THE IMPACT OF BANK CAPITAL AND INSTITUTIONAL QUALITY ON LENDING: EMPIRICAL EVIDENCE FROM THE MENA REGION

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The Impact of Bank Capital and Institutional Quality on Lending: Empirical Evidence from the MENA Region

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Abstract

This paper aims to investigate the influence of bank capitalization and institutional quality on the lending activity of commercial banks in the MENA region over the period from 2000 to 2016. By applying the fixed effect panel data estimator, we find that, commercial bank lending depends on bank-specific variables, macroeconomic variables and the institutional environment. Our results show that any increase in bank capitalization and the implementation of capital regulation (Basel II and Basel III) have negative impacts on the credit supply. We find, also, that political stability and good regulatory quality encourage foreign, domestic and private banks to improve their credit supply. However, commercial banks tend to behave cautiously when there is increasing government effectiveness and financial freedom.

Keywords: Bank capital; institutional quality; credit supply; and MENA region

1. Introduction

Thirty years of banks' capital regulations did not achieve a consensus about their effectiveness and the 2008 financial crisis highlighted their failure in protecting the financial system from systemic crises. However, despite their poor results, once again, the Basel Committee on Banking Supervision (BCBS) asked banks to raise their capital levels to absorb any new external shocks. Bankers know that, economically, increasing the banks' resources is costly because of three detrimental factors. Firstly, it induces a "debt overhang" problem that Myer (1977) analysed almost fifty years ago. Secondly, as Admati et al. (2018) underlined recently, it creates a "debt addiction". Thirdly, the issue of shares in the market sends a negative signal by revealing an information asymmetry problem (Myers and Majluf, 1984). Furthermore, in most cases, to offset these hidden costs in order to comply with the institutional required solvency ratio, the banks reduce the denominator of the McDonough ratio as an alternative strategy. Consequently, this lessens the credit supply (Klimenko and Rochet, 2015; Aiyar et al., 2015; Dagher et al., 2016) and reduces the supposed benefits of this restrictive policy.

Empirical studies corroborate partially this theoretical insight. Historically, the increase in the banks' capital generated the so-called "credit-crunch" crisis that started in the United States of America (USA) in the early nineties. First, some authors point out that the credit rationing undertaken by the USA and several developed countries was caused by mainly the Basel I regulations (Peek and Rosengren, 1995-1997; Haubrich and Wachtel, 1993; Ito and Sasaki, 2002). However, the defenders of the banks' capitalization highlighted its positive effects in inducing the banks to reduce their risks (Kim and Santomero, 1988; Rochet, 1992; Bernanke and Loan, 1991; Buch and Prieto, 2014) and, these had a positive impact on their credit supply (Bernanke and Lown, 1991; Hancock and Wilcox, 1994). More recently, research studies shifted to the direct effect of capitalization on banks' behaviours; these studies were conducted to verify the capital regulation influence on the credit supply[1].

In addition to capital regulation, the findings of several studies show that the banks' behaviours depend on the countries' institutional quality (Demirgüç-Kunt and Levine, 2002; Lensink and Meesters, 2007; Sufian and Habibullah, 2010; Mutarindwa et al., 2018; Bermpei et al., 2018; Park, 2012). From a general point of view, North's (1991) findings highlight the importance of the institutional dimension that leads the relationships between the different economic agents: "*it is the human constraints that structure the political, economic and social interactions*". Furthermore, since the early 1990s, the World Bank (World Bank, 1992) insists on the necessity of the national institutions being of good quality of for the banks' environment. Indeed, this is indispensable for, firstly, establishing sound and reliable economic policies and, secondly, reinforcing stability between the different economic agents. Indeed, the poor-quality institutions can amplify the problem of information

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[1] We present in the second section of our article a brief literature review relating to this subject.

asymmetry (Bae and Goyal, 2009) and, consequently, the credit supply. Then, because the quality of countries' institutions can influence their efficiency (Bermpei et al., 2018), it is important to understand the impact of banking regulations on bank behaviour.

It follows that our paper aims to examine the impact on banks' capital and credit supply in the Mena region of both the regulations and the countries' institutional quality. Indeed, most of the previously mentioned studies focus mainly on Western countries' banks where, generally, they conduct their operations in a safe institutional environment. However, for other countries, the institutional quality of the banking system is much less known. In particular, none of these previous studies take account of MENA countries[2] in order to understand the effects of higher capital standards and institutional quality on the banks' behaviours in respect of credit supply. Therefore, this paper tries to remedy this shortcoming by an empirical analysis, based on a sample of 231 commercial banks in the MENA region. This sample, which covers the period from 2000 to 2016, represents 53% of the commercial banks operating in these countries. In the MENA region, the vast majority of banks have to deal with low quality government and regional institutions. Furthermore, because of the small number of non-bank financial institutions, the commercial banks dominate the financial sector and are the main source of external financing. Consequently, any decline in bank credit supply has a negative impact on the real economy.

In our empirical study we analyse firstly the effects of bank capitalization and institutional quality on the banks' behaviours in terms of credit supply. However, the structure of banks in the MENA region varies from one country to another (foreign banks, national banks, private banks and public banks). Therefore, we conducted the empirical analysis by de-constructing the sample according to the terms of the banks' ownership and the manner in which they are managed.

Consistent with the negative effects of capital regulation hypotheses, our results show that there is a negative association between bank capitalization and regulatory bank capital. Furthermore, greater financial freedom and government efficiency have, also, negative effects on the growth of credit supply. Consequently, MENA banks tend to reduce their credit supply to cope with the constraint of capital regulation and behave cautiously when dealing with both an increased government efficiency and some financial freedom. Then, due to improved political stability and regulatory quality they improve the growth of their credit supply.

Our paper is organized as follows. Section 2 reviews the relevant literature. Section 3 presents the structure of the sample used in the empirical study: the variables and the methodology. Section 4 presents our empirical results. Finally, section 5 presents our conclusions.

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[2] As defined by the World Bank, The MENA region consists of Algeria, Bahrain, Djibouti, Egypt, Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Malta, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Somalia, Syria, Palestinian Territories, Tunisia, United Arab Emirates and Yemen. For reasons of geographical consistency, we have added Turkey to our study and have excluded countries that do not have sufficient data.

2. Brief Review of the literature

Since the late 1980s, there has been an ongoing discussion about the effect of capital regulation on banks' lending behaviours. Moreover, the literature remains divided on the benefits and the costs of such regulation. In this section, we present firstly a brief review of the literature on this topic. Then, we mention another section of the literature that emphasizes the influence of countries' institutional quality on the banking sector.

