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Study the effect of Islamic derivatives during financial crises of 2008 using Translog function, a case study of Iraq

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Abstract

This research uses a statistical method to assess the efficiency and performance of Islamic and conventional banks. The Iraqi banks have been chosen as a case study in the period from 2006 to 2011. The data collected from, banks' financial reports, IMF database, the cost function and Seemingly Unrelated Regression were used to analyse the Iraqi bank's elasticity of substitution between inputs. It has been shown that the conventional banks in Iraq have better substitution than Islamic banks. In conclusion, the Islamic and conventional banks are exposed to a similar degree of risks, but different in nature; and the Islamic banks have less security than conventional banks to financial shocks. Since the Islamic banks cannot charge a fixed, predetermined return, and can't borrow from the financial market, so the Islamic banks could face more risk and volatile returns on their assets. The implication of that an excessive management modernization of Islamic banks is necessary to achieve a higher level of efficiency. This will give privilege for Islamic banks over the conventional bank. For conventional banks, they have to invent similar techniques to reduce cost and keep their position in the market.

Keywords: Islamic banks, conventional banks, efficiency, performance, Trans log function-seemingly unrelated regression

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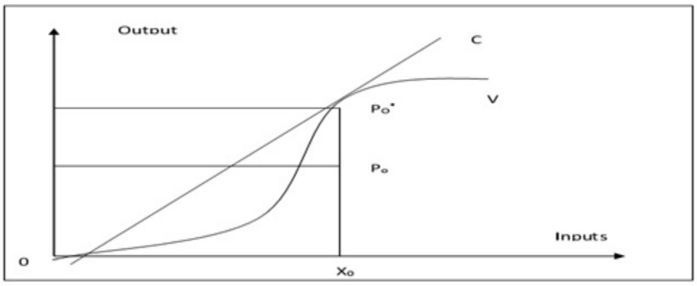

Figure 1: The technical efficiency of banks with one input and one output [p. 5, 18].

1. Introduction

Efficiency in Islamic and conventional banks occupies an important position effecting planning and development strategies across the world. Relationships between Arab banks and international banks increased significantly, this led to improvements within the banking industry throughout the Arab world, such as a structural reform in the financial system, liberalization of the capital, and total market integration that became inevitable [18].

challenges for the Arab, Islamic and conventional banks have increased and have become the face of fierce competition with foreign banks that has opened branches in Arab and Muslim countries. Therefore, both types of Arabic banks must raise their efficiency to the level of professional foreign banks. Islamic and conventional, Arabic banks have to diversify their products in direct and indirect investments and to work seriously to reduce costs to a minimum in term of input and output. Therefore, it became a necessity for Arab banks to analyse the operational cost in terms of inputs and outputs [1].

The analysis of bank efficiency and finding the optimum size and an optimum mix of a product can be done by measuring the economies of scale and economies of scope respectively [17]. This research will attempt to measure the efficiency of Islamic and conventional of Iraqi banks' activities from 2006 to 2010 This period covers the financial crises of 2008. I will use Trans log function to measure the elasticity of substitution between inputs, price elasticity, economies of scale and economies of scope. The aim is to find out, which is more efficient in term of efficiency, Islamic or conventional banks, given the consequences of financial crises. The results of the empirical analysis in this research will confirm or reject the allegation that both type of banks in Iraq have the same efficiency level in cost control.

2. Literature review

Banking efficiency can be measured in three approaches as follows:

2.1. Technical efficiency

This is the ability of the bank to achieve greater output and better service from a set of available resources [6]. Suppose that the bank uses a single productive element and achieves a single product (figure 1) and assume that the bank is working on constant return to scale, so the line (OC) represents a production possibility curve of production possibility frontier, and that any point on this curve represents the full technical competence of a bank. The points at the bottom of the curve represent a case of inefficiency. The point P_0 represents the inefficient bank while point P_0* represents a technically efficient bank.

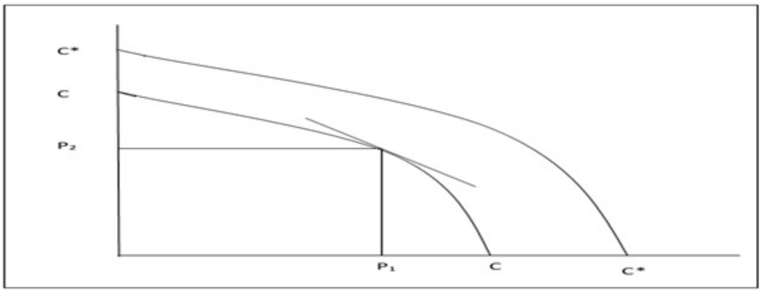

Figure 2: The technical efficiency of banks with one input and two outputs [p. 5, 18].

