks' lending is unclear from theoretical point of view. It is usually perceived as negative relationship, but there are arguments that it could be positive as well. The two conflicting theories are the crowding out and the Ricardian equivalence whereas the former provides arguments for the negative relationship, while the latter theory may offset this negative effect. Thus, the aim of this study is to detect and quantify the crowding out effect of the real central government borrowing on the private sector real loans provided by the Macedonian banks. However, as it was mentioned above, the crowding out effect might be compensated by the Ricardian equivalence effect. Therefore, the relationship between the real central government borrowing and real deposits will be studied as well. The point of the investigating the Ricardian equivalence is to consider whether this effect compensates for the crowding out. This paper utilizes a Vector Error Correction Model (VECM) for investigating the relationship between private loans, deposits and government borrowing from the Macedonian banks. The estimated results indicate that the government borrowing crowds out the private loans, while the effect of the Ricardian equivalence is not large enough to offset the former effect.

Key words: Central government borrowing, crowding out effect, Ricardian equivalence effect, real loans
JEL Classification: C32, H62, H63, E51

Introduction

The relationship between the government borrowing and banks' lending is unclear from theoretical point of view. It is usually perceived as negative relationship, but there are arguments that it could be positive as well. The two conflicting theories are the crowding out and the Ricardian equivalence whereas the former provides arguments for the negative relationship, while the latter theory may offset this negative effect.

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16) *The views expressed herein are those of the author only, and do not have to represent the views of the National Bank of the Republic of North Macedonia.*

The crowding out thesis is based on the notion that the government as first-class creditworthy client borrows large amounts of money by direct indebting from the banks or issuing state securities and selling them to the banks. Hence, from the aspect of the banks' balance sheet, more funds placed to the government decreases the funds available for granting loans to the private sector. Banks that lend to the government, face less credit risk because the government is less likely to default due to the secured income from the public revenues. Moreover, the banks earn small and stable profit from government borrowing, unlike placing the funds in the real sector where the credit risk is higher as well as the probability for default and losses. Subsequently, the banks impose higher interest rates on the less available funds for lending and the real sector is not capable to invest the projects cheaply or is prevented to borrow from the banks. As a result of that, the overall preformancess of the economy may decline.

The government collects public revenues to finance its public expenses, but often the revenues are insufficient and the budget deficit is created. Thus, the government has to borrow more money in order to cover the excess of the public expenses. The government borrowing postpones eventual implementation of higher taxes or other forms of public revenues, which are considered as stringent and unpopular measures from the politicians. However, having rational economic agents may offset the crowding out effect from the government borrowing. Namely, the rational economic agents will expect eventual increase of the taxes by the government in the future, with an aim to return the borrowed money from the banks. Therefore, they will save more in the present in order to smooth out consumption that might be affected by the decrease of the income when the government will implement tougher public revenues. Thus, the counter thesis to the crowding out thesis is the Ricardian equivalence thesis which provides arguments for increased saving that will be placed in the banks and thus the available funds for private sector lending may not decrease.

Thus, the aim of this study is to detect and quantify the crowding out effect of the real central government borrowing on the private sector real loans provided by the Macedonian banks. However, as it was mentioned above, the crowding out effect might be compensated by the Ricardian equivalence effect. Therefore, the relationship between the real central government borrowing and real deposits will be studied as well. The point of the investigating the Ricardian equivalence is to consider whether this effect compensates for the crowding out and if there are evidence of partial crowding out effect.

This paper utilizes a Vector Error Correction Model (VECM) for investigating the relationship between private loans, deposits and government borrowing from the Macedonian banks. The estimated results indicate that the government borrowing crowds out the private loans, while the effect of the Ricardian equivalence is not large enough to offset the former effect. The government of North Macedonia has been indebting permanently, from the domestic banks while, the capital expenditures have been reduced compared to the plans indicating that the government inefficiently has been spending the funds. Namely, Koczan (2015) asserts reduction of the capital expenditures concerning the Macedonian economy after 2009, and warns about the shift of the capital expenditure towards current expenditure. Additionally, Fiti et al. (2017) explain crowding out effects for the Macedonian economy caused by the government borrowing and empirically estimate low and negative fiscal multipliers as indication for the inefficiently used funds borrowed. Moreover, CEA (2019) provides concrete figures for non-realized capital expenditures and it has estimated the cumulative loss of the non-realized capital expenditutre of around 700 millions of Euros or lost cumulative economic growth of 6.5% for the period from 2010 to 2018. The Macedonian banking sector claims nominal amount of 684 millions of Euros as of 2019q2, from the central government, which is approximately close to the cumulative loss estimated by CEA (2019). The money that banks keep as claims from the government might actually compensate for the loss caused by the non-realized capital expenditures, if invested in the real sector. Thus, the significance of this study arises from the answer provided to the policymakers for the size of the crowding out effect caused by the central government borrowing from the commercial banks which is very important for creating proper policies for improving the overall economy. The size of the crowding out effect is important to undertake measures and stimulate the banks to credit the real sector as main driver of the economy, and the government to become aware of placing the funds in efficient and productive investments yielding to higher economic growth.

