A Comparative study of Islamic and Conventional Banks Risk Management Operating in QISMUT Countries

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ABSTRACT

The clue of a good financial management for any bank or financial institution is risk management. The most important part of the process of risk management is to identify and determine the source of risk. This study is carried out in order to identify and analyze the factors that influence credit risk, liquidity risk and capital risk of both Islamic and conventional banks in QISMUT countries (Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey) during the period from 2011 to 2015 taking in to consideration answering research question if determinants of risk in Islamic banking sector are the same as conventional banking sector or not. Concerning credit risk log of bank size is only common factor that significantly affects both Islamic and conventional banks. Bank fund management is the only factor that shows significant impact to both Islamic and conventional banks. Deposits structure is considered to be the only significant factor that influence capital adequacy of both Islamic and conventional banks. From the investigated factors for each risk there is only factor which has significant impact on Islamic and conventional banks. This indicates that there is a big difference in the factors that influence risk in Islamic and conventional banks and this may be due to the factors mentioned in chapter 1 that differentiate Islamic banking from conventional banking.

Keywords: Islamic banks, Conventional banks, Credit risk, Liquidity risk, Capital risk.

ÖZ

Herhangi bir banka veya finansal kurum için iyi bir mali yönetim iddiası risk yönetimidir. Risk yönetimi sürecinin en önemli parçası, risk kaynaklarını belirlemektir. Bu çalışma, QISMUT ülkelerinde (Katar, Endonezya, Suudi Arabistan, Malezya, Birleşik Arap Emirliklerive Türkiye) hem İslami hem de geleneksel bankaların kredi riski, likidite riski ve sermaye riskini etkileyen faktörleri tanımlamak ve analiz etmek için İslami bankacılık sektöründe risk belirleyicilerinin geleneksel bankacılık sektörüyle aynı olup olmadığı araştırma sorusunu cevaplamayı dikkate alarak 2011-2015 yıllarını kapsıyor. Kredi riskiyle ilgili olarak, banka büyüklüğünün günlüğü yalnızca hem İslami hem de konvansiyonel bankaları önemli ölçüde etkileyen ortak faktördür. Hem İslami hem de konvansiyonel bankalara önemli etkisi olan banka fonları yönetimi tek faktördür. Hem İslami hem de konvansiyonel bankaların sermaye yeterliliğini etkileyen tek factor mevduat yapısıdır. Her bir risk için araştırılan factorlerden yalnızca İslam ve konvansiyonel bankalar üzerinde önemli bir etkiye sahip olan faktör var. Bu, İslami ve geleneksel bankalardaki riski etkileyen faktörlerde büyük bir farklılığın olduğunu ve bunun, bölüm 1'de bahsedilen İslami bankacılığı klasik bankacılıktan ayıran etkenlerden kaynaklanabileceğini göstermektedir.

Anahtar kelimeler: İslami bankalar, Konvansiyonel bankalar, Kredi riski, Likidite riski, Sermaye riski.

Dedicated To My Family

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LIST OF ABBREVIATIONS

CAR   Capital Adequacy Ratio

CR   Credit Risk

CI   Cost to Income Ratio

DEP   Deposit Structure

E-VIEWS Economic Views

GDP   Gross Domestic Products

INF   Inflation Rate

IPS   Im pesaran and Shin W-stat

LEV   Leverage Ratio

LNS   Logarithmic of Bank Size

LLC   Levin Lin and Chu

LR   Liquidity Risk

PP   Philip Peron

Chapter 1

INTRODUCTION

1.1 Background

Financial institutions are connected to each other with local money market. Local money markets are connected to each other through the international financial market. Local money market is exposed to fluctuations and disturbances which leads to uncertainty and hence risk. Changes in the international financial market also contribute to this uncertainty. Risk increases according to the degree of uncertainty. Risk is correlated to return. Many financial institutions in order to generate high return on their assets take high risk. Banks due to their specific features in their balance sheet carry risk. A conservative bank may not make good use of market opportunities and as a result have higher cost of capital while a risk taker bank may give a huge amount of loans to risky customers which in turn may expose the bank to risk of failure. Risks should be identified, controlled and managed (Akkizidis and Khandelwal, 2007). In this study the factors that affect credit risk, liquidity risk and capital adequacy of participatory and conventional banks in QISMUT countries will be studied.

1.2 The Main Characteristics of Islamic and Conventional Banks

Islamic banking depends on Shariaa that prohibits paying or receiving interest (riba). Islamic financial products are offered in compliance with Islamic rules (pejman et al, 2013). According to Shariaa financial transactions should not involve any of the following: Riba (interest),Maisir (gambling), and non-halal (prohibited) activities.

Islamic banking refuses many conventional banking basic concepts as future value of money and accepts return on capital. This return on capital is based mainly on the profitability of the project being financed and the amount of risk incurred (Ariss, 2010). According to Shariaa any speculative financial transaction is not permitted. These transactions include using options and futures and risk managing by using forward contracts, interest rate swaps and any transaction that include items that are not under the ownership of the seller (short sale) and all types of derivatives because it involves trading in financial in securities that are not traded in reality (Khan,2010). According to Shariaa fixed interest rate and charging interest on loans is prohibited. Supporters of Islamic finance argue that Islamic banks are theoretically more balanced than conventional banks towards financial shocks as some of the financial losses are transferred to depositors. As well the risk sharing nature of PLS concept enables Islamic banks to provide funds to long-term projects with high risk-return premium and thus enhances economic growth (Chong and Liu, 2009).

1.3 Intermediation Role in Banking

The main role of any financial intermediary is asset and risk transformation. Financial intermediaries offer some brokerage services to their customers. Asset mediation takes the shape of matching between need for fund and abundance of financial resources. Shariaa offers a group of mediation contracts that ease performing of clear and efficient financial activities in a given economy. These contracts enable Islamic financial institutions to offer the same mediation services of Conventional banks as asset and risk transformation but in compliance with sharia. The features of financial mediation of Islamic banks are different from that of conventional banks. Understanding this difference is the clue to differentiate between the type of risk in Islamic and conventional banks. The principles of Islamic banking

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are based mainly on participating in both profit and losses and not simply on financial intermediation. There is kind of profit sharing among the depositors, the bank and the entrepreneur (Greuning and Iqpal, 2008). While Conventional banks act as intermediates transferring funds from lenders to borrowers by charging interest Islamic banks perform the same function by active participation between both lenders(depositors) and borrowers (banks' customers) sharing both risks and returns in more active and formal way (Akkizidis and Khandelwal, 2007).Islamic banks play the role of financial mediator by screening financially viable projects and monitoring the performance of projects on behalf of their customers (depositors and at the same time investors)(Greuning and Iqpal, 2008). Due to relying on equity financing over debt financing the risks in Islamic banking is different from that in conventional banking. PLS principle in Islamic banking changed the relationship between the lender and borrower into partners who share in both profits and losses (Akkizidis and Khandelwal, 2007).

1.4 Mechanism under which Islamic and Conventional Banks Operate

All Islamic financial products are provided in accordance with profit and loss sharing principle (Pejman et al, 2013). PLS is the base of all Islamic banking contracts. PLS may be shaped by different contracts. The most common one where the bank enters into a contract with entrepreneur where the bank agrees to finance the project fully and the other party only gives time and effort. Profits are shared as on an agreed basis between both parties. In case of any loses the bank solely will bear the risk if there is poor management from the other party. The rate of return on any investment is not fixed and uncertain as fixed income is prohibited by Shariaa. Accordingly Islamic banking seems to experience greater risk (Akkizidis and Khandelwal, 2007).

On the other hand the nature of contracts between the banks and investors on the basis of PLS will enhance efficiency and stability in the system (Archer and Karim, 2007). Islamic banking faces higher credit, operational, market and liquidity risks due to PLS. This requires that the terms of contracts of any transaction to be clear and transparent. Transparency is needed in Shariaa and uncertainty (Ghara) is forbidden by Shariaa(Akkizidis and Khandelwal, 2007). The PLS concept exposes Islamic banks to greater market risk. Islamic banks have to spend more time and effort to select good customers because they can lose more than conventional banks lose. Banks have to screen its investments to ensure accurate reporting of profits and lose. Supporters of Islamic finance assert that the basic advantage of PLS is the efficient distribution of capital because the return is on capital and mainly depends on the profitability of the project. In Islamic banks both lenders and borrowers share in risk of venture because neither the lender nor the borrowers are certain about success or failure of the venture (Chong and Liu, 2008). Islamic banks are restricted in using many of the products that conventional banks use to mitigate risk due to their prohibition according to sharia (Ahmed and Khan, 2007).

1.5 Islamic Bank's Balance Sheet

The structure of a bank's balance sheet is one of the most important factors that determine the degree of the risks faced by the bank. Balance sheet of bank structure lies at the top priorities of determining asset-liability management process. The structure of a bank's balance sheet differs significantly according to financial institution's business, market and customer orientations and the economic environment atmosphere in which the bank operates. In order to analyze the risks of bank financial analysts should determine the weight of the bank's asset items and the changes in theses weights over time (Greuning and Iqpal, 2008). Islamic bank asset

side of balance sheet contains riskier assets (Musharakah and Mudarabah) than a conventional bank may acquire. Due to their dependence on short-term maturity products Islamic banks are constrained in their ability to provide investment products to investors who seek long-term investments. Islamic banks excessive reliance on trade and commodity financing products has constrained their choice of maturity structure in short-term maturity financing while theoretical model states that financial mediators should diversify their maturity structure to get benefit of portfolio diversification. Islamic banks always suffer from absence of institutions that support PLS. There are no institutions offering sound information on the credit quality of borrowers and entrepreneurs. A few reliable institutions that provide information about debtors (Archer and Karim, 2007).