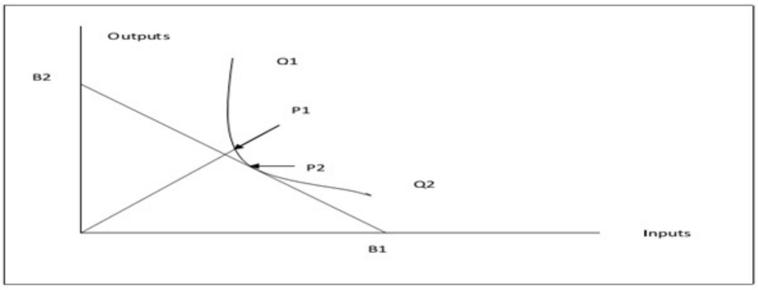

Figure 3: The Allocative efficiency of a bank with two productive elements [p. 12, 3].

Suppose that the bank is using one element of production to produce two products, with the aid of figure number two; we can see that at a certain technical level, the isoquant cost curve (CC) is giving a possible combination of output that can be achieved within the limits of the productive elements. However, at a higher level of costs, (larger use of production component) the isoquant curve moves to (C*C*). These curves represent a form of possible production limits at certain levels of production element. The value of any bank located between the two curves is not technically efficient.

2.2. Scale efficiency

: Scale efficiency measures a bank's capacity for expansion, according to the size of its operations If the input components of production increased by the same percentage of production increase, this is called (constant return to scale). If the rate of increase in the output elements is larger than the percentage of increase in production elements, this known as (increased return to scale) [9]. However, if the rate of increase of element production is larger than the increase in production output called (decreased return to scale).

2.3. Allocative efficiency

It is the use of proportions of production elements at a certain level of prices to produce a certain level of production The price efficiency for a bank is the ability to use the input and output in ideal rates, taking into account the price levels and technological progress (Coelli, 2005).

In the figure below, there are two production elements, let us say that the costs are less than what they can be when the isoquant line (Q1Q2) touches the line (B1B2) at the point (P2). In this case, point (P2) represents the distributive efficiency of the bank.

2.4. The coast function

The cost function is a combined estimation of the cost function and inputs' share equations. It is characterised by increasing the degrees of freedom without any increase in the estimated coefficients.

Since the total inputs share ratios in total costs must be equal to one, I drop one of the equations, which are here the financial capital equation. I utilized throughout this study the cost function; labour share function and physical capital share function [8]. The regression model used throughout this study is (seemingly unrelated regression), which includes a linear regression model equation for each dependent variable and independent variable. Each equation of linear regression in the model can be estimated separately.

The technique used here is (Zellner iteration), by repeating the process or iteration until the convergence and reaching the point of stability. The Trans log function has a good characteristics; First, it allows for estimating the concave curve of average cost and at the same time does not impose restrictions on the estimated function such as those imposed by a Cobb–Douglas function; in particular, the stability of the elasticities of substitution between factors of production and the stability of returns to scale. Second: it allows for a direct estimate of the cost elasticities of the prices of production elements, cost elasticity of production (economies of scale), and economies of scope. If the value is less than one, it is a sign of the existence of economies of scale [9] If the value is larger than one, it is a sign of diseconomies of scale, and if the value is one means no economies of scale or diseconomies of scale.

The regression model used in this paper is Seemingly Unrelated Regression. It is a linear model that includes a set of regression equations and each one has a separate dependent variable and explanatory variable. Each linear regression equation can be estimated separately as follows:

$$TC = A_0 Y^{b1} Y^{b2} Y^{b3} \cdots Y^{bn}.$$

The equation of total cost can be modified to a linear equation as follows:

$$\log tc_1 = \log A_0 + B_1 \log y_{i1} B_2 \log y_{i2} + \cdots + B_n \log_{ik} + \varepsilon.$$

A multi-linear regression equation assumes a linear relationship between independent and dependant variable. The system of equation applied depending on the number of cases (banks) under study [19].

