

Determinants of Domestic Banks Lending behavior
Evidence of Jordan

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ABSTRACT

According to the importance of banking industry and the role of banks in improving the financial project, financial activities and the economy of countries, this study examines the determinant of lending which is the main source of banking business.

In this study, we analyzed the determinants of lending for Jordanian domestic banks considering 16 banks for the period 2005 to 2014. Where 11 factors impacting banks lending analyzed by using unbalanced panel data to examine the relationship between dependent variable and independents variables. The results of regression showed that liquidity ratio, management quality, return on asset ratio, volume of deposits and inflation rate had positive and significant impact on banks' lending while credit risk, return on equity ratio and regional crisis had negative and significant impact on banks' lending also the result found that equity to asset ratio, bank size and global crisis had statistically insignificant impact on bank's lending. So the study suggested that banks should work better to receive more deposits and take caution in making decisions related to lending to avoid any default in bad loans. Experience and skills management will affect directly on the banks' liquidity and profitability which lead to influence the banks' ability of lending.

Keywords: Jordan, bank lending, panel data, determinants of lending

ÖZ

Bu çalışmada, bankacılık sektörünün önemi ve finansal projeyi, finansal faaliyetleri ve ülke ekonomisini iyileştirmede bankaların rolü ele alınarak, bankacılık sektörünün ana kaynağı olan kredi verme belirleyicileri incelenmektedir.

Bu çalışmada, Ürdün yerli bankaları için 2005-2014 döneminde 16 bankayı göz önüne alarak borç vermenin belirleyicilerini inceledik. Bankaların kredi vermeyi etkileyen 11 faktör, dengesiz panel verilerini kullanarak bağımlı değişken ve bağımsız değişkenler arasındaki ilişkiyi incelemek amacıyla analiz edildi. Gerileme sonuçları, likidite oranı, yönetim kalitesi, aktif karlılığı oranı, mevduat hacmi ve enflasyon oranının bankaların kredi verme üzerinde pozitif ve önemli etkide bulunduğu, kredi riski, özkaynak kârlılığı ve bölgesel krizin bankalar üzerinde olumsuz ve belirgin bir etkisinin olduğunu göstermiştir ve aynı zamanda Kredi verme sonucunda varlık oranı, banka büyüklüğü ve küresel krizin bankanın kredileri üzerinde istatistiksel olarak önemli bir etkisi olmadığı bulundu. Dolayısıyla çalışma, bankaların daha fazla mevduat almak için daha iyi çalışması gerektiğini ve kötü kredilerde varsayılanlardan kaçınmak için borç verme kararlarını vermede ihtiyatlı davranmalarını önerdi. Deneyim ve beceri yönetimi, bankaların borç verme yeteneğini etkileyen doğrudan likidite ve karlılığı etkiler.

Anahtar Kelimeler: Ürdün, banka kredileri, panel verileri, borç vermenin belirleyicileri

Dedicated To My Lovely Family

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LIST OF ABBREVIATIONS

TLA	Total loans ratio
EA	Equity-to-asset ratio
LR	Liquidity ratio
MQ	Management quality ratio
CR	Credit risk ratio
ROA	Return on asset
ROE	Return on equity
LnSize	size of bank
INF	Inflation ratio
D1	Global crisis dummy variable
D2	Regional crisis dummy variable

Chapter 1

INTRODUCTION

Inevitably, banking industry have significant impact on the country's overall economy which makes banks a critical component of the financial system and one of the main factors that lead to the development of the country. Because most of financial projects and financial activities of business depend on banks funding, banks are defined as intermediary institution. Their current operations consist of granting loans and receiving deposits from the individuals and also transfer funds, supply the currency, and provide both long –term and short-term credit.

Lending is the main service provided by banks to their customers (individuals or corporations), banks mostly transfer its general asset to liquid asset and lend it as the order also banks use the customers' or other banks' deposits to support the credit line.

Lenders or creditors extend funds based on beliefs that the borrower can be trusted to repay the debt. Loans are the primary source of funds to earn income for most banks, typically they make it for fixed term at fixed rates and sometimes secured with real property, banks generally make money by lending loans at rates higher than the cost of the loans they lend, by collect interest on loans as stated by Stephen (2015), most of financial activities and development organizations were funded by banks. From here we realize the importance of studying and evaluating the determinants of lending and how it can affects the performance of banks.

Financial transaction is useful and important in Jordan and intermediated through banking industry. Jordanian banking sector is fully privately owned, which made it developed, profitable and interested in business. Like all banking sectors, Jordanian banking sector with other sectors has played a positive role in enhancing the growth of the Jordanian economy. Jordanian banking sector consists of 26 banks, the number of domestic banks is 16 banks, the number of conventional banks are 12 banks while there are 4 Islamic banks. The number of foreign banks arrive 10 banks which one of them is Islamic and 9 banks are conventional. The sector improved the credit line and deposits strategy between 1970s-1980s, and during last 20 years there was increasing in the amount of deposits and loans

1.1 Goal of study

The aim of this study is to analyze the determinants of lending for domestic banks in Jordan and finds the factors that affect the lending of domestic banks in Jordan for the period 2005 to 2014. In addition value suggestion to managers and policy values of Jordanian banking sector. To achieve the aim of study, 16 domestic banks are taken into account and analyzed.

This study will test to find if there is cross-sectional variation in bank's lending amount. And if this variation founded the study will explain it by many properties of the banks like size, liquidity, credit risk, volume of deposits. The result of this study will provide bank-level constraints in lending by examines and identify the determinants which affect banks' ability to lend and which indicators affect bank lending.

1.2 Research Methodology

This study uses data of 16 domestic banks in Jordan, the data collected from the published financial statements of domestic banks in Jordan and the data help to determine which factors that determine or influence the lending of Jordanian banking sector during the period 2005 to 2014.

The variables divided into two groups, first group is dependent variable, which is loan to asset ratio, second group is independent variables which are equity-to-assets ratio, liquidity ratio, management quality ratio, return on assets ratio, return on equity, credit risk, size of bank, volume of deposits, inflation rate and the dummy variables which represent impact of global and regional crisis.

1.3 Framework of the study

This study is structured as follow: chapter 1 contains the introduction, chapter 2 present the literature review which related to the determinants of lending while chapter 3 explains the background and overview for the banking sector in Jordan. Chapter 4 explains the methodology also the data and variables used in the analysis. Chapter 5 examines the findings and the results of the study and chapter 6 conclude with the policy implications.