2.1. Benefits and Costs of Strengthening Bank capital on the Banks' Behaviours

Regulation of banks' capital aims mainly to ensure the stability of the financial system by protecting it from general systemic bank failure. Indeed, the reinforcement of the banks' capital is supposed to help them to absorb losses due to unexpected risks and to encourage them to better manage the risks (Aiyar al., 2015; Dagher et al., 2016). The findings of several theoretical and empirical studies show that the binding nature of regulation contributes to both improved capital levels and reduced asset risk (Furlong and Keeley, 1989-1990; Shrieves and Dahl, 1992; Jacques and Nigro, 1997; Jokipii and Milne, 2010). In view of the information asymmetry and agency problems between banks and borrowers, Santos (1999) suggests that a minimum capital requirement leads banks to reduce their risky investments. This is because they must assess the high costs which they would incur in the event of bankruptcy. However, despite these advantages, some analysis points out the negative effects of capital regulation. Indeed, on the one hand, in order to offset losses due to reduced leverage capital, regulation would encourage banks to invest in riskier assets (Koehn and Santomero, 1980; Kim and Santomero, 1988; Gennotte and Pyle, 1991; Bishsel and Blum, 2004). On the other hand, the findings of several studies report that, in the early 1990s, capital regulation was the main cause of several developed and developing countries rationing credit supply (Brinkmann and Horvitz, 1995; Peek and Rosengren, 1997; Bernanke and Lown, 1991; Hancock and Wilcox,1994).

More recently, following the 2008 financial crisis and the enforcement of the new international Basel III standards, researchers have questioned the impact of capital regulation on banks' credit supply. Some authors' findings show a positive and significant relationship between the improvement of equity capital and credit supply (Carlson et al., 2013, in the USA; Bush and Prieto,2014, in Germany). Also, from their investigation of the effect of capital and liquidity constraints on credit supply, Kim and Sohn (2017) present a positive relationship between prudential regulations and the USA commercial banks' credit supply. However, other findings show that banks prefer to reduce credit supply rather than increase their capital (Berrospide and Edge, 2010, for the USA; and Lown and Morgan, 2006,

Noss and Tofano, 2016, in the United Kingdom; Hessou and Lai, 2018, in Canada). Furthermore, the improvement of bank capitalization, associated with a high level of non-performing loans and provisions for credit losses, can slow down the credit supply activity (Labonne and Lame, 2014, in France; Olszak et al., 2014b, in Europe; Beatty and Liao, 2011, in the USA). Moreover, when comparing the USA and Europe, Naceur and Roulet's (2018) findings show that, in the USA, the increase in credit supply is associated with an improvement in the levels of capitalization and liquidity in order to improve the risk absorption capacity. Furthermore, in Europe, the increase in capitalization encourages large banks to invest in less risky assets by reducing their credit supply.

With regard to the MENA region, Naceur and Kandil (2013) used a sample of 5 countries (Morocco, Jordan, Lebanon, Egypt, Tunisia) to study the relationship between the implementation of Basel I agreement and credit rationing between 1989 and 2003. They noted that Basel I capital regulation led to an increase in the credit supply. Similarly, Louhichi and Boujelbene (2017) studied the impact of equity quality on the credit supply. They compared Islamic banks (32 banks) and conventional banks (123 banks) from 10 countries in the MENA region. Their findings show that there is a positive association between the quality of bank capital, as measured by the core capital ratio (tier 1)[3], bank behaviour. A high level of Tier 1 capital enabled banks, both conventional and Islamic, to resist and maintain their credit supply activity during the financial crisis period. Similarly, their findings show that, during normal periods, there is a weak positive relationship between the supplementary capital ratio (tier2) and the conventional banks' credit supply. In addition, and through the financial crisis, customer deposits had a positive effect on credit supply activity while there was a negative relationship between interbank deposits and credit supply activity. In order to follow up on the differences in banks' behaviours, the authors proposed to the regulatory authorities that, taking into account the specific characteristics of these banks, specific regulations ought to be implemented for Islamic banks.

The above literature review concludes that several features influence lending decisions. These fall in two groups: namely, (a) bank-specific factors; and (b) macroeconomic factors related to the banks' environment. It is noteworthy that, when investigating the macroeconomic conditions, few research studies have considered the countries' institutional quality on banks' behaviours.

2.2 The Impact of Institutional Quality on Bank Behaviour

La Porta et al.'s (1996, 1997, 1999) findings highlight that, in a sound and efficient

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[3] Regulatory capital consists of two categories: Tier 1 core capital and Tier 2 additional capital. However, core capital is divided into two sub-categories: Tier 1 and Core-Tier 1. Each category is characterized by a unique set of criteria that banks must meet before calculating total regulatory capital. Tier 1 core capital is considered to be the core capital. With this capital, a bank is able to continue its activities and remain solvent. Tier 1 core capital of higher quality is called Core Tier 1, while Tier 2 core capital is the additional capital that ensures the absorption of losses according to changes in the situation. (BIS, March 2019).

judicial system, companies rely on external finance to fund their investments and this leads to the development of the financial markets. One of the main decisive factors concerning the lending relationship is the borrower's ability to repay their debts. However, when dealing with doubtful credits, the lender must resort to judicial proceedings in order to preserve their rights and to disclose the borrower's actual information. Consequently, legal safety impacts on the bank's policy in relation to credit supply.

In addition, La Porta et al.'s (2002) findings display a connection between the existence of public banks and poor institutional quality (low protection of property and democracy rights, low tax compliance rate, low bureaucratic quality, high level of corruption...) and low financial development. The authors point out that public ownership manages the credit supply to favour political objectives without considering their efficiency.

The findings of Sufian and Habibullah (2010) study of the determinants of Malaysian banks' performance during the period from 1999 to 2007 show that the bank's profitability increases with the improvement in democracy and the reduction in corruption. More recently, Gee and Karim (2016) conducted a study using a sample of 173 banks from 5 East Asian countries. Their results show that independence, financial freedom and good governance have positive effects on bank profitability and the efficiency of banking operations. Marcelin and Mathur's (2015) findings show that the reduction in the State's influence on the ownership of enterprises improves their efficiency and promotes the development of the financial sector development. This happens only in countries where there is a more favourable regulatory framework.