The paper is organized in the following manner: the next section is a review in the existing literature, whereas the following section provides an overview of the government borrowing from the Macedonian banks as well as the real loans and the real deposits developments. Furthermore, the data, methodology and estimations are presented and finally conclusions are provided.

2. Literature overview

The theoretical explanation for both the crowding out and Ricardian equivalence lies in the following equation representing the balance sheet of the whole banking sector (Ponomarenko, 2019).

$$NFA + CREDPNBS + CREDGOV = CASH + D + LPNBS + LGOV + CAP \quad (1)$$

Where NFA is the net foreign assets of commercial banks, CREDPNBS is credit to the private non-banking sector, CREDGOV is claims on the central government, CASH is the currency in circulation, D is deposits in the banking sector, LPNBS is other liabilities of banks to the private non-banking sector, LGOV is the banking sector's liabilities to the government and CAP is banking sector's capital. By rearenging the equation (1) with regards to CREDPNBS and D, it is implied the relationship between the government borrowing and private sector credit and deposits in the following equations (2) and (3).

$$CREDPNBS = CASH + D + LPNBS + LGOV + CAP - NFA - CREDGOV \quad (2)$$

$$D = NFA + CREDGOV + CREDPNBS - CASH - LPNBS - LGOV - CAP \quad (3)$$

Thus, the equation (2) clearly explains the crowding out effect and that is the negative relationship between the CREDGOV and CREDPNBS. The rationale behind this relationship is more lending to the government reduces the available funds for providing loans to the private firms and households. Additionaly, the equation (3) indicates the crowding out's counter theory and that is the Ricardian equivalence represented as positive relationship between the CREDGOV and D. As the government indebts, the rational firms and households would expect higher future taxes and therefore they will save more today to safeguard their constant consumption through the time.

The main critique of the Ricardian equivalence is based on the empirical indications that the economic agents are not so much rational to perceive the increased government borrowing as an opportunity to increase their deposits. Moreover, concerning the developing countries, the Ricardian equivalence is not very likely to hold because the capital markets are underdeveloped and they do not provide opportunity for the economic agents to save in various securities. Gümüş (2003) provides overview of the theoretical literature that considers both the crowding out effect and the Ricardian equivalence. Namely, the study by Gümüş explains the approach of the other studies in a sense of how other authors construct the empirical models for testing the crowding out effect or the Ricardian equivalence. The author of this paper concludes that the manner of constructing the models, the variables used in the empirical procedure and the stance of the business cycle of the economy are the main factors that will support one of the theories or there can be evidence for partial holding of both theories. However, Gümüş also states that most of the papers considered, find out empirical evidence of partial crowding out effect and that is the government borrowing does not completely shrinks the investments due to the smaller offsetting effect of the Ricardian equivalence.

Concerning the emerging market economies, the study by Zaheer et al. (2017) estimates the crowding out effect on the private sector credit caused by the government borrowing in Pakistan. This paper utilizes monthly data for the period from 1998m6 to 2015m12 and by employing Ordinary Least Squares (OLS) methodology, it estimated statistically significant effect of 0.08 percentage points decline in private sector credit monthly growth as a result of the increase of the monthly growth of the government borrowing by 1 percentage point. This paper uses simple OLS econometric methodology that could be considered as weakness of this study. Namely, the OLS methodology does not take into account the endogeneity of the vari-

ables and that is the return effect that private sector credit as dependent variable might have on the independent variables. For example, the government borrowing may reduce the private sector credit, but consecutively, an increase of the private sector credit reduces the available funds of the banks for lending the government. Thus, not having taken the endogeneity issue into account might yield biased estimate of the size of the crowding out effect.