1.7 Hypothesis

The factors that influence risk in Islamic banking system is different from those that influence risk in conventional banks.

1.8 Research question

- What are the determinants of credit risk, liquidity risk and capital risk of Islamic and conventional banks in QISMUT countries?

- Are the risk determinants of Islamic banks same as those of conventional banks?

1.9 Aim of the Study

To explain and analyze the determinants of credit, liquidity and capital risks of participatory and conventional banks in QISMUT countries using regression analysis.

Chapter 2

LITERATURE REVIEW

There is a growing interest on the studies for Islamic banking and Conventional banking nexus (Amilin,2016; Cavalier,2013; Kia,2014; Sujianto and Effendi,2016; Suryanto,2016; Waemustafa and Sukri,2016; Yunus,2016). However, risk management studies in Islamic banking system reserves attention.

Risk management is very crucial for any financial institution. Risk management for Islamic institutions is controversial issue because of the specific features that differentiate Islamic financial institutions from other institutions as the prohibition of interest and the nature of profit and loss sharing which is the base of all Islamic banks transactions. Islamic banks have increased in size during the last period which provokes scholars and researchers to investigate, measure, identify and interpret the risk that are associated with its financial products. Scholars were also provoked to study the differences between Islamic financial institutions and non-Islamic financial institutions in terms of risk management.

Waemustafa and Sukri (2015) examined the factors that influence credit risk. They applied the study on participatory and conventional banks in Malaysia during the period from 2000 to 2010. In this study loan loss provision, REGCAP, Liquidity, debt-to-total asset ratio, size, earning management and macroeconomic variables as inflation and M3 are used as explanatory variables to explain credit risk. They used

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regression analysis to identify the relationship between independent variables and credit risk. It was found that Islamic contract and regulatory capital significantly affect the credit risk of Islamic banks. Loan loss provision, REGCAP, Liquidity, debt-to-total asset ratio, size, earning management have significant effect on credit risk of conventional banks. Macroeconomic variables as inflation and M3 have significant influence on credit risk of participatory and traditional banks.

Masood et al (2012) studied the credit risk of participatory and traditional banks in UAE. Survey is used to gather information to be used in the study. Data were collected from 6 conventional banks and 3 Islamic banks with 148 credit risk managers participating in the study. In order to differentiate Islamic and conventional banks in UAE binary logistic regression model is used. Conventional banks seem that they have more developed Risk adjusted return on capital for risk pricing and give more priority to cash than Islamic banks. Islamic banks are more conservative using the credit risk management techniques and more careful concerning analyzing inter-bank exposure in order to manage credit risk. Due to its distinctive features Islamic banks give more attention to the property deposits than conventional banks in UAE.

In order to determine the factors that influence risk management in Islamic banks many studies have been implemented includes the study of Haron and Hin Hock (2007) on credit risk and Archer and Haron (2007) on operational risk. They found that some risks may be originated in the operations of both Islamic and non-Islamic banks. Although that risk management of is more complicated in case of Islamic banks than conventional banks but the basics of credit and market risk can be applied to both.

Pejman et al (2013) examined the factors that influence credit risk. They applied their study on 118 Islamic banks, 81 commercial banks with Islamic branches and 354 conventional commercial banks from 24 countries from 1999 to 2009. Data of banks were collected from bankscope while macroeconomic variables as GDP per capital, domestic interest rate and growth rate of GDP per capita were obtained from the World Bank website. They investigated credit risk using random effect regression analysis. Credit risk represented in loan loss reserve is dependent on many variables as Size, market share, Asset growth, Capital asset ratio, cost inefficiency, loan growth, , Noninterest income , Ownership structure, Bank age and macroeconomic variables as domestic interest rate and GDP per capita. It was found that Islamic banks are less risky than conventional banks in terms of credit risk. It was found that size has negative influence on credit risk of both Islamic and conventional banks. Share of muslim in population negatively affects credit risk of Islamic banks. Results show that there is positive but not significant relationship between domestic interest rate and credit risk of Islamic banks. Leverage has negative impact on the credit risk of both Islamic and conventional banks but higher leverage linked with lower credit risk for Islamic banks in comparison to conventional banks.

Abdel Megeid (2017) investigated liquidity risk of commercial and Islamic banks in Egypt. Correlation and regression analysis are used in this research to explain, analyze and interpret the determinants of liquidity risk of Islamic and conventional banks in Egypt. This study was applied on 6 conventional banks and 2 Islamic banks in the period from 2004 to 2011. The data were extracted from Bank scope. In order to examine the hypothesis that bank loan quality, liquidity management levels and funding and assets quality have positive influence on the liquidity risk of Islamic banks versus conventional banks in Egypt regression model was developed. Growth

of total assets, Impaired loans /Gross loans and Growth of gross loans represent loan quality, Loans/Customer deposits, Customer deposits/Total funding excluding derivatives and Inter-bank assets/Inter-bank liabilities represent funding management and Loan loss reserve/Gross loans and Impaired loans/Gross loans represent asset quality while liquidity risk which is the dependent variable is represented in Net loans/Total assets, Liquid assets/Deposits and short-term funding. It was found that for conventional banks funding and asset quality have positive influence on liquidity risk meanwhile for Islamic banks loan quality and funding management have positive influence on liquidity risk but asset quality affects it negatively. The results show that concerning asset and funding quality management traditional banks are performing better than participatory banks however concerning loan quality management participatory banks are performing better than traditional banks. It is clear also that participatory banks are less liquid than traditional banks.

Zineldin (1990) studied the liquidity risk management of Islamic and conventional banks of Egypt and Malaysia. It was discovered that Islamic banks have better liquidity risk management than conventional banks.

Tariq and Momeneen (2012) studied the effect of profitability ratios on the liquidity risk of participatory and traditional banks of Pakistan. Ratio as loan/asset ratio, loan/deposits and borrowing and liquid assets/deposits ratio are considered as independent variables in this research. The results show that conventional banks are better in managing liquidity than Islamic banks.

Ika and Abdullah (2011) investigated the liquidity of Islamic and conventional banks in Indonesia. Financial ratios as cash deposit ratio, current ratio and loan deposit ratio

were used to interpret banks' liquidity. They discovered that participatory banks are more liquid than traditional banks.

Muhammad and Manarvi (2011) carried out a comparative research on traditional and participatory banks of Pakistan. They concluded that Islamic banks are better than conventional banks in terms of liquidity risk management.

Anam*et al.* (2012) examined the influence of bank's size, adequacy of capital requirements, return on equity, ROA and net working capital on liquidity risk of islamic and conventional banks in Bangladesh from 2006 to 2010. The results show that Net working capital in conventional banks and banks' size in Islamic banks has a positive strong effect on liquidity risk.

Iqbal (2012) studied the influences of liquidity risk in participatory and traditional banks of Pakistan. In this study nonperforming loans, capital adequacy, ROA, ROE and size of the bank were used as explanatory variables to explain liquidity risk. Results show that ROA, ROE and capital adequacy have a positive strong effect on liquidity risk management while nonperforming loan ratio has a negative strong effect on it in Both Islamic and conventional banks.

Akhtar et al (2011) examined liquidity risk of Islamic and conventional banks of Pakistan from 2006 to 2009. Data were collected from the annual reports of 6 Islamic and 6 conventional banks. Liquidity risk is the dependent variable in this study. The control variables used in this study are size of the bank, Net working capital, return on equity, Return on assets and capital adequacy ratio. Correlation and regression analysis are used to distinguish between the influences of explanatory variables on

the dependent variable. SPSS is the program used to run the regression analysis. According to the results of F-test both models are good models. Networking capitals to net assets and size have positive strong influence liquidity risk management. ROA for participatory banks and capital adequacy for traditional banks are positively and significantly to liquidity risk while ROA for traditional banks and capital adequacy in participatory banks is positively but insignificantly to it.

Ojo (2010) discovered that capital adequacy ratio is positively and significantly to liquidity risk of traditional banks while it has weak effect in case of Islamic banks.

Pellegrina (2012) studied the influence of capitalization on risk management of Islamic and conventional banks. This study was implemented to investigate the formulation of capital of various banks and its impact on risk taking efficiency. Data were collected from 522 traditional banks and 71 Islamic banks over the period from 2000 to 2011. Data were retrieved from Bankscope. Regression and stochastic cost frontier analysis are used in this study to test the effect of capitalization on risk management of Islamic and conventional banks. The results show that the higher the capital those Islamic banks have the less risky strategies they implement in terms of asset formulation and the higher the liquidity they have compared to Islamic banks with lower capital. This higher capitalization is associated as well with lower nonperforming loans which results in positive impact on profitability. However conventional banks with higher capital change their financial policy from making traditional loans into investing in off-balance sheet items and other assets. This financial policy is accompanied by higher profitability and profit efficiency while increase in nonperforming loans.

