



The Impact of Macprudential and Monetary Policies Instruments on the Private Credit Growth in the Arab Banking Sector

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ABSTRACT

This paper investigates the potential impact of macroprudential instruments, namely debt-to-income (DTI) and loan-to-value (LTV) ratios on controlling the private credit growth in the Arab banking system, and we also attempt to examine the effects of the monetary policy instruments on private credit growth by using Generalized Method of Moments (GMM) technique. We measure the effect of loosening or tightening these instruments on the growth of private credit using a sample covers ten Arab countries based on quarterly data for the period (2014-2019). The results reveal that the macroprudential policy tools have the power to control the private credit growth, as the effects of tightening the DTI and the LTV ratios appear directly after one quarter, while the monetary policy tools and the required reserve ratio have a negative impact on the private credit growth, and their effects appear after two quarters and one quarter respectively. Finally, the results show that there is no evidence of significant impact of the economic variables on credit growth.

Keywords: Macroprudential Policy, Monetary Policy, Private Credit Growth, Arab Region, Generalized Method of Moments

JEL Classifications: E44, E51, E58, E61, G51

1. INTRODUCTION

Perhaps one of the most important lessons learned from the global financial crisis in 2008 is that achieving financial stability should be one of the main goals of central banks, so many central banks have amended their laws to add the responsibility of enhancing financial stability to their other goals, so central banks seek to assess systemic risk on an ongoing basis, and thus use of appropriate macroprudential policy tools to mitigate systemic risks in the financial system, central banks use capital-based instruments and liquidity-based instruments to enhance the ability of the financial system to withstand unexpected shocks (Obeid, 2023), while asset-side instruments such as the debt-to-income (DTI) ratio and the loan-to-value (LTV) ratio are used to mitigate systemic risks in the financial system. However, the impact of these tools on systemic risks, especially those resulting from excessive

growth of private credit, may depend on several factors such as the monetary policy adopted by the central bank, economic conditions, and others. Recent studies (such as Ampudia et al., 2021; Obeid, 2022) have demonstrated that macroprudential policy instruments contribute to the control of the financial cycle by influencing credit growth and limiting the occurrence of an asset.

In this paper, we focus on analyzing the potential role of the LTV and DTI ratios in mitigating the risk arising from private credit. Notably, the LTV and DTI ratio caps are the most important prudential instruments used to reduce the risk accumulation in private credit (Arregui et al., 2013). Asset tools are distinguished from liquidity and capital tools in that they do not target all economic sectors, as the DTI ratio targets the household sector, which is less productive compared to the corporate sector, while the LTV ratio targets the real estate sector or housing loans.

Therefore, this paper provides an opportunity to explore the determinants of the private credit growth and analyze the impact of macroprudential and monetary policies, in addition to economic conditions, on private credit behavior in the Arab banking system.

2. LITERATURE REVIEW

Several empirical studies have investigated the effect of the macroprudential policy and monetary policy tools on the growth of private credit, but it is necessary to distinguish between the objectives of macroprudential and monetary policies, where the macroprudential policy aims to mitigate systemic risks as we have already mentioned, whereas monetary policy aims to control prices and inflation (Obeid and Awad, 2017), so, for example, central banks may raise interest rates on monetary policy instruments to reduce market liquidity in order to contain inflationary pressures, so monetary policy may directly or indirectly affect private credit growth.

Arregui et al. (2013) revealed that LTV and DTI ratios were effective instruments in 38 countries for containing high credit growth and rising property prices. Kuttner and Shim (2013) examined the effect of limiting LTV and DTI ratios on credit growth through assessing the four-quarter effects. They attempted to capture the effects of macroprudential policy changes on credit and housing prices over the next 4 quarters. The paper revealed that in 57 countries, limiting DTI decreased home loans by 4-7%, whereas limiting LTV decreased home loans by 1%.

Claessens (2014) that, based on data of individual banks in 48 countries over the period 2000-2010, the LTV and LTV caps, were effective in reducing the credit growth. Where Zhang and Zoli (2014) showed that macroprudential policies restricted the supply of credit in selected Asian banks.