The parameters of (seemingly unrelated regression) are the most efficient compared to other estimation methods, because it depends on iteration in the process of estimating the parameters, and each iteration is converted to reduce the Multicollinearity, until it reaches the degree of stability assessment process (convergence) where the parameters provide the best estimate of Maximum Likelihood [20]. After determining the components of the independent variables in the model, and the application of homogeneity in the prices of production elements, I drive restrictions of symmetry to reduce the number of parameters needing to be estimated from (21) to (15) parameter. The reduction of parameters will raise the degrees of freedom in the model and increases the estimation adequacy.The general form of Translog Cost Function used is as the following: The cost function equation is:

$$\ln TC = A_0 + \sum_i A_i \ln Y_i + \sum_i B_i \ln P_i + \frac{1}{2} \sum_i \sum_j A_{ij} \ln Y_i \ln Y_j + \frac{1}{2} \sum_i \sum_j B_{ij} \ln P_i \ln P_j + \sum_i \sum_j G_{ij} \ln P_i \ln Y_j.$$

TC: total cost
Y: outputs
P: price of inputs

A, B, G coefficient of the cost function [4].

In order to build logical conclusions from the cost function, it must be synonymous with the typical production function and has the following characteristics:

1- The first partial derivatives are positive and consistent with the marginal product of each element.

2- The second partial derivatives are negative and consistent with diminishing marginal productivity.

This requires restrictions on the cost function where it should be:

A- Homogeneous of degree one in the input prices.

B- Increasing in the output and input prices (Monotonicity).

C- To be a concave function, which means the matrix to be an almost negative Jacobian matrix (negative quasi- definite) [18].

If the function has all the above conditions, we will get the lowest cost function for each level of production as follows:

$$\begin{aligned}\ln TC =& A_0 + A_1 \ln Y_1 + A_2 \ln Y_2 + A_3 \ln Y_3 + B_1 \ln P_1 + B_2 \ln P_2 + B_3 \ln P_3 \\ &+ \frac{1}{2} A_{11} (\ln Y_1)^2 + A_{12}(\ln Y_1)(\ln Y_2) + A_{13}(\ln Y_1)(\ln Y_3) \\ &+ \frac{1}{2} A_{22}(\ln Y_2)^2 + A_{23}(\ln Y_2)(\ln Y_3) + \frac{1}{2} A_{33}(\ln Y_3)^2 \\ &+ \frac{1}{2} B_{11}(\ln P_1)^2 + B_{12}(\ln P_1)(\ln P_2) + B_{13}(\ln P_1)(\ln P_3) \\ &+ \frac{1}{2} B_{22}(\ln P_2 - \ln p_3)^2 + G_{11}(\ln P - \ln P_3)(\ln Y_1) + G_{12}(\ln P_2 - \ln P_3)(\ln Y_1) \\ &+ G_{21}(\ln P_2)(\ln Y_1) + G_{22}(\ln P_2)(\ln Y_2) + G_{23}(\ln P_2)(\ln Y_3) + G_{31}(\ln P_3)(\ln Y_1) \\ &+ G_{32}(\ln P_3)(\ln Y_2) + G_{33}(\ln P_3)(\ln Y_3). \qquad (2.1)\end{aligned}$$

The total cost equation will be homogeneous with respect to the input prices if it's subjected to the following restriction:

$$B_1 + B_2 + B_3 = 1 \qquad \text{and} \qquad \sum_i B_i = 1 \qquad (2.2)$$

$$\left\{ \begin{array}{c} B_{11} + B_{12} + B_{13} = 0 \\ B_{21} + B_{22} + B_{23} = 0 \\ B_{31} + B_{32} + B_{33} = 0 \end{array} \right\} \qquad \Longrightarrow \qquad \sum_j B_{ij} = 0 \qquad (2.3)$$

$$\left\{ \begin{array}{c} G_{11} + G_{12} + G_{13} = 0 \\ G_{21} + G_{22} + G_{23} = 0 \\ G_{31} + G_{32} + G_{33} = 0 \end{array} \right\} \qquad \Longrightarrow \qquad \sum_j G_{ij} = 0. \qquad (2.4)$$

