Are Macroeconomic Factors Substantially Influential For Islamic Bank Financing? Cross-Country Evidence

Shamsun Nahar[1], Niluthpaul Sarker[2]

[1](Ph.D Fellow, School of Accounting, Zhongnan University of Economics and Law, P.R. China)
[2](Ph.D Fellow, School of Management, Huazhong University of Science and Technology, P.R. China)

Abstract: *The advent of Islamic finance has created a significant change in global financial setup and with the introduction of Islamic banking system. The objective of this study is to examine the influence of macroeconomic factors on the financing of Islamic banks. The study used FGLS regression method to analyze the unbalanced panel data of 172 Islamic banks from 48 Muslim and Non-Muslim countries that met the selection criteria and had at least three years' financial data obtainable for the period spanning from 2004 to 2013. The results found that GDP growth rate and inflation rate have significant positive relationship with Islamic bank financing. The effect of exchange rate on Islamic bank financing was found negative, and as expected the Islamic bank financing was found to be positively significant for countries with Muslim population in majority. However, surprisingly and inconsistent with the general reports on remarkable growth of Islamic banks after global financial crises, the study found insignificant results for financing volume of Islamic banks during the post global financial crises period.*

Keywords: *Islamic Banking, Macroeconomic Factors, Islamic bank financing, Bank Credits, Panel data.*

I. Introduction

In the past decade increasing attention has been given to Islamic banking system, one major reason of this growing popularity of Islamic banking system was the resilience of Islamic banking as witnessed during global financial crises (GFC). Despite the financial turmoil in 2008, that crippled most of the Western institutions, Islamic banks continued to grow in size and distinction. Asian Banker Research states that the world's 100 largest wholly Islamic banks, ranked by assets, held more than $580 billion in assets in 2008, a 66% increase from the $350 billion they held in the previous year, which clearly depicts that Islamic banks came out of this crises quite unscathed as opposed to its conventional counterparts.

The Global Islamic Finance Report (2014) [1] estimated the size of the global Islamic financial services industry at $1.813 trillion at the end of 2013 with an estimated annual growth of more than 15% per annum. Presently, Islamic banking growth rate is 50% faster than overall banking sector in several core markets and Islamic banks are now operating in more than 83 countries around the world which includes Muslim countries i.e Bahrain, UAE, Saudi Arabia, Malaysia, Brunei and Pakistan etc. and non-Muslim countries like USA, UK, Canada, Switzerland, Australia, South Africa and others.

Existing literature lacks the comprehensive research on examining the financing portfolio of whole Islamic banking industry. This study will bridge this gap by discussing different macro-level factors that influence the lending decisions of Islamic Banks, so that it contributes to the researchers' and policy makers' notion.

There is a general agreement in literature that Islamic banks are superior to conventional or mainstream banks in terms of their performance (Safiullah, 2010 [2]; Samad, 2004[3]; Awan, 2009[4]; Rosly and Abu Bakar, 2003) [5]. Different studies related to Islamic banking have been conducted in different areas while considering the importance of Islamic banking.

It is evident from the literature that numerous studies have focused on determinants of conventional bank lending while neglecting determinants of Islamic banks financing. There are macroeconomic factors that influence the Islamic bank credits. Thus, in this study we include macroeconomic factors- conventional banks' interest rate, GDP growth rate, inflation and exchange rate, in order to study the impact of these variables on Islamic bank lending in 48 countries having established Islamic banking setup for the period from 2004 to 2013.

II. Literature Review

In the literature, there are many empirical studies that disclose the relationship between macroeconomic variables such as interest rate, inflation, exchange rates, money supply, etc., and conventional and/ or Islamic bank financing. The literature divided the determinants (factors) of banks financing in two types: the first is the micro-economic factors such as bank size, bank capitalization, liquidity and asset quality, capital ratios and collateral security and the later one refers to the macroeconomic factors such as money supply, interest rates, economic growth, inflation rate, exchange rate, and stock market index etc.

In our studies, we, therefore, include macroeconomic factors i.e. conventional banks' interest rate, economic output (GDP),inflation rate and exchange rate as explanatory variables in the study to examine the impact of these variables on Islamic bank financing in 48 countries, that have established Islamic banking setup, for the period from 2004 to 2013.

