Financial Performance of Islamic Banks and Economic Growth: An Empirical Evidence

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Summary: The aim of this study is to investigate the relationship between the financial performance of Islamic banks and economic growth in all of Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia in a frame of endogenous growth model. Unlike the previous studies, CAMELS system parameters are used as variables for the performance of Islamic banks to examine the exact relationship with economic growth, while gross domestic product (GDP) is used as a proxy of economic growth. The sample consists of all Islamic banks working in the five countries. The study period range is from the first quarter of 2014 until the last quarter of 2018. Dynamic Panel System GMM is used to estimate and examine the impact of Islamic finance performance on economic growth. The results show that the only significant exogenous factor of Islamic banking performance which affects economic growth is the profitability through the return on equity (ROE). The empirical results suggest that Islamic banks should stimulate other performance factors to achieve a significant contribution on economic growth.

Keywords: Islamic Banking Performance; Economic Growth; CAMELS Model, Endogenous Growth; Panel System GMM.

JEL Classification Codes: G21; G32; O47; C23.

I.   Introduction :

Islamic finance is one of the fastest growing sectors in the last decade, which was estimated to be worth US$2.4 trillion in 2017 and forecast to grow by 6 % CAGR to reach US$3.8 trillion by 2023 (Islamic finance development ICD-THOMSON REUTERS report, 2018). This positive high growth rate of Islamic finance assets year after year attracts the attention of all policy makers, bankers and financial scholars to look into Islamic finance industry. Lately, in the last decade, one of the main debates among financial scholars and policy makers besides the relation between the Islamic finance and economic growth is whether the Islamic finance performance contributes to economic growth. According to (Bourke, 1989), banks with high profitability stay well capitalized and its access to funds is easy. Certainly, the well- functioning institutions play a major role in economic growth and financial performance (Rabaa & Younes, 2016). Moreover, the banking sector performance and profitability fuel the growth of economies and support them to absorb the negative shocks (Athanasoglou, Brissimis, & Delis, 2008; Tabash & Dhankar, 2014), also (Bikker & Hu, 2002; Demirgüç-Kunt & Huizinga, 1999) have reported a positive relationship between economic growth (GDP) and the performance of banks. Furthermore, according to Tabash & Anagreh, (2017), Islamic banks have effected significantly the growth of gross domestic product and investments of the Middle East countries.

Currently, the Islamic banking sector covers 71% of total Islamic finance assets with a share of 1.721 trillion US$ (Islamic finance development ICD-THOMSON REUTERS report, 2018) and

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could prove its stability in and after global financial crisis 2008 (Olson & Zoubi, 2017; Tabash & Dhankar, 2014).

According to the Islamic finance development report (2018), the most developed Islamic finance markets are in the southeast of Asia in all of Malaysia, Indonesia and Brunei, where Malaysia in the lead with the best performance of Islamic finance compared to 131 countries and with an IFD indicator score equal to 137. Moreover, the most improved performances in southeast Asia were by Brunei and Indonesia, Brunei was the biggest gainer in southeast Asia and took the 9th place with an IFD indicator score of 50 equals to Indonesia which took the 10th place. Moreover, the latest report of the global Islamic economy state mentioned that Saudi Arabia came in the fourth place as one of the best countries concerning Islamic finance performance with a GIE indicator score of 54, while, Turkey came in the top 15th countries with a GIE indicator score of 31 (State of the Islamic economy report, 2018/19). Moreover, this huge performance of Islamic finance industry in all of Malaysia, Indonesia, Brunei,Turkey and Saudi Arabia has synchronized a high level of economic growth. (Malaysia's economy expanded 4.9 percent year-on-year in the second quarter of 2019, following a 4.5 percent growth in the previous three-month period and beating market prospects of 4.8 percent (report of the Trading Economics, 2019), while Indonesia's economy is predictable to grow at 5.1 percent in 2019 and then rise to 5.2 percent in 2020 (report of the world bank report July 1,2019). Moreover, Gross Domestic Product of Brunei grew 0.1% in 2018 compared to 2017 (report of the Country Economy, 2018), whereas gross domestic product in Turkey lengthened 1.20 percent in the second quarter of 2019 over the previous quarter, GDP Growth Rate in Turkey averaged 1.09 percent from 1998 until 2019 (report of the Trading Economics, 2019), while Saudi Arabia's gross domestic product prolonged 1.66% year-on-year in the first quarter of 2019, easing from a 3.59% advance in the previous period (report of the Trading Economics, 2019).