Abusharba et al (2013) investigated the determinants of capital adequacy in Islamic banks. Data were obtained from Bankscope and the annual financial report of 11 Islamic banks of Indonesia over the period from January 2009 to December 2011 based on monthly data. Regression analysis is used in this study to determine the impact of deposits structure, operational efficiency, liquidity and asset earning quality on the dependent variable capital adequacy. Equity/Risk weighted total assets represent the dependent variable capital adequacy in this study. The results show that liquidity and ROA have positive significant effect on capital adequacy while nonperforming financing has negative strong influence on capital adequacy. It is also clear that operational efficiency and deposits structure have no effect on the capital adequacy of participatory banks.

Büyüksalvarc and Abdioğlu (2012) investigated the determinants of capital adequacy of Turkish banks. They discovered that LEV, return on equity and LOA have a negative influence on capital adequacy while ROA and LLR have positive influence on capital adequacy. It was found also that deposits structure, size, liquidity and net interest income have no significant impact on capital adequacy.

Alsbbagh (2004) investigated the factors that influence capital adequacy of commercial banks in Jordan. It was found that risky assets ratio, loan to assets ratio, dividends payout ratio and ROA have positive influence on capital adequacy while size of the bank, loan provision ratio and deposits assets ratio have negative influence on capital adequacy.

Bokhari and Ali (2009) investigated the factors that influence capital adequacy of commercial banks of Pakistan. GDP growth rate, profitability, deposits and portfolio

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risks were used in this study as explanatory variables. The results show that ROE, GDP, deposits and portfolio risks have a negative significant impact on capital adequacy.

Williams (2011) analyzed the effect of the macro-economic factors on the capital adequacy of banks in Nigeria over the period from 1980 to 2008. He found that return on investments, inflation, money supply, real exchange rate and political instability are the most important factors in determining capital adequacy in Nigeria. He found also that inflation has negative effect on bank's capital.

El-Ansary and Hafez (2015) analyzed the determinants of capital adequacy in the Egyptian commercial banks. The study conducted on 36 conventional banks over the period 2004-2013. Data were retrieved from Bankscope. Pearson's Correlations Matrix and descriptive statistics is the methodology used to determine the relation between explanatory and dependent variables in this study. In this study deposits assets ratio, earning assets ratio, net interest margin growth, profitability, size, liquidity, Loan loss provision and loans assets ratio are the explanatory variables which are used to analyze capital adequacy of commercial banks in Egypt. Earning assets to total assets represents asset quality, loans to deposits and securities to total assets represents liquidity and total loans to total assets represent management quality. The results show that ROA, loans to deposits, securities to total assets and total loans to total assets have a positive strong impact on capital adequacy. It was found also that Log of total assets which measures the size of the bank and loan loss reserves to total loans have negative significant effect on capital adequacy. Earning assets to total assets and loan loss reserves were found to not have effect on capital adequacy.

Bertraned (2000) studied capital adequacy of Swiss banks and its impact on risk policy of the bank. Bank's size which is represented by total assets, ROA and loan portfolio loss rate which represents credit risk are the explanatory variables used in this study. Capital to risk weighted assets represent CAR. The results show that ROA has positive significant effect on CAR.

Stolz and Wedow (2005) studied determinants of capital adequacy in Germany. It was found that risky assets have positive influence on the change of capital adequacy ratio for banks with high adequate capital while it has negative impact on banks with low capital adequacy. The profitability of the bank was found to have positive effect on CAR. Also Deposits was found to have a positive significant effect on CAR but bank's size was found to have negative relation with CAR.

Bateni et al., (2014) examined the determinants of CAR in the private banks of Iran from 2006-2012. They found that size has negative impact on CAR while LAR, ROE and ROA have positive influence on CAR. Risk asset ratio and deposit asset ratio were found to not have influence on CAR.

Olalekan and Adeyinko (2013) investigated the relation between CAR and profitability in Nigeria. The results show that bank's profitability has positive significant effect on CAR.

Ogere et al (2013) studied the change in money deposit banks in Nigerian. They found that risk ratios and deposits to total assets ratio have negative influence on CAR.

Aspal et al (2014) found that in India LAR, management efficiency and assets quality have positive influence on CAR while liquidity has negative influence on it.

Rahari (2014) found that in Indonesia governmental banks capital adequacy ratio is affected by revenue ratio, total assets growth, equity to total assets ratio, nonperforming loans, operational cost and interest rate risk.

Al-Tamimi and Obeidat (2013) investigated the factors that affect commercial banks in Jordan. Results shows that liquidity has positive impact on CAR while ROA has negative impact on it. It was found also that credit risk has negative but insignificant influence on CAR.

Asarkaya and Ozcan (2007) studied the factors that influence CAR in Turkey. It was found that lagged capital, average capital level, , ROE, portfolio risk and economic growth have positive influence on CAR while deposits to assets ratio were found to have negative influence on CAR.

Romdhane et al (2012) studied the factors that influence CAR in Tunisia. The results show that risk and interest margin have positive significant effect on CAR.

Shingjergji and Hyseni (2015) found that EM, size, loans to deposits ratio and nonperforming loans have negative influence on CAR. They found also that ROE and ROA do not have effect on CAR.

Abdul Karim et al (2013) investigated CAR, deposits and lending policy of traditional and Islamic banks. They found that loan growth and deposits have positive effect on CAR in both traditional and participatory banks.

Polat and Al-Kalaf (2014) analyzed the factors that influence CAR of banks in Saudi Arabia over the period 2008-2012. They found that Loans to assets ratio and Loans to deposits ratio have negative significant effect on CAR while size and leverage and ROA have positive significant effect on CAR. Nonperforming loan was found to not have significant effect on CAR.

Chapter 3

DATA AND METHODOLOGY

3.1 Data Collection

This study analyzes the determinants of credit, liquidity and capital adequacy ratio of Islamic and conventional banks in QISMUT countries (Qatar, Indonesia, Saudi Arabia, Malaysia, UAE and Turkey) which are expected to participate significantly in the international expansion of Islamic finance in the future. The data used in the study is panel data. Financial ratios were retrieved from Bank scope data base while macroeconomic indicators were obtained from World Bank website. We have developed 3 models to measure each risk separately. We applied each model on both Islamic and conventional banks within the same countries. For credit risk 30 Islamic banks and 80 commercial banks are considered. We considered 14 Islamic banks and 18 conventional banks from Malaysia, 2 Islamic banks and 24 conventional banks from Indonesia, 4 Islamic banks and 4 conventional banks from Qatar, 6 Islamic banks and 17 conventional banks from UAE, 3 Islamic banks and 8 conventional banks from Saudi Arabia, 1 Islamic bank and 9 conventional banks from Turkey. Concerning liquidity risk and capital adequacy risk in total 33 Islamic and 80 conventional banks are included. We considered 14 Islamic banks and 18 conventional banks from Malaysia, 4 Islamic banks and 24 conventional banks from Indonesia, 4 Islamic banks and 4 conventional banks from Qatar, 6 Islamic banks and 17 conventional banks from UAE, 3 Islamic banks and 8 conventional banks from Saudi Arabia, 2 Islamic banks and 9 conventional banks from Turkey. The number of

banks selected in our study is according to the availability of the data for the ratios and variables that are included in our study in Bank scope data base.

3.2 Variables

This study is implemented to investigate the factors that affect the credit risk, liquidity risk and capital adequacy ratio of both Islamic and conventional banks in QISMUT countries during the period from 2011 to 2015. Liquidly risks, leverage, log of size, return on assets and cost to income ratio are the dependent variables used to explain credit risk. Credit risk, bank fund management, ROA and leverage are the explanatory variables used to analyze liquidity risk. Liquidity risk, Deposits structure, log of size and cost to income are the independent variables used to examine capital adequacy in this study. Inflation and GDP growth rate represents macroeconomic variables that are used in all the three models.

3.2.1 Dependent Variables

Credit Risk

In conventional banks it is measured by nonperforming loans to gross loans while in Islamic banks it is measured by nonperforming financing to total financing in Islamic banking. A loan is considered to be nonperforming if the debtor does not make the scheduled payments for at least 90 days.

Liquidity Risk

In this study we used liquid assets/total assets to measure liquidity risk. It measures the amount of assets that can be converted to cash quickly in order to meet the financial obligation of a given bank compared to its total size. Having low liquidity ratio is a problem for any bank which may lead to insolvency and may end up with bankruptcy that is why liquidity risk is very important to be considered in terms of the risks that banks face.

Capital Adequacy Ratio

The ratio of equity capital to risk weighted total assets represents capital adequacy ratio in this study. Having adequate capital ensures that the bank convers acceptable amount of losses before becoming insolvent and lose depositors' deposits. Implementing Capital adequacy rules will lead to reliable governance and management (El-Ansary and Hafez, 2015).

3.2.2 Independent Variables

Average Return on Assets (Avg ROA)

It is measured by Net income/ Total assets. ROA indicates how efficient the bank in managing its assets in order to generate profit.

Leverage

Equity ratio is used in this study in order to measure leverage. Equity ratio measures the amount of total assets that are financed by stockholders. Great amount of debt compared to low equity is considered risky for any bank.