Jacome and Mitra (2015) investigated the impact of LTV and DTI on credit growth in six countries (Brazil, Romania, Hong Kong, Poland, Malaysia, and South Korea). In these countries, LTV and DTI ratios ranged between 60-85% and 30-40%, respectively. The study indicated that the selected countries changed the rates many times during the study period since the central banks in those countries did not achieve the desired effect on the target growth of credit. Even though the central banks in Romania and Poland consulted with the banking sector before putting or changing the caps on the LTV and DTI ratios, and the central bank in Korea gave the banks 2 weeks period before adopting limits on the LTV and DTI ratios, the study recommended that central banks when tightening LTV and DTI ratios, it is preferable to have no prior consultation with banks, in order to avoid the last-minute rush to purchase automobiles or real estate, and thus create a prices bubbles in the asset markets. The results have shown that LTV and DTI ratios were effective in reducing the growth of loans and improving the debt service performance of the bank's clients.

McDonald (2015) investigated the impact of the tightening and loosening macroprudential instruments on housing loans in 17 countries. The paper revealed that when central banks tightened the LTV and DTI ratios, it reduced the volume of housing loans by

2-3%, while loosening them led to an increase of 0-3%, indicating that the impact of tightening is greater than that of releasing. Given the impact of policy adjustment across the selected countries in the study, the impact of setting limits on DTI and LTV is greater when credit expands rapidly and when real estate prices are high, as setting caps on these ratios during economic booms periods reduced the level of loans a year after implementing the 4-8% limit, whereas during economic recessions period they ratios reduced housing loans by 2-3%.

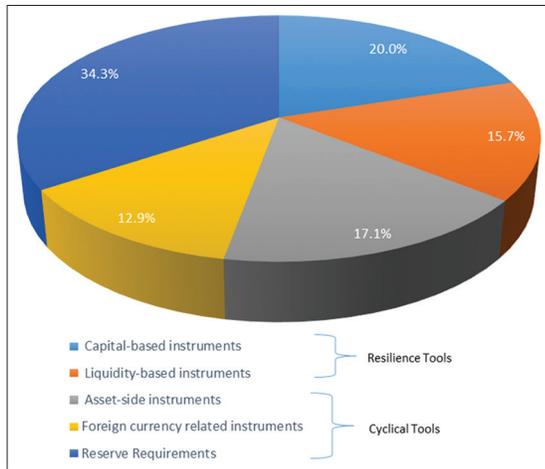
Akinci and Olmstead-Rumsey (2015) developed a quarterly index of macroprudential policies in 57 countries for the period 2000-2013, with tightening and easing recorded separately, the paper found that the tightening macroprudential policy has decreased the bank credit growth and slowed the increase of home prices.

Obeid (2022) showed that the LTV and DTI ratios have clear effects in controlling the growth of household credit in the Arab banking sector, as the results of releasing or tightening the LTV and DTI ratios appeared after one quarter.

3. AN OVERVIEW OF THE MOST IMPORTANT MACRO PRUDENTIAL POLICY DECISIONS TAKEN BY ARAB CENTRAL BANKS DURING THE PERIOD (2014-2019)

Central banks in the sample studies made a great effort, during the period (2014-2019), to assess the systemic risks that the banking system may be exposed to, as it is the main component of the financial system, and because of its vital role in the national economy, which is directly reflected in financial stability. It must be noted that the use of macroprudential policy tools does not necessarily mean the existence of systemic risks in the financial sector, as the use of macroprudential policy tools is based mainly on two dimensions, the first dimension is controlling systemic risks, and the second dimension is strengthening the banking system's ability to withstand shocks, taking into account what many countries have done in various parts of the world, another dimension may be added represented in supporting other economic policy decisions in a way that does not negatively affect the soundness of the financial positions of the banking sector (but it is possible to include this dimension in the framework of systemic risk control). In this context, (Figure 1) shows the macro-prudential policy tools and the liquidity support tools that were used by central banks in the Arab region during the period (2014-2019) (regardless of the direction of the prudential policy by tightening or loosening). The reserve requirements ranked first in terms of use, as it constituted about 34.3% of the total number of macroprudential policy instruments used, followed by capital instruments at 20.0%. About the tools that are used to face systemic risks or fluctuations (asset tools, foreign currencies and cash reserves), they accounted for 64.3% of the decisions related to the use of macroprudential policy tools, while the tools aimed at enhancing the ability of the banking sector to withstand shocks (capital and liquidity tools) with a rate of 32.6%.

Figure 1: Use of macroprudential instruments (in percent) during the period 2014-2019 (type of instrument)



Source: Arab Monetary Fund (2021), Financial Stability Report in the Arab countries

With regard to the direction of the macroprudential policy decisions, the tightening measures accounted for 74% of the total macroprudential policy decisions taken by Arab central banks during the period (2014-2019), while loosening measures constituted about 26% of those decisions, which reflects that the Arab central banks were generally conservative (Figure 2).