There is an ambiguous relationship between corruption and credit supply. Generally, corruption is a consequence of the poor quality of legal institutions, and in this situation, banks must be more careful when conducting their activities. However, the empirical studies present contradictory results. From a database of 665,000 companies from 14 Central and Eastern European countries, Fungacova et al.'s (2015) findings show a positive relationship between corruption and the debt ratio. They note that corruption and, more particularly, bribery facilitates the external financing of companies and providing them with access to bank loans. Consequently, the credit supply depends on the banks' institutional quality. In contrast, from his investigation of 882 Russian banks, Weill's (2011) findings highlight a negative relationship between corruption and credit supply. In fact, a high level of corruption induces the bank to become more cautious and to reduce their offers of credit. This has a negative effect on the economic growth. However, Park's (2012) findings present corruption as having a negative effect on counterparty risk and credit default. Thus, the results indicate a positive and very significant relationship between corruption and non-performing credit levels. Consequently, the increase in counterparty risk has a negative effect on bank performance and can destabilize the country's financial and economic situation.

Besides corruption, legal uncertainty increases the risk of bank failure. Fang et al.'s (2014) findings drew attention to credit risk. In developing countries, there is a correlation

between the quality of legal institutions and banking stability. The improvement and strengthening of the institutional environment reduces banking risk by, on the one hand, reducing the volatility of returns on assets and, on the other hand, reducing the rate of non-performing credit. However, Mutarindwa et al.'s (2018) study of 216 banks from 44 African countries over the period from 2005 to 2015. focused on national governance regulations because of the banks being the main sources of external financing. Their conclusions show that good institutional and legal quality leads to improved governance of banking institutions. Consequently, by involving an improved financial stability and a reduction in bank risk, these changes have positive effects on the institutions' efficiency and performance. Earlier, from his study of a sample of 894 banks operating in 11 emerging markets between 1996 and 2001, Godlewski's (2004) findings emphasise the effects of the institutional, regulatory and legal environment on the default risks to banks of emerging markets. He stressed the importance of regulatory quality and the usefulness of reliable regulations to ensure banking stability.

Recently, researchers have drawn attention to the role of institutional quality and capital regulation on banks' risky behaviours. From studying a sample of 1,050 commercial banks from 69 emerging and developing countries between 2004 and 2013, Bermpei et al.'s (2018) findings show how institutional quality influences regulation on risk and banking stability. In this respect, they make clear that the effect of banking regulations depends on institutional quality. More specifically, political stability and the control of corruption reinforce the positive effect that capital regulation has on the banks' stability. However, these results underline that the strengthening of banking regulations and creditors' rights have negative effects on banks' behaviours and that these encourage them to invest in riskier assets. On the other hand, Alraheb et al. (2017) considered a sample of 187 MENA banks in order to understand the impact of the institutional environment on bank capitalization in the period from 2004 to 2014. Their findings show that political stability, economic freedom and low levels of corruption have positive and significant effects on the level of regulatory capital. In addition, they argue that, while stronger creditors' rights have a negative effect on bank capital, there is no significant relationship between institutional variables and unweighted risk ratios. In countries, where it is easier to resolve insolvency, banks hold less capital because, in case of client default, this good credit protection guarantees the repayment of credit.

Accordingly, Kutan et al.'s (2017) findings emphasise the need for MENA countries to improve their institutional quality. By using a sample of 21 MENA countries over the period from 1980 to 2012, they analysed the relationship between financial development and economic growth. Their findings show that institutional quality plays a fundamental role in the short-term relationship between financial development and economic growth.

The country's political governance and institutional quality influence the banks' activities. However, the above-mentioned studies do not reach a consensus view on the relationship between institutional quality and bank behaviour. Despite the

recommendations and efforts of international organizations to improve the institutional quality in MENA countries, the existing studies provide insufficient clarity and, consequently, there is a need for more studies.

3. Empirical Study

3.1. Sample

We consider a sample of MENA commercial banks. No institutional consensus exists with regard to the consideration of this region's frontiers. Consequently, we adopt the World Bank definition and we add Turkey. However, because of the lack of reliable data, we ignore Iraq, the Palestinian Territories, Sudan, Somalia, Djibouti and Syria. Consequently, our sample's countries are Algeria, Bahrain, Egypt, Israel, Jordan, Kuwait, Lebanon, Mauritania, Malta, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Turkey, United Arab Emirates and Yemen.

Consequently, our final sample comprises of an unbalanced panel of 231 commercial banks (These include 43 public banks, 80 foreign banks, 151 domestic banks and 188 private banks.) operating in 17 countries in the period from 2000 to 2016.

[Insert table 1]

Table 1 shows the sample of the banks per country and their distribution between foreign banks, domestic banks, private banks and public banks. The sample is dominated by both Lebanese banks (18.61%) and Turkish banks (11.69%). In our sample, Mauritania, Lebanon and Jordan do not have public banks while Kuwait, Qatar, Saudi Arabia and Yemen have no foreign banks, and Israel has only private domestic banks.

3.2. Variables and definition

3.2.1 Dependent variable

The credit supply is the variable that we seek to explain in our empirical study. It is measured by the growth in credit supply from one year to another. This procedure overcomes the "spurious correlation" problem that can arise when calculating credit levels (Bernanke and Lown, 1991; Berrospide and Edge, 2010; Kim and Sohn, 2017).

3.2.2. Explanatory variables

In the following section, we present the explanatory variables that can affect either directly or indirectly the banks' behaviours on credit supply. These variables are grouped into: i) specific-bank variables; ii) macroeconomic variables; and, iii) institutional quality variables. In order to measure the impact of Basel Committee's regulations (Basel II and

Basel III), we introduce two indicators in the form of dummy variables.

3.2.2.1. Bank specific variables

We employ several bank specific variables drawn from the bank lending literature. We present them in the next part. In order to control the effect of bank capitalization, we adopt its traditional measure, namely, the equity ratio. This is because of the lack of data on regulatory capital ratios that affect most of the sample. This measure has been widely adopted when using international samples (Delis, 2012; and Deli and Hassan, 2017).

We measure liquidity by the ratio of liquid assets to the bank's total assets. This is the level of the bank's liquid assets that can be converted easily into cash.

The credit risk may affect the credit supply. Consequently, as used widely in the banking literature, we use the non-performing loan ratio (doubtful loans to total loans) as the proxy of credit risk. Moreover, the non-performing loan ratio indicates the quality of the bank's credit portfolio. Furthermore, as shown in the existing literature, bank profitability is an important determinant of bank lending. The bank's Return On Assets (ROA) is one of the most widely used ratios in literature to measure bank profitability. It is measured by the ratio of net income to total assets.