Chapter 2

LITREATURE REVIEW

There are many studies that examine the determinants of lending. This study provides the scenario to review the literature on determinants of banks lending by handling with some of studies which examined the determinants of lending in some countries and explain the results of these studies. The study follows the same procedure of previous literatures in discussing the bank lending in different contexts.

Banks size almost measured by the total assets of the bank, the size of bank provides an idea about the value of bank and its ability to do banking business, since the lending is one of these businesses it can be affected or limited by the size of bank. In case of Ghana, Ladime, etal. (2013), investigated the determinants of bank lending behavior, by using panel data which involve 17 banks for the period 1997 to 2006. They found that bank size has positive and significant impact on bank lending behavior, this means bigger banks seem to be in a better position to lend more. In another study which is conducted in the Russian context, Chernykh and Theodossiou (2011) examined the determinants of bank long-term lending behavior by using a large sample of Russian banks. They used total business loans as dependent variable in the study and found that ability to extend long-term loans affected by the bank size. Rababah (2015) studied the determinant of lending in Jordan, by using 10 commercial banks for the period (2005 to 2013). The study used ratio of total loans to total assets as a dependent variable, he

showed that bank size have a positive and significant impact on the total loans of commercial banks.

In another study Ngomsi, A. (2012), carried out to investigate the determinants of bank long-term lending behavior in Central African Economic and Monetary Community context. The study used panel data model, and number of observations is 60. The sample included 6 countries, and the finding showed that the bank long-term lending depends on bank size

Capital structure is the way how the bank finance its assets, there are many ways to finance the assets through a combination of equity and debt, capital structure can described by calculates the equity to assets ratio. According to Alu, et al. (2012), who analyzed the effect of funding strategy on the lending behavior of banks in Ghana, found that equity to asset ratio of bank is positively and significantly affect the lending. In another study, Inderst and Mueller (2005), in their study bank capital structure and credit decision. They found that banks must be sufficiently levered to have first-best incentives to lend. Laidroo (2014) studied lending growth determinants and found that banks' level of equity is positively impact lending growth. Berrospide and Edge (2010) examined the effect of the capital stricter on banks lending and found that equity to asset ratio has positive and significant impact on lending. Ngomsi, A. (2012) in his study determinants of bank long-term lending behavior showed that ratio of book equity to assets has positive and significant impact on long-term lending behavior, indicating that better capitalized banks seem to be in better position to lend more.

Banks can never be sure that the customers who have debt will repay the money within the agreed timespan. Non-performing loans can be occurred when the borrower default in repaying any interest payments to cover its debt in the bank, which impact the bank profitability and liquidity adversely. Loan loss provision is an account set in expenses side to represent bank's best estimate of future loan losses to cover any losses on loans due to defaults. Cucinelli (2015) investigated the impact of non-performing loans on bank lending behavior. The study used 488 listed and unlisted banks in Italy for the period (2007-2013). The study shows that non-performing loan and loan loss provision ratios have negative impact on lending behavior of Italian banks. In another case Malede (2014), investigated the determinants of commercial banks lending in Ethiopia using sample of 8 commercial banks for the period (2005 to 2011). Findings revealed that banks size and credit risk are the factors which impact the commercial banks credit in Ethiopia. Gaarica et al (2013) studied TARP banks lending behavior in USA. The findings showed negative and significant relationship between non-performing loan and size of loans. Alhassan (2013) also found that non-performing loan has significant and negative influence on banks lending.

Deposits play a critical role in bank funding, because banks depend partly on deposits to transfer it loans. Also it is considered as main portion of bank's assets which financed by customers or other banks. According to Onyango, A. (2015), who analyzed the determinants of lending behavior for a sample of a commercial banks operating in Kenya for the period (2002-2011), found that the volume of deposit have positive and significant impact on the total loans. Also in Nigeria context Ohadebere, et al, (2012), in their study attempted to examine the determinants of lending behavior of commercial banks in Nigeria over a period of 37 years which started from 1975 to 2010 by using Commercial bank loan and advances as a measurement of credit

lending. The result of the study shows that volume of deposits is positively and significant affect the lending behavior of commercial banks. In another study Olokoyo (2011), investigated the determinants of lending behavior in the Nigerian commercial banks for the period 1980 to 2005. The study aimed to examine and test the effectiveness of the determinants of credit behavior and how it affect the lending behavior in Nigeria, The result found that volume of deposits is positive and significantly influence the credit behavior of banks. Generally speaking, Olokoyo (2011), was conclude that commercial banks deposits have the larger effect on the credit behavior and suggested that the banks should work enough and focus on increasing the amount of deposits as they can by promoting the customers to invest, this enhance the lending performance. Banks should also develop the procedures, and put good planning encompasses budgeting, build and develop the liquidity system management and foreign exchange management.

Amano (2014), investigated the determinants of lending behavior of banks in Ethiopia, the panel data used for sample of 8 commercial banks for the period (2001 to 2003). The study found that volume of deposit, inflation rate and bank size have positive and significant impact on bank loan and advance. However liquidity ratio has negative and significant impact on loan and advance. As such study suggest that commercial banks should make good strategy to collect more deposit to improve credit lending performance, and they should build good system and skills in liquidity management. John (2014), studied the effect of deposit volume on banks' lending behavior in Nigerian post-consolidation era by investigate 22 deposits banks for the period 2006-2012. The study found positive relation and significant impact between deposits and lending

To measure the banks' ability to cover unexpected cash outflows and its implication to lending liquidity ratio has been used. It also measures the ability with which assets of bank can easily convert to cash. Liquidity is basic and important requirement for banks to meet any requests from the customers related to cash or loans. It is also one of the most important resource that affect the ability of bank to provide banking services. If banks fail to provide new funds to borrowers because of liquidity problem, then profits will also decline. Amidu (2014) investigated the factors influences banks lending for the Sub-Saharan Africa using data of 264 banks for 24 SSA countries. The findings show that liquidity ratio is significantly and negatively influences the lending in SSA countries. Rababah (2015) also found that liquidity ratio and non-performing loans have a negative and significant impact on the ratio of credit lending. The study suggested that commercial banks of Jordan should maintain the stability of liquidity and reduce the amount of non-performing loans. On the other hand, Karim et al. (2010) used disaggregated bank level data to examine bank lending in Malaysia and he found significant and positive relationship between liquidity and lending. Sarath (2015) investigated the determinants of lending behavior in Vietnam. The result shows that liquidity ratio has positive and significant impact on lending behavior.