Due to the limited studies that investigate the link between Islamic finance performance and economic growth and the lack of understanding this link (Tabash, 2019), it had led us to investigate this issue of understanding this through a powerful evidence from Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia as the most pioneer countries in the Islamic finance industry. So, the study gives an answer to this research question:
"What is the relationship between the financial performance of Islamic banking sector and economic growth ".

II.   Literature review:

II.1. banking performance and Economic growth background:
Endogenous Growth Theory (new growth theory) was developed in the 1980"s by Romer, Lucas and Rebelo, the endogenous growth model is one in which the long-run growth rate is determined by variables within the model, not an exogenous rate of technological progress as in a neo-classical growth model (Romer, 2011). Jhingan (2011) explained that the endogenous growth model emphasizes technical progress resulting from the rate of investment, the size of the capital stock of human capital, and both Tabash & Anagreh (2017) have confirmed that Islamic banking sector have effected significantly the growth of gross domestic product and investments of the Middle East countries. Thus, according to the endogenous growth model, when investments increase due to the banking performance that leads to higher economic growth (Petkovski & Kjosevski, 2014). Moreover, Bourke (1989) has confirmed that banks with high profitability stay well capitalized and its access to funds is easy. As a result, the increasing in capital stock in banking sector due to the banking profitability leads to economic growth according to the endogenous growth theory. In conclusion, the economic growth is determined by banking sector performance because of its significant impact on increasing investments and capital stock.

II.2. CAMELS system background:
CAMELS is an acronym for six components capital adequacy (C), asset quality (A), Management efficiency (M), Earnings (E), Liquidity (L) and Sensitivity to market risk (S) to measure the banking performance (Wanke et Al., 2016) as it shown in table 1, CAMELS is an

extended approach to CAMEL system which has been used in the USA since 1979 in order to assess the soundness of banks (Christopoulos et al., 2011; Roman & Şargu, 2013). Later, CAMEL has been extended and used as a tool to assess soundness and performance of banks for the supervisory authorities in different countries (Roman & Şargu, 2013). The financial weakness and soundness was measured by the International Monetary Fund (IMF) using five major handful parameters of Financial System Soundness with acronym CAMEL (Capital adequacy, Asset quality, Management quality, Earnings ability and Liquidity) (Roman & Şargu, 2013a). Nevertheless, it has been extended to include the sixth parameter "S" that captures the sensitivity of the bank to the changes in the market (Roman & Şargu, 2013a). This "S" measure the sensitivity to marker risk like interest rate, foreign exchange and inflation risk which in overall capture the system risk (Gasbarro et al., 2002; Karim, Alhabshi, Kassim, & Haron, 2018). Currently, CAMELS becomes an evaluation tool for the bank performance (Roman & Şargu, 2013). According to the report of (IMF, 2000), the IMF and the World Bank recommended the usage of CAMELS as a useful indicators for the health of financial system.

II.3. Previous empirical studies:

Pure studies on the financial performance and economic growth nexus are limited, most of them have agreed on that there is a link between banking sector performance and economic growth of any country, but all of them was focused only on the conventional banking sectors. Therefore, this study is one of the limited studies that investigates the link between Islamic banking sector performance and economic growth and it's the first of its kind that linked the Islamic banking performance in a structure of CAMELS model with economic growth in a frame of endogenous growth. Thus, it is believed that this study will make a significant contribution to the literature.

We organized empirical studies that relevant to the objective of the study with respect to Islamic banking performance and its relation with economic growth into four categories. The first category contains the pure studies of financial performance and economic growth. Secondly, we presented the studies of banking performance and profitability determinants. Thirdly, we showed the pure studies that apply CAMELS model to measure the banking performance. Fourthly, we showed some notable studies of finance and economic growth relationship.

In a study, Rabaa & Younes (2016) have examined the Effect of Islamic Banks performance on the Economic growth in terms of liberalization financial by tacking a simple of Islamic banks in all of Abu-Dhabi, Saudi Arabia, Bahrain, Great Britain and Tunisia covering the period of (2001-2012), they used a panel fixed effect and GLS regression with variables of Gross Domestic Product (GDP), Return on Assets (ROA), Return on Equity (ROE), ratio of the division of the income, ratio of the performance of Zakat, ratio of Islamic returns vs not Islamic returns, IPI, CPI, Money Market Rate. They concluded that Islamic bank performance effects are positive and significant on economic growth during the period 2001-2012 in term of financial liberalization.

Similar conclusion was also arrived by Tabash (2019), who found that there is a positive relationship between the performance of Islamic banks and economic growth in the UAE, he used pooled ordinary least square with variables of GDP, Return on Assets (ROA), Return on Equity (ROE) and Net Revenue Margin (NRM) on a sample of all full-fledged Islamic banks working in United Arab Emirates covering the period of (2000-2014).