Size is, also, a determinant of a bank's credit supply (Berger and Udell, 2006) and, in this regard, it is important to control the effect of the bank's size on its credit supply. In general, a bank's size is measured by the natural logarithm of its total assets on the balance sheet. This is done, mainly, to distinguish between the behaviours of small and large banks. However, having considered the recent literature, the impact of bank size on the credit supply is still uncertain.

3.2.2.2. Macroeconomic Variables and Demand for Credit

In the empirical literature about bank lending, the determination of the level of demand for credit remains one of the main problems because generally, there is a lack of data. We adopt the most efficient method[4] and consider macroeconomic variables such as GDP growth and inflation as proxy variables of demand for credit (Bikker, 2004; Gambacorta and Mistrulli, 2004; Berrospide and Edge, 2010). Therefore, the growth rate of Gross Domestic Product (GDP) per capital (purchasing power capital) helps when assessing the economic cycle that reflects the country's overall economic health (Barth and al. 2013). Then, we measure inflation by using the Consumer Price Index (CPI) as the most appropriate measure of inflation. According to the pro-cyclicality theory of bank lending[5], the expected

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[4] For further details, see the articles of Labonne and Lamé (2014) and Olszak et al. (2014). They present the approaches used to distinguish between the demand and supply effects on bank lending.

[5] We mean by pro-cyclicality of credit the situation in which banks tend to increase their lending due to economic developments; these improve the demand for new credit and vice versa. For further information on

signs of the macroeconomic variables' coefficients are positive.

3.2.2.3. Institutional quality

The banks' institutional environments influence greatly their behaviours. In order to deal with it, we integrate five different variables as a proxy for country institutional quality and use different indexes from the Worldwide Governance Indicators (WGI) project's datasets[6]. They are: i) control of corruption; ii) government effectiveness; iii) regulatory quality; and (iv) political stability and lack of violence. Furthermore, we introduce the financial freedom indicator from Fraser economic freedom index constructed by Heritage Foundation. The definitions of these variables are as follows:

- **Control of corruption:** This indicator reflects the transparency of the bank's public performance. It considers both petty and grand corruption. According to the literature, while its role remains ambiguous, corruption influences the banks' supply behaviours of banks. Some authors claim that corruption has a negative effect on the bank's lending performance (Barth et al., 2009; Chen et al., 2013) while others show that it may improve the bank's lending performance.
- **Regulatory quality:** This index measures the government's ability to develop and implement policies and regulations. Both should allow and promote private sector development and encompass the incidence of adverse market policies. A poor legal environment reduces the regulation's impact and can lead to unexpected reactions. Hence, poor regulatory quality promotes greater opportunities for moral hazards and, consequently, more risks.
- **Government effectiveness:** This index reflects the quality of public services the civil servants' independence from political pressure, the quality of administration, and the credibility of the government's decisions. The higher the degree of government effectiveness the greater the accountability of the public sector (Huther and Shah, 1998). Furthermore, this ensures a closer match between services to households and company preferences and needs. Mauro et al.'s (1998) and McKinney and Moore's (2008) findings show that improved governance leads to better development outcomes such as economic growth, public investment and foreign direct investment. From this perspective, a low degree of governance effectiveness may have a negative effect on

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bank lending pro-cyclicality, see the articles of Borio (1994-2001), Berger and Udell (2004), and Salaam (2015).

[6] The WGI "Worldwide Governance Indicators" are the result of a project realized by Daniel Kaufman and Aart Kraay and published by the World Bank in 1996. Until 2002, the indicator was published only once every two years. Since then, it has been published on an annual basis. The WGI were constructed by using individual data collected from 30 different sources, covering more than 200 countries and including MENA countries. The WGI is composed of six composite indicators: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. Each indicator gives the country's score in units of a standard normal distribution which range from -2.5 to 2.5. The highest values involve a better institutional quality.

the banks' behaviours.

- **Political stability and lack of violence:** This index is used to measure political instability and the presence of violence and terrorism in MENA region countries. In a situation of political instability, banks are less likely to determine the repayment powers of their borrowers. This leads them to become highly cautious by drastically reducing their credit supply. With this scenario, the expected signs on these variables are positive.

- **Financial freedom:** This index measures the banking system's independence from government supervision and interference in the financial sector. According to the Heritage Foundation, this global rating assesses the extent of government regulation of financial services, the extension of government intervention to banks, the difficulty of opening and operating financial services companies (prohibition for individuals and foreigners) and the State's effects on credit distribution. It ranges from 0 to 100. An ideal banking and financial environment is rated as 100 and this means that the State limits itself to enforcing contractual obligations and preventing fraud in such circumstances, the public banks may disappear and the granting of credit depends only on market conditions.

3.2.2.4. Basel Committee regulations

In taking our lead from Roulet's (2018) and Naceur and Roulet's (2018), we measure the impact of Basel Committee's regulations through the following two indicators (dummy variables):

- The Basel II implementation indicator has a value 1 if the country has implemented the Basel II agreement and 0 if it has not.

- The Basel III implementation indicator is the sum of three dummy variables: namely, the regulatory capital ratio; the regulatory liquidity ratios; and the leverage ratio. This indicator considers the gradual implementation by national regulators of Basel III.

[Insert table 2]
[Insert table 3]

We used the BankScope - Bureau van Dijk and Orbis Bank database to collect the annual bank-level data while the macroeconomic data came from the World Development Indicators (World Bank), institutional quality data from the World Bank's Governance Indicators (WGI by Kaufmann) and the Heritage Foundation's Economic Freedom Indicators. We present in Tables 2 and Table 3 the descriptive statistics of the variables and the sources.

