Bank Profitability and Monetary Policy Transmission in Cameroon

Marcel Takoulac Kamta
University of Bamenda, HICM, Cameroon
E-mail: marcelk049@yahoo.fr; takoulackamta@uniba.cm

Willi Verlaine Dongho Wamba Tejio
University of Bamenda, HICM, Bamenda, Cameroon
E-mail: donghowamba@uniba.cm

Dinah Gembom Phungeh
University of Bamenda, HICM, Bamenda, Cameroon
E-mail: dinahgembom@uniba.com

Gautier Tchoffo Tameko
University of Dschang, FSEG, Dschang, Cameroon
E-mail: gautier.tchoffo@univ-dschang.org

Abstract

This study aims to evaluate the effect of bank profitability on the monetary policy transmission of the Bank of Central African States (BEAC). In order to accomplish this, we conducted a panel data analysis using a sample of 12 commercial banks that were active in Cameroon over the period 2010-2021. The Credit National Council of Cameroon provided the data used in this study. The Fully Modify Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS) methods are used to estimate our model. We find that the most profitable banks are less sensitive to the restrictive monetary policy shocks than those with low profitability. This result shows that bank's profitability negatively affect the effectiveness of monetary policy. Consequently, we advise BEAC to promote the entry of new commercial banks into the Cameroon financial sector. This will lead to a decline in bank profitability while also raising bank sensitivity to change in monetary policy.

1. Introduction

Over the past two decades, research on credit channel has shifted from macro to micro data. The idea under this new approach of testing monetary policy transmission is that banks with different characteristics levels will behave differently after the implementation of monetary decision. Along the same line, a number of authors based on bank's individual data have identified bank market power, size, capitalization and liquidity as banking internal factors influencing the commercial

banks responsiveness to monetary policy shocks (Kashyap and Stein, 1995, 2000; Brissimis et al., 2014; Roman et al., 2021; Al-Khouri and Arouri, 2019; Renzhi and Beirne, 2023). From this review, an important factor has been neglected. That factor is bank profitability. According to Ouédraogo (2011) the most efficient banks are most likely to hedge their balance sheets against the monetary policy tightening since they have easier access to external funds. So, one should also consider bank profitability as an additional factor influencing the loan sensitivity to monetary policy shocks. An empirical check is therefore necessary. We will do it trough the case of Cameroun, a country of the Economic Community of Central African States (CEMAC).

Several studies on the credit channel's identification demonstrate that it exists in the CEMAC zone (Saxegaard M., 2006; Kamgna and Ndambendia, 2008; Bikai and Kenkouo, 2015; Takoulac et al., 2020a, 2020b). However, excess liquidity and bank concentration make it less effective (Takoulac et al., 2020a). Although Takoulac et al. (2020a) used the example of Cameroon to assess the effect of the characteristics of bank balance sheet and bank concentration on the monetary policy transmission in this area, the latter did not account for bank profitability. While, according to the Structure Conduct Performance (SCP) hypothesis, in a concentrated market, banks make monopolistic profits. Thus, they can use them to hedge their balance sheets against restrictive monetary policy decisions. Additionally, the easier access to other financing funds out of those of the Central Bank provides to them a buffer against restrictive monetary policy shocks (Brissimis et al., 2014).

From reading annual reports of the Credit National Council of Cameroon (2010-2021), we note that the bank rate of Return On Asset (ROA) in Cameroon varies from year to year and from one bank to another. In 2010, for example, three banks out of 12 of our sample achieved a negative rate of return while the other 9 had favourable rates with a maximum rate of 2.10%. In 2021, on the other hand, only one bank obtained a negative rate (-0,50). The most profitable bank achieve a 3.2% Return On Asset (ROA) rate whose performance improved by 1.2% between 2010-2021. Given the differential level of profitability of banks operating in Cameroon, one is entitled to wonder whether all banks operating in Cameroon react similarly to changes in monetary policy. Therefore, we propose highlighting the bank credit channel by testing the effect of bank profitability on the monetary policy transmission in Cameroun. In other words, the work here consists of testing the sensitivity of bank loans to monetary policy decisions by considering bank profitability. It is also important to mention that Cameroun have the highest banking system with 28,85% of the total number of commercial banks operating in CEMAC[1] zone in 2021. Furthermore, in 2021 Cameroon's banking system alone supplied about 57,5% of total credit granted in CEMAC zone (BEAC, 2021). Due to the fact that we don't have access to other countries' individual dater, we will focus our mind on the case of Cameroon.