In the same vein, Alkhazaleh (2017) showed in his study the link between the performance of commercial banks in Jordan and economic growth. He used ROA, deposits and credit facilities as independent variables and GDP as dependent variables. He used pooled regression analysis to test the relationships between variables. He concluded that the performance of commercial banks on Jordan contribute to growth of the economy.

In other empirical study determining how profitability in the banking industry affect economic growth in Nigeria, Adekola (2016) showed that there is a direct relationship existed between banks profitability and economic growth in the context of Nigeria. He used a pooled regression method for all banks working in Nigeria under the period 2005–2014 for the variables Gross Domestic Product (GDP), Return on Equity (ROE), and Return on Capital Employed

(ROCE). He recommended that the central Bank on Nigeria (CBN) and the government should work to grow wiser measures for banks regulations and transparency.

In a similar study, Yazdani (2011) studied the impact of the performance of private banks on the growth of the economy in case of Iran. he adopted GDP, ROA, cash, and investments as study variables. he used secondary data for the analyses. his results concluded that bank performance had a positive impact on the economic growth of Iran.

Concerning studies of Islamic banking performance determinants measured by the profitability, Khan et al. (2014) have investigated factors that affect the profitability of Islamic banking industry in Pakistan. They used a sample of Five Islamic banks of Pakistan for a period ranging from 2007–2014. They utilized Bank size, gearing ratio, non-performing loans (NPL) ratio, operational efficiency, asset composition, asset management, capital adequacy ratio, deposit ratio, (GDP), and (CPI) as independent variables and Return on Assets (ROA), Return on Equity (ROE), Earnings per Share (EPS) as dependent variable. Their findings indicated that measures of Islamic banking profitability are significantly affected by bank-specific factors such as gearing ratio, asset management, deposit ratio, and NPL ratio and external factor such as CPI. Further, Djalilov & Piesse (2016) have investigated the determinants of bank profitability in the early transition countries of Central and Eastern Europe, they applied system GMM , Random effects regression on a sample of 275 banks from 16 transition economies, eight are from the former Soviet Union, other countries are from the CEE and the Baltic States covering the period of 2000-2013, they adopted Capital, Credit risk, Cost, bank Size, bank market share, GDP growth, inflation, government spending, fiscal freedom, monetary freedom as independent variables and Return on Assets (ROA) as dependent variable, they found that the impact of credit risk on bank profitability is positive in early transition countries, government spending and better capitalized banks are more profitable in early transition countries. In other special case of Indonesia, Setyawati et al. (2017), they analyzed the internal and external factors affecting the performance of Islamic banking, they applied panel multiple regression on a sample of all the Islamic banks in Indonesia for a period ranging from 2004-2012, they adopted internal determinants (non-performing finance (NPF), capital strength (CS), external determinants (GDP, Inflation, dummy variable of the financial crisis) as independent variables and Return on Assets (ROA) as dependent variable. Their results show that the performance of Islamic banks is significantly affected by non-performing finance and inflation, and it has been quite better after crisis.

Moreover, Alharbi (2017) investigated the determinants of Islamic banks profitability using a simple of 110 Islamic banks in 25 countries that were members of the organization of Islamic Cooperation (OIC) covering the period of 1992-2008 by applying panel fixed-effects regression, he used as independent variables Islamic banks profitability (return on assets average (ROAA) and net profit revenue average over earning assets (NIM))) as dependent variable Internal Variables (capital ratio, operating income (OOI), External Variables (GDP, GDP per capita oil) and Regulation Variables (bank taxation, financial structure (Market capitalization to GDP) as independent variables, he indicated that equity, other operating income, GDP per capita, bank size, concentration, and oil prices affected Islamic banks positively. Another study of Zarrouk et al (2016), they examined whether Islamic bank profitability is driven by same forces as those driving conventional banking in the Middle East and North Africa (MENA) region, they used panel system GMM on a simple of 51 Islamic banks in all of Qatar, Turkey, UAE, Egypt, Kuwait, Yemen, Sudan, Bahrain, Saudi Arabia and Jordan, covering the period of 1994-2012, they adopted Bank - specific determinants (liquidity, Risk and solvency, efficiency ratios, asset quality, capital, operations, annual stock data), Macroeconomic determinants (GDP, CPI, investment% of GDP, dummy variable of inflation) as independent variables and Profitability ratios (Return on assets (ROA), Return on equity (ROE), Net profit margin (NPM)) as dependent variables, they concluded that profitability is positively affected by both banks' cost-effectiveness, asset quality and level of capitalization. Other similar study of Olson & Zoubi (2017), they examined whether the Global Financial Crisis (GFC) has led to a convergence in performance between Islamic and commercial banks in the MENASA region (22 countries) Covering the period of 1996-2014, they applied dynamic panel model using Performance ratio (Return on assets (ROA) as dependent variable and bank specific accounting ratios (ROE, ROD, NIM, NNIM), financial variables as independent

variables, they specified that Islamic banks (IBs) initially weathered the outbreak of the GFC better than commercial banks (CBs) in 2007-2008.