Furthermore, Fayed (2012) investigates the crowding out effect for other emerging economy. Namely, this study relates to the Egypt and the analysis refers to the period from 1998q2 to 2010q3 period. The effect was estimated through utilization of the more sophisticated Vector Error Correction Mechanism (VECM) or known as Johansen cointegration technique. Unlike the OLS methodology used in Zaheer et al. (2017), this econometric methodology takes into consideration the endogeneity problem among the variables used. The results of this study indicate crowding out effect of 4.03 on the private credit and that is an increase of the government borrowing from the Egyptian banks by 1 percentage points decreases the private sector credit by 4.03 percentage points pretty much higher compared to the effect found in the study by Zaheer (2017) for Pakistan.

Concerning the developed countries, the paper by Başar and Temurlenk (2007) utilizes Structural Vector Autoregression (SVAR) for testing three hypothesis of: Crowding out effect, crowding in effect and Ricardian equivalence for the Turkish economy during the period from 1980 to 2005. This study has different approach in terms of the variables used compared to previous two studies explained above for Pakistan and Egypt. Nameley, Başar and Temurlenk do not take the government borrowing from the banks and private sector credit, but they investigate the government spending effect on the private investment. The SVAR methodology implemented in this paper indicates small negative relationship between the government spending and the private investment and it provides evidence in favour of the crowding out hypothesis.

The study by Agnello et al. (2011) uses panel data analysis for 132 countries for the period from 1960 to 2008, and investigates the relationship between the discretionary government spending as regressor and Gross Domestic Product, private consumption growth and investment growth as regressands. The authors imply that discretionary government spending has short-run crowding in effect, but crowding out effect dominates in the long-run and overcomes the crowding in effect.

Regarding the Ricardian equivalence, the study by Ricciuti (2001) examined the theoretical and empirical literature concerning this theory. The evidence provided in this paper is not in favour of this theory. Thus, the author concluded that this theory has been opposed by two thirds of the scholars while the remaining part of the scholars support it mainly depending on whether the econometric models constructed take into account debt neutrality or not.

The Macedonian case is analyzed as panel model consisted of 11 countries encompassing the period from 1991 to 2009, in the sudy by Gjini and Kukeli (2012). The authors assess the crowding out effect by investigating the relationship between the public investment and private investment. The results do not indicate crowding out effect, but in contrast, the higher public investment crowds in private investments. However, the authors are reserved concerning the proper specification of the econometric model and they propose addressing this issue by other researches. Strictly, the Macedonian case is econometrically analyzed by Fiti et al. (2017) and they indicate crowding out effect caused by the inefficient use of the borrowed funds by the government. Namely, the study points out that government borrowing rose by higher rate compared to the growth of the real gross domestic product in the last 10 years and the funds have been placed in non-productive investments at the expense of the private sector performances. Furthermore, according to the study, the government inefficiency contributed to low positive (below 1) fiscal multipliers in the short run and going into negative zone in the long run. Additionally, having in mind the studies by Koczan (2015) and CEA (2019), the inefficient use fo borrowed funds is also implied, but none of the papers explained in this paragraph do not indicate the Ricardian equivalence.

Thus, having in mind the above mentioned researches, it can be summarized that the literature develops various approaches to study the crowding out and Ricardian equivalence theories. This study will rely on the approach implemented in the studies by Zaheer et al. (2017) and Fayed (2012) and the relationship between banks' claims on central government (central government borrowing) and banks' loans will be investigated for North Macedonia. Furthermore, this study will take into account the recommendations from Gümüş (2003) for testing whether the Ricardian equivalence compensates for the crowding out and thus the relationship between the banks' central government claims and the banks' deposits will be studied for North Macedonia as well.

3. Stylized facts on the central government borrowing, loans and deposits in the North Macedonia

Having in mind the aim of this paper, couple of observations can be made about the Macedonian banks' exposure to the central government, loans and taken deposits. The data for the three variables are deflated with the Consumer Price Index (CPI, 2010=100) and expressed in real numbers and annual growth is calculated for the period from 2004q1 to 2019q2.