4. MODEL AND DATA

This paper investigates the cumulative impact of the LTV and DTI ratios on the private credit growth for a panel of 10 Arab countries (The United Arab Emirates [UAE], Jordan, Iraq, Tunisia, Morocco, Egypt, Saudi Arabia, Kuwait, Bahrain, and Oman), using quarterly data for the period (2014-2019). We examine the following model that has been used in previous research (Neagu et al., 2015 and Obeid, 2022):

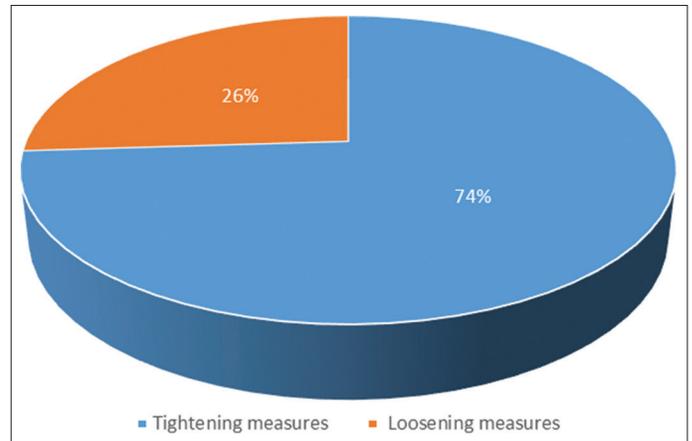
$$\begin{cases} \Delta C_{it} = \alpha \Delta C_{it-1} + \beta_{MP} \sum_{s=1}^4 \Delta r_{MP,t-s} + \beta_{MRR} \Delta r_{MRR,t-1} + \beta_y y_{t-1} \\ \quad + \beta_{inf} \pi_{t-1} + \delta X_{i,t-1} * r_{MP,t-s} + \mu D_{t-1} + \varepsilon_{i,t} \\ i = 1, 2, \dots, N, t = 1, 2, \dots, T \end{cases} \quad (1)$$

Where i represents the country at the time t , ΔC is the quarterly credit growth, r_{MP} stands for the main monetary policy interest rate, r_{MRR} refers to the regulatory requirement for the mandatory cash reserve ratio, π stands for the inflation rate, y represents the real GDP growth, X refers to the legal liquidity ratio, D represents dummy variable that measures the macroprudential measures, it take the value 1 when DTI ratio and/or LTV ratio are tightened, the value -1 when DTI and/or LTV ratios are loosening, and the value zero otherwise, $\varepsilon_{i,t}$ refers to the error term.

5. ECONOMETRIC METHODOLOGY

This paper evaluates the dynamics of the household credit response to banking and macroeconomic factors in the Arab banking sector considering the potential role of macroprudential and monetary

Figure 2: Use of macroprudential instruments (in percent) during the period 2014-2019 (type of measurement)



Source: Arab Monetary Fund (2021), Financial Stability Report in the Arab countries

policies tools. We use the difference GMM (generalized method of Moments) to achieve the purpose of our study, the GMM was developed by Holtz-Eakin et al. (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) as following:

$$C_{i,t} = \gamma C_{i,t-1} + \beta' X_{i,t} + \psi_i + \varepsilon_{i,t} \quad (2)$$

$$i = 1, 2, \dots, N, t = 2, \dots, T$$

Where the dependent variable (Private credit growth) represented by the vector of C , and X refers to a set of explanatory factors: the legal liquidity ratio, the main monetary policy rates, the regulatory requirement for the mandatory cash reserve ratio, the inflation rate, the real GDP growth, the macroprudential policy measures, and $\varepsilon_{i,t}$ stands for the error term. The term ψ_i refers to the country-specific effect that is not captured by the random error term $\varepsilon_{i,t}$, considering that the value of the $\psi_i + \varepsilon_{i,t}$ term represent a compound standard deviation, for each $i = 1, \dots, N$ and $t = 2, \dots, T$ we have $E(\psi_i) = 0$, $E(\varepsilon_{i,t}) = 0$ and $E(\psi_i + \varepsilon_{i,t}) = 0$. Now we subtract the country-specific effects from the first difference, so Equation (2) will be as following:

$$C_{i,t} - C_{i,t-1} = \gamma(C_{i,t-1} - C_{i,t-2}) + \beta'(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (3)$$