Bank Size

A bank's total assets represent bank size. The structure of Islamic banks' total assets is different from that of conventional banks due to the special features that distinguish Islamic banking system from that of conventional banks. Loans constitutes the largest portion of the conventional bank's total assets on the other hand Murabaha, Mudarabah, Musharaka and other investments constitute the largest portion of Islamic banks assets. Unlike conventional banks Islamic banks do not offer loans with interest due to the prohibition of interest according to Shariaa which is one of the main differences between Islamic and conventional banks.

Bank Fund Management

Customer loans/ Customer deposits represent fund management of a bank. It measures bank's liquidity and the efficiency of the bank's management. If the ratio is too high that means that the bank is exposed to risk in case of sudden decrease in the amount of deposits. If the ratio is too low it is a sign that the bank reserves excess amount of capital that is not used efficiently (Abdel Megeid 2016).

Deposits Structure

Deposits in Islamic banks are different from that of conventional banks. Mudarabah saving deposits and Mudarabah time deposits constitutes deposits in Islamic banks. Time deposits, saving deposits and current deposits constitute main deposit type in conventional banks. Depositors in Islamic banks earn unfixed return on their deposits while depositors in conventional banks earn fixed interest on their deposits. In this research total deposits/total assets is used to investigate the effect of deposits on CAR of both Islamic and conventional banks.

Cost to Income Ratio

It measures the efficiency of a given bank. It measures the ability of a bank to generate revenues from its current resources. Salaries, rent and other general and administrative fees are considered as bank's costs. Cost of a bank does not include interest expense because it is not related to the operations of the bank. Bank's revenue includes interest income and fee income. The lower the ratio is the better. An increase in the cost to income ratio means that there is increase in cost or decrease in revenues.

Inflation Rate

Inflation rate represents the general level of increase of prices of goods and services. An increase in inflation rate is accompanies by decrease in the purchasing power of currency.

Annual GDP Growth Rate

It measures the annual growth rate of the financial value of all the finished goods and services manufactured within the country. GDP refers to all private and public consumption, investments, government outlays and exports minus imports that occur in the same country. It is a measurement of the growth of the economy of a given country.

3.3 Methodology

The panel data collected from Bank scope for the banks included in our study is used to make a regression analysis in order to investigate the determinants of credit, liquidity and capital adequacy risks of both Islamic and conventional banks in QISMUT countries from 2011 to 2015. The stability of data is very essential in order to be sure that the change in time will not have influence on the variable or the variable will not have autocorrelation problem (Davydenko, 2011). Unit root test results indicate that the variables are stationary at different level of significance. Henceforth the next step is to perform diagnostic test procedure in order to be sure that our results are valid. This test includes the following multicollinearity, heteroscedasticity and auto correlation tests. The Hausmann test then is carried out to select the model that should be used for regression analysis.

3.4 Regression Models

We used three regression models in order to study the determinants of credit, liquidity and capital adequacy risks of Islamic and conventional banks in QISMUT countries as following:

$$CR=\beta 0+\beta 1(LR_{i,t})+\beta 2(LEV_{i,t})+\beta 3(LNS_{i,t})+\beta 4(ROA_{i,t})+\beta 5(CI_{i,t})+\beta 6(INF_{i,t})$$
$$+\beta 7(GDP_{i,t})+\varepsilon_{i,t}$$

$$LR=\beta 0+\beta 1(CR_{i,t})+\beta 2(FM_{i,t})+\beta 3(ROA_{i,t})+\beta 4(LEV_{i,t})+\beta 5(INF_{i,t})+\beta 6(GDP_{i,t})+\varepsilon_{i,t}$$

$$CAR=\beta 0+\beta 1(LR_{i,t})+\beta 2(DEP_{i,t})+\beta 3(LNS_{i,t})+\beta 4(CI_{i,t})+\beta 5(INF_{i,t})+\beta 6(GDP_{i,t})+\varepsilon_{i,t}$$

Where

Dependent variable includes

CR= Credit risk

LR= Liquidity risk

CAR= Capital adequacy ratio

Independent variables include

LR = Liquidity risk

LEV= Leverage ratio

LNS= Log of size

ROA = Return on assets

CI= Cost to income ratio

FM= Bank funding management

DEP= Deposits structure

INF= Inflation rate

GDP= GDP growth rate

ε = Estimation error

β_0 is the intercept while β_1, β_2, β_3, β_4, β_5, β_6 and β_7 are the coefficients of the explanatory variables.

Chapter 4

EMPRICAL ANALYSIS AND RESULTS

This chapter discusses the result of our analysis corresponding to our research models which defines the risk effects on Islamic banks and conventional banks. Our results and discussion will help us define to identify and analyze the factors that influence risk in both Islamic and Conventional banks.

4.1 Unit Root Test

A unit root test is a statistical test for the proposition that in an autoregressive statistical model of a time series, the autoregressive parameter is one. In a data series y (t), where t a whole number, modeled by:

$y_{(t+1)} = a_{y(t)} +$ other terms

Where a is an unknown constant, a unit root test would be a test of the hypothesis that a=1, usually against the alternative that |a| is less than 1.

In most multi variant models especially when there are two or more variables trending at the same time, the regression of the system gives a closer linearity even when the variables are not related. Therefore, a unit root test validates the stationary of every research on multiple variant models. The unit root test result shows that the variable of these models are stationary. Shown in appendix A. A non-stationary data cannot be said to be reliable for interpretation or used for any form of analysis of a time series unless the data are stationary according to Gujarati, 2011.

The outcome of unit root test shows that every single variable included in our study is stationary at different levels of significance according to different unit root tests IPS or PP or LLC with changing the model either τ_T or τ_μ or τ.

4.2 Correlation Analysis (Test for Multicolinearity)

The Correlation Analysis is the statistical tool used to study the closeness of the relationship between two or more variables. The variables are said to be correlated when the movement of one variable is accompanied by the movement of another variable. In regression, "multicollinearity" refers to predictors that are correlated with other predictors. Multicollinearity occurs when your model includes multiple factors that are correlated not just to your response variable, but also to each other. In other words, it results when you have factors that are a bit redundant.

The next step after unit root test is to verify that the prescribed data consist of multicollinerity amongst the variables. In order to examine this issue the pearson correlation matrix method is adopted in this research, which helps to detect the multicollinerity amongst the variables and also judge the relationship between the dependent and independent variables.

Table 1: The Correlation Matrix of Islamic Banks' Variables for Credit Risk Model

	CR	LR	LEV	ROA	LNS	CI	INF	GDP
CR	1							
LR	0.08	1						
LEV	0.13	0.006	1					
ROA	0.01	0.14	0.12	1				
LNS	-0.10	-0.06	0.13	0.16	1			
CI	0.02	-002	-0.12	-0.52	-0.63	1		
INF	0.2	-0.07	0.25	-0.02	0.02	0.01	1	
GDP	0.03	-0.04	0.02	0.03	0.02	-0.006	0.60	1

Using the guide presented by Angrist and Pischke (*2008*) which suggest the absolute value of correlation 0.00-0.19 represent a very weak correlation, 0.20-0.39 show a weak correlation, 0.40-0.59 moderate correlation, 0.60-0.79 strong correlation and 0.80-1.0 show a very strong correlation, thus from our variables CI and ROA show a moderate correlation (-0.52) and CI against LNS has a strong correlation (-0.63) while GDP show a strong correlation to inflation at (0.60) and inflation show a weak correlation against leverage. However other independent variables show very weak correlation among each other. According to Kennedy,(2003) when the sample correlation is greater than 0.80, it is evidence to severe Multicollinerity and thus our variant correlation show a less than 0.80 which proof that there is no multicollinearity.

Table 2 shows the correlation for conventional banks variables for credit risk model. The table also measures the multicollinearity among variable. Again we consider these bench marks, as presented by Angrist and Pischke (*2008*) for defining the multicollinearity among variables.

Table 2: The Correlation Matrix of Conventional Banks' Variables for Credit Risk Model

	CR	LR	LEV	ROA	LNS	CI	INF	GDP
CR	1							
LR	-0.02	1						
LEV	0.23	0.19	1					
ROA	-0.11	-0.13	0.36	1				
LNS	-0.09	-0.32	-0.27	0.32	1			
CI	0.06	0.07	0.22	-0.67	-0.37	1		
INF	0.05	0.003	-0.01	0.05	-0.006	0.001	1	
GDP	-0.01	-0.02	0.007	0.02	0.01	0.02	0.46	1

Table 2 shows that LNS and LR has a weak correlation among each other (-0.32) and ROA against LEV (0.36) level of correlation, also LNS against LVE maintain a correlation of 0.27 while CI and LVE has a correlation of 0,22, all very low correlation. The correlation between LNS and ROA is 0.32 while those between CI and ROA are 0.67 which is a strong correlation and CI against LNS share a weak correlation at 0.37. GDP and INF maintain a moderate correlation at 0.46. However other independent variables have very weak correlation among each other. In general we can say that since correlation among independent variables is not more or equal to 0.80, we conclude that there is no multicollinearity among the variables.

Tables 3 show the correlation of the Islamic bank for liquidity risk model. Again these variables are tested for internal multicollinearity. Also considering the contributions of Kennedy (2008) facts on multicollinearity. We therefore describe our analysis as follows based on the level of correlation among our variables (see table 4.3 below).