Profitability of banks can be measured by return on asset ratio and return on equity ratio these measures provide evidence on the performance of banks. More profit generating banks can assist more credit to the customers. Moussa and Chedia (2016) divided variables into two parts for Tunis banking sector, internal and external factors, and examine the determinants of bank lending by using panel data for 18 banks over the period 2000 to 2013. The results of the study show that from the internal factors liquidity ratio, return on asset and return on equity are significantly and negatively affect the banks loans. Laidroo (2012) examined the determinants of lending growth of

banks in 15 central eastern European countries for the period 2004-2010. The study found that significant and positive impact between profitability of bank and lending. Berlinand Mester (1998), analyzed the relationship between profitability and lending by use panel data of 126 banks. The study found that banks profitability has positive and significant impact on lending. In another study Gunji and Yuan (2010), investigate the how banks profitability affect lending in China during the period 1985 – 2007. The result showed positive and significant influence between bank profitability and lending for the Chinese banking sector.

The quality of banks' management is captured by the processes that use low cost to create high amount of profit. A highly management quality banks assumed to have better appreciation of lending. Alhassan (2013), studied the impact of asset quality on banking lending behavior in Ghana by investigate 25 banks for the period 2005-2010. The findings show negative and significant relationship between management quality and lending behavior in Ghana. Pham (2015), investigated the determinants of bank lending for 146 countries and found that management efficiency has significant and positive impact on lending.

Inflation is the rate at which the general price level of goods and services is raising and consequently the purchasing power of currency is falling, during the banks deal in nominal financial instrument inflation is important impact to the bank business, Al-Kilani and Kaddumi (2015) studied the cyclicity of lending behavior in Jordan for the period (2000-2013), the study used panel data for 13 conventional banks related to Jordan banking sector, the study found that inflation rate has significant and positive impact on lending behavior of the sample banks also Tomak (2013)in his study determinants of lending for commercial banks in Turkey found significant and positive

impact between inflation rate and lending. Moussa and Chedia (2016) also found that inflation rate has significant positive effect on bank lending in Tunis.

Crisis as whole have significant impact on economy and banks by impacting banks capital structure, debt maturity and liquidity. Gambacorta and Ibanez (2011) investigated the bank lending channel during the crisis. The study showed that crisis has significant impact on banks liquidity and capital structure, which causes negative impact on lending. Kawan (2010), studied the impact of financial crisis on bank lending. The result found high negative impact on bank lending. In another study Claessens and Horen (2014) investigated the impact of the global financial on bank lending for the period 1995-2009. The findings found that global crisis negatively affect the lending of ODEC countries advanced countries.

Chapter 3

BACKGROUND OF JORDAN BANKING SECTOR AND JORDAN ECONOMY

3.1 Overview of Jordan banks

Jordan banking system has dual banking system, conventional (commercial) and Islamic banking. Islamic banking system provides services according to the Shari'a or Islamic laws, like all banking sectors. Jordanian banking like other sectors has played a positive role in enhancing the growth of the Jordanian economy. And further more rehabilitation of the financial sector enhance the opportunity for economic growth Ananzeh (2016). In spite of the rise of the geopolitical and economic events during 2014 and 2015 the banking sector has proved well capitalized and highly regulated, maintaining its growth and expansion.

In 1964, The Central Bank of Jordan (CBJ) was established as independent entity owned by government, the CBJs' tasks are important and playing substantial role in maintaining financial stability in Jordan. CBJ responsible about the issuing of banknotes, coinage, credit regulation and management of exchange assets also provide the required liquidity and manage banks reserves' the CBJ duty also control and monitor the financial transactions of the sector, although manages the Jordan's' gold and foreign currency reserves.

3.2 Banking sector size

The number of banks in Jordan increased to 26 banks at the end of 2014. It consists of 16 domestic banks divided into 13 commercial banks with 609 branches in Jordan and

163 branches abroad, and 3 Islamic banks with 113 branches in Jordan and 15 branches abroad. There are 10 foreign banks divided into 9 commercial banks with 52 branches and one Islamic with 3 branches, the figure below shows the structure of Jordanian banking sector.