The real (deflated) government borrowing from the Macedonian banking sector has experienced volatile movement in the past years from 0.9% annual growth rate in 2004Q1 to annual growth of 16.1% in 2019Q2. Furthermore, the banks' real claims on central government (central government borrowing from the Macedonian banks) rose by annual average rate of 15.6% for the mentioned period, implying that banks significantly contribute in the central government funding. Moreover, the annual growth of the real loans provided by the Macedonian banks to the private sector, was 14.6% on average and the annual average growth of the real deposits was 12.9%. Merely reading this numbers, gives indication that there might be some crowding out effect from the government borrowing because its' average rate of growth is higher compared to the growth rate of the real loans. However, the numbers do not quantify the size of the crowding out effect and whether it is offset to some extent by the Ricardian equivalence.

Figure 1.
Real (deflated) banks' central government claims, real (deflated) loans and real (deflated) deposits, annual growth in %

Source: National Bank of the Republic of North Macedonia and State Statistical Office
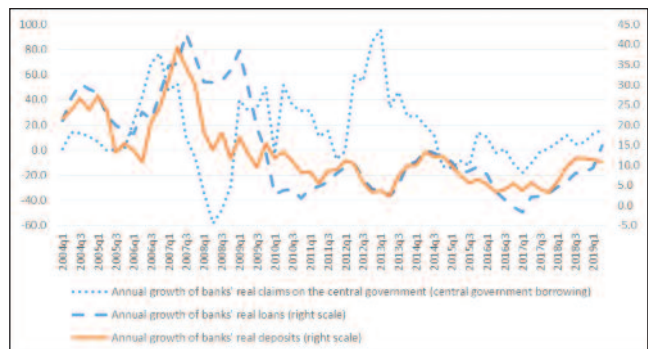
The figure 1 indicates large negative movement of the banks' real claims on the central government in 2008. The banks faced liquidity pressures from the real sector and decreased the portfolio of Treasury securities (among other securities) as a "reflection of the banks' necessity for timely response to the psychological reactions of part of the depositors, primarily households, to the developments the banks from the developed countries face with" (NBRM, 2009, pp 58). Another negative development of the real claims on the central government is noticed in 2014 and "the decline in banks' investments in government securities in 2014 was largely due to the changes in the primary market for government securities during the year" (NBRM, 2015 pp 21). Namely, the maturity of government securities was increased in the primary market in 2014. Finally, 2016 was the last year when the central government borrowing experienced declining rate due to the liquid-

ity pressures from the real sector to withdraw deposits from the banks and thus the banks sold government securities in order to respond appropriately (NBRM, 2017). Additionaly, as noted in NBRM (2017), the government securities supply decreased on the primary capital market because of the issued Eurobond in the same year.

Concerning the real loans and real deposits, the figure 1 implies dominantly joint movement of both variables with the highest annual growth acchived before the global financial crisis from 2008 to 2009. Afterwards, both variables experienced moderate growth rates because of the subsequent European sovereign debt crisis that lasted up to 2012.

4. Data

In order to assess the relationship between the banks' real claims on the central government (central government borrowing from the Macedonian banking sector) on one side and the real loans and real deposits on other side, the following variables, presented in the Table 1 have been used for the case of the Macedonian banking sector. Banks' real claims on the central government is the key independent variable whose effect on the real loans and real deposits has to be estimated. The first relationship (with real loans) would indicate the crowding out effect while the second one (with real deposits) would imply the Ricardian equivalence.

Table 1: Definition of the variables and data sources

Abbreviation	Dependent/ independent variable	Description	Period	Source
Real loans	Dependent[17] /Independent[18]	Natural logarithm of the real loans; Nominal loans in millions of denars deflated with CPI (2010=100)	2003q1 to 2019q2	National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia
Real deposits	Dependent[19] /Independent[20]	Natural logarithm of the real deposits; Nominal deposits in millions of denars deflated with CPI (2010=100)	2003q1 to 2019q2	National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia
Real claims on the central government	Independent	Natural logarithm of the real claims on the central government; Nominal claims on the central government in millions of denars deflated with CPI (2010=100)	2003q1 to 2019q2	National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia

Real nonperforming loans (Real NPL)	Independent	Natural logarithm of the real nonperforming loans; Nominal nonperforming loans in millions of denars deflated with CPI (2010=100)	2003q1 to 2019q2	National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia
Real central bank bills' interest rate (Real CBBIR)	Independent	Nominal central bank bills' interest rate in % minus the annual inflation rate in %	2003q1 to 2019q2	National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia
Real Gross Domestic Product (Real GDP)	Independent	Natural logarithm of the real GDP	2003q1 to 2019q2	State Statistical Office of North Macedonia