If we apply the Ordinary Least Squares (OLS) to estimate our model, this leads to a biased estimation of the coefficient γ , so we use an alternative technique, the GMM method can be used by the following moment conditions, we assume that we don't have serial correlation in the error term, and there is no correlation between the independent variables and the future values of the errors (Carkovic and Levine, 2005):

$$E[C_{i,t-s} (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } t = 3, \dots, T, s \geq 2 \quad (4)$$

$$E[X_{i,t-s} (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } t = 3, \dots, T, s \geq 2 \quad (5)$$

To overcome the weak instruments problem, we impose the following additional moment conditions (Blundell and Bond, 1998):

Table 1: Summary statistics of the variables (%)⁽¹⁾

Country	CG	MoPa	LIQ	RRR	RGDP	INF
Bahrain						
Mean	2.956	1.900	120.123	1.242	3.386	1.526
SD	6.015	1.650	2.551	3.12	1.399	0.215
Egypt						
Mean	4.126	3.714	142.312	9.453	4.125	4.253
SD	7.087	4.386	2.321	1.242	1.211	3.215
Iraq						
Mean	1.346	2.714	214.516	5.242	2.923	6.254
SD	3.657	3.946	5.658	7.265	5.974	8.258
Kuwait						
Mean	6.852	2.421	190.715	5.210	0.304	2.365
SD	7.532	2.625	6.425	1.052	2.373	3.352
Jordan						
Mean	5.312	2.163	198.5	7.000	2.102	3.521
SD	1.202	1.546	2.201	0.000	0.278	1.354
Oman						
Mean	4.823	5.729	135.6	5.623	3.240	3.521
SD	1.641	3.431	3.256	5.352	1.293	1.523
Morocco						
Mean	4.823	4.251	194.5	4.502	3.240	3.120
SD	5.641	1.253	2.354	6.254	1.293	1.235
KSA						
Mean	6.815	4.729	153.6	3.654	3.240	4.325
SD	5.641	2.431	3.654	2.354	1.293	1.235
Tunisia						
Mean	5.823	6.729	122.6	6.521	3.240	6.121
SD	6.641	3.431	6.325	4.351	1.293	8.953
UAE						
Mean	5.254	4.729	175.2	6.252	3.152	2.581
SD	4.625	3.431	7.852	5.235	1.293	1.354
Full panel						
Mean	4.905	3.357	88.548	4.510	2.387	3.522
SD	5.009	2.903	4.685	5.033	3.701	4.166

⁽¹⁾ CG: Private credit growth, MoP: Main rate of the monetary policy, LIQ: Legal liquidity ratio, RRR: Required reserve ratio, RGDP: Real GDP growth, INF: Inflation rate, SD: Standard deviation. Source: Author's calculations

$$E[\Delta C_{i,t-s}(\psi_i + \varepsilon_{i,t})] = 0 \text{ for } s = 1 \text{ and } t = 2, 3, \dots, T \quad (6)$$

$$E[\Delta X_{i,t-s}(\psi_i + \varepsilon_{i,t})] = 0 \text{ for } s = 1 \text{ and } t = 2, 3, \dots, T \quad (7)$$

Considering the above, the technique of the GMM system is now consistent and efficient by using the additional moment conditions given by equations (4), (5), (6) and (7).

6. ANALYSIS OF THE RESULTS

6.1. Descriptive Analysis

Table 1 reports a summary of the descriptive analysis, the table reveals that Kuwait (6.852) and Saudi Arabia (6.815) ranked the highest average credit growth during the study period, followed by Jordan (5.312) and the United Arab Emirates (5.254), which reflects the desire of the commercial banks in the Arab region to support the private sector by liquidity. Regarding the average private credit growth for the whole study sample, it amounted to 4.9%. This indicates the interest of the banking sector in the Arab countries to support the private sector as a strategic partner for the public sector, noting that the credit granted to the private sector constitutes about 75% on average of the total credit granted by the Arab banking sector (Arab Monetary Fund, 2021), at the level of private sector categories, the corporate sector accounts for a slightly higher share than the household sector during the study

Table 2: Difference dynamic panel estimation results (credit growth is the dependent variable)