The cost function after amendment will be as follows:

$$\begin{aligned}\ln TC =& A_0 + A_1 \ln Y_1 + A_2 \ln Y_2 + B_1(\ln P_1 - \ln P_3) \\ &+ B_2(\ln P_2 - \ln P_3) + \ln P_3 + \frac{1}{2}A_{11}(\ln Y_1)^2 + A_{12}(\ln Y_1)(\ln Y_2) \\ &+ A_{13}(\ln Y_1)(\ln Y_3) + \frac{1}{2}A_{22}(\ln Y_2)^2 + A_{23}(\ln Y_2)(\ln Y_3) \\ &+ \frac{1}{2}A_{33}(\ln Y_3)^2 + \frac{1}{2}B_{11}(\ln P_1 - \ln P_3)^2 \\ &+ B_{12}(\ln P_1 - \ln P_3)(\ln P_2 - \ln P_3) + \frac{1}{2}B_{22}(\ln P_2 - \ln P_3)^2 \\ &+ G_{11}(\ln P_1 - \ln P_3)(\ln Y_1) + G_{12}(\ln P_2 - \ln P_3)(\ln Y_1) \\ &+ G_{21}(\ln P_1 - \ln P_3)(\ln Y_2) + G_{22}(\ln P_2 - \ln P_3)(\ln Y_2) \\ &+ G_{31}(\ln P_1 - \ln P_3)(\ln Y_3) + G_{32}(\ln P_2 - \ln P_3)(\ln Y_3). \end{aligned} \tag{2.5}$$

Then, we derive the function of Share Equations of labour, physical capital, and cash capital from Translog Cost Function with respect to the price of inputs as follows:

$$S_i = \frac{\partial \ln TC}{\partial \ln P_i} \cdots S_i = B_i + \sum_j B_{ij} \ln P_j + \sum_j G_{ij} \ln Y_j. \tag{2.6}$$

Which lead to the following of share equations of inputs [20, p. 25]:

$$S_1 = B_1 + B_{11} \ln P_1 + B_{12} \ln P_2 + B_{13} \ln P_3 + G_{11} \ln Y_1 + G_{12} \ln Y_2 + G_{13} \ln Y_3 \tag{2.7}$$

$$S_2 = B_2 + B_{21} \ln P_1 + B_{22} \ln P_2 + B_{23} \ln P_3 + G_{21} \ln Y_1 + G_{22} \ln Y_2 + G_{23} \ln Y_3 \tag{2.8}$$

$$\begin{aligned} S_3 =& (1 - B_1 - B_2) - (B_{11} + B_{12})(\ln P_1 - \ln P_3) + (B_{12} - B_{22})(\ln P_2 - \ln P_3) \\ &- (G_{11} + G_{12}) \ln Y_1 - (G_{21} + G_{22}) \ln Y_2. \end{aligned} \tag{2.9}$$

Elasticity of substitution among inputs, economies of scope, economies of scale and price elasticity of demand can be calculated between the production elements of the cost functions by Translog Function in the following equations:

1-Elasticity of substitution among production elements

$$\sigma = \frac{(B_{ij} + S_i S_j)}{S}, \qquad i \neq j. \tag{2.10}$$

2- Price elasticity of demand:

$$B_{ij} S_i + S_i - 1. \tag{2.11}$$

3- The economies of scale as follows:

$$ELS = \sum_i \frac{\partial \ln TC}{\partial \ln Y_i} = \sum_i A_i + \sum_i \sum_j A_{ij} \ln Y_j + \sum_i \sum_j G_{ij} \ln P_j. \tag{2.12}$$

$$ES = \frac{1}{ELS}. \tag{2.13}$$

ES: The economies of scale.

ELS: Elasticity of substitution of cost function with production elements.

The above equation impose the following facts:

1- If $ELS > 1$ the economies of scales will be negative and $ES < 1$, decreasing returns to scale.

2- IF $ELS < 1$ the economies of scales will be positive and $ES > 1$, increasing returns to scale.

3- If $ELS = 1$ there is no economies of scale and $ES = 0$, constant returns to scale.