The variables used in this paper, encompass the supply side and the demand side on the Macedonian loan market as indicated by the Bernanke and Blinder (1988). Namely, real GDP variable is demand side variable as representative of the income capacity of the Macedonian economy, while all other variables are representatives of the supply side on the loan market or more concretely the capacity of the banks for lending (real deposits) and credit risk exposure (nonperforming loans). The real CBBIR is the reference interest rate by the National Bank of the Republic of North Macedonia for conducting the monetary policy and it could be considered as both loan demand and loan supply factor. Namely, higher real CBBIR affects the banks' lending interest rate and might discourage the loan demand and moreover, might increase/decrease the loan supply based on the banks perception of risk-return.[21] Also, all the series are seasonally adjusted by using the additive Census X12 option in EViews 8.

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17) Real loans are dependent variable in the econometric specifications where the real deposits along with banks' real central government claims are used as independent variables.

18) Real loans are independent variable along with banks' real central government claims in the econometric specifications where the real deposits are used as dependent variable.

19) Real deposits are dependent variable in the econometric specifications where the real loans along with banks' real central government claims are used as independent variables.

20) Real deposits are independent variable along with banks' real central government claims in the econometric specifications where the real loans are used as dependent variable.

21) Higher lending interest rate might encourage banks to increase the loan supply and lend more when they perceive possibility for higher return. However, higher lending interest rate might discourage creditworthy borrowers for indebting and adverse selection problem arises in a sense of remaining the non-creditworthy borrowers at the loan market that carry higher credit risk for the banks. Hence, the higher lending interest rate would contribute the banks undertaking more risk and decrease of the loan supply.

Figure 2. Graphical overview of the variables used
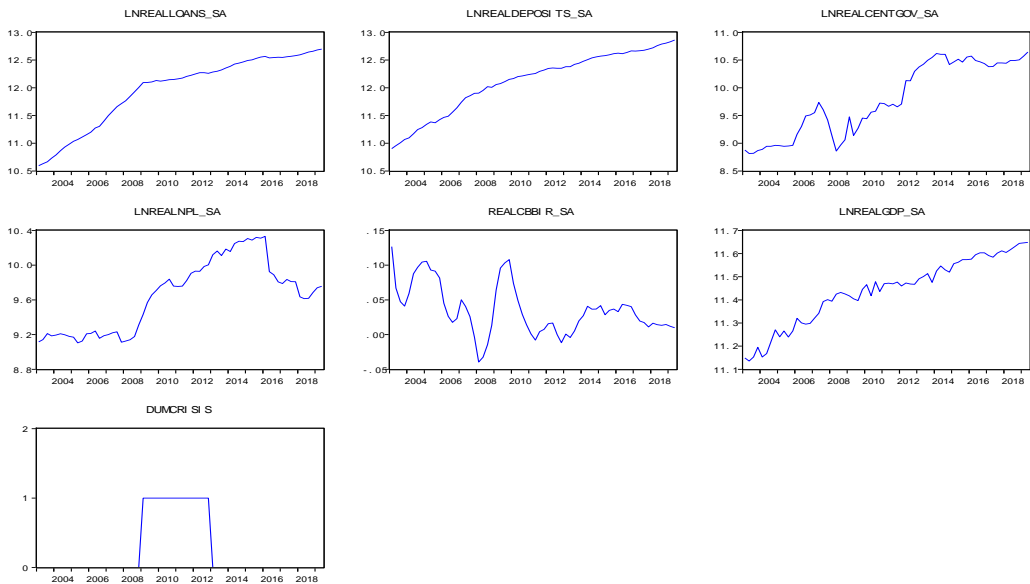
Source: National Bank of the Republic of North Macedonia and State Statistical Office of North Macedonia

The integrative features of the variables were tested by employing two tests: Augmented Dickey-Fuller test (ADF) and Phillips-Perron test (PP). The results from the tests indicate that all the variables used are non-stationary in the level and that are integrated of order 1 - I(1) .[22]

5. Methodology and econometric specification

Johansen cointegration technique (Vector Error Correction Model-VECM)[23] will be employed to assess the effect of banks' real claims on the central government on the real loans and the real deposits. The Johansen technique allows variables to be taken with the same order of integration and uses lags in order to mitigate the problem that might arise from the endogenous variables (Haris and Sollis, 2003). Additionally, this technique provides long-run equilibrium coefficients and the error correction mechanism (ECM) which presents the speed of adjustment of short-run disequilibrium towards long-run equilibrium. Furthermore, this technique allows estimating multiple regressions by imposing restrictions and that is estimation of more than one cointegrating vectors.