A review of literature on the effects of macroeconomic factors on financing portfolio of Islamic banks has led to the decision of including the four variables. Thus four explanatory variables and two dummy variables are selected according to the literature review and their relevance to the subject matter.

Macroeconomic factors: Interest rate, GDP growth rate, inflation and exchange rate.

Interest Rate: The amount/ rate charged by lenders as compensation for the loss of their asset/ capital's use, it is the most important factor affecting the demand and supply of bank credit. In a study to investigate the impact of interest rates on Islamic Banks' financing in a dual banking system, Kader & Leong (2009) [6] consider the effect of interest rate fluctuations on the demand for Islamic banks' financing in Malaysia, collecting monthly data for the period from 1999 to 2007. The findings suggest that interest rate is positively associated with Islamic bank credits but negatively related to the conventional bank financing.

Rosly (1999) [7] describes the theoretical explanation of the effect of interest rate fluctuations on performance of Islamic banks in a dual banking system. He found that Islamic banks are susceptible to interest rate risks more than the conventional banks because of the over dependence of Islamic banks on BBA financing in which the profit rates (financing rate) are fixed. Unlike Kadir and Leong (2009) [6] and Rosly (1999) [7], Adebola et al. (2011) [8] found that interest rate has significant negative effect on Islamic Banks financing in Malaysia, which is taken to mean that Islamic banks financing is complementary rather than substitute to conventional banks financing.

The current study also investigates the relationship between interest rate and financing of the Islamic banks. Conventional banks' lending interest rate is selected to measure the interest rate and the following hypothesis analyzes the relationship between interest rate and loan portfolio of the Islamic banks and to examine if the relationship is positive or negative:

Hypothesis 1: There is significant negative relationship between interest rate and financing of the Islamic banks.

GDP Growth Rate: Economic output is one of the most important macroeconomic factors. The causal nexus between economic growth and bank lending is bidirectional, and many studies have been conducted to analyze the effect of one over the other. Tajgardoon et al. (2012) [9] explains that increase in GDP growth rate will influence bank financing by creating more investment opportunities and better financing prospects, rendering the banks and investors with ample opportunities to grow and henceforth increasing the demand and supply for bank (Islamic) financing.

Mansur and Elyasiani (1995) [10] found that bank loans have a positive relationship with stock prices and real output. Karim et al. (2011) [11] used inflation and GDP growth as control variables while analyzing the effect of interest rate on Malaysian bank financing; he found negative results between interest rate and bank financing.

Demetriades and Hussein (1996) [12] find that there is a bi-directional causality between bank financing and economic growth. Likewise, when we looked at the contemporary theoretical and empirical studies the relationship between economic growth and financing nexus, (Greenwood and Jovonavic (1990) [13]; Bencivenga and Smith (1991) [14]; Roubini and Sala-i-Martin (1992) [15]; King and Levine (1993a) [16]; Greenwood and Smith 1997) [17] indicated that growth and financial structure were inevitable linked and also financial repression effect on economic growth negatively.

Podpiera (2007) [18] analyzed the impact of gross domestic product (GDP) and inflation on growth rate of total loans in Czech banks for 1996 to 2001. They found that there is a strong positive correlation between GDP growth rate and bank loans however, the effect of Inflation on Czech Bank loans were found insignificant. In another study Du (2011) [19] investigated the relation between the problem of long-term loan and macroeconomic variables in China. The study suggests that current economic growth rate and accelerated industrialization stimulate the demand for medium- and long-term loans, and there is a positive relation between the two variables. According to results the association between Islamic banking and Islamic facilities, and economic growth is positive. Based on review of literature, the second hypothesis for this study is:

Hypothesis 2: There is significant positive relationship between GDP growth rate and Islamic bank financing.

Inflation: The importance of inflation on the performance of banks was heavily discussed in the literature, primarily due to the influence of inflation on the sources and users of banks' financial resources. In particular, inflation affects companies' pricing behavior. For instance, if companies expect general inflation to be higher in the future, they may believe that they can increase their prices without suffering a drop in demand for their output (Driver and Windram 2007) [20].