Table 3: The Correlation Matrix of Islamic Banks' Variables for Liquidity Risk Model

	LR	CR	FM	ROA	LEV	INF	GDP
LR	1						
CR	0.07	1					
FM	-0.19	-0.25	1				
ROA	0.15	0.01	-0.39	1			
LEV	0.05	0.10	0.07	0.13	1		
INF	0.008	0.15	-0.08	-0.005	0.28	1	
GDP	-0.03	0.02	-0.003	0.03	0.04	0.59	1

Our results show that FM and CR has a very week correlation at -0.25 while ROA and FM has also a negative and weak correlation at -0.39, inflation verse leverage

maintain also a week correlation at 0.28 while GDP has a strong correlation against inflation at 0.59. However other independent variables show very weak correlation among each other. Also according to Kennedy (2003) since the correlation among all of the independent variables is less than 0.80 there is no multicollinearity.

Table 4: Presents the Correlations for conventional banks Variables for liquidity risk model. Our aim is also to define the multicollinearity nature in conventional bank. The table includes credit risk, funding management, return on assets, leverage, inflation and GDP as the dependent variables.

Table 4: TheCorrelation Matrix of Conventional Banks' Variables for Liquidity Risk Model

	LR	CR	FM	ROA	LEV	INF	GDP
LR	1						
CR	-0.02	1					
FM	-0.28	-0.003	1				
ROA	-0.13	-0.11	0.03	1			
LEV	0.19	0.23	0.04	0.36	1		
INF	-0.03	0.02	0.03	-0.04	-0.09	1	
GDP	0.05	-0.04	-0.06	-0.01	-0.02	0.46	1

In general evaluation, again since the correlation among all the independent variables is not more that 0.80 we consider that these variables do not have a multicollinearity among themselves. The table result indicates LEV correlation again CR at 0.23 which is a weak correlation and also LE against ROA has a weak correlation at 0.36 while GDP maintain a moderate correlation at 0.46. The rest of the independent variable has a relative poor correlation.

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Table 5 shows the correlation for Islamic banks variables for capital adequacy model. We examine these variables for multicollinearity, our finding our concluded using the Kennedy approach of 2008.

Table 5: The correlation matrix of Islamic Banks' Variables for Capital Risk Model

	CAR	DEP	LR	CI	LNS	INF	GDP
CAR	1						
DEP	-0.35	1					
LR	0.15	0.007	1				
CI	-0.13	-0.02	-0.17	1			
LNS	0.15	0.004	-0.03	-0.63	1		
INF	0.29	-0.02	0.02	-0.07	0.05	1	
GDP	0.01	0.03	-0.03	-0.03	0.03	0.58	1

Table 5 show that LNS has a strong positive correlation against CI at 0.63 while the GDP shows a moderate but strong correlation to inflation at 0.58 other variable show a relative low level of correlation. However other independent variables show very weak correlation among each other. The correlation among these variables shows a less value against the bench mark of 0.80 therefore there is no multicollinearity, Kennedy (2003).

Table 6 presents the conventional bank variables for capital adequacy model. We again examine our data for multicollinearity, this table indicates the results for the capital adequacy model.

Table 6: The correlation matrix of Conventional banks' variables for capital risk model

	CAR	DEP	LR	CI	LNS	INF	GDP
CAR	1						
DEP	-0.20	1					
LR	0.23	-0.36	1				
CI	0.07	0.14	0.07	1			

LNS	-0.26	0.06	-0.32	-0.37	1		
INF	0.02	-0.03	0.03	0.17	-0.09	1	
GDP	-0.04	0.08	0.05	0.04	-0.11	0.46	1

Table 6 show that LR has a weak correlation with DEP at -0.36 and LNS maintain a weak correlation of -0.37 against CL. Also GDP show a moderate correlation against inflation at 0.46. Other independent variables show very weak correlation among each other again since the correlation among all the independent variables is less than our bench mark there is no multicollinearity.

4.3 Hausmann and Likelihood Ratio Tests

According to Yaffee and Bruderl, (2005) Fixed and Random effect models are the two models which help to analyze the panel data. Hausman and likelihood are the tests that are used for prescribed models for this research in order to choose the most appropriate model for regression analysis.

4.3.1 Haussmann Test

In most panel analysis, to avoid ordinary least square from failing, statistic have employed Haussmann test to enable detect the variables which may cause this failure some time it is also describe as model misspecification. Its basic use is to define which model is considered most effective in regression, either the fixed effect model (alternative hypothesis) and or the random effect model (null hypothesis) we conducted a Haussmann test to define which of these model best fit in our analysis. (Haussemann,1978; Baltag, 2011)

4.3.2 Likelihood Ratio Test

The likelihood test is a test of goodness of fit that supports the theory of Haussmann test of the best model of a regression, especially when there are more than two

models thus the Haussmann and the likelihood ratio test provide adequate understanding of which model best fit and why. Likelihood ratio test is carried out according to the beneath hypothesis.

H_0: Fixed impact is not suitable

H_1: Fixed impact is suitable

The following below tables are the results of our research Haussmann analysis and the likelihood ratio test. The test result is presented in sections, for the three models of Islamic bank and the conventional banks.

4.3.3 Haussmann and likelihood ratio tests for the three models of Islamic banks

Table 7: Hausmann Test Resul for Credit Risk Model

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	22.410619	7	0.0022

Table 8: Hausmann Test Result for Liquidity Risk Model

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	12.126414	6	0.0592

Table 9: Hausmann Test Result Capital Adequacy Ratio Model

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	24.807581	6	0.0004

The result figures of the above tables indicate that the p- value of the Islamic banks credit risk model and capital adequacy ratio is less than 10% (0.1) significance level, this means the null hypothesis is rejected statistically and thus the random effect

model for credit risk model and capital adequacy ratio is not appropriate. The Hausmann test result of the liquidity risk model p-value is more than 5% level of significance but less than 10% significance level, this means we can accept the null hypothesis at 5% however the likelihood test of the liquidity model support that fixed effect model is also appropriate for this model.

Table 10: Likelihood Ratio Test Result for Credit Risk Model

Effects Test	Statistic	d.f	Prob value
Cross-Section F	5.440925	(29,74)	0.0000
Cross-Section Chi Square	126.734589	29	0.0000

Table 11: Likelihood Ratio Test Result for Liquidity Risk Model

Effects Test	Statistic	d.f	Prob value
Cross-Section F	18.993522	(32,84)	0.0000
Cross-Section Chi Square	259.341752	32	0.0000

Table 12: Likelihood Ratio Test Result for Capital Adequacy Model

Effects Test	Statistic	d.f	Prob value
Cross-Section F	12.684720	(32,85)	0.0000
Cross-Section Chi Square	217.447844	32	0.0000

The results for likelihood ratio for the entire model indicate that all the p-. Values are less than a significance level of 10%, which implies that there is an enough proof in order to reject the null hypothesis and accept the alternative hypothesis. According to these results fixed effect model is suitable for these prescribed models.

4.3.4 Hausmann and likelihood ratio tests for conventional banks

Table 13: Hausmann Test Result for Credit Risk Model:

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	48.612207	10	0.0000

Table 14: Hausmann Test Result for Liquidity Risk Model:

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	48.184397	6	0.0000

Table 15: Hausmann Test Result Capital Adequacy Model:

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	21.171877	6	0.0017

The test results of Hausmann and likelihood ratio for conventional banks for QISMUT countries indicates that the probability value of all the models contains less than 10% of significance level, it intimates that there is an enough proof in order to reject the Null hypothesis and the random effect is not appropriate for regression analysis for this research.

Table 16: Likelihood Ratio Test Result for Credit Risk Model:

Effects Test	Statistic	d.f	Prob value
Cross-Section F	13.807093	(70,238)	0.0000
Cross-Section Chi Square	515.133029	70	0.0000

Table 17: Likelihood Ratio Test Result for Liquidity risk model:

Effects Test	Statistic	d.f	Prob value
Cross-Section F	20.190970	(79,275)	0.0000
Cross-Section Chi Square	694.410747	79	0.0000

Table 18: Likelihood Ratio Test Result for Capital Adequacy Model:

Effects Test	Statistic	d.f	Prob value
Cross-Section F	2.722416	(79,278)	0.0000
Cross-Section Chi Square	208.583569	79	0.0000

The likelihood ratio test results for ROA of all the models explains that the probability value is less than the significance level of 10% which intimates that the burden of proof is enough in order to reject the Null hypothesis and to accept the alternative hypothesis. According to these result fixed effect model is suitable for all the prescribed models.

4.4 Autocorrelation

Autocorrelation is a characteristic of data in which the correlation between the values of the same variables is based on related objects. It violates the assumption of instance independence, which underlies most of the conventional models. It generally exists in those types of data-sets in which the data, instead of being randomly selected, is from the same source.

It is the one of the properties of OLS that serial correlation should not exist between the error terms or disturbance between two or more models. In regards to get rid of the linear inaccurate estimators of our regression models, Durbin Watson test is a tool which helps to detect autocorrelation among the models.

Gujarati (2009) states that d represent Durbin Watson and that the range is from 0 to 4.

When d value is near to 0 this indicates a positive autocorrelation. When d value is near to 4 this indicates negative autocorrelation. When d value is near to 2 this indicates the absence of autocorrelation.