The VECM technique requires specifying the number of lags or so-called order of Vector autoregression (VAR) and testing for cointegration. The choice of the number of lags or so-called order of the VAR was arbitrarily chosen at 2 lags in order to avoid overparametarization of the model due to the limited sample size, and additionally to include sufficient lags in order to ensure the statistical validity.

The next step is to determine the cointegration among variables. For that purpose, Trace of the Stochastic Matrix and Maximal Eigenvalue tests were considered for the regressions (4) and (5) specified above. If the tests were conflicting between one and more than one cointegrating vectors, then in such cases, recommendations are to examine the estimated cointegrating vectors and base the choice on the interpretability of the

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22) The results are not presented in order to save space. Eviews 8 software was used.

23) VECM was done in Eviews 8 software.

cointegrating relations and estimated long-run coefficients (Johansen and Juselius, 1990). Therefore, the choice was based on the test that yielded one cointegrating vector.

Therefore, the bellow given regressions (4) and (5) were constructed and estimated the long-run coefficients.[24] The regression (4) indicates the crowding out effect while the regression (5) represents the Ricardian equivalence.

Real loans t
= f (real claims on central government t, real deposits t, real NPL_t, real central bank bills' interest rate t real GDP t)

Real deposits t
= f (real claims on central government t, real loans t, real NPL_t, real central bank bills' interest rate t real GDP_t,)

Regarding these two regressions, the key point is to consider the estimated coefficient in front of the banks' real claims on the central government and which one is higher. Higher estimated negative coefficient in front of the real claims on the central government in the regression (4) compared to the positive coefficient in the regression (5), would imply dominance of the crowding out effect over the Ricardian equivalence and vice versa.

6. Estimation results

The regressions (4) and (5) were developed in 8 subregressions by combining various independent variables with an aim to consider whether the coefficient in front of the banks' real claims on the central government is robust. Table 2 below contains the estimated long-run coefficients in front of the independent variables for the 8 subregressions (I-VIII) developed from the regressions (4) and (5) and ECM term, for each subregression separately.

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24) The dummy variable for the global financial crisis and subsequent European sovereign debt crisis is not contained here because it is taken as an exogenous variable to account for the unexpected effects of the mentioned crisis.

Table 2: Estimated long-run coefficients for the regressions (4) and (5) by employing VECM method, real loans and real deposits are the dependent variables (normalization of real loans = -1 and real deposits = -1)

	Dependent variables								
	Real loans and real deposits								
	Real loans	Real deposits	Real loans	Real deposits	Real loans	Real deposits	Real loans (a)	Real loans (b)	Real deposits
	I	II	III	IV	V	VI	VII[25]		VIII
							Probability for not rejecting restrictions of the coefficients (0.044)***		
Independent variables									
Real claims on the central government	-0.176*	0.093*	-0.251*	0.148*	-0.104*	0.060*	0	-0.197*	0.138*
Real deposits	1.89*		1.692*		1.731*		0	1.807*	
Real loans		0.529*		0.591*		0.578*			0.236*
Real NPL			0.137*	-0.081*					
Real CBBIR					0.106	-0.061	-3.234*	-0.891*	-0.195
Real GDP							7.419*	0	2.230*
ECM	-0.128*	-0.170*	-0.083	-0.340*	-0.147*	-0.219*	-0.016	-0.126*	-0.075
No serial correlation in the first order (probability)***	0.143	0.143	0.056	0.056	0.021	0.021	0.004		0.002

*and ** indicate statistically significant coefficient at 1% and 5% level of significance (H0: coefficient=0); *** a figure higher than 0.01 indicates non rejection at 1% statistical level of the following null hypothesis: (1) restriction of the coefficients, (2) no serial correlation in the residuals at the first order.

Source: Author's calculations

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25) Two cointegrating vectors are estimated. Restrictions are imposed based upon the suggestions by Bernanke and Blinder (1988) for loan market. The real loans variable is modeled in the first cointegrating vector as dependent variable of loan demand side factors: Real CBBIR and real GDP as demand factors while real claims on the central government and real deposits are set to 0 because they are supply side factors. Furthermore, the real loans variable is modeled in the second cointegrating vector as dependent variable of loan supply side factors: Real claims on the central government, real deposits and real CBBIR as supply factors while real GDP is set to 0 because it is demand side factor. Therefore, the regression VII provide results on loan demand (real loans (a)) and loan supply (real loans (b)) factors.