The relationship between bank profitability and monetary policy has been covered by several authors (Brissimis et al., 2010; Mbabazize et al., 2020). However, as far as we know, studies have only examined how monetary policy shocks affect bank profitability; none have examined how bank profitability affects monetary policy transmission. Therefore, this work enriches the literature on credit channels by including bank profitability among the factors likely to affect the response of commercial banks to the monetary policy shocks.

We structured the remainder of this work around four points after the introduction in the first section. The literature review is covered in Section 2, the methodological approach used in this

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[1] Cameroon : 15 banks ; Congo : 11 banks; Tchad : 10 banks; Gabon 7 banks; Equatorial Guiney : 5 banks; Central African Republic : 4 banks.

work is developed in Section 3, the primary findings are covered in Section 4, and we wrap up the study by providing the essential conclusions in Section 5.

2. Literature review

The Credit channel debate focuses today on the identification of factors likely to influence the response of credit supply to change in monetary policy. Before going through that, it is noteworthy to point out that, two presumptions must be valid for the credit channel to work (Bernanke and Blinder, 1988): first, the commercial banks' refinancing (resources) depends on the Central Bank, and second, the economy's financing depends on bank credit. Consequently, the banking sector should be the primary source of investment capital. The validity of these two assumptions increases the sensitivity of banks and non-financial agents to monetary policy decisions ceteris paribus. Since the financial landscape has changed with the development of financial markets, commercial banks and non-financial agents can find investment capital out of banking system. This can be explained by the fact that banks can raise money by issuing certificates of deposit. They can use it to maintain their credit activity unchanged after a restrictive monetary policy shock (Romer, 1989). This will reduce the ability of the credit channel to conduct the monetary policy decisions. Therefore, the Bernanke and Blinder (1988) theoretical hypothesis became questionable.

According to Mishkin (2010), if works on credit channel remains relevant in both market and debt economies despite criticism, it's because restrictive monetary policy is accompanied by a fall in credit. Therefore, the economic activity and the level of employment will drop. It is easy to understand because the banking system remains the primary source of financing for companies that cannot afford the financial market. This proves that the credit channel is indeed a monetary policy transmission channel. Thus, it is no longer a matter of identifying the credit channel but determining the factors likely to affect it.

For example, in an empirical study in the United States, Kashyap and Stein (1995), show that banks with big-size are less responsive to monetary policy change than small sizes banks. In another work published by the same authors in 2000, it appears that liquidity follows the same logic. In order to set out their thinking, they assume a restrictive monetary policy shock causing losses on deposits so that banks can no longer turn to other sources of funding given the drying up of the interbank market. As a result, the balance sheet assets of both banks are shrinking significantly. However, the more liquid banks can maintain their lending activity since they hold a securities stock. On the other hand, after a monetary policy tightening, the less liquid bank will significantly reduce their loan.

After Kashyap and Stein (1995, 2000), Van Den Heuvel (2002) in "does bank capital matter for monetary policy transmission" adds bank capital to previous factors[2]. He shows that, the level of bank capital may explain banks' different responses to monetary policy. According to him, a banking system with a less capital endowment is more sensitive to monetary policy decision than that with a strong capital level.

 Based on the Structure-Conduct-Performance (SCP) hypothesis, another category of researchers paid a particular attention on the link between banking market structure and monetary policy transmission (Adams and Amel, 2005; Olivero et al., 2011a; Nasha et al., 2015; Takoulac et al., 2020a). For example, Adams and Amel (2005) in an empirical study find that a competitive market

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[2] Bank size and liquidity.

is more able to conduct monetary policy than a concentrated banking system. According to them, in a concentrated banking system, banks have market power and earn high profit. Therefore, they will use their efficiency skill or profit to absorb monetary policy changes. As a result, in a concentrated market, restrictive shocks have little impact on interest rates and credit.