Durbin Watson results for the three models (credit risk, liquidity risk and capital adequacy) for Islamic banks are 2.21, 2.02 and 1.38 respectively whereas, for conventional banks the results are 1.29, 1.6 and 2.14. DW 2.21 and 2,02 for credit risk and liquidity risk for Islamic banks and DW 1.6 and 2.14 for liquidity risk and capital adequacy for conventional banks are approximately equal to 2 and shows absence of autocorrelation. While DW 1.38 for capital adequacy ratio of Islamic banks and 1.29 for credit risk of conventional banks are located between 0 and 2 and might indicate a positive autocorrelation.

4.5 Heteroscedasticity

This is another important assumption of the OLS (ordinary least square) which stipulates that the variance of the error term should be equal. Heteroscedasticity should be eliminated to remove wrong t-ratios, inaccurate estimators and entrusted standard errors generated from the regression equations. White cross-section standard errors and covariance is used in this research thereby performing the regression analysis to solve the problem of heteroscedasticity.

4.6 Regression Analysis

Regression analysis can be simply defines as a technique for determining the statistical relationship between two or more variables where a change in a dependent variable is associated with, and it depends on a change in one or more independent variables. Under this research, the regression analysis technique is used in regards to

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measure the determinants of credit risk, liquidity risk and capital adequacy of Islamic and conventional banking system in QISMUT countries.

E-view is the software which is selected for this research in order to examine the relationship between dependent and independent variables that are chosen in the prescribed models. The relationship results of the variables for Islamic and Conventional banking system are displayed below which are constructed through E-view program.

4.6.1 Credit risk model

$$CR=\beta 0+\beta 1(LR_{i,t})+\beta 2(LEV_{i,t})+\beta 3(LNS_{i,t})+\beta 4(ROA_{i,t})+\beta 5(CI_{i,t})+\beta 6(INF_{i,t})+\beta 7(GDP_{i,t})$$

$$+\epsilon t_{i,t}$$

After the test of regression assumptions and ensuring them, the results obtained of fit of the regression equation above is provided in the table below.

Table 19: Regression Analysis Results for Credit Risk Model for Islamic and Conventional Banks

	Islamic banks		Conventional banks	
Variable	Coefficient	Prob.	Co-efficient	Prob.
C	2.078724	0.0001	0.204206	0.0029
LR	0.077026	0.2162	0.064627	0.0000
LEV	-0.315556	0.0037	0.032190	0.3291
ROA	-1.845122	0.0000	-0.461673	0.1161
LNS	-0.283849	0.0004	-0.024810	0.0099
CI	-0.144385	0.0000	0.002018	0.8679
INF	-0.174185	0.5553	0.017439	0.6049
GDP	1.316046	0.1314	-0.092791	0.3871

In accordance with the above table, the level of significance of the LR, INF and GDP variables (0.2162), (0.5553), (0.1314) under Islamic banks are more than the considered significant level in this study (5%); So H_0 hypothesis is not rejected at 95% confidence level, on this basis there is an insignificant relationship between CR, LR, INF, and GDP of banks for Islamic banking system. At the same time, we found LEV, ROA, CI, INF and GDP with the level of significant of (0.3291), (0.1161), (0.8679) (0.6049), (0.3871) are insignificant considering the significant level 5% for conventional banks.

However, variables such as LEV, ROA, LNS, CI for Islamic banks and LR and LNS for conventional banks are the variables which contain less than 5% of significant level that indicates a significant relationship with credit risk.

According to the above regression results LR has a positive significant influence on CR of conventional banks. An increase in the amount of liquid assets implies that the bank holds a great amount of liquid assets with low return and that the bank makes fewer loans to customers. In case that the bank keeps a great amount of liquid assets and makes less amount of loans if one or two customers default on these loans the credit risk of the bank will increase more than that if the bank make more loans to different categories of customers (diversification) and retain less amount of liquid assets.

LEV shows a negative significant to CR of Islamic banks. Islamic banks operate under the principal of PLS which exposes the bank to higher financial risk. Unlike conventional banks Islamic banks do not give loans to customers and earn interest on it instead most of the financing goes to real projects in which they share profits and

loss with investors under Musharakah and Mudarabah contracts (Akkizidis and Khandelwal, 2008). Because of the high risk Islamic banks carefully manage and screen their projects. An increase in the amount of equity as a result of increase in a bank's retained earnings will enable the bank to increase the amounts of funds assigned to monitor and manage a project, which enable the bank to efficiently monitor and manage project and improve their credit risk management. As a result, higher earnings will be achieved and reduction in bad or non-performing financing and credit risk.

ROA indicates negative significant relationship to CR of Islamic banks. Due to the PLS concept under which Islamic bank operate, Islamic banks are exposed to high financial risk that is why they spend more time and effort selecting potential projects and investments. Islamic banks also monitor the performance of these projects and report their losses and profits. This leads to increase in the return on their assets and at the same time reduction in nonperforming projects and financing.

LNS shows a negative relationship to credit risk of both Islamic and conventional banks. It is said that large banks diversify their assets portfolio in such ways to reduce the associated credit risk (Sufian&Muhamed, 2011; Rahman&Shahimi, 2011). The benefit of the diversification also is to shield the bank from the credit risk of non-performing loan in case one or two of the diversified business fail, thus protects the bank from the risk of investing in only one project or industry so that incase the project fails the bank will not suffer a great loss of non-performing loan and accordingly credit risk declines.

Cost to income ratio indicates a negative significant relationship to credit risk of Islamic banks. Due to the principle of PLS under which Islamic banks operate which was previously mentioned in detail and their involvement or participation in the project, they incur more costs to manage and monitor the project. Accordingly, their credit risk management will improve and bad or non-performing financing will decrease and therefore credit risk will decrease.

4.6.2 Liquidity risk model

$$LR=\beta 0+\beta 1(CR_{i,t})+\beta 2(FM_{i,t})+\beta 3(ROA_{i,t})+\beta 4(LEV_{i,t})+\beta 5(INF_{i,t})+\beta 6(GDP_{i,t})+\varepsilon t_{i,t}$$

After the test of regression assumptions and ensuring them, the results obtained of fit of the regression equation above is provided in the table below.

Table 20: Regression Analysis Results for the Liquidity Risk for Islamic and Conventional Banks

	Islamic banks		Conventional banks	
Variable	Coeff	Prob.	Coeff	Prob.
C	0.406954	0.0000	0.370297	0.0000
CR	-0.037343	0.7763	0.563254	0.0000
FM	-0.081256	0.0000	-0.147778	0.0000
ROA	0.883397	0.0000	0.256452	0.5200
LEV	-0.224914	0.0658	-0.264028	0.1796
INF	0.498332	0.1313	0.373071	0.0079
GDP	-1.802802	0.0173	-1.069586	0.0974

The above table shows that the level of significance of the CR, and INF variables with the following level of significance (0.7763), (0.1313) under Islamic banks are more than 5% level of significant So H_0 hypothesis is not rejected at this level of significant. According to this, CR and INF have insignificant relationship with liquidity ratio for Islamic banking model. Whereas we found that the level of

significant of ROA and LEV (0.5200), (0.1796) which means that ROA and LEV have insignificant relationship with liquidity ratio for conventional banking model. However, variables such as FM, ROA, LEV, & GDP for Islamic banks and CR, FM, INF and GDP for conventional banks are the variable that fall within our 5% level of significant and thus indicates a significant relationship with liquidity ratio.

There is a positive relation between CR and LR of conventional banks. An Increase in credit risk is associated with increase in liquid assets. As the credit risk and liquidity ratio increases simultaneously, this means that the bank retains much liquid assets and do not make loans to new customers as a result non-performing loan will affect the credit possession of the bank severally while if the bank keep less amount of liquid assets and allocate credit to different customers, if some of these loans is not yielding, the credit risk of the bank will not be highly affected.

It is clear that the FM indicates a negative significant relationship to LR of both Islamic and conventional banks. If the customer loans increase over the amount of deposit, the liquid assets that the bank hold will decrease which will expose the bank to high liquidity risk. Thus the bank might be not able to meet high unexpected withdrawals of its depositors.

ROA is positively and significantly linked to LR for Islamic banks. An increase in the return on a bank's assets will increase profits and accordingly will increase the amount of cash that banks hold which in turn increase bank's liquidity.

LEV has negative significant impact on LR of Islamic banks. According to PLS under which Islamic banks operate in which banks do not finance investors by giving

loans instead they participate in these projects sharing both profits and losses. In order to achieve high return Islamic banks participate in many projects. This leads to increase in banks's equity capital and decrease in liquid assets that the bank hold.

INF has a positive significant impact on the LR of the conventional bank. If the inflation rate increases the borrowing interest rate will increase and less people will be able to borrow funds at this high interest rate, as a result the bank will have high amount of liquid funds.

GDP has negative impact on LR of both Islamic and conventional banks. An increase in the GDP growth rate of a given country implies that the economy of the country is growing. As a result, the demand of loans will increase and accordingly the liquidity within the banks will decline.

4.6.3 Capital adequacy ratio model

$CAR = \beta_0 + \beta_1(LR_{i,t}) + \beta_2(DEP_{i,t}) + \beta_3(LNS_{i,t}) + \beta_4(CI_{i,t}) + \beta_5(INF_{i,t}) + \beta_6(GDP_{i,t}) + \varepsilon t_{i,t}$

After the test of regression assumptions and ensuring them, the results obtained of fit of the regression equation above is provided in the table below.