3.3 Methodology

This paper's main aim is to study the effect of bank capital regulation and institutional quality on the growth in bank credit. In line with the studies conducted by

Berrospide and Edge (2010), Roulet (2018), Maurin and Toivanen (2010), Bridges et al. (2014) and Al Raheb et al. (2018), we used the following model to explore bank lending behaviour in the MENA region:

$$DCRE_{i,j,t} = \alpha_0 + \alpha_1 CAR_{i,j,t-1} + \alpha_2 BANK\_DETER_{i,j,t-1} + \alpha_3 MACRO_{j,t-1}$$
$$+ \alpha_4 INST\_QUAL_{j,t} + \alpha_5 Basel\_II_{j,t} + \alpha_6 Basel\_III_{j,t} + \alpha_i + \epsilon_{i,t}$$

Where;
- **DCRE** is the growth rate in credit supply of a bank i, in country j, at time t.
- **CAR** measures the bank capitalization as the ratio of total equity to total assets.
- *BANK_DETER* is a vector of bank specific variables. These include: the liquid asset ratio (RLIQ); the Non-Performing Loans (NPL) ratio which is the ratio of impaired loan to gross loan. The Return On Assets (ROA) is the measure of bank profitability, and SIZE is the size calculated as the logarithm of total assets.
- **MACRO** is a vector macroeconomic variable that assesses the economic cycle. On the one hand, this reflects the country's economic health and, on the other hand, estimates the demand for bank credit. MACRO represents two measures of macroeconomic environment: namely, the growth rate of Gross Domestic Product per capita (GGDP) in purchasing power parity and the rate of inflation measured by the Consumer Price Index (CPI).
- *INST_QUAL* is a vector of institutional quality variables:
    o Control of corruption Indicator (CORP);
    o regulatory quality Indicator (RQUA);
    o Government effectiveness indicator (GOVE); and
    o Political stability indicator (PSTA) and the Financial Freedom Index (FFRE).
- *BASEL_II* is the Basel II Implementation Indicator; this takes the value 1 if the country has implemented Basel II and 0 if it has not.
- *BASEL_III* is the Basel III implementation indicator; this is composed of three dummy variables to consider the gradual implementation of Basel III of the various regulations by national regulators.
- α_i is the individual effect of banks that consider omitting banking characteristics[7].
- $\varepsilon_{i,t}$ is a white noise error term assumed to be normally distributed with a zero mean and constant variance, $\varepsilon it \sim iid\ N(0, \sigma2)$

We used the fixed effects panel method to estimate this model. A fixed-effects model is validated by the results of the Hausman specification. Our choice of a static panel model is

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[7] With reference to Brei et al. (2013) and Roulet (2018), time-fixed effects are excluded from the model when demand effects are taken into account through the use of macroeconomic variables.

validated by the results of the Woolridge test for autocorrelation[8]. Results tests are presented in Tables 4. In order to avoid endogeneity bias, we studied all the specific variables and macroeconomic variables at a time lagged by one period.

In view of the value of the determination coefficients (R^2) and the P-value Fisher test, the models appear well specified and all the results are statistically significant. The Durbin-Watson values are close to 2; this guarantees the absence of autocorrelation. Also, the correlation matrix shows that there is no major problem of multicollinearity between the variables.

3.4.   Empirical Results

We begin our empirical analysis by using the individual fixed effects model's estimation of our sample of all MENA banks. Table 4 reports the results of the estimation that we developed successively in the following 3 steps:

- The first step (DCRE 1) integrated the bank's specific variables and the macroeconomic variables; GDP growth and inflation rate.
- The second step (DCRE 2) consisted of adding the variables relating to the capital regulation: the dummy variables of Basel II and Basel III.
- A third step (DCRE 3) introduced the institution quality and the financial freedom variables.

[Insert table 4]

Moreover, we aimed to control the effect of bank ownership on the bank's lending behaviour. For this reason, we divided the sample into four sub-samples according to the terms of bank ownership (foreign, domestic, private and public). Then, we repeated the empirical analysis used in the initial study. Table 5 presents the results.

[Insert table 5]

The results show a negative and significant relationship between bank capitalization and credit growth in relation to the MENA region's commercial banks. By dividing the sample according to the terms of bank ownership, the results do not change significantly with the exception of foreign banks. The foreign bank presents a non-significant relationship in the third step following the integration of institutional quality variables. Moreover, we find that in most of regressions the coefficient for Basel II and Basel III regulations are negative and significant. This highlights that bank tend to reduce their growth in the face of the

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[8] As discussed by Baltagi (2001) and Wooldridge (2002), it's more efficient to use other estimators than standards OLS when we find a serial correlation in the idiosyncratic error term (Drukker, 2003). Though, our results show that we cannot reject the null hypothesis of "no first-order autocorrelation". Thus, a static model is used in our study.

constraints from the bank capital regulation. These results are similar to those obtained by Lown and Morgan (2006), Noss and Toffano (2016), Hessou and Lai (2018). They support the hypothesis that there is a negative relationship between the increase in the level of bank capitalization and the banks' behaviours in terms of credit supply.

The negative and significant relationship between non-performing loans and our dependent variable at the 1% level explains the decline in the banks' portfolio quality following an increase in non-performing loans. This is because such circumstances result in all banks becoming more cautious when making lending decisions. This result is consistent with those of Labonne and lame (2014), Olszak et al. (2014b) and Beatty and Liao (2011). Indeed, these authors show that the use of a high level of non-performing loans to improve bank capitalization levels slows down credit supply activity.

With regard to the impact of profitability on credit growth, we find a positive relationship with different levels of significance. For foreign banks, our results show a positive and significant relationship at the 10% level. This result is justified for public banks when we introduce the bank capital regulation variables and the institutional variables. For the private banks this relationship is significant at the 1% level when we introduce institutional variables and is significant at the 5% level for domestic banks. This positive value is because the MENA region banks adopt retained earning strategies as a source of funding their investments. Indeed, in this regard, financing, through debt or equity, can be expensive due to information asymmetry problems and high transaction costs (Bitar and Tarazi, 2019).

This study's results show that the size of banks has a positive effect on the growth in credit supply. These results support the hypothesis that large banks can achieve significant economies of scale (Barth et al., 2013) and, thus, increase their credit supply, profitability and efficiency (Bikker and Hu, 2002; Goddard et al. 2004). However, these results cannot be generalized to all banks. Table 5 presents the impact of size on the growth in credit supply of foreign and private banks. This becomes insignificant when we consider the institutional quality variables.

Further, increasing rates of inflation and GDP growth appear to have a positive effect on the growth in credit supply. In our study, we used inflation and GDP growth rates to consider macroeconomic effects and credit demand (Berrospide et al., 2010; Bridge et al., 2014; Carlson et al., 2014). The results show that economic growth has a positive and significant relationship at the 1% level for domestic, public and private banks and at the 10% level for foreign banks. This may be explained by the credit supply strategy being linked positively to the demand for credit supply which, in turn, is linked to the country's economic growth. These results accord with Kashyap et al.'s (1993) hypothesis that the development of economic conditions increases the number of profitable projects which, in turn, increases the demand for credit supply. The rate of inflation coefficient is significant and positive at the 1% level for domestic and private banks. Then, inflation encourages companies and households to use external financing and, in turn, increases the credit supply (see, also,

Gambacorta and Mistrulli, 2004).