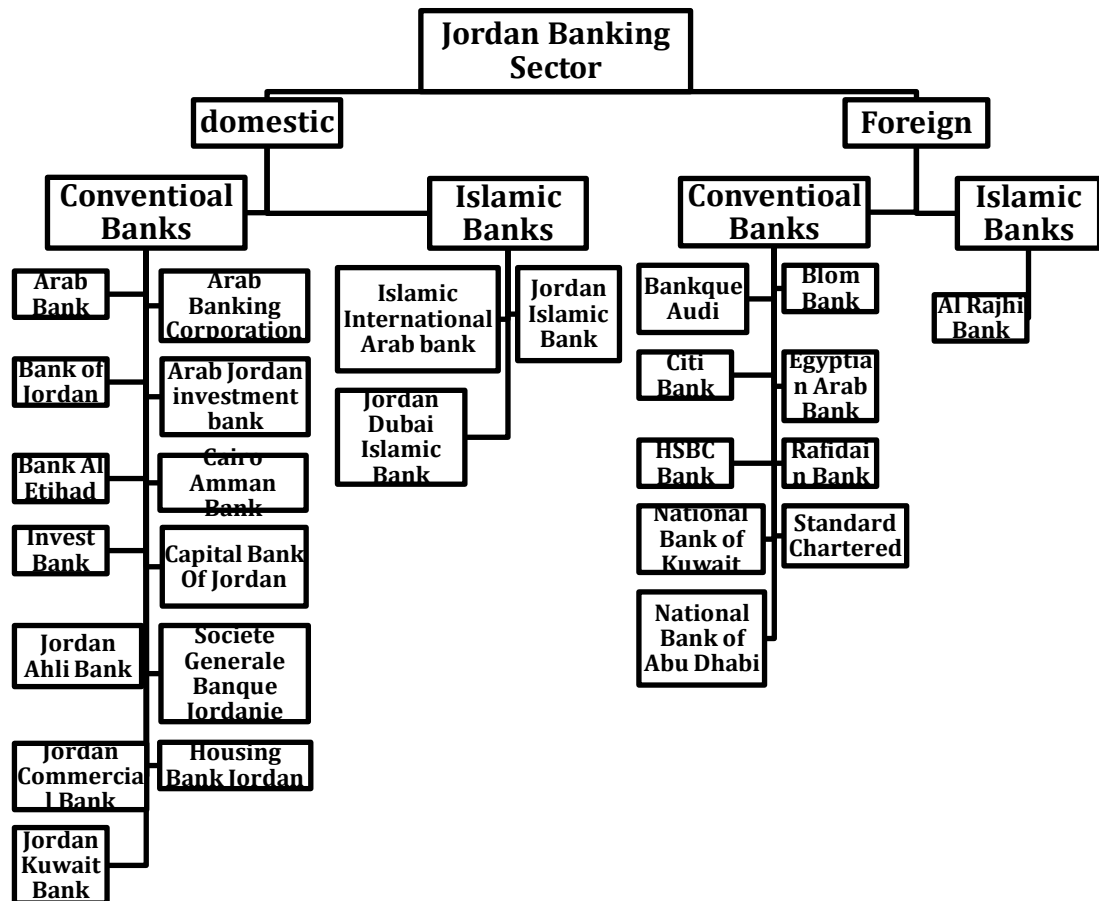


Figure 3.1: Jordan Banking Sector

The sector improved loans line and deposits strategy between 1970s-1980s and there was increasing in the number of banks and financial institution, in another improvement for the last 20 years the sector increased the amount of loans and deposits

3.3 Jordan economy

Jordan is located in the continent of Asia, specifically in the Middle East, the population of Jordan was 6.459 million according to 2015. Jordan suffered with adverse economic shocks over the past several years, but Jordan has achieved great success in dealing with these shocks. Syrian refugee crisis was one of several recent shocks to Jordan's economy and Iraq crisis, remain the largest recent shock affecting Jordan's economy.

Jordan's economy is facing several important obstacles which are water, oil, energy and agricultural productivity and asylum and the instability of the markets. Jordan's economy depends on foreign assistance, phosphate, potash, fertilizers and derivatives, as well as tourism and remittances from abroad.

After king ABDALLAH came to the throne in 1999, a lot of improvement and enhancement of the Jordan economy and many of the reforms have taken place. In 2001 Jordan became a member of the World Trade Organization as a result of reforms that aimed to establish a free market. Jordan has also turned into a regional center for business and one of the most desired locations for the investment in the region, and is characterized by efficiently tourism and real estate sectors. Jordan made a lot of agreement to support free trading with many countries such as USA, European Union, Canada, Turkey and Tunisia.

3.4 Macroeconomics factors

This section shows macroeconomic factors in Jordan, such as interest rate, exchange rate, inflation rate and gross domestic product.

3.4.1 Interest rate

Interest rate one of important factors which affect the economy in any country. Interest rate play an important and main role in impacting the economy and specially the banking sector, the table below shows the interest rate in Jordan for several years.

Table 3.4.1: interest rate

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Values%	5.47	-2.24	3.45	-9.04	6.25	0.65	2.16	4.10	3.23	5.36

3.4.2 Inflation rate

According to the changing in the price from time to time in Jordan, inflation has important impact on Jordan's economy. The table below shows the inflation rate in Jordan for several years.

Table 3.4.2 Inflation rate

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Values%	4.5	6.3	5.4	14.9	-0.7	4.4	4.4	4.8	5.9	2.9

3.4.3 Exchange rate

The table below shows the exchange rate between Jordanian Dinar and US dollar.

Table 3.4.3: Exchange rate

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
values	0.709	0.709	0.709	0.710	0.710	0.710	0.710	0.710	0.710	0.710

3.4.4 GDP-Real growth rate

GDP real growth rate shows the economic growth from period to period and how the fast the economy is growing, the table below shows the GDP-real growth rate in Jordan for several years

Table 3.4.4: GDP real growth rate

Years	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Values%	8.16	8.09	8.18	7.23	5.47	2.34	2.56	2.65	2.83	3.1

Chapter 4

DATA AND METHODOLOGY

The purpose of this chapter to present the data and methodology implemented to achieve the study aim. Also it will cover the chosen sample and the methodology used to analyze the model in order to get final result.

4.1 Data

The study uses balanced panel data for the for 16 domestic banks in Jordan for the period (2005-2014).The data collected from audited financial statements of Jordanian banks, E-views software has been chosen to perform regression analysis for the data, since it can be used for general statistical and econometric analyses and forecasting such as panel data analysis and time series estimation.

4.1.1 Sample Data

Below, chosen banks for the study is given:

Table 4.1: Sample Banks

Number	Bank name
1	Arab bank
2	Arab banking corporation (Jordan)
3	Cairo Amman bank
4	Bank of Jordan
5	Capital bank of Jordan
6	Commercial Jordan bank

7	Housing bank Jordan
8	Jordan Dubai Islamic bank
9	Invest bank
10	Islamic international Arab bank
11	Jordan Islamic bank
12	Al-Ahli Jordan bank
13	Jordan Kuwait bank
14	SocieteGenerale Bank Jordan
15	Union bank
16	Arab Jordan investment bank

Data sample included 16 domestic banks related to Jordan banking sector, 3 of them are Islamic banks while the rest are commercial banks for the period 2005 to 2014, and the number of observation was 160.

4.2 Model and variables

The variables classified into two groups, dependent variable which is loan-to-asset ratio and independent variables which are equity-to-asset ratio, liquidity ratio, management quality ratio, credit risk ratio, return on assets, return on equity ratio, size of bank, volume of deposits, inflation rate and two of dummy variables which represents the global crisis and regional crisis.

4.2.1 Dependent variable

Table 4.2: dependent variable of the regression model

Symbol	Description	Formula
TLA	Loans-to-asset ratio	Total loan / total assets

Loan-to-Assets ratio (TLA):

The loan to assets ratio measures the total loans outstanding as a percent of total assets

4.2.2 Independent variables**Equity-to-asset ratio (EA):**

It shows the strength of bank capital and its good indicator of the level of leverage. It tells us what percentage of banks' assets are owned by investors and not leveraged.

The higher of equity-to-asset ratio means the less leveraged the bank. The expected sign is negative because low leverage banks feel more risky in lending more.