Table 21: Regression Analysis Results for the Capital Risk for Islamic and Conventional Banks

	Islamic banks		Conventional banks	
Variable	Coeff	Prob	Coeff	Prob.
C	1.827549	0.0000	0.727793	0.3998
DEP	-0.080339	0.0324	-0.205537	0.0000
LR	0.044830	0.5052	-0.500195	0.3011
CI	-0.031960	0.0340	0.004671	0.8658
LNS	-0.232147	0.0000	-0.045911	0.7043
INF	0.022955	0.8490	0.046492	0.8936
GDP	0.215479	0.5302	0.041968	0.9796

The above table shows that the level of significance of the LR, INF and GDP variables (0.5052), (0.8490),(0.5302) under Islamic banks are more than 5% level of significant So H_0 hypothesis is not rejected at this level of significant. Thus LR, INF and GDP have insignificant relationship with CAR for Islamic banking model. Whereas we found that the level of significant of LR, CI, LNS, INF and GDP (0.3011), (0.8658), (0.7043), (0.8936), (0.9796) which means that LR, CI, LNS, INF and GDP have insignificant relationship with CAR for conventional banking model.

However, variables such as DEP, CI and LNS for Islamic banks and DEP for conventional banks are the variable that fall within our 5% level of significant and thus indicates a significant relationship with CAR.

DEP has a negative significant impact on CAR of Islamic and conventional banks. A bank's assets are mainly financed by deposits and equity. If deposits increase over the amount of equity capital that the bank hast the depositors will be less protected against unexpected losses and therefore capital risk will increase.

CI shows negative and significant relation to CAR of Islamic bank. Cost to income ratio is a measurement of bank efficiency and is measured by operating expenses to operating income. As the bank diversifies its activities and carefully monitor and screen their financing a bank's operating income will increase more than its operating cost and as a result t a bank's retained earnings will increase and the bank capital will increase.

LNS has a negative significant effect on CAR of Islamic banks. According to Cabilies (2012) it is understood that large banks highly engage in risky activities

seeking for higher profits. An increase in the portion of risky assets relative bank's equity capital will lead to decrease in capital adequacy ratio.

Chapter 5

Conclusion

Almost, all forms of financial (Banking) intuitions bear the risk because of their intermediary services when borrowing or financing the funds to their customers. Islamic banks adopt the same risk management methods or procedures for financing, as conventional banks use, but still the difference exists, due to their applications implication procedures. In terms of risk, the Islamic banking system is different from the conventional banking system, because the risk and profit is shared among the partners (banks' owner) and with the depositors, whereas, in case of Conventional banks, the equity holders are responsible for the whole risk.

The objective of this research is to investigate the determinants of credit, liquidity and capital risks of conventional and Islamic banks in QISMUT countries from 2011 to 2015.

We developed three regression models one for credit risk, one for liquidity risk and another one for capital adequacy. First of all, unit root test is performed to ensure the stationary of our variables. Second Multicolinearity, Heteroscedasticityand autocorrelation were tested in order to make sure that valid results can be obtained from all the three regression models that are included in this study and that the main assumptions of OLS (ordinary least squares) are not violated. Haussmann and likelihood tests were carried out in order to determine whether fixed or random effect

model is appropriate for regression models. The next step is to start identifying the significant variables that influence credit risk, liquidity risk and capital adequacy.

Our results for Islamic banks indicate that leverage, ROA, log of size and cost to income ratio have negative significant impact on credit risk. It was found also that bank fund management, leverage ratio and GDP growth rate have negative significant effect on liquidity risk whereas ROA has positive significant effect on it. Deposits structure, cost to income ratio and log of size are negatively significant to capital adequacy.

On the other hand, our findings for conventional banks show that liquidity risk has positive significant effect on credit risk while log of size has negative significant impact on it. It was found also that bank fund management and inflation have negative significant influence on liquidity risk while credit risk has positive significant impact on it. Deposits structure is the only variable to show significant relation to capital adequacy and is negatively related to it.

According to the above mentioned results it is easy to answer our research question which is that the determinants of credit risk, liquidity risk and capital adequacy of Islamic banks are different from those of conventional banks. This may be due to the specific features that differentiate Islamic banking system from that of conventional banking and the different mechanism under which they operate.

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APPENDICES

Appendix A: Unit Root Test

Unit Root Tests for Islamic Banks for the Credit Risk Model:

Levels			
Variables	LLC	IPS	PP
CR			
τT	3.26	-0.43	35.65*
$\tau\mu$	-21.05*	-6.87*	66.02*
τ	112.29	-	123.89*
LR			
τT	-10.61*	-0.19	30.18***
$\tau\mu$	-3.93*	-0.64	22.42
τ	-18.23*	-	150.83*
LEV			
τT	1.16	-3.70*	53.78*
$\tau\mu$	-27.06*	-6.04*	59.30*
τ	-20.15*	-	176.71*
ROA			
τT	-4.19*	-1.16	44.77*
$\tau\mu$☐	-14.13*	-3.41*	42.75**
τ	-1.36***	-	88.76*
LNS			
τT	5.12	0.11	27.73
$\tau\mu$	-5.12*	-0.45	46.98*
τ	1.86	-	56.41
CI			
τT	-0.11	-2.92*	68.72*
$\tau\mu$	-5.73*	-2.85*	48.55*
τ	45.42	-	67.47
INF			
τT	-18.98*	-0.53	125.12*
$\tau\mu$	-18.60*	-6.97*	253.64*
τ	-20.92*	-	316.99*
GDP			
τT	-28.88*	-2.05**	162.69*
$\tau\mu$	-30.61*	-11.35*	265.01*
τ	-1.72**	-	42.6

Unit Root Tests for Islamic Banks for the Liquidity Risk Model:

Levels			
Variables	LLC	IPS	PP
LR			
τT	-11.45*	-0.22	36.16***
τμ	-4.31*	-0.47	24.19
τ	-11.45*	-	157.10*
CR			
τT	-52.10*	-49.62*	35.70***
τμ	-38.89*	-14.06*	80.20*
τ	119.55	-	139.58*
FM			
τT	-5.51*	-3.59*	68.37*
τμ	-15.43*	-3.65*	49.98*
τ	1.34	-	67.91
ROA			
τT	-3.88*	-1.25	55.09*
τμ	-12.94*	-2.59*	42.90**
τ	-0.77	-	100.52*
LEV			
τT	1.78	-3.20*	56.22*
τμ	-10.35*	-2.32	51.58*
τ	-20.85*	-	183.87*
INF			
τT	-19.91*	-0.56	137.6*
τμ	-19.51*	-7.31*	279.01*
τ	21.95*	-	348.6*
GDP			
τT	-30.29*	-2.15**	178.96*
τμ	-32.10*	-11.91*	291.5*
τ	-1.81***	-	46.38

Unit Root Tests for Islamic Banks for the Capital Adequacy Model:

Levels			
Variables	LLC	IPS	PP
CAR			
τT	3.02	-1.46***	74.97*
τμ	-7.84*	-2.27**	46.85*
τ	-4.80*	-	125.40*
DEP			
τT	-26.15*	-29.03*	97.95*
τμ	-10.80*	-12.66*	105.78*
τ	6.31	-	103.26*
LR			
τT	-11.78*	-0.28	40.63**
τμ	-3.48*	-0.15	23.81
τ	-11.51*	-	160.918*
CI			
τT	2.75	-5.71*	102.29*
τμ	-6.04*	-1.38***	42.66**
τ	-9.47*	74.20	74.20
LNS			
τT	3.30	1.94	39.21**
τμ	-4.34*	0.58	41.48**
τ	2.02	-	57.51
INF			
τT	-19.91*	-0.58	137.6*
τμ	-19.51*	-7.31*	279.01*
τ	21.95*	-	348.6*
GDP			
τT	-30.29*	-2.15**	178.9*
τμ	-32.10*	-11.9*	2951.51*
τ	-1.81**	-	46.38

Unit Root Tests for Conventional for the Credit Risk Model:

Levels			
Variables	LLC	IPS	PP
CR			
τT	-28.42*	-6.23*	266.24*
$\tau\mu\square$	-34.48*	-10.48*	220.42*
$\tau\square$	-10.06*	-	335.81*
LR			
τT	-11.32*	-2.44*	216.77*
$\tau\mu$	-12.15*	-2.26**	173.26*
τ	-9.27*	-	306.49*
LEV			
τT	0.46	-5.58*	249.29*
$\tau\mu$	-12.36*	-3.46*	201.22*
τ	6.22	-	187.02***
ROA			
τT	-8.61*	-4.80*	269.29*
$\tau\mu$	-7.99*	-0.65	143.07
τ	-4.20*	-	223.33*
LNS			
τT	-66.43*	1.82**	199.47*
$\tau\mu$	-4.95*	-3.67*	257.17*
τ	27.67	-	89.92
CI			
τT	26.23	1.31**	208.16*
$\tau\mu$	-8.17*	-0.51	153.16**
τ	4.97	-	148.50
INF			
τT	-31	-0.87	333.67*
$\tau\mu$	30.38*	-11.38*	676.39*
τ	-34.17*	-	845.32*
GDP			
τT	-47.16*	-3.36*	433.84*
$\tau\mu$	-49.98*	-18.55*	706.71*
τ	-2.82*	-	112.445