4- Economies of scope of any producers (y) and (z) measured in Translog function through the integration of Translog equation, in the following relationship:

$$\frac{\partial^2 TC}{\partial Y_i \partial Y_j} = \frac{TC}{Y_i Y_j}\left(\frac{\partial \ln TC}{\partial \ln Y_i} * \frac{\partial \ln TC}{\partial \ln Y_j} + \frac{\partial^2 \ln TC}{\partial \ln Y_i \partial \ln Y_j}\right) \tag{2.14}$$

The economies of scope, depends on the signal of the number in the brackets above, if it is negative, this indicates that there is no existence of economies of scale and if it is positive or equal to zero this indicates that the bank has an economy of scope. The above mathematical model helps to calculate the elasticity of substitution, Price's elasticity of demand, economies of scale, and economies of scope.

After the re-drafting of the model is to get rid of certain parameters and reduce the Multicollinearity, we get the following equation of Translog function:

$$\begin{aligned}
\ln TC = & A_0 + A_1 \ln Y_1 + A_2 \ln Y_2 + B_1(\ln P_1 - \ln P_3) \\
& + B_2(\ln P_2 - \ln P_3) + \frac{1}{2}A_{11}(\ln Y_1)^2 + \frac{1}{2}A_{22}(\ln Y_2)^2 \\
& + A_{12}(\ln Y_1)(\ln Y_2) + \frac{1}{2}B_{11}(\ln P_1 - \ln P_3)^2 \\
& + B_{12}(\ln P_1 - \ln P_3)(\ln P_2 - \ln P_3) + \frac{1}{2}B_{22}(\ln P_2 - \ln p_3)^2 \\
& + G_{11}(\ln P - \ln P_3)(\ln Y_1) + G_{12}(\ln P_2 - \ln P_3)(\ln Y_1) \\
& + G_{21}(\ln P_1 - \ln P_3)\ln(Y_2) + G_{22}(\ln P_2 - \ln P_3)\ln Y_2
\end{aligned}$$

Using (Shephard's Lemma), we can get share functions of inputs in the bank total cost as follows:

$$S_1 = B_1 + B_{11}(\ln P_1 - \ln P_3) + B_{12}(\ln P_2 - \ln P_3) + G_{11}\ln Y_1 + G_{21}\ln Y_2$$

$$S_2 = B_2 + B_{12}(\ln P_1 - \ln P_3) + B_{22}(\ln P_2 - \ln P_3) + G_{12}\ln Y_1 + G_{22}\ln Y_2$$

$$\begin{aligned}
S_3 = & (1 - B_1 - B_2) - (B_{11} + B_{12})(\ln P_1 - \ln P_3) + (B_{12} + B_{22})(\ln P_2 - \ln P_3) \\
& - (G_{11} + G_{12})\ln Y_1 - (G_{21} + G_{22})\ln Y_2.
\end{aligned}$$

2.5. Aim of The Study

The research aim to achieve the following:

1. Estimate the parameters of the cost function (Translog Function) to analyse the efficiency of Islamic and conventional banks in Iraq.
2. Estimate the elasticity substitution and price elasticity of inputs used by banks under study.
3. Analyse the economies of scale, if any, to determine the optimal size of conventional and Islamic banks.

3. Research questions

the major questions of this research are as follows:

1. Do the Iraqi Islamic banks have the ability to control costs and achieve a balance between profit and risks better than conventional banks?
2. Are Iraqi banks different in price elasticity in the production elements and different in elasticity of substitution among production elements between Islamic and conventional banks and which bank type more elastic?

4. Methodology

Data collected for nine Iraqi banks,. Cross-sectional data for each bank was used in the analysis to determine those banks operating in Iraq as benchmarks for their peer banks in the region. The data covered Iraqi bank activity between 2006 and 2010. The number of coefficients to be estimated in the cost function (Translog function) is fifteen coefficient and the constant coefficient, so it is difficult to use the data of each bank or banking group separately. The technique used throughout this research is a combined cross-sectional data from all banks with the time-series for each bank (Pooling Time Series and Cross Section Data). The least squares method may be used to estimate the cost function coefficients, but this method-maligned neglect of information in the share equation. As a large number of independent variables, that could lead to the emergence of the problem of Multicollinearity. Therefore, the application of the least square method results in most of the coefficient not being significant due to the Multicollinearity. If there are no Multicollinearity in the data, the result of Translog function will be the same as OLS.

5. Hypothesis

In order to identify the efficiency levels of Iraqi banks and understand the extent of control of cost and management, we must estimate elasticities of substitution and price elasticities of banks and analyse their implications. it will be the goal to identify the mechanisms to raise the efficiency of the banking system and the possibility of the application of these mechanisms within the banks in terms of operational efficiency measurement using stochastic frontier analysis, so the hypotheses are as follows:

HO:

1- The Islamic banks have better elasticity of substitution than conventional banks.