The results presented in Table 2 for the subregressions I-VIII arising from the regressions (4) and (5), are in accordance with the expectations regarding the real claims on the central government. The subregressions I, III, V and VII yielded negative coefficient ranging from -0.104 to -0.251. The meaning of this coefficient is that an increase of the real claims on the central government by 1% decreases the real loans within the interval from 0.104% to 0.251%. Thus, these subregressions indicate the estimated crowding out effect. However, the crowding out effect would be confirmed, only if this coefficient is higher compared to the corresponding positive coefficient in the subregressions II, IV, VI and VIII where Ricardian equivalence is implied. The estimated coefficient in front of the real claims on central government spans from 0.060 to 0.148 in the subregressions II, IV, VI and VIII. The meaning of this coefficient is that an increase of the real claims on the central government by 1% increases the real deposits within the interval from 0.060% to 0.148%. Hence, the Ricardian equivalence effect is not large enough to overwhelm the crowding out effect, but only partially offsets it. Consequently, the results favour the crowding out effect as higher compared to the Ricardian equivalence effect.

Finally, the ECM term is mostly negative suggesting correction of the disequilibrium towards equilibrium. The diagnostic test for the serial correlation as the most important problem when having time series, does not indicate large problems in the residuals, except in the VII and VIII subregression and therefore this results should be taken cautosly.

The results regarding the other variables are in line with the expectations except for the positive real NPL coefficient in the subregression III. It would be expected this coefficient to be negative because the higher credit risk imposes higher lossess for the banking sector. Additionally, this result is not logical because the NPL variable affects the deposits, as the main funding source for the loans, negatively in the subregression IV.

7. Conclusion

This study detects and quantifies the crowding out effect of the real central government borrowing on the private sector real loans provided by the Macedonian banks. Moreover, the Ricardian equivalence effect was also tested because the crowding out effect might be compensated by it. Therefore, the relationship between the real central government borrowing and real deposits was studied as well.

Concerning the main variable of interest (banks' real claims on the central government), the estimated results indicate that the crowding out effect as dominant over the Ricardian equivalence effect. The results for the crowding out effect are robust as can be seen from the relatively narrow range of the coefficients from -0.104 to -0.251.

It is clear that the Macedonian economic agents are rational and they permanently save money in the banks and partially offset the crowding out effect. Having in mind that the estimated crowding out is compensated to some extent by the Ricardian equivalence as well as its' relatively small magnitude, the policymakers could deduce that the crowding out effect is not serious issue for the Macedonian banking sector. Moreover, the crowding out should be a matter of concern because as implied by Koczan (2015), Fiti et al. (2017) and CEA (2019), the government has not been using efficiently the funds. Moreover, the banks claim significant amount of 684 millions of Euros as of 2019q2 in nominal terms (676 millions of Euros, deflated), that could offset the cumulative loss of the economic growth caused by the non-realized capital expenditures as implied by CEA (2019), under condition that the banks place the money in the real sector. Therefore, the government as policy maker has to improve the efficiency of the investments that is going to make in the future, especially when using the funds borrowed from the domestic banks. Hence, the government using the funds more efficiently would create higher economic growth and would contribute to higher profitability of the domestic companies that would be attractive for the banks to increase the lending.

Additionaly, concerning the relationship among the government, banks and real sector, it would be recommended the government to indebt in foreign capital markets instead of borrowing from domestic banks, and the funds to be used for capital projects made by the domestic companies. In this manner, the Macedonian banks would have more funds available to support the domestic companies conducting the capital government projects and also, they would face companies carrying less credit risk and increased creditworthiness due to engagement in the capital projects. Consequently, the multiplying effects of the fiscal policy would become more significant and the problems arising from the negative fiscal multipliers and indicated by Fiti et al. (2017), could be overcome.

Concerning the banks only, it would be recommendable to enhance the credit risk management in order to better analyze the domestic companies and lend them more in order to support their profitable opportunities. Although the government is considered as first class borrower due to the secured revenues form taxes, placing large funds in one client caries concentration risk as shown by the later European sovereign debt crisis from 2011 and 2012.

Regarding the other reserchers dealing with this topic, it would be recommended to apply different approach than the one used in this paper in order to confirm it or deny it the both crowding out and Ricardian equivalence.

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