Du (2011) [19] found that Inflation has a threshold effect on bank loans with lower level of inflation having positive impact on medium- and long-term loans, while high level inflation having negative impact on medium and long-term loans. Abd Karim et al. (2011) [11] used inflation and GDP growth as control variables while analyzing the effect of interest rate on Malaysian bank financing; he found negative results between interest rate and bank financing.

Adebola et al. (2011) [8] found that inflation and stock market index causes Islamic bank finances in short run and there is a positive relationship between inflation and bank financing. Based on the above, the next hypothesis is as follows:

Hypothesis 3: There is significant positive relationship between inflation rate and Islamic bank financing.

Exchange Rate: The exchange rate measures the relative value of a country's currency against the value of the currency of its trading partners. Mbutor (2010) [21] studies the relationship between lending bank lending, exchange rate volatility and stock price fluctuation. The study suggests that exchange rate fluctuations affect the lending behavior of Nigerian banks, however the effects were insignificant.

Mansur and Elyasiani (1995) [10] found that exchange rate have no direct effect on bank lending however it seems to affect bank financing activities through its effect on real output and stock prices. Similarly, Adebola et al. (2011) [8] also confirmed the same findings that there is an association between real effective exchange rate and Islamic bank financing, however the relationship is insignificant in long run. Mansur and Elyasiani (1995) [10] found that exchange rate volatility have no direct impact on bank lending however it seems to affect bank financing activities through its effect on real output and stock prices. So the research findings conclude that:

Hypothesis 4: There is significant negative relationship between Exchange rate and Islamic bank financing.

Control variable: As a part of the further analyses, two dummy variables will be included about the demographic characteristic of country from which sample observations are selected and the other dummy variable for pre and post-global financial crises period to investigate the claim of high resilience of Islamic banking in adverse economic conditions.

Demography: Compliance to Shariah principles by financial institutions varies from country to country as the need to inter operate with their non-Shariah-compliant counterparts requires, at times, a broad interpretation of the boundaries of how Shariah principles that are applied to the world of financial instruments, are becoming more complex.

A control (dummy) variable is added in the model, to analyze the effect of demographic characteristics of a country with majority Muslim population or otherwise.

Post Global Financial Crises Period: Previous literature, financial reports and Islamic finance reviews have all posted that Islamic banking system got its major break after the global financial crises, when many contemporary financial institutions were hit badly by the financial crises. Besides, historical data shows that Islamic banking had a high growth rate even prior to the financial crises in 2008, however after the financial debacle of 2008, Islamic banking growth accelerated at a very high pace. Considering the above discussed perception about Islamic banking growth after 2008's global financial crises, a dummy variable is added for the period after 2008 to analyze Islamic bank financing in pre/ post GFC period.

III.   Methodology
The Islamic Banking market consists of more than 200 Islamic Banks operating in various regions in the world. The analyses are based on bank loan data of 48 Islamic banks for the period from 2004 to 2013. The study has chosen panel data of 172 Islamic Banks from 48 countries for the period 2004-2013.The list of Islamic banks was obtained from the website of World Database for Islamic Banking and Finance (WDIBF). Following the list the banks' data has been collected from the Bank scope database and websites of the respective banks and/ or from the respective central banks' website, whereas, the data related to explanatory and control variables are obtained from secondary sources such as World Bank database, International Monetary Fund, various economic surveys and central banks of the respective countries.

Only two criteria were set for the sample selection, that is:

The bank included in the sample should be a full-fledged Islamic bank and all those banks having both Islamic banking branches alongside conventional branches are excluded from the sample. At least three years' annual data of the bank must be available for examination.

Whereas the overall objective of the above mentioned criteria was to ensure the continuous observation and comparability of the loan data and to avoid error resulting due to erroneous inclusion of conventional loan data as part of Islamic lending data of bank following dual systems.

Table 01: Sample Description

	Sample Selection based on Country	Sample size (no. of IBs)	Percentage
Muslim Country	27	117	68.02%
Non-Muslim country	21	55	31.98%
Total	48	172	100%

In order to reach the objectives of current research and to analyze the data the statistical software STATA and EVIEWS are used.