Institutional quality variables appear to be an important determinant of the growth in credit supply. We find a positive and significant value relationship at the 1% level between the regulatory quality and the growth in credit supply. This result is consistent with La-Porta et al.'s (1997), Djankov et al.'s (2007) and Haselmann and Wachtel's (2010) findings that the bank's behaviour depends on the legal environment and its perception of it. Then, in line with previous studies' findings that highlight the importance of political stability, our study's results show that the political stability Index has a positive and significant effect on the growth of credit supply at the 10% level.

Contrary to expectations, the government effectiveness index has a negative effect on the growth of credit supply. Indeed, this relationship is statistically significant at the 1% level for private and foreign banks and at the 10% level for domestic banks. From a general point of view, government effectiveness reflects the public sector's good performance in relation to its missions and actions (Garcia-Sanchez et al., 2013). According to Barth et al. (2013) greater government effectiveness shows higher institutional quality and, in turn, this contributes eventually contributes to a higher level of bank efficiency. Therefore, our empirical result can be explained by the fact that MENA countries' banks behave prudently and adopt effective behaviours that improve the quality of their credit portfolios and reduce their credit risks. On the other hand, while the coefficient of the control of corruption index shows the expected sign, it has no significant effect on the growth of credit supply. Consequently, in the context of our study, it is difficult to present a clear explanation about the possible effects of control of corruption on the growth of credit supply.

However, the financial freedom index has a negative relationship at the 1% level with domestic banks' growth of credit supply growth and, similarly, at the 5% level with public banks and at the 10% level with foreign banks. In other words, banks behave cautiously and tend to reduce their lending whenever there is a reduction in government control and interference. This is especially the case due to the poor institutional quality in most MENA countries. It can be said that the growth in credit supply is determined by the regulations, which the State puts in place, and by market conditions.

In addition, foreign and public banks adopt some specific behaviours. For the GDP growth variable, a positive but insignificant relationship is seen in steps DCRE1 and DCRE2. This result may be explained by foreign banks' behaviours being linked to their head office strategies (De Haas and Lelyveld, 2006). By introducing institutional quality variables, we may observe a positive and significant relationship at the 10% level with the growth of credit supply. Hence, institutional quality (political stability, government effectiveness and regulatory quality) forms an important determinant of the growth of credit supply by foreign banks. In contrast, this relationship is insignificant for public banks. This may be explained by public banks focusing their credit supply strategies much more on political concerns rather than on social and market situations (Mian, 2003).

4. Conclusions

This paper tested the hypothesis that the MENA countries' commercial banks respond to the regulation of capital requirement by reducing the growth in their credit supply. In conducting this research study, we were required to form a sample of 231 commercial banks operating in 17 MENA countries in the period from 2000 to 2016. This involved us, firstly, analysing both the role of the banks' specific variables and of macroeconomics variables on the growth of the banks' credit supply. Secondly, we studied the influence of regulatory capital (Basel II and Basel III) and, finally, we shed light on the role of country institutional quality in explaining the growth in the banks' credit supply.

Our study's results show that the banks' decisions on the growth of credit supply depend on many factors. First of all, these depend on bank specific characteristics (bank profitability, size, risk, and bank capitalization level). Also, bank lending is strongly dependent on macroeconomics variables and demand factors (measured by variables such as GDP growth and inflation). In addition, banks' lending behaviours depend on the institutional quality of the country (government effectiveness, regulatory quality, political stability and financial freedom).

Obviously, an increase in the bank's capital ratio results in a reduction in the growth of its credit supply. With particular regard to MENA countries' banks, the enforcement of Basel II and Basel III have had negative effects on the growth of their credit supply. Furthermore, with the exception of public banks, political stability and good regulatory quality encourages foreign, domestic and private banks to improve their credit supply. These results accord with the findings of recent researches by Louhichi and Bojelbenne (2017) and Hessou and lai (2018) which highlight, also, the negative effects of bank capital regulation on the growth of credit supply. On the other hand, financial freedom and government effectiveness impact negatively on the growth of the banks' credit supply. In fact, the MENA region suffers from a poor institutional quality (Heidenhof, 2014; Ianchovichina et al, 2013). In this context, the MENA countries' banks can reduce the growth in their credit supply in order to reduce their credit risks and to increase the quality of their portfolios. Consequently, this negative relationship may suggest that, when considering their credit supply, MENA countries' banks tend to behave cautiously.

Our results question the relevance of a uniform capital requirement for all countries and for all types of banks. It seems necessary for regulators to understand the difference in institutions quality between developed and developing countries. In countries, such as those in the MENA region, banks are the main source of funding of all economic activity. Thus, banking regulation has a negative effect on investment growth. Consequently, governments or banks regulatory institutions should adopt regulations which adhere not only to the bank balance sheet structure but, also, when considering their economic environment, they should take account of the institutional quality of the country's national banks of their.

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Table 1: Number of Banks in our Sample by Country and Type of Owner

Country	Total	Public banks	Private banks	Foreign banks	National Banks
United Arab Emirates	18	7	11	7	11
Algeria	15	6	9	8	7
Bahrain	9	1	8	3	6
Egypt	22	6	16	13	9
Israel	10	-	10	-	10
Jordan	14	-	14	5	9
Kuwait	6	1	5	-	6
Lebanon	43	-	43	14	29
Morocco	11	3	8	3	8
Malte	7	2	5	1	6
Mauritania	7	-	7	2	5
Oman	6	2	4	1	5
Qatar	6	4	2	-	6
Saudi Arabia	9	3	6	-	9
Tunisia	17	4	13	9	8
Turkey	27	3	24	14	13
Yemen	4	1	3	-	4
Total	**231**	**43**	**188**	**80**	**151**

Table 2: Descriptive Statistics

	OBS	Mean	STDV	Minimum	Maximum
Credit growth (DCRE)	**3825**	0.519	10.269	-0.974	464.156
Capital ratio (CAR)	**4059**	0.130	0.104	-0.959	0.998
Liquidity ratio (RLIQ)	**4059**	0.436	0.710	0.002	32,835
Non-performing Loan (NPL)	**4057**	0.081	0.258	0	14.508
Profitability (ROA)	**4059**	0.012	0.021	-0.540	0.322
Size (SIZE)	**4059**	14.734	1.848	8.911	19.222
GDP per capital growth (GDP)	**4389**	1.181	4.119	-0.157	0.299
Inflation (INF)	**4389**	5.452	9.093	-4.863	64.867
Corruption (CORP)	**3917**	-0.114	0.645	-1.664	1.567
Political stability (PSTA)	**3903**	-0.594	0.895	-2.5	1.599
Governance effectiveness (GEFF)	**3917**	0.058	0.593	-1.919	1.509
Regulation quality (RQUA)	**3917**	0.050	0.567	-1.479	1.431
Financial Freedom (FFRE)	**4385**	51,964	14,892	10	90