In a comparative analysis between the Euro area and the United States, Brissimis et al. (2014) show that banks with low market power are more sensitive to monetary policy shocks than banks with high market power. However, its impact is more pronounced in Europe than in the United States. This result is in line with that of Al-Khouri and Houda (2019) and contrasts with that of Yifei et al. (2022). Yifei et al. (2022) found that banks' market power on deposits increases bank credit supply's sensitivity to changes in the Fed's key interest rates. This last category of work differs from Kashyap and Stein (1995, 2000) and Van den Heuvel (2002)'s work by taking into account market power in the credit channel analysis. Unlike these authors, we replace market power with bank profitability measured by the Return On Assets. Then, we assess the sensitivity of commercial banks to restrictive monetary policy shocks. This study joins the work of Renzhi and Beirne (2023), who empirically demonstrate that firms with low markup conduct monetary policy better than those with high markup.

After carefully examining the empirical literature, we discovered that some authors find neutral outcomes and others are paradoxical. It is the instance of Golodniuk (2006), who finds that bank size and liquidity do not affect the sensitivity of bank credit to monetary policy shocks in Ukraine. Regarding bank capital, Boughrara and Ghazouani (2009) find in Egypt that the most capitalized banks respond more fully to monetary policy shocks, while in Morocco, The effect capitalization on credit channel is not significant. This last result is in line with those found in Nigeria by Ezema (2009) and contrasts with those of Kashyap and Stein (1995, 2000) and Brissimis et al. (2010).

In light of this literature review, the effects of the characteristics of banks on the transmission of monetary policy are questionable according to the economic areas. While they significantly affect the sensitivity of bank credit supply to monetary policy in some countries, they have no effect in others. This gives rise to the debate and justifies our study. Even if the most recent studies focus more on the impact of market power on the monetary policy transmission, it is still important to note that assessing the effect of bank profitability on the monetary policy transmission is necessary. Let's move to the methodology approach.

3. Methodology

The methodological framework that guides our econometric study is the main topic of discussion in this section. Therefore, the econometric model, the data, and the estimation process are presented here.

3.1. Econometric model and variable description

Most of the recent analysis on the credit channel uses a panel data model inspired by Kashyap and Stein (1995). The advantage of this model is that it uses desegregated data. This allows us to account for the individual specificities of our sample. With this model, it is possible to draw attention to the asymmetry of commercial banks' reactions to monetary policy without estimating the model

separately for each homogeneous group using the interaction term (Raulin Lincifort, 2009). Therefore, we formulate the following dynamic econometric model:

$$\log(L_{it}) = b_1\log(L_{it-1}) + b_2INFL_t + b_3\log(D_{it}) + b_4TIAO_t + b_5TIAO_t * ROA_{it} + \varepsilon_{it} \quad (1)$$

$$ROA_{it} = \frac{NR_{it}}{TAB_{it}} \quad (2)$$

Where: Credit supply (L) is the dependent variable. The independents variables are: inflation (INFL), deposits (D), Interest Rate on Tenders TIAO (the main rate of the BEAC), Return On Asset (ROA) used to measure bank profitability, multiplicative variable (ROA*TIAO). Net Income (NR) and total bank assets (TA). ɛ account for random error term. The index i and j associated to each variable represent period and bank, respectively. $b_1, b_2, b_3, b_4, b_5, b_6, b_7$ and b_8 are parameters. Their expected signs are presented in table 1 below.

Table 1 - Expected signs and variable description

Variable	Description	Expected signs	Justification
L	Credit supply		Kashyap and Stein (2000)
L_{it-1}	Credit supply lagged by one period	+	Ouédraogo (2011)
INF	Inflation rate in %	+	Birendra (2013)
D	Deposit	+	Bernanke et Blinder (1988)
TIAO	BEAC Key interest rate on tenders	-	Brissimis et al. (2014)
$ROA_{it} * TIAO_t$	Interaction between bank profitability[3] and Central Bank's interest rate	+	Kashyap and Stein (1999/2000); Adams and Amel (2005).

Source: authors, starting from the literature review.