In light of the past research studies, the above selected independent variables are considered to affect our variable under study, i.e. Islamic bank financing. Therefore, our model consist of four independent variables i.e. interest rate, GDP growth rate, inflation and exchange rate; two control variables i.e. demography of the respective country based on official religion of the country and GFC representing the post global financial crises period. The model of the study is:

$$Fin_{it} = \beta_1 + \beta_2\,INT_{it} + \beta_3\,GDPR_{it} + \beta_4\,CPI_{it} + \varepsilon \,.. \,(1)$$

$$Fin_{it} = \beta_1 + \beta_2\,INT_{it} + \beta_3\,GDPR_{it} + \beta_4\,CPI_{it} + \beta_5\,REER_{it} + \beta_6\,DM_{it} + \beta_7\,GFC_{it} + \varepsilon ....\,(2)$$

Table 02: Definition of Variables

Dependent variable: (IB Financing) = Natural logarithm of financing value of Islamic banks represented in USD (thousands)				
Hypotheses	**VARIABLES**	**Label**	**MEASUREMENT**	Exp. Sign and relationship
H1	Interest rate	INT	Annual lending interest rate of conventional banks, in percent form, is used to measure this variable	+/-
H2	GDP growth rate	GDPR	Annual GDP growth rate taken in percent form	+
H3	Inflation	CPI	Inflation is measured with the Consumer price index of the respective country, taken as percentage	+
H4	Exchange rate	REER	Real effective exchange rate indices is used as measure of exchange rate, Index Number (2010=100) is used as the base index	-
Control Variables				
	Demography	DM	A dummy variable that equals one if the Islamic bank is operating in a country with majority of Muslim population and zero otherwise;	+
	Global financial crises effect	GFC	A dummy variable that equals one for period after global financial crises, and zero otherwise (1: t>2008, 0: t≤ 2008)	+

IV. The Results

Descriptive Statistics

Initially, data related to 217 Islamic banks were collected from 81 different countries in the world; however, some observations could not meet the sampling selection criteria and were dropped from the sample. The shortlisted sample size was reduced to (176) Islamic banks operating in 48 countries which met the selection criteria and have had the relevant financial data obtainable, but the researcher found that there were (4) banks that were considered as outliers and needed to be excluded. Finally, a sample of 172 Islamic banks (176 primary sample − 4 Islamic banks considered as outliers) were selected which is sufficient to predict large effects in this thesis. Table below presents summary statistics (mean, standard deviation, minimum and maximum) for all variables used in the study.

Table 03: Descriptive Statistics of the Dependent and Independent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent variable					
LnFin	1276	13.254	2.669	0	19.096
Independent variable					
INT	1038	9.049%	4.311%	0.5%	25%
GDPR	1269	4.848%	4.656%	-15.09%	26.17%
CPI	1261	6.262%	6.594%	-8.28%	39.27%
REER	1280	103.504	11.237	74.38	166

The sample is based on observations of 172 firms over the period 2004-2013.

REER indices are used as a measure of the value of local currency against a weighted average of a basket of foreign currencies using 2010 =100 (base year)

For this study, the natural logarithm of financing value (LnFin) of Islamic banks has been used as dependent variable. The above table shows that total 1276 firm-year observations related to Islamic bank financing were collected with the average value of sample data being 13.254 with standard deviation of 2.669 and the values ranging from '0' minimum value to maximum of 19.096.

The average lending interest rate was around 9% with a standard deviation of 4.311%, however, among the sample data, some countries like Canada and Bahamas has the lowest interest rate of 0.5% in 2013 whereas Yemen had the highest reported interest rate of approximately 25% for the last one decade.

The overall average GDP growth rate in the sampled countries were 4.848% with standard deviation equal to almost the same size i.e; 4.656%, however there was huge disparity in GDP growth rate from one country to the other, with countries having GDP growth rate in negative figures going as low as -15.09% while other countries having a very healthy GDP growth rate of 26.17%.

Consumer price index (CPI) which was used as measure of inflation, and just like GDP growth rate, Consumer price index showed similar trend in the sample data, over the last decade. Table (5.1) shows that average CPI in the sampled countries over the period from 2004-2013 was 6.262% with standard deviation of 6.594%. There was notable disparity in CPI as well with the values ranging from -8.28% to 39.27%.

Real effective exchange rate (REER) was used as measure of exchange rate with 2010 considered as the base year for calculating the results which shows that REER ranges from 74.38 to 166 with an average of 103.504 and a standard deviation of 11.237.