Table 3: Definitions and Sources of variables

Variables	Definitions	Sources
Dependent variable		
DCRE	Annual credit growth	Calculated by the authors from Bankscope
Independent variables		
Bank-specific variables		
CAR	Capital over total assets	Calculated by the authors from Bankscope
RLIQ	Liquid assets over total assets	Calculated by the authors from Bankscope
NPL	Impaired loans on total loans	Calculated by the authors from Bankscope
ROA	Net results on total assets	Calculated by the authors from Bankscope
SIZE	The Logarithm of Total Assets	Calculated by the authors from Bankscope
Macroeconomic and institutional variables		
GDPP	Gross domestic product growth rate per capita (per purchasing power parity)	The World Bank's Development Indicator
INF	Consumer Price Index (CPI)	The World Bank's Development Indicator
CORP	Control of corruption	The World Bank's Governance Indicator
PSTA	Political Stability and Absence of Violence	The World Bank's Governance Indicator
GEFF	Government Effectiveness	The World Bank's Governance Indicator
RQUA	Regulatory Quality	The World Bank's Governance Indicator
FFRE	Financial freedom	The Heritage Foundation's Economic Freedom Indicator
BAS2	The Basel II implementation indicator, a dummy variable that values it 1 if the country has implemented Basel II and 0 if not.	Annual reports, Barth et al. report (2013) and central bank reports
BAS3	The Basel III implementation indicator, the sum of three dummy variables to consider implementation: the regulatory capital ratio, the regulatory liquidity ratio and the leverage ratio.	Annual reports, Barth et al. report (2013) and central bank reports.

Table 4: Results of the Fixed-Effects Model Econometric Estimation

Variables	DCRE (1)	DCRE (2)	DCRE (3)
Constant	0,8256 (6,3542)***	-0,1056 (-0,6044)	0,0763 (0,4468)
CAR (-1)	-1,0396 (-7,5968)***	-0,7229 (-5,0967)***	-0,4621 (-3,5392)***
RLIQ (-1)	0,0059 (0,4055)	0,0045 (0,3170)	0,0108 (0,8343)
NPL (-1)	-0,1686 (-3,3153)***	-0,2480 (-4,7203) ***	-0,2621 (-5,3498)***
ROA (-1)	0,8533 (2,4146)**	0,5796 (1,7639)*	0,0772 (0,1999)
SIZE (-1)	0,0209 (2,4456)**	0,0444 (3,7601)***	0,0294 (2,6130)***
GDPP (-1)	0,4748 (4,0710)***	0,2183 (1,9122)*	0,6465 (6,2375)***
INF (-1)	0,9642 (6,2772)***	0,8200 (5,4748)***	0,4207 (4,9068)***
BAS2		-0,0723 (-6,3523)***	-0,0459 (-4,0160)***
BAS3		-0,0203 (-4,6557)***	-0,0216 (-5,1947)***
CORP			-0,0151 (-0,6453)
PSTA			0,0200 (1,6455)*
GEFF			-0,1359 (-4,4575)***
RQUA			0,2342 (8,1780)***
FFRE			-0,0023 (-4,5495)***
Observation	3593	3593	3381
Number of banks	231	231	231
R-squared	0,1561	0,1751	0,2321
F-test	2,6178***	2,9788***	3,8847***
Durbin-Watson stat	1,6889	1,7468	1,7371
Hausman test	17,1452	19,4027	51.8009
Prob (Hausman Test)	0,017	0,022	0.000
Wooldrige test	(2.323)	(2.364)	(2.112)
Prob (Wooldrige test)	0.000	0.000	0.000

***, **, * indicate the respective 1%, 5% and 10% significance levels. Figures in parentheses are t-statistics.

Table 5: Results of the Fixed-Effects Model Econometric Estimation of the: by Bank Ownership