Liquidity ratio (LR):

Liquidity ratio is used determine the bank's liquid assets to total assets, liquidity ratio is important factor affecting the amount of lending. The high liquidity ratio means that low proportion of loans granted. The expected sign is negative because when bank lend more it will increase the consumption of liquid fund.

Management quality ratio (MQ):

Management quality ratio is a determination of quality policy and its implementation, by use significant plan and good management for the liquidity which impact the bank performance, and the ability to lend. The measurement used is total operating expenses to total operating income and the expected sign is positive, because when the expenses increase bank lend more to cover it.

Credit risk ratio (CR):

Credit risk ratio refers to risk of default on repay a loan from a borrower which brings losses in principal and interest for the lenders. Non-performing loans to total loans

ratio is used to represent the credit risk ratio. When the ratio is high leads to decline in the strength of bank to lend more, the expected sign of this variable is negative.

Return on assets (ROA):

Return on asset ratio shows the percentage of profit a company earns in relation to its overall assets, also it's used to measure the efficiency of management for the bank. Return on asset ratio can be measured as net income to total assets. The high return on assets ratio mean robust financial and operational performance, while low ratio mean that the bank carrying a lot of debt. The expected sign is positive according to increase in the profit bank feel less risky in lend more and if bank will keep the money it will increase the expense of these money.

Return on assets (ROE):

Return on equity ratio shows the percentage of a profit a company receives by using the money of shareholders, high return on equity ratio indicates that the bank is using its investors' funds effectively. The expected sign is negative according to the cost of profit when bank pay part of these profit for the shareholders.

Size of bank:

The neural logarithm of total assets has been used to measure the size of the bank, bigger bank is able to lend more since it has large fund and more strong for the shocks. Hence expected sign is positive.

Volume of deposits (VD):

Total deposits to total assets ratio used to measure the percentage of deposits the bank received with the amount of its assets. Volume of deposits is important factor that can

affect the amount of loans provided to the customer. An increase in this ratio indicates that more availability of money in the bank, which mean more ability to lend.

Therefore the expected sing is positive.

Inflation rate (INF)

Inflation rate determinate the level of rise in goods and services prices. Inflation rate affect the purchasing power of money in this situation banks lend more to save the value of their money, therefore the expected sign is negative.

Dummy variable 1 (D1):

The dummy variable 1 show if there is any effect of the global crisis on the performance of the banks, because the global crisis is impacting the economy and the financial situation of the country and it can affect the performance and the business of the banks. Hence the expected sing in negative.

Dummy variable 2 (D2):

The dummy variable 2 shows if there is any effect of the regional crisis on the performance of the banks, because the regional crisis increase the number of refuges in the country which affect the economy of the country and foreign transactions. In this situation banks feel more risky in lending, therefore the expected sing in negative

Table 4.3: independent variable of the regression model

Symbol	Description	Formula
EA	Equity-to-assets ratio	Total equity / total assets
LR	Liquidity ratio	Liquid asset / Total

		assets
MQ	Management quality ratio	Total operating expenses / total operating income
CR	Credit risk ratio	PLL / Total loans
ROA	Return on assets ratio	Net income / Total assets
ROE	Return on equity ratio	Net income / Total equity
LnSize	Size of bank	Natural logarithm of total assets
VD	Volume of deposits	Total deposits / total assets
INF	Inflation rate	
D1	Dummy variable for the global crisis	
D2	Dummy variable for the regional crisis	

4.3 Methodology

This section presents the methodologies that were employed to achieve studies objective.

In this section we will use quantitative method to find the aim of the study, also to test the hypotheses which will provide an answer for the research questions, by make relationship between the chosen variables (dependent and independent) and test the effeteness between them.

4.3.1 Statement of hypothesis

The main goal of the study was synthesized into the following hypothesis:

H0: there is no functional relationship between the dependent variable (loan-to-assets ratio) and specified independent variables

H1: there is functional relationship between the dependent variable (loan-to-assets ratio) and specified independent variables

4.3.2 Model specification and variables

This section presents the measurements that chosen to study the variables. In this study loan-to-assets ratio used as dependent variable.

According to Greene (2002), the basic framework of the panel data is a regression model of the form

$$Y_{it} = \alpha + \beta X_{it} + \epsilon_{it}$$

Where:

$Y_{i,t}$: dependent variable (loan-to-asset-ratio)

$X_{i,t}$: independent variables (EA, Lr, MQ, CR, ROA, ROE, LinSize, VD, INF, D1 and D2)

α : Represents the intercept of the equation

ϵ : is the error term of the model

i : Presents the cross-sectional dimension

t: Presents the time series dimension

The functional relationship between loan-to-asset ratio, equity-to-asset ratio, liquidity ratio, management quality ratio, credit risk ratio, returns on asset, return on equity, size of bank, inflation rate and dummy variables can be represented as follows:

$$\begin{aligned}TLAi, t = & \beta_0 + \beta_1EAi, t + \beta_2Lri, t + \beta_3Mqi, t + \beta_4CRi, t + \beta_5ROAi, t \\ & + \beta_6ROEi, t + \beta_7LnSizei, t + \beta_8VDi, t + \beta_9INFi, t + \beta_{10}D1i, t \\ & + \beta_{11}D2i, t + \mu i, t\end{aligned}$$

Where

EA: Equity-to-asset ratio

LR: Liquidity ratio

MQ: Management quality ratio

CR: Credit risk ratio

ROA: Return on asset

ROE: Return on equity

LnSize: size of bank

INF: Inflation ratio

D1: Global crisis dummy variable

D2: region crisis dummy variable

$\mu i, t$: Error term

4.3.4 Panel Unit root test:

Panel unit root test will be used to test whether the variables are stationary or non-stationary. The independent variables can be stationary if its mean and variance are constant over the time also the value of covariance should depend on the distance or lag between two times, Gujarati (2009). Non-stationary data are unpredictable and

cannot be modeled or forecasted because the mean, variance and covariance change over time. Unit root test shows that if the data are stationary or not, and it used to obtain a more reliable result and more essential.

If a variable become stationary that mean its' mean, variance and covariance are all constant over time, while for non-stationary variable its change over time.

This study carried out unit root test of the variables depending on Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) unit root test and Levin Lin Chu test. The null hypothesis of the test is the variable has unit root (non-stationary), If the null hypothesis rejected we conclude that the variable has no unit root (stationary), this will be done in difference significant level of α which 1%, 5%, 10%.