3.2. Data and their sources

The secondary data used in this study was obtained from the National Credit Council of Cameroon for 2010–2021. It is noteworthy pointing out that, there were 15 commercial banks operating in Cameroon in 2021. Three of them enter the Cameroon banking system in 2010, 2015 and 2018 respectively. Including them in the study will reduce the consistency of the result because their data are not available within the entire period. Among the thirteen banks in Cameroon in 2010, the thirteenth was registered in November 2010. So, the data for this period are missing. Data for the remaining 12 banks are available yearly from 2010 to 2021. For these reasons, the study period in this research work is limited to 2010-2021, with a sample of 12 commercial banks holding 91% of total banking asset in Cameroon (CNC, 2021). Our sample's individual bank data (micro) are mainly credit supply, deposits, net income and total bank assets. The other variables include macroeconomic data like inflation and the BEAC's primary policy rate. The following table present the descriptive statistics of our variables.

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[3] Commercial Bank profitability is measured by the Return on Asset's rate.

Table 2 - descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev	Probability	Obs.
L	1.96E+11	1.24E+11	7.93E+11	3.20E+08	1.76E+11	0.000005	144
INFL	0.030500	0.024500	0.090000	0.011000	0.021517	0.000000	144
D	3.00E+11	2.22E+11	1.19E+12	4.41E+10	2.39E+11	0.000001	144
TA	3.90E+11	2.93E+11	1.51E+12	6.51E+10	3.01E+11	0.000000	144
RN	4.30E+09	3.50E+09	2.45E+10	-2.09E+10	6.92E+09	0.000005	144
ROA	0.008952	0.012626	0.143388	-0.081062	0.026229	0.000000	144
TIAO	0.032792	0.032750	0.040000	0.024500	0.005284	0.033298	144
TIAO*ROA	0.000282	0.000388	0.005736	-0.003242	0.000926	0.000000	144

Source: authors computation from Eviews10.

As shown in the above table, the large values of the standard deviations compared to the means of these variables confirm the heterogeneity between the individuals in the sample used. Therefore, for this investigation, the disaggregated data strategy is highly suitable.

3.3. Estimation procedure

Once the data is assembled, several preliminary checks are made using the Eviews.10 and Stata14 software to guarantee the accuracy of the findings. Using the IPS stationarity test, it appears that all our variables are stationary in first difference. Therefore, we decided to check if there is a long-run relationship between the variables. Kao cointegration test confirmed that our variables are cointegrated. The Breusch-Pagan test shows the presence of Heteroscedasticity. The Fisher test reveals that the panel is heterogeneous. The correlation coefficients given in the table 3 below are low, implying that there is no multicollinearity.

Table 3 - Correlation matrix

Variable	LOGL	INFL	LOGD	TIAO	TIAOXROA
LOGL	1.000000				
INFL	0.037967	1.000000			
LOGD	0.400848	0.020852	1.000000		
TIAO	-0.048101	-0.499495	-0.092781	1.000000	
TIAOXROA	0.148693	-0.023661	0.168905	-0.046276	1.000000

Source: Authors using Eviews10.

Given the preliminary tests results, the choice is made on two estimation methods: FMOLS (Fully Modified Ordinary Least Square) and DOLS (Dynamic Ordinary Least Square). FMOLS automatically correct problems of autocorrelation, heteroscedasticity, endogeneity and give non bias estimators in small sample size. This is the case of our sample size (N=12 and T=12). However, a comparison investigation by Kao C. and Chiang M. (2000) demonstrates that DOLS outperforms FMOLS in both homogeneous and heterogeneous panels and in both large and small samples. Another difference between these two methods is that, FMOLS involve non parametric adjustment of regressors while DOLS involve parametric adjustment. These benefits lead to the FMOLS' initial estimation of the model. Then, DOLS are utilised for robustness check.

4. Discussion of results

This study aims to evaluate the impact of bank profitability on the credit channel's ability to transmit monetary policy. Given each bank's profitability level, we examine the effect of the Central Bank interest rate (TIAO) on credit availability. Table 4 below provides a summary of the findings.

Table 4 - Summary of the results

Variables	Estimations methods	
	FMOLS	DOLS
LOGL(-1)	-0.104256	-0.073309
	(0.126934)	(0.051637)
INFL	0.338867	0.486903
	(0.144962)	(0.791558)
LOGD	0.714398***	0.696630**
	(0.126020)	(0.327858)
TIAO	-18.67513***	-18.61014***
	(0.107211)	(3.870256)
TIAO*ROA	53.59802***	53.69339***
	(0.143937)	(3.655420)
Observations	144	144
Number of banks	12	12
R-squared	0.896614	0.899307
Adjusted R-squared	0.864803	0.871934

Note: standard errors in parentheses, *** $p<0.01$ and ** $p<0.05$.
Source: authors computation from Eviews 10.