Variables	Foreign banks			National Banks			Public banks			Private banks		
	DCRE(1)	DCRE(2)	DCRE(3)	DCRE(1)	DCRE(2)	DCRE(3)	DCRE(1)	DCRE(2)	DCRE(3)	DCRE(1)	DCRE(2)	DCRE(3)
Constant	2,8211	2,4436	0,7959	0,2197	-0,8368	-0,6009	-0.0671	-1.2090	-1.1634	1.0523	0.3681	0.3981
	(5,3070)***	(3,8316)***	(2,0157)**	(2,1615)**	(-6,0996)***	(-3,7302)***	(-0.3708)	(-5.1945)***	(-4.3064)***	(6.3696)***	(2.3549)**	(2.5166)**
CAR(-1)	-1,4449	-1,1251	-0,0453	-0,3202	-0,1750	-0,1926	-0.3015	0.3392	1.0518	-1.1474	-0.8606	-0.3883
	(-3,2555)***	(-2,3467)**	(-0,1254)	(-2,2355)***	(-1,7541)*	(-1,8248)**	(-2.3986)**	(1.1669)	(3.8236)***	(-7.2673)***	(-5.1989)***	(-2.6835)***
RLIQ(-1)	0,0016	-0,0086	-0,0111	-0,0108	-0,0172	-0,0001	0.1093	0.0241	0.0774	0.0039	0.0078	0.0062
	(1,7561)	(-0,2775)	(-0,4788)	(-0,4830)	(-0,7656)	(-0,0053)	(1.9091)*	(0.4230)	(1.1904)	(0.2361)	(0.4762)	(0.4406)
NPL(-1)	-0,1944	-0,1975	-0,2944	-0,3090	-0,3320	-0,3157	-0.2206	-0.2644	-0.2285	-0.1999	-0.2630	-0.2517
	(1,7561)*	(-1,8433)*	(-2,7574)***	(-5,3285)***	(-5,7580)***	(-5,2832)***	(-1.8013)*	(-2.2010)**	(-1.8086)**	(-3.5616)***	(-4.4901)***	(-4.7721)***
ROA(-1)	0,8978	1,1706	0,7406	0,4256	-0,0700	0,4579	-0.1514	0.8251	1.3748	0.7201	0.2455	0.3363
	(1,8498)*	(1,8541)*	(1,8199)*	(1,7743)*	(-0,1657)	(1,8395)**	(-0.1796)	(1.7595)*	(2.0168)*	(0.0773)*	(0.5404)	(3.5073)***
SIZE(-1)	-0,1211	-0,0946	0,0088	0,0037	0,0716	0,0612	0.0101	0.0862	0.0849	0.0298	0.0280	0.0193
	(-3,3300)***	(-2,1149)**	(0,2562)	(0,5790)	(7,9804)***	(5,8891)***	(0.9277)	(5.9021)***	(5.0690)***	(2.7035)***	(1.7996)*	(1.3490)
GDPP(-1)	0,5735	0,3717	0,5474	0,7554	0,5936	0,6183	0.8088	0.6109	0.6587	0.4717	0.2226	0.6251
	(0,9801)	(0,5946)	(1,6605)*	(9,1105)***	(7,3269)***	(6,8033)***	(4.8869)***	(3.6398)***	(3.7545)***	(3.1431)***	(1.5220)	(4.6559)***
INF(-1)	0,5230	0,5364	0,4106	0,4198	0,3226	0,5535	-0.0064	-0.0073	-0.0046	0.8723	0.6611	0.3862
	(1,6559) *	(1,0025)	(1,6723)*	(5,4636)***	(4,1573)***	(6,3534)***	(-1.9756)**	(-1.3810)	(-1.0892)	(4.4122)***	(3.4348)***	(3.6699)***
BAS2		-0,0173	-0,0545		-0,0872	-0,0688		-0.1242	-0.1161		-0.0478	-0.0478
		(-0,3939)	(-1,3666)		(-9,7300)***	(-6,6889)***		(-6.5111)***	(-5.2637)***		(-3.2272)***	(-3.3723)***
BAS3		-0,0355	-0,0486		-0,0177	-0,0159		-0.0273	-0.0249		-0.0250	-0.0224
		(-1,7106)	(-3,9298)***		(-4,9967)***	(-4,2730)***		(-3.1925)***	(-2.7504)***		(-4.4574)***	(-4.2957)***
CORP			0,0052			-0,0011			-0.0137			-0.0269
			(0,0588)			(-0,0558)			(-0.3616)			(-0.8754)
PSTA			0,1259			0,0199			0.0142			0.0278
			(3,0682)***			(1,8109)**			(0.4814)			(1.8594)**
GEFF			-0,3521			-0,0444			-0.0630			-0.1797
			(-3,7735)***			(-1,6753)*			(-1.2810)			(-4.5038)***
RQUA			0,3743			0,0995			0.0295			0.2733
			(4,0790)***			(4,3391)***			(0.8534)			(7.3371)***
FFRE			-0,0032			-0,0020			-0.0023			-0.0024
			(-1,9882)*			(-4,2497)***			(-2.5634)**			(-3.7448)***
Observation	1166	1166	1100	2427	2427	2281	706	706	666	2887	2887	2715
Banks	80	80	80	151	151	151	43	43	43	188	188	188
R-squared	0,1401	0,1403	0,1885		0,2403	0,2663	0.1633	0,217	0.234	0,1603	0,1707	0,2198
F-test	2,044***	1,9976***	2,5122***		4,509***	4,6831***	3.1237***	3.5607***	3.3318***	2,6494***	2,8256***	3,5231***
Durbin-Watson	1,501291	1,4927	1,4524		1,8265	1,8603	1,6593	1,6845	1.8380	1,6861	1,7135	1,7298
Hausman test	18,3144	18,1337	50,7764	21,8939	24,9305	35,3753	24.3847	47.8810	107.318	15,1452	16.999	50,4073
Prob (Hausman test)	0,0106	0,0337	0,0000	0,0278	0,0029	0,0001	0.003	0.0000	0.0000	0,0342	0,0487	0,0000
Wooldrige test	(2.571)	(2.075)	(1.731)	(2.048)	(2.604)	(2.235)	(1.782)	(2.363)	(1.952)	(2.202)	(1.932)	(1.952)
Prob (Wooldrige test)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

***, **, * indicate the respective 1%, 5% and 10% significance levels. Figures in parentheses are t-statistics.

Table 6: Correlation Matrix

	DCRE	CAR	NPL	RLIQ	SIZE	ROA	GDPP	INF	BAS3	BAS_2	CORP	PSTA	GEFF	VACC	FFRE	RQUA
DCRE	1															
CAR	-0,0027	1														
NPL	-0,2140	0,0205	1													
RLIQ	-0,0499	-0,0943	0,0491	1												
SIZE	0,0285	-0,2048	-0,1316	-0,3685	1											
ROA	0,1533	0,5021	-0,0803	-0,0945	0,0823	1										
GDPP	0,2669	0,0247	-0,0093	-0,0226	0,0065	0,1181	1									
INF	0,1215	0,0554	0,1201	-0,0233	-0,0315	0,1172	0,2194	1								
BAS3	-0,1741	0,0057	-0,0517	-0,0261	0,1901	-0,0523	-0,3416	-0,1258	1							
BAS2	-0,1440	0,1275	-0,1007	-0,1537	0,2510	0,0072	-0,2000	0,0448	0,4462	1						
CORP	0,0564	0,1965	-0,0115	-0,4988	0,3472	0,1789	0,1176	-0,1723	-0,0618	0,0400	1					
PSTA	0,0767	0,2317	0,0646	-0,3181	0,1077	0,2021	0,1321	-0,2367	-0,1739	-0,2135	0,5724	1				
GEFF	0,0458	0,1128	-0,0189	-0,4235	0,2945	0,0546	0,1478	-0,1741	-0,0754	0,0438	0,4893	0,5832	1			
VACC	0,0245	-0,2001	-0,1161	0,0871	-0,0644	-0,2401	0,0523	-0,0469	-0,1141	0,0471	0,0720	-0,2106	0,2238	1		
FFRE	-0,0466	-0,0857	-0,0400	0,1906	0,0154	-0,1858	0,0432	-0,2234	0,1363	0,1862	0,1039	-0,0610	0,2775	0,3734	1	
RQUA	0,0968	0,1224	-0,0426	-0,3390	0,3216	0,0838	0,2173	-0,1342	-0,0309	0,1297	0,3145	0,4806	0,4597	0,2558	0,4137	1

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