2- Islamic banks control their costs through their input prices better than conventional banks.

4- The Islamic banks and conventional in Iraq have economies of scale which allow it to diversify its activities.

3- The Islamic banks in Iraq have an economy of scope which allow them to diversify their products more than conventional banks.

H_1: None of the above is accurate.

6. Estimation of the model

The technique used here is (Zellner Iteration), by repeating the process or iteration until convergence and then reaching the point of stability. In the Table 1 are the estimated coefficients of the model.

From the Table 1, the value of (R-squared =0.98), so 98% of the change in the cost function can be explained by the regression that links the total costs with input prices and the output, the rest of variations are due to random error. This is an indication of the strength of linear correlation

Table 1. The estimated coefficient of the Translog function of Iraqi banks from 2006 to 2010.

Dependent Variable: LOG(TC)					
Method: Least Squares					
Date: 11/08/15 Time: 21:24					
Sample: 1 45					
Included observations: 45					
Variable		Coefficient	Std. Error	t-Statistic	Prob.
C	A0	-0.912126	3.976594	-0.22937	0.820
LOG(Y1)	A1	-3.588813	3.364208	-1.06676	0.295
LOG(Y2)	A2	4.822277	3.349546	1.439681	0.160
LOG(P1)-LOG(P3)	B1	1.686215	0.742627	2.270607	0.031
LOG(P2)-LOG(P3)	B2	-0.19191	0.507741	-0.37797	0.708
LOG(P3)	A11	1.042175	0.12968	8.036498	0.000
0.5*(LOG(Y1))^2	A22	-1.82657	0.953369	-1.91591	0.065
0.5*(LOG(Y2))^2	A12	-2.52004	1.452333	-1.73517	0.093
(LOG(Y1))*(LOG(Y2))	B11	2.158005	1.20096	1.7969	0.082
0.5*((LOG(P1))-(LOG(P3)))^2	B12	0.135912	0.105381	1.289722	0.207
(LOG(P2)-LOG(P3))*LOG(Y1)	B22	-0.362091	0.174434	-2.07581	0.047
(LOG(P1)-LOG(P3))*LOG(Y1)	G11	0.232366	0.41824	0.555581	0.583
(LOG(P1)-LOG(P3))*LOG(Y2)	G12	-0.385625	0.448343	-0.86011	0.397
(LOG(P2)-LOG(P3))*LOG(Y2)	G21	0.372306	0.202798	1.835845	0.076
0.5*((LOG(P2))-(LOG(P3)))^2	G22	-0.009956	0.033396	-0.29812	0.768
R-squared		0.984125	Mean dependent var		5.723714
Adjusted R-squared		0.976717	S.D. dependent var		0.761122
F-statistic		132.8417	Durbin-Watson stat		1.669674
Prob(F-statistic)		0			

Source: Data in the appendix (3) and (4) and Eviews program.

Table 2. The estimated coefficient of cost and share function of (TC, P1 and P2).

Equation	Observations	Parameters	RMSE	R-Squared	CHI-SQ	P
Ln TC	45	16	0.09229	0.98	3305.17	0.00
S1	45	5	17.854	0.66	92.63	0.00
S2	45	5	7.11	0.62	71.76	0.00

Source: Data in the appendix (3) and (4) and Review's program.

Table 3. The elasticity of substitution between inputs of Islamic banks in Iraq

Elasticity of substitution	south bank	iraq Finance House	Boubyan Bank	Iraq Bank
Labour and physical capital	0.98	0.99	1.00	0.97
Labour and financial capital	1.01	1.51	1.70	1.63
Physical and financial capital	1.00	1.00	1.02	1.04

Source: Data in the appendix (3) and STATA program.