The Baseline models:

The regression analysis is used to test the hypothesis. The Feasible Generalized Least Square (FGLS) regression model is used as the method of data analysis. Data was first tested and checked for multicollinearity and heteroscedasticity before selection of the feasible model. As the test results found that the data is heteroscedastic so following Shahimi (2006) [22] and Zakaria (2007) [23] and to address the problem of heteroscedasticity, the feasible GLS estimation is used to test the impact of macroeconomic factors on Islamic bank financing.

Two models are estimated to analyze the effect of macroeconomic factor; Interest Rate, GDP growth rate, CPI (as a measure of Inflation) real effective exchange rate, on the financing volume of Islamic banks. First the main model with four independent variables, and then a second model by adding two control variables; demography in the model to check if there is any difference in the resultant effect of macroeconomic factors on loan portfolio of Islamic banks operating in countries with Muslim Majority population, and the second control variable as GFC, which is a dummy variable for the period after global financial crises to review the trend of Islamic bank financing in relation to independent variables.

Table 04: Multiple Regression Result of IB financing and macroeconomic factors over period (2004-13)

Variable	Model 1		Model 2	
	Coefficient	Z	Coefficient	Z
Intercept	15.591***	30.88	15.073***	29.56
INT	-0.211***	-9.04	-0.218***	-9.44
GDPR	0.028**	2.04	0.028**	2.01
CPI	0.058***	3.01	0.064***	3.27
REER	-0.008**	-1.99	-0.014***	-3.09
Control Variables				
DM	-	-	1.033***	4.69
GFC	-	-	0.338	1.63
Observation (n)	1003	-	1003	-
IB's (n)	172	-	172	-
Wald Chi(2)	92.91	-	120.3	-
Probability	0.0000	-	0.0000	-

***indicates significance at 1% level; ** indicates significance at 5% level and * indicates significance at 10% level.
The reported p-values are all two-tailed.

Model 1:

Focusing on the first model, as expected interest rate, which is the main independent variable in the model is negatively correlated to Islamic bank financing and the coefficient is significant at 1% level, whereas, GDP growth rate and inflation (measured with CPI) has positive association with the financing of Islamic banks, however, GDP growth rate is only significant at 5% level. Likewise, the relationship between exchange rate (being measured with (REER)) and Islamic bank financing is negative and significant at 5% level of significance. The overall model is significant and it has passed the Wald Chi-Square test at 1% level of significance.

Model 2:

Discussing the second model, the overall model has passed the Wald Chi-Square test; detailed analyses of the relationship of each explanatory variable with the dependent variable, Natural logarithm of the financing of the Islamic banks, can be summarized, in light of the results shown in the table 04, as follows:

$$Fin = 15.073 - 0.218INT + 0.028GDPR + 0.064\ CPI - 0.014\ REER + 1.033DM + 0.338GFC + \varepsilon$$

The investigation into relationship between Interest rate and Islamic bank financing is the first hypothesis in this study. Consistent with the first hypothesis, the results indicate the existence of statistically significant negative relationship (coefficient = -0.218 p- value <0.01) between the interest rate and the variable under study i.e.; Islamic bank financing (log).The results suggest that an increase in conventional banks interest rate will negatively influence Islamic bank financing. An increase in conventional banks' lending interest rate will generate a copycat behavior in the Islamic banking system with the consequence of Islamic banks raising their financing rate and therefore leading to a decrease in volume of Islamic bank financing.

These results are in agreement to the study of Adebola et al. (2011) [8] but in contradiction to many studies like Kadir and Leong (2009) [6] and Rosly (1999) [7]. Theoretically, Islamic bank financing, being the substitute for conventional bank lending, is supposed to have a positive cross price elasticity with the conventional bank lending (other things remaining the same), and there should be a positive relationship between the two variables, however, Islamic banks like any other financial institution are very responsive to the changes in the market, and as Islamic banks now have floating/ variable rate financing instruments like Ijarah, Musharakah etc., they can easily adjust their profit rates according to any changes in conventional banks' interest rate which in return effects the overall financing volume negatively.