The preceding table's study of the coefficient of determination reveals that the model's specified variables account for more than 89% of the variation in the credit supply. This result aligns with the Wald test, showing that the model is globally significant. Additionally, it can be shown from our findings that the parameters of our model that were estimated using the two different estimating techniques had identical signs and similar values. This gives us comfort that the results are consistent.

Our results show two categories of variables: variables that do not significantly impact credit supply (inflation and the lag one credit supply) and those that do (deposits, interest rate and the interaction term). An interpretation of the first category of variables shows a positive relationship between inflation and credit supply in Cameroon. This sign is consistent with the work of Birendra (2013). But, the coefficient is not significant. Meaning that, inflation does not contribute to the explanation of change in credit supply in Cameroon. It is the same case with the lag one credit supply who does not significantly affect the credit supply.

Concerning the second category of variables, we notice that, deposits have a positive and significant effect on credit supply. This result can be explained by the fact that more deposits means more resources to lend. This outcome is consistent with the predicted sign and supports the economic theory of credit multiplier. We are not even surprised because it appears from the Cameroon banking system data that deposits have consistently outpaced credits for the entire study period (CNC, 2021). Meaning that, deposits are the main bank financing resources in Cameroon. This outcome is consistent with Bernanke and Blinder's (1988) research.

Additionally, the TIAO coefficient reveals that the Central Bank key interest rate negatively and significantly impact credit supply in Cameroon. This can be explained by the fact that during a period of monetary policy tightening, an increase of the Central Bank interest rate will lead to an increase in the refinancing cost of commercial banks at BEAC. They will consequently reduce their credit supply. This result confirms that the credit channel is active in Cameroon. Therefore, the Central Bank may modify its interest rate to rebalance liquidity when appropriate. This outcome conforms with Brissimis et al. (2014) and Takoulac et al. (2020a).

According to our estimation, the interaction term coefficient (TIAO*ROA) is positive and significant. Meaning that, the level of bank profitability affects the monetary policy transmission in Cameroon. The positive sign of the multiplicative variable coefficient found in our model implies that, the most profitable banks are less sensitive to restrictive monetary policy shocks than the most profitable banks. This outcome can be explained by the fact that a high level of bank profitability indicates the bank's efficiency and minimal risk to interbank and financial market players. As a result, a bank of this type can more easily acquire funds other than deposits and Central Bank refinancing. This enables it to maintain a consistent credit supply even during the restrictive monetary policy period. The most prosperous banks can also use their retained profits to protect their balance sheets from a restrictive monetary policy shock. This result aligns with that of Brissimis and Delis (2010). However, banks with low profitability will reduce their credit supply in line with the central bank's expectations. This last result reflects the asymmetry of banks' response to monetary policy shocks. As a result, bank profitability is another factor to consider when analyzing the lending channel and conducting monetary policy.

5. Conclusion and recommendation

The main aim of this paper was to evaluate the effect of bank profitability on the BEAC's monetary policy transmission. In order to achieve this goal, we used a panel data analysis using 12 commercial banks operating in Cameroon. Individual data from this sample cover the period 2010-2021. The application of preliminary tests to these data led to the choice of FMOLS as the estimation method and DOLS for robustness checks. The interpretation of the interaction's term coefficient reveals that the most profitable banks are less sensitive to the tightening of monetary policy in Cameroon than the weak, profitable banks. This enables us to claim that high bank profitability lowers monetary policy's effectiveness.

Therefore, we recommend that the BEAC encourage the entry of new firms into the Cameroonian banking system, particularly in the CEMAC zone in general. This will increase the level of banking competition and ultimately reduce profitability per bank while increasing their sensitivity to monetary policy decisions. This will improve the credit channel's ability to transmit monetary policy. The principal limitation of this paper is that we carried out the study only in Cameroun. Therefore, for the future research, we advise to consider the whole banking system of the CEMAC zone.

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