4.3.4 Hausman test:

To generalize this model there are two basic framework first one is fixed effect approach which its take α to be a group specific constant term in the regression, and the second one is random effect approach which specific that α is a group specific disturbance. For panel data we should know whether random effect or fixed effect is appropriate for the given data set, before implementing the OLS regression. Fixed effect are constant across individuals, while random effects vary. For this reason husam test should be implemented to choose fixed or random effect.

4.3.5 Multicollinearity

Multicollinearity shows if there is relationship between independent variables, according to the classical regression model, Its assumed that there is no multicollinearity (relationship) among the independent variables because this relation make the variance infinite it will be failure of the assumption of the model, Greene

(2002). If there is high correlation between any two independent variables, problem of multicollinearity arises.

Multicollinearity is a problem because it can increase the variance of the coefficient which makes the estimator very sensitive according to any change in the model.

4.3.6 Autocorrelation

The disturbance values would be correlated positively or negatively, but it is assumed to be not correlated Gujarati (2009). It shows the degree of similarity between a given time series or how the data is influenced by its own historical values. Autocorrelation problem means your observations are not independent then you have less information and, as a result, your estimates, though unbiased, will be less precise and less accurate.

4.3.7 Heteroskedasticity

When the variance of error is constant at all levels of independent variables, if Heteroskedasticity problem is existent, that seeks to minimize residuals and in turn produce the smallest possible standard error that lead to inefficient ordinary least squares estimator. White test of Heteroskedasticity will be used to know if there is Heteroskedasticity problem in the model or not?

Chapter 5

EMPERICAL FINDINGS

This section presents the empirical results for the tests which applied on the variables. E-views software is used to test our hypotheses and model analysis.

5.1 Panel unit root test

H0: data are not stationary (there is unit root)

H1: data are stationary (there is no unit root)

From the table in appendix D, and according to prob. value we rejected the null hypothesis at level 1%, 5%, and 10%, that mean the data have no unit root in other word, it is stationary.

5.2 Hausman test

Table 5.1: Hausman test

Cross-sectional random effect			
Summary	Chi-square stat	d.f.	Prob.
Cross-section random	0.065962	11	1.0000

Hausman test is carried out to choose in between random and fixed effect.

According to the prob. value we cannot reject the null hypothesis which means random effect is appropriate.

Null and alternative hypotheses for hausman test.

H0: Random effect is appropriate

H1: Random effect is not appropriate

To confirm the hausman test we also use likelihood ratio. Table 5.3 present the result of the likelihood ratio.

Table 5.2: likelihood ratio

Effect Test	Statistic	d.f.	Prob.
Cross-section F	18.520154	(15,138)	0.3544
Cross-section Chi-square	176.472999	15	0.4723

The likelihood ratio also is supporting the hausman test, which give support for random effect.

Null and alternative hypotheses for likelihood ratio test.

H0: fixed effect is not appropriate

H1: fixed effect is appropriate

5.3 multicollinearity

To evaluate process of multicollinearity among variables, correlation matrix is estimated.

Table 5.3: correlation test

	TLA	EA	LR	MQ	CR	ROA	ROE	Lnsize	VD	INF	D1	D2
TLA	1.00											
EA	-0.31	1.00										
LR	0.058	-0.09	1.00									
MQ	0.01	0.03	-0.03	1.00								
CR	-0.28	0.32	-0.11	0.16	1.00							
ROA	0.30	-0.05	0.16	-0.25	-0.02	1.00						
ROE	0.204	-0.45	0.08	-0.02	-0.17	0.68	1.00					
Lnsize	-0.04	-0.29	-0.11	-0.09	-0.12	-0.263	-0.08	1.00				
VD	0.26	-0.09	0.13	0.03	-0.26	-0.043	0.367	0.327	1.000			
INF	0.133	-0.02	0.15	-0.26	-0.03	0.02	-0.05	-0.03	0.02	1.00		
D1	-0.04	-0.02	-0.07	-0.30	0.04	0.360	0.308	-0.070	-0.06	-0.02	1.00	
D2	-0.05	-0.08	0.05	-0.20	0.06	0.11	0.09	-0.18	0.00	0.15	0.36	1.00

From the correlation table we can see that most of the coefficients in the table are less than 50%, that implies no multicollinearity problem.

5.4 Autocorrelation

The rule of thumb supposed that, if Durbin Watson value lies between 1 and 3, there is no autocorrelation, as showed in table 5.7 Durbin Watson value is 1.895401 which mean that the data has no serial autocorrelation.

Autocorrelation affects the validity of the results, in the table below show the Q-test for autocorrelation. From the prob. value we can't reject the null hypotheses which is there is no serial autocorrelation.

Table 5.4: Q-test

Lag	AC	PAC	Q-Stat	Prob.
1	-0.007	-0.006	0.0588	0.805

2	0.000	0.000	0.0582	0.970
3	0.018	0.015	0.3706	0.938
4	0.026	0.026	1.0381	0.903
5	-0.014	-0.012	1.1809	0.936

5.5 Heteroskedasticity

White test for Heteroskedasticity will be conducted to know if the variance of error terms differ across the independent variables. The result below shows the white test for Heteroskedasticity. According to the prob. value we can reject the null hypotheses which means there is no Heteroskedasticity problem. Here we find Heteroskedasticity problem, therefore, white correction done in the regression estimation to solve Heteroskedasticity problem.

Table 5.5: White test result

F-statistic	3.353339	Prob. F(66,93)	0.0000
Obs*R-squared	123.8751	Prob. chi-Square(66)	0.0845
Scaled explained SS	56.0707	Prob. chi-Square(66)	0.0231

5.6 Regression Results

After we applied the panel unit root test we found that our data are stationary. Then we run the simple regression to find out if the explanatory variables are statistically significant, and to find out how they affect the dependent variable.

Table 5.6: regression Results

Variables	Coefficient	STD.ERROR	T- Statistics	Probability
C	0.095862	0.369287	0.259587	0.7955
EA	-0.065962	0.066410	-0.993256	0.3222
LR	0.556903	0.169068	3.293694	0.0012
MQ	0.067130	0.037534	1.788510	0.0757
CR	-1.659251	0.446225	-7.18419	0.0003
ROA	4.569414	1.711388	2.722593	0.0073
ROE	-0.543803	0.192806	-2.820472	0.0055
LnSize	-0.001875	0.016249	-0.114259	0.9092
VD	0.202904	0.061127	3.319399	0.0011
INF	0.264282	0.085967	3.074230	0.0025
D1	0.002907	0.009042	0.321476	0.7483
D2	-0.017944	0.006594	-2.721419	0.0073

R-squared	0.757644
F-statstic	18.96114
Prob.(Fstatstic)	0.000000
Durbin-Watson stat	1.895401

R-squared measures how close the data to fits the regression equation, from the result given the R-squared estimation is 0.75, which means the model explains 75% the variability of the response data around the mean.