Unit Root Tests for Conventional Banks for the Liquidity Risk Model:

Levels			
Variables	LLC	IPS	PP
LR			
τT	-11.32*	-2.44*	216.77*
$\tau\mu$	-12.15*	-2.26**	173.26*
τ	-9.27*	-	306.49*
CR			
τT	-28.42*	-6.23*	266.24*
$\tau\mu$	-34.48*	-10.48*	220.42*
τ	-10.06*	-	335.81*
FM			
τT	-8.75*	-9.24*	306.18*
$\tau\mu$	-14.87*	-2.64	198.72*
τ	5.27	-	92.69
ROA			
τT			
$\tau\mu$	-8.61*	-4.80*	269.29*
τ	-7.99*	-0.65	143.07
	-4.20*	-	223.33*
LEV			
τT	-0.46	-5.58*	249.01*
$\tau\mu$	-12.36*	-3.46*	201.22*
τ	6.22	-	187.02***
INF			
τT			
$\tau\mu$	-19.91*	-0.56	137.6*
τ	-19.51*	-7.31*	279.01*
	-21.95*	-	348.6*
GDP			
τT			
$\tau\mu$	-30.29*	-2.15**	178.96*
τ	-32.10*	-11.91*	291.5*
	1.81***	-	46.38

Unit Root Tests for Conventional Banks for the Capital Adequacy Model:

Levels			
Variables	LLC	IPS	PP
CAR			
τT	0.62	-1.20	224.06*
τμ	-20.14*	-4.44*	194.55*
τ	-10.09*	-	239.34*
DEP			
τT	6.41	1.60	205.25*
τμ	-8.85*	-2.34*	195.73*
τ	-7.58*	-	236.02*
LR			
τT	-11.32*	-2.44*	216.77*
τμ	-12.15*	-2.26**	173.26*
τ	-9.27*	-	306.49*
CI			
τT	26.23	-1.31***	208.16*
τμ	-8.17*	-0.51	153.16**
τ	4.97	-	148.50
LNS			
τT	-66.43*	-1.82**	199.47*
τμ	-4.95*	-3.67*	257.17*
τ	27.67	-	89.92
INF			
τT	-19.91*	-0.58	137.6*
τμ	-19.51*	-7.31*	279.01*
τ	-21.95*	-	348.6*
GDP			
τT	-30.29*	-2.15**	178.9*
τμ	-32.10*	-11.91*	2951.51*
τ□	-1.81**	-	46.38

Appendix B: Regression Tables

Dependent Variable: CR
Method: Panel Least Squares
Date: 06/03/17   Time: 01:38
Sample: 2011 2015
Periods included: 5
Cross-sections included: 30
Total panel (unbalanced) observations: 111
White cross-section standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.078724	0.496792	4.184294	0.0001
LR	0.077026	0.061752	1.247340	0.2162
LEV	-0.315556	0.105322	-2.996115	0.0037
ROA	-1.845122	0.285857	-6.454709	0.0000
LNS	-0.283849	0.077045	-3.684178	0.0004
CI	-0.144385	0.033062	-4.367104	0.0000
INF	-0.174185	0.293943	-0.592583	0.5553
GDP	1.316046	0.862696	1.525504	0.1314

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.709395	Mean dependent var	0.035685
Adjusted R-squared	0.568020	S.D. dependent var	0.052331
S.E. of regression	0.034395	Akaike info criterion	-3.640626
Sum squared resid	0.087542	Schwarz criterion	-2.737449
Log likelihood	239.0547	Hannan-Quinn criter.	-3.274233
F-statistic	5.017813	Durbin-Watson stat	2.214963
Prob(F-statistic)	0.000000		

Dependent Variable: CR
Method: Panel Least Squares
Date: 06/03/17   Time: 01:34
Sample: 2011 2015
Periods included: 5
Cross-sections included: 80
Total panel (unbalanced) observations: 364
White cross-section standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.204206	0.068078	2.999595	0.0029
LR	0.064627	0.011214	5.763287	0.0000
LEV	0.032190	0.032926	0.977645	0.3291
ROA	-0.461673	0.292848	-1.576496	0.1161
LNS	-0.024810	0.009554	-2.596828	0.0099
CI	0.002018	0.012119	0.166476	0.8679
INF	0.017439	0.033671	0.517923	0.6049
GDP	-0.092791	0.107126	-0.866190	0.3871

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.821131	Mean dependent var		0.032288
Adjusted R-squared	0.765598	S.D. dependent var		0.033621
S.E. of regression	0.016278	Akaike info criterion		-5.193180
Sum squared resid	0.073393	Schwarz criterion		-4.261717
Log likelihood	1032.159	Hannan-Quinn criter.		-4.822966
F-statistic	14.78630	Durbin-Watson stat		1.291230
Prob(F-statistic)	0.000000			

Dependent Variable: LR
Method: Panel Least Squares
Date: 06/02/17   Time: 19:02
Sample: 2011 2015
Periods included: 5
Cross-sections included: 33
Total panel (unbalanced) observations: 123
White cross-section standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.406954	0.051656	7.878212	0.0000
CR	-0.037343	0.131029	-0.284998	0.7763
FM	-0.081256	0.004814	-16.87949	0.0000
ROA	0.883397	0.169774	5.203378	0.0000
LEV	-0.224914	0.120659	-1.864047	0.0658
INF	0.498332	0.326997	1.523965	0.1313
GDP	-1.802802	0.742680	-2.427428	0.0173

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.886165	Mean dependent var	0.230311
Adjusted R-squared	0.834669	S.D. dependent var	0.096613
S.E. of regression	0.039284	Akaike info criterion	-3.383222
Sum squared resid	0.129631	Schwarz criterion	-2.491554
Log likelihood	247.0682	Hannan-Quinn criter.	-3.021029
F-statistic	17.20822	Durbin-Watson stat	2.020419
Prob(F-statistic)	0.000000		

Dependent Variable: LR
Method: Panel Least Squares
Date: 06/02/17   Time: 19:04
Sample: 2011 2015
Periods included: 5
Cross-sections included: 80
Total panel (unbalanced) observations: 364
White cross-section standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.370297	0.034624	10.69479	0.0000
CR	0.563254	0.093372	6.032396	0.0000
FM	-0.147778	0.032493	-4.547945	0.0000
ROA	0.256452	0.398094	0.644201	0.5200
LEV	-0.264028	0.196228	-1.345516	0.1796
INF	0.373071	0.139389	2.676467	0.0079
GDP	-1.069586	0.643035	-1.663340	0.0974

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.880447	Mean dependent var	0.169726
Adjusted R-squared	0.843894	S.D. dependent var	0.122538
S.E. of regression	0.048415	Akaike info criterion	-3.015007
Sum squared resid	0.651643	Schwarz criterion	-2.094251
Log likelihood	634.7314	Hannan-Quinn criter.	-2.649049
F-statistic	24.08630	Durbin-Watson stat	1.616606
Prob(F-statistic)	0.000000		

Dependent Variable: CAR
Method: Panel Least Squares
Date: 06/02/17   Time: 19:10
Sample: 2011 2015
Periods included: 5
Cross-sections included: 33
Total panel (unbalanced) observations: 124
White cross-section standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.827549	0.161644	11.30602	0.0000
DEP	-0.080339	0.036945	-2.174553	0.0324
LR	0.044830	0.066997	0.669139	0.5052
CI	-0.031960	0.014834	-2.154485	0.0340
LNS	-0.232147	0.023215	-10.00008	0.0000
INF	0.022955	0.120208	0.190964	0.8490
GDP	0.215479	0.341863	0.630308	0.5302

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.864116	Mean dependent var	0.169974
Adjusted R-squared	0.803368	S.D. dependent var	0.060523
S.E. of regression	0.026838	Akaike info criterion	-4.146622
Sum squared resid	0.061222	Schwarz criterion	-3.259598
Log likelihood	296.0906	Hannan-Quinn criter.	-3.786292
F-statistic	14.22462	Durbin-Watson stat	1.380601
Prob(F-statistic)	0.000000		

Dependent Variable: CAR
Method: Panel Least Squares
Date: 06/02/17   Time: 19:12
Sample: 2011 2015
Periods included: 5
Cross-sections included: 80
Total panel (unbalanced) observations: 364
White cross-section standard errors & covariance (no d.f.
correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.727793	0.863072	0.843259	0.3998
DEP	-0.205537	0.042852	-4.796430	0.0000
LR	-0.500195	0.482839	-1.035945	0.3011
CI	0.004671	0.027626	0.169093	0.8658
LNS	-0.045911	0.120849	-0.379902	0.7043
INF	0.046492	0.347388	0.133833	0.8936
GDP	0.041968	1.643586	0.025535	0.9796

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.504348	Mean dependent var	0.181957
Adjusted R-squared	0.352800	S.D. dependent var	0.161765
S.E. of regression	0.130138	Akaike info criterion	-1.037446
Sum squared resid	4.708188	Schwarz criterion	-0.116690
Log likelihood	274.8152	Hannan-Quinn criter.	-0.671488
F-statistic	3.327969	Durbin-Watson stat	2.140620
Prob(F-statistic)	0.000000		