Variable	Coefficients	Probability
Credit growth (t-1)	0.1215**	0.0198
Change in monetary policy (t-1)	0.7251	0.4526
Change in monetary policy (t-2)	-2.5426**	0.0425
Change in monetary policy (t-3)	-0.1425*	0.0715
Change in monetary policy (t-4)	-0.2584	0.7496
Macroprudential instruments (t-1)	-2.1153**	0.0216
Liquidity ratio	0.2512***	0.0012
Required reserve rate (t-1)	-0.0032***	0.0002
Real GDP	1.71691	0.23541
Inflation (t-1)	-0.2223	0.4625
Wald test		3156.52*** (0.0000)
Hansen J test (P)		0.4152
A-B test AR (1) (P)		0.023
A-B test AR (2) (P)		0.426
Observations		280
Number of countries		10

The P values are displayed in parentheses, ***Significant @ 1%, **Significant @ 5%, *Significant @ 10%. Dependent variable: Growth rate of private credit. We use the GMM estimation method which developed by Arellano and Bover (1995). The small number of groups limits the number of instrumental variables (Hansen probability increases to very high values). The endogenous variables used in the model are the lagged dependent variable, liquidity ratio and the real GDP growth. The instrumental variables are entered into the regression with two to six lags. 1. GMM: Generalized Method of Moments. Source: Author's calculations

period in terms of the volume of private credit (Arab Monetary Fund, 2021).

6.2. Discussion of the Results

Table 2 displays the GMM estimation of the determinants of the private credit growth for ten Arab countries during the period (2014-2020). As expected, the estimation indicates that LTV and DTI ratios have a significant negative impact on the credit growth, if the central bank takes a decision to loosening the LTV ratio and/or the DTI ratio, this will lead to an increase in the pace of private credit growth by 2.12% in the following quarter, considering that the magnitude of the effect depends on the amount of reduction or increase in those ratios, this result is consistent with (Akinci and Olmstead-Rumsey, 2015). The results also show that there is a significant positive relationship between private credit growth and its previous value.

Regarding the impact of monetary policy instruments on the private credit growth, the results reveal a significant negative relationship between the main interest rate of the monetary policy and the growth of the private credit, but this effect is start to appear after 2 quarters, then the effect decreases in the third quarter until it fades in the fourth quarter, an increase in the monetary policy interest rate by 1% lead to decrease the credit growth by 2.54% and 0.14% in the next third and fourth quarters respectively. The sign of the relationship between the monetary policy tools and the credit growth is consistent with economic theory, as higher interest rates of the monetary policy instruments reduce the banking liquidity, thus lead to increase the cost of credit, which mitigate the demand for credit (Obeid, 2022).

The results also indicate the required reserve ratio (RRR) has a significant impact on private credit growth. If the central bank

raises the RRR, this will lead to reducing the market liquidity, resulting in higher costs for banks, which may push commercial banks to pass these costs through the net interest margin ratio, thereby decreasing the demand for credit. These results demonstrate the significance of coordination between monetary and prudential policies to achieve the desired balance between protecting the financial sector, on the one hand, and stimulating economic activity, on the other (Obeid and Adeinat, 2017; Obeid, 2021).

Regarding the legal liquidity ratio, the results reveal that liquidity has a significant positive impact on private credit growth, as the high liquidity levels encourage to employ it through loans to gain greater profits. Finally, regarding the economic variables, there is no evidence for a significant impact of the real GDP and the inflation rate on the private credit growth, which is consistent with (Akinci and Olmstead-Rumsey, 2015).

6.3. Diagnostic Analysis

Finally, using the Wald test and the second-order serial correlation test, we examine the consistency of the two-step system GMM estimators (the model's validity). In addition, we evaluate the validity of over-identification restrictions using the Hansen test. Table 2 demonstrates that the Wald test rejects the null hypothesis, indicating the model's overall significance. In contrast, the results indicate that there is no autocorrelation in the first-differenced errors, as the null hypothesis was accepted by the test. Lastly, the Hansen test demonstrates the validity of over-identifying restrictions (as the test does not reject the null hypothesis), indicating the validity of instruments. All diagnostic tests support the two-step system GMM estimators of the relationship between private credit growth and the independent variables.

7. CONCLUSION

This study presents an analysis of the potential relationship between a set of banking and economic variables on the one hand, and the growth of private credit in the banking sector on the other hand, based on the data of ten Arab countries covering the period (2014-2019). We analyze also the impact of macroprudential and monetary policies tools on private credit growth, the GMM model was used for this purpose. The results show a significant impact of the macroprudential and monetary policies instruments in addition to the legal liquidity indicator on the growth of private credit, while the results did not show a significant effect of economic variables, the paper recommends the importance of continuing central banks assesses systemic risks in the financial sector, and uses the appropriate tools to control those risks. It is also important to coordinate between the macroprudential and monetary policies in a way that supports each other.

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