F-statistics test used to know whether all coefficients in the regression model are the same or not, the null hypothesis for F-statistics test is all coefficients are equal to zero, according to the prob. value which equal (0.0000) we rejected the null hypothesis. These results indicate that the independent variables of the study can affect the dependent variable, also the regression has validity in fitting the data.

Liquidity ratio is significant at 1% significance level and it's positively correlated to the TLA. The coefficient sign is opposite to the expected sign, while it supports the finding of Karim et al. (2010) and Oluwatsin and Chukwuemeka (2012), where they found positive correlation between liquidity and lending. The positive correlation means when banks liquidity increase bank lend more. The reason is related to that banks feel less risky to lend more when liquidity increase. Because banks are cautious to keep more liquid funds to face any risks can be occur also to meet current requirements or obligations.

Management quality ratio was statistically significant at 10% significance level. And it's positively correlated to the TLA which complies with the expectation sign. As MQ measured in this study (total operating expenses to total operating income) an increase in MQ demonstrates the increased in operating expenses and to cover these expenses banks increase the amount of credit to receive more profit. That explains the positive correlation between MQ and TLA. The result supports the finding of Al-Kilani (2015) who studied the cyclicity of lending behavior in Jordan. The management efficiency is important to improve the performance of banks and the ability of lending. When MQ increase that indicate an increase in operating expense and to cover these expenses banks lend more to generate profit and cover it.

Credit risk ratio statistically significant at 1% significance level. As the result suggests credit risk ratio is negatively correlated with TLA and it is consistent with the expected sign. Result also supports the finding of Malede (2014), who study the determinants of commercial banks lending in Ethiopia. His result show the negative impact of credit risk on the size of credit and how it can affect the ability for lending. Also Cucinelli (2015) in his study showed that non-performing loans has negative impact of credit risk on bank lending behavior. In this study CR measured by loan loss provision ratio, when the allowance for bad loans increase (which is expenses item) CR will increase that leads more risk and as it is well known that banks take fewer risk which leads to reduce their credit size. In sum increase in risks explain reason of negative correlation between CR and TLA.

Return on asset ratio significant at 1% significance level, as the study expected the return on asset positively correlated with the dependent variable (TLA). This result is consistent to the Laidroo (2012) findings, where he found that an increase in return on asset leads to increase in total loans to asset ratio. An increase in ROA lead to increase in the amount of loans because banks feel less risky to lend more also to avoid any increase in cost by holding this money, this construes the positive correlation between ROA and TLA.

Return on equity ratio is significant at 1% significance level, it is evident from the result that, return on equity ratio is negatively correlated with total loans to asset ratio, this result supports to the findings of Moussa and Chedia (2016), who found that return on equity ratio is negatively correlated with bank lending. Banks reduce their amount of loans when ROE increase because of the risky condition.

Bank size and Equity-to-assets ratio have negative impact on lending which mean large banks lend less than smaller banks, also an increase in EA lead to decrease of loans, but according to the result LnSize and EA are not significant.

The regression output revealed a positive and significant association between VD and TLA which is significant at 1% level of significance. The sign of VD conform to our prior expectation. The finding is parallel with the finding of Olokoyo (2011) where he found that volume of deposits is positively correlated to lending. Also findings support the suggestion of Omowunmi (2011) study where the author suggested that banks should work enough and focus on increasing the amount of deposits. Probably banks depend on deposits to granting loans, banks willing to lend more when it receives deposits to generate more profit and cover the expenses of these deposits.

Inflation rate is significant at 1% level of significance. It is evident from the result that inflation rate is positively correlated with total loans to asset ratio. The same finding was found by Al-Kilani (2015), the result indicates that banks keep providing additional loans without being affected by inflation rate in Jordan. The positive correlation may be attributed to the fact that when inflation rate increase the demand of loans increase. This contributes to increase in the prices which lead to increase the interest of banks related to the increase of prices.

The first dummy variable which represents the global crisis is positively correlated with banks lending, which mean that Jordanian domestic banks increased their lending during the global crisis, but it is statistically not significant.

The second dummy variable represents the regional crisis is significant at 1% level of significance and it negatively correlated with TLA, the coefficient value indicates that regional crisis decreased the TLA by 1.8% approximately. This is due to the negative effect of regional crisis on the economy and the banking sector. The banks reduce their lending during the crisis, also to take caution of default in loans repayment from the borrowers' difficult economic conditions faced by the country during the crisis.

Chapter 6

CONCLUSION AND RECOMMENDATION

Banks play an important role in order to promote the economy of any country. Lending is the basic service for the banks and it is primary source to generate the income, while funding the economic activities.

Since lending is crucial both for banks and economy, it is important to determine the factors that can affect banks lending. In this context this thesis, aims to find determinants of lending in Jordan for sample of 16 domestic banks during the period 2005-2014.

The findings of the analysis show that; liquidity ratio has positive effect on lending which means that the lending is escort with the liquidity of bank. The management quality ratio also has positive effect on lending, which shows the importance of bank management related to lending. Hence my recommendation to domestic banks in Jordan is to maintain the stability of liquidity and use efficient liquidity management due to the significant impact of liquidity on the lending.

Also the study concluded that return on assets ratio is positively and significantly related lending of domestic banks in Jordan. On the contrary, the return on equity ratio has negative impact on lending. The study suggests that banks should work more by their assets which reduce the cost of business and the value of profit.

Another deduction of the study is about credit risk ratio that has negative impact on lending. The measurement of credit risk in this study shows the effect of loan loss on lending and how banks should take the necessary action before making any decision to lend. This is necessary to avoid any default in repayment from the borrowers. On the other hand, volume of deposits has positive effect on lending therefore, banks should work well to get more deposits from the investors. This increase the liquidity for the bank and to cover the expense of the deposits banks lend more, this recommend to stimulate and encourage the investors to deposit their money to the banks.