between variables. Some of the values of (T-statistics) is not significant, suggesting the possibility that the model suffered from Multicollinearity. Some coefficients are significant at a level of 5% as it has taken the expected sign of positive, but there are other coefficients, which take a negative sign due to Multicollinearity. The coefficients that have no statistical significance cannot be excluded from the model, because it may have a poor effect of its own, but the impact may become stronger with other coefficient in the model. The direct statistical reason for that is due to the small size of the sample of banks and the period of the study, which is only five years. The longer the time series data of a phenomena the more pronounced in the statistical analysis. The value of F (F=132) is more significant than the value of (R-squared) indicating that the model totally fits the data. In the Table 2 is the result of the estimation of the cost equation, labour share equation and physical share equation. For the cost equation, the R-squared values of the cost function is (0.98), this means that 98% of the change in the total cost can be explained by the regression, which link the total costs with the output and prices of input. The proportion refers to the strength of the correlation between dependent variable (TC) and independent variables. The value R-squared which is labour and capital are (0.66), (0.62) respectively and represent the values of a good, strong model. The values of the chi - square of the cost function for the labour share function and physical capital share function are (3305.17), (92.63), (71.76), respectively. This indicates high significance, which is a sign of the strength of the model in explaining the variation of the data.

6.1. Estimation of the elasticity of substitution

Elasticity of substitution is a property of production function and represents the degree of a productive element to replace another productive element in DMU. If the elasticity of substitution is positive between two elements, then they are alternatives and can replace each other. If the elasticity of substitution is negative between two production elements, then the two elements are complementary and cannot replace each other. Elasticity of Substitution between two production elements are measured through the application of the equation (2.10) above after calculating S1, S2 and S3, by using the estimated coefficients in the model. Elasticity of substitution was calculated for all observations for each bank, and then the total elasticities were divided by the number of years under study.

From the Table 3, the elasticity of substitution of Labour and physical capital is positive for all Islamic banks and the values are close to each other. The results indicate that the assets of Islamic banks are very large compared to its outputs, thus can dispense with a part of the labour and compensate this with other fixed capital elements to enhance the ability of banks to improve

Table 4. The elasticity of substitution between inputs of conventional banks in Iraq from 2006 to 2010.

Elasticity of substitution	Labour and physical capital	Labour and financial capital	Physical and financial capital
National bank	0.98	1.00	1.03
Gulf bank	0.99	1.02	1.00
south bank	0.98	1.00	1.00
Burgan Bank	1.00	1.07	1.6

Source: Data in the appendix (3) and STATA program.

Table 5. The comparison of elasticity of substitution between Islamic and conventional banks from 2006 to 2010.

Elasticity	Islamic banks	conventional banks
Labour and physical capital	0.9853	0.9875
Labour and financial capital	1.4625	1.0225
Physical and financial capital	1.015	1.1575

Source: Data in the appendix (3) and STATA program.

performance and efficiency, such as equipment, computers, cash machines, software and other. In the second line of the table above, the elasticity of substitution between labour and financial capital is shown, which is positive for all Islamic banks. This means that there is a large degree of convergence in the elasticity of substitution between labour and financial capital for all Islamic banks in Iraq. For conventional banks, Table 4 represents the averages of Elasticity of substitution of conventional banks.

The elasticity of substitution values of conventional banks is positive as they are in Islamic banks. The comparison between Islamic and conventional banks regarding the elasticity of substitution of labour with physical assets shows that the Islamic and conventional banks are similar, but conventional banks are slightly higher than Islamic banks. This means the possibility of substitution of employment in conventional banks, larger than Islamic banks. What prevents Islamic banks from being on the same level of substitution, is that, the Islamic banks in its work in the implementation of contracts need more employment and cannot replaced by electronic machines.

In the comparison between Islamic and conventional banks in elasticity of substitution of labour with financial capital, the Islamic banks are more elastic than the conventional banks. This is due to the dependence of Islamic banks on depositors as an essential source of assets. Therefore, the Islamic banks practice substitution more than conventional banks, Figure 4 and Table 5.

The elasticity of substitution of physical capital and financial capital of conventional banks is

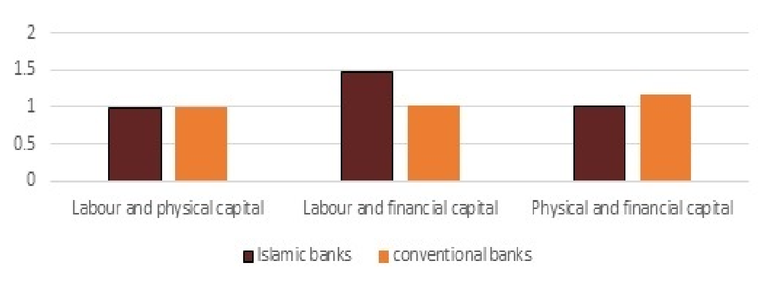

Figure 4: The comparison of Elasticity of substitution between Islamic and conventional banks.
Source: Data in the appendix (3) and STATA program.