Hypothesis 2 predicts a positive association between GDP Growth Rate and Islamic bank financing. The positively signed coefficient of GDPR, shown in the table, supports the study's argument and hypothesis. Results from table (5.3) show the presence of a statistically significant positive relationship between the GDP growth rate and the financing of Islamic Banks. Beta coefficient of 0.028 shows the positive relationship between the two variables, whereas Z-statistic of 2.01 with P- value of 0.044 shows the significant relationship.

This finding goes in the same line with the findings of Tajgardoon et al. (2012) [9], Mansur and Elyasiani (1995) [10], Podpiera (2007) [18], Adebola et al. (2011) [8], and many other researchers as increase in GDP growth rate will signify more investment opportunities and better financing prospects, rendering the banks and investors with ample opportunities to grow and henceforth increasing the demand and supply for bank (Islamic) financing.

The third research hypothesis proposes a positive relationship between Inflation rate (CPI used as a measure of inflation) and Islamic bank financing. The study points out that inflation rate is significantly and positively associated with the financing of Islamic banks, the positively signed coefficient ($\beta = 0.064$, $p = 0.0010 < 0.05$), thus hypothesis 3 is supported. The result indicates that as the inflation rate in economy increases, the prices of goods and services in economy will increase as a result of increase in inflation rate and it is not surprising that rational producer will like to produce more upon any price increases, thereby venturing in to more investment and ultimately more financing from banks. This result is consistent with findings of Du (2011) [19] and Abd Karim et al. (2011) [11] Pruteanu- Podpiera (2007) [18] etc.

The fourth research hypothesis predicts a negative relationship between real effective exchange rate and Islamic bank financing. The result indicates coefficient value of -0.014 showing the negative effect of exchange rate over the independent variable i.e.; Islamic banks' financing, which supports our Hypothesis-4 the Z Statistic of -3.09 with p value =0.0020 shows the statistically significant relationship.

Mbutor (2010) [21], Adebola et al. (2011) [8] found the effect of exchange rate on Islamic bank financing as insignificant, and contrary to their findings this this study found a significant relationship between real effective exchange rate and Islamic bank financing, which shows that an increase in real effective exchange rate will result in decreasing the Islamic bank financing and vice versa. This finding is supported by the argument that an increase in exchange rate signifies the depreciation of the local currency in a country resulting

in local goods becoming less competitive and more expensive relative to foreign competitors. An increase in the real effective exchange rate will result in increase in net imports (more imports and fewer exports) which will negatively influence the overall production level in general and financing prospects from banks (Islamic and conventional) in particular.

In the control variables, the demography (DM) is significantly and positively associated with the Islamic bank financing. Consistent with general belief, the result verified the author's assumption that Islamic bank financing have positive growth chances in countries having Muslim population in majority. However, the relationship between Islamic bank financing and GFC (dummy variable 1 for period after global financial crises and 0 otherwise) is not significant.

V. Conclusion

The current study focuses on analyzing the impact of macroeconomic factors on the financing of Islamic banks using the sample of 172 Islamic banks operating in 48 Muslim countries including Pakistan, Malaysia, Indonesia, Bahrain, Iran, UAE etc. and non-Muslim countries like South Africa, India, Canada, France and United Kingdom etc. There are more than 200 Islamic banks operating in more than 75 nations around the globe, however only 172 of them met the selection criteria for this study, the data is obtained for the period from 2004 to 2013.The feasible generalized least squares (FGLS) regression model is used as the method of data analysis. It has been chosen because of its suitability for the unbalanced panel data with heteroscedasticity problem and this approach helps in explaining the relationships among the various variables of the study. The results were as follows:

Table 05: Summary of key Findings

N	Hypotheses	Proxy	Multivariate Analyses
H1	there is significant negative relationship between interest rate and financing of the Islamic banks	Annual lending interest rate (%)	Supported and significant at $p < 0.01$
H2	there is significant positive relationship between GDP growth rate and Islamic bank financing	GDP growth rate (%)	Supported and significant at $p < 0.05$
H3	there is significant positive relationship between inflation rate and Islamic bank financing	Consumer price index	Supported and significant at $p < 0.01$
H4	there is significant negative relationship between Exchange rate and Islamic bank financing	Real effective exchange rate indices (2010=100)	Supported and significant at $p < 0.01$

The outcomes of the current study offer an important insight into the association between Islamic bank financing and macroeconomic factors namely, interest rate, GDP growth rate, inflation rate and exchange rate.

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