Equity to asset ratio has positive impact on lending but statistically is not significant like size of bank and the global crisis dummy variable.

Finally the study found that inflation rate has positive impact on lending, banks willing to lend more according to an increase in inflation rate, and the regional crisis has negative impact on lending in Jordan. Hence my recommendation is to take caution during the crisis period by make informed decisions related to the lending. Also take caution about the disadvantage of inflation rate when it increase.

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APPENDICES

Appendix A: Hausman test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.065962	11	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EA	-0.082449	-0.065547	0.002071	0.7171
LR	0.538208	0.556903	0.001615	0.6418
MQ	0.061826	0.067130	0.000020	0.2302
CR	-1.492612	-1.659251	0.017547	0.2084
ROA	4.526199	4.659414	0.068263	0.6101
ROE	-0.524726	-0.543803	0.001113	0.5674
LNSIZE	0.007708	-0.001857	0.000403	0.6338
VD	0.247869	0.202904	0.001015	0.1582
INF	0.268254	0.264282	0.000061	0.6106
D1	0.007823	0.002907	0.000049	0.4844
D2	-0.016283	-0.017944	0.000037	0.7855

Cross-section random effects test equation:

Dependent Variable: TLA

Method: Panel Least Squares

Date: 01/13/17 Time: 08:10

Sample: 2005 2014

Periods included: 10

Appendix B: Regression result

White cross-section standard errors & covariance (d.f. corrected)
 WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.095862	0.369287	0.259587	0.7955
EA	-0.065962	0.066410	-0.993256	0.3222
LR	0.556903	0.169068	3.293964	0.0012
MQ	0.067130	0.037534	1.788510	0.0757
CR	-1.659251	0.446225	-3.718419	0.0003
ROA	4.659414	1.711388	2.722593	0.0073
ROE	-0.543803	0.192806	-2.820472	0.0055
LNSIZE	-0.001857	0.016249	-0.114259	0.9092
VD	0.202904	0.061127	3.319399	0.0011
INF	0.264282	0.085967	3.074230	0.0025
D1	0.002907	0.009042	0.321476	0.7483
D2	-0.017944	0.006594	-2.721419	0.0073

Effects Specification		S.D.	Rho
Cross-section random		0.070956	0.6816
Idiosyncratic random		0.048495	0.3184

Weighted Statistics			
R-squared	0.757644	Mean dependent var	0.093501
Adjusted R-squared	0.524767	S.D. dependent var	0.070512
S.E. of regression	0.048609	Sum squared resid	0.349698
F-statistic	16.96114	Durbin-Watson stat	1.895401
Prob(F-statistic)	0.000000		

Unweighted Statistics			
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Appendix C: Heteroskedasticity test

Heteroskedasticity Test: White

F-statistic	4.353339	Prob. F(66,93)	0.0000
Obs*R-squared	120.8751	Prob. Chi-Square(66)	0.0000
Scaled explained SS	156.0707	Prob. Chi-Square(66)	0.0000

Test Equation:
 Dependent Variable: RESID^2
 Method: Least Squares
 Date: 12/31/16 Time: 16:52
 Sample: 1 160
 Included observations: 160

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.007930	0.025792	-0.307468	0.7592
EA^2	-0.298434	0.080142	-3.723797	0.0003
EA*LR	-0.050719	0.175829	-0.288458	0.7736
EA*MQ	0.101523	0.079652	1.274577	0.2056
EA*CR	0.587317	1.194978	0.491488	0.6242
EA*ROA	5.576487	2.856412	1.952270	0.0539
EA*ROE	-0.288019	4.115300	-0.069987	0.9444
EA*LNSIZE	0.018085	0.006688	2.704325	0.0081
EA*VD	-0.326387	0.187655	-1.739288	0.0853
EA*INF	0.408954	0.352428	1.160388	0.2489
EA*D1	0.010318	0.030125	0.342500	0.7327
EA*D2	0.050173	0.020341	2.466637	0.0155
LR^2	0.553540	0.157983	3.503799	0.0007
LR*MQ	-0.085899	0.173511	-0.495065	0.6217
LR*CR	-2.205037	3.023675	-0.729257	0.4677
LR*ROA	-3.570260	4.740710	-0.753107	0.4533
LR*ROE	0.315401	0.519644	0.606955	0.5454

Appendix D: Panel Unit Root Test

Variables	Levin Lin Chu	ADF Fisher Chi square	PP Fisher Chi square
TLA τ_T	0.0000*	0.0035*	0.0000*
τ_μ	0.0000*	0.0064*	0.0065*
τ	0.8812	0.9881	0.9535
EA τ_T	0.0000*	0.0005*	0.0003*
τ_μ	0.0004*	0.2631*	0.0119**
τ	0.7732	0.8523	0.2552
LR τ_T	0.0000*	0.0095*	0.0000*
τ_μ	0.0000*	0.0207**	0.0000*
τ	0.7723	0.9646	0.2552
MQ τ_T	0.0000*	0.0321**	0.0988***
τ_μ	0.0000*	0.0010*	0.0024*
τ	0.3611	0.9096	0.9418
CR τ_T	0.0000*	0.0000*	0.0000*
τ_μ	0.0000*	0.0000*	0.0000*
τ	0.0000*	0.0023**	0.0000*
ROA τ_T	0.0000*	0.0000*	0.0000*
τ_μ	0.0000*	0.0000*	0.0000*
τ	0.0000*	0.0000*	0.0000*
ROE τ_T	0.0000*	0.0015*	0.0000*
τ_μ	0.0000*	0.0000*	0.0000*
τ	0.0000*	0.0000*	0.0000*
Lnsizet τ_T	0.0000*	0.0354**	0.0004*
τ_μ	0.0016*	0.0166**	0.0003*
τ	1.0000	1.0000	1.0000
VD τ_T	0.0000*	0.0860***	0.0005*
τ_μ	0.0000*	0.0001*	0.0003*
τ	0.4041	0.9469	0.5716

INF τ_T	0.0000*	0.0000*	0.0000*
τ_μ	0.0000*	0.0000*	0.0000*
τ	0.0004*	0.4231	0.0001*

Notes:

- Signals (***) , (**) & (*) denotes the significant level of 10% , 5% & 1% . .
- τ_T represents the model with a drift and trend; τ_μ is the model with only the drift; τ represents the model without a drift and trend.