Table 6. The price elasticity of conventional banks in Iraq between 2006 and 2010.

	Iraq	Gulf bank	Commercial banks	south bank	Burgan bank
Labour	-0.035	-0.036	-0.052	-0.080	-0.18
Physical capital	-0.017	-0.002	-0.003	-0.003	-0.009
Financial capital	-0.94	-0.95	-0.93	-0.90	-0.79

Source: Data in the appendix (3) and STATA program.

Table 6. The comparison of price elasticity of conventional and Islamic banks in Iraq.

	Labour	physical capital	financial capital
Islamic banks	-0.2075	-0.04975	-0.7225
conventional bank	-0.0766	-0.068	-0.902

Source: Data in the appendix (3) and STATA program.

higher than the Islamic banks due to flexibility and long history of conventional banks. The Conventional banks more skilled in the conduct of financial capital and turn it into the physical capital. There is a significant ability to expand when they have cash in terms of opening new branches, or new markets, Islamic banks suffer of intensity of cash capital from depositors and lacks the ability to convert it into physical capital. **From the analysis above, we reject the hypothesis that say Islamic banks has better elasticity of substitution between all inputs than conventional banks**.

6.2. Price elasticity of demand

Price elasticity of demand measures the response of quantity demand of each of the production elements (input) to the relative change in the prices of those elements. The price elasticity of demand in our study calculated by applying the equation no (2.11). It can obtain from the cost function directly and through its relationship with the elasticity of substitution by the equation. The value of price Elasticity refers to the importance of the inputs, if the value is small means that the demand for it does not effected by its price in the market, and if the value of price elasticity is high, that means the demand of the inputs will effected and decreased.

Through the table below, the price elasticity of demand of Islamic banks. All Islamic banks, the demand for inputs is inelastic, and all Islamic banks in Iraq in the period between 2006 and 2010 have price elasticity less than one. Meaning that there is a considerable importance for the three inputs for banking operations. The value of the price elasticity varied among Islamic banks in Iraq between the highest value in the (south) bank is (-0.93) and lowest in Iraq international bank of (-0.009). This disparity In the Table 6, the value of the price, elasticity of demand for conventional banks is all values under one. The highest value is for the Iraq bank with financial capital (0.94), and smallest value is for a Burgan bank with the elasticity of physical capital (0.009).

The comparison between Islamic and conventional banks shows that the average of price elasticity of labour in Islamic bank is smaller than conventional banks. This means the demand for labour is not elastic, and lack of skilled labour in Islamic banks endure costlier especially. The average of Islamic and conventional banks is similar with respect of price elasticity of physical capital.
From the obtained analysis, we reject the hypotheses that say the Islamic banks control their costs through their input prices better than conventional banks and accept the alternative that there is no large difference between Islamic banks and conventional bank in cost control.

Therefor we accept the hypotheses that the Islamic banks in Iraq have economies of scale, which allow them to diversify their activities more than conventional banks.

7. Conclusion

The comparison between Islamic and conventional banks in Iraq shows that there is a distinctive pattern that Iraqi banks, followed in the levels of efficiency during the financial crises of 2008. Conventional banks had the superiority in efficiency over the Islamic banks before the financial crises and more economically efficient than Islamic banks. After the financial crises of 2008, the Islamic banks began to take the initiative in banking and controlling costs. The change in the level of efficiency during the financial crises may due to the powerful tools of risk-sharing principle that attract depositors and shareholders to supply the Islamic bank with enormous liquidity, which helped to stabilize the operating banking system in Islamic banks, which in turn improved the efficiency of Islamic banks.

The average of price elasticity of labour in Islamic bank is less than conventional banks. This indicates that the demand for labour is not elastic and lack skilled labour in Islamic banks' endures is costlier especially the Islamic bank in need for religious committees interprets the financial transaction in term of Islamic law. The price of elasticity of demand for financial capital in the conventional bank is higher than the Islamic banks, which mean that the price of financial assets is inelastic for conventional banks. The averages of Islamic and conventional banks are similar with respect to price elasticity of physical capital.

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