Regarding studies that have used CAMELS model to measure and analyze the banking performance, most of them have found that the CAMELS is a quite useful in terms of judging the financial performance, (Rashid & Jabeen, 2016) examined the determinants of Islamic and conventional banks in Pakistan, they created the financial performance index (FPI) based on CAMELS's ratios and then run the calculated index on the CAMELS' s determinants. They used the GLS regression on an unbalanced annual panel data covering the period 2006-2012. They found that operating efficiency, reserves, and overheads were significant determinants of conventional banks performance, while, operating efficiency, deposits, and market concentration were significant in explaining performance of Islamic banks. Another study of Rodica-Oana (2014), she used CAMELS approach to observe the evolution of the banking system in Romania for the period of pre-crisis before 2007 and post-crisis after 2007, she concluded that there are cross sectional effects between banking indicators which contributed a cautionary signal concerning the evolution of the banking system. Other similar study of (Karim et al., 2018), they used all of CAMELS model and Z-score to measure the stability of 50 banks in Malaysia for a period from 1999 to 2015, they found that both local Islamic and conventional banks were classified satisfactory in general average of bank stability.

Another study of (Masood et al. , 2016); they applied CAMELS rating model to analyze the performance of Islamic banks operating in Pakistan for the year of 2015, they found that two of the Islamic banks were showing satisfactory position, while rest of the other banks were in fair position. Other equivalent study, (Rostami, 2015), he applied CAMELS model to evaluate an Iranian bank performance for the period of 2009-2014, he found that CAMELS is an efficient tool to assess the bank performance. In the same frame, Rozzani & Rahman, (2013) examined the performance of both the Islamic and conventional banks in Malaysia for the period of 2008-2011, their results showed that the levels of performance for both conventional and Islamic banks were extremely parallel.

Concerning studies of finance and economic growth nexus, Petkovski & Kjosevski (2014) examined if the banking sector influences economic growth in 16 transition economies from Central and South Eastern Europe over the period 1991-2011, they applied GMM dynamic panel method and adopted endogenous growth model for estimation the link between banking sector development and economic growth, they used credit to the private sector, interest rates, and ratio of quasi money as an independent variables which are measurements of the development and GDP growth as a dependent variable, they concluded that credit to the private sector and interest margin are negatively connected to the economic growth, while ratio of quasi money is positively connected to economic growth. Other Similar study, Kassim (2016) investigated the impact of Islamic finance on performances of major macroeconomic indicators on a sample of all Islamic banks in Malaysia covering a quarterly period from 1998 to 2013 by applying ARDL approach, She adopted industrial production index as a proxy for economic growth as dependent variable and total deposit of the Islamic banks, total financing by Islamic banks, Gross fixed capital formation, general government expenditure and inflation as independent variables, She exposed that Islamic banking system contributes to the real economy by financing investment projects. In other special case of Turkey, Yüksel & Canöz (2017) have showed that Islamic banks loans do not caused the development of economy and industry in Turkey, they used industrial production index and GDP growth rate as target variables and the growth rate of total loans amount of Islamic banks, they applied VAR causality on a sample of all banks in Turkey for the quarterly period ranged from 2005 to 2015. Unlike this results, Boukhatem & Moussa (2018) indicated a strong empirical evidence that Islamic financial system development stimulated economic growth in the 13 selected MENA region, they applied Panel Cointegration and FMOLS regression on a sample of Islamic banks in the MENA region for a period ranged from 2000-2014, they used GDP per capita growth as dependent variable and Loans by Islamic banks/GDP, Education, Inflation, Government consumption/GDP, Trade openness, Domestic credits to private sector/GDP, Rule of law and Regulatory quality as independent variables.

In our study, we will adopt the most suitable empirical model and the most popular variables for both determinants of Islamic finance performance and economic growth according to the literature. Moreover, and unlike the previous studies, we linked the Islamic banking performance in a structure of CAMELS model with the economic growth in a frame of endogenous growth, therefore, this is the only study that examines the relation of Islamic banking performance and economic growth with this way. Thus, the results will be more efficient and accurate than other studies.

III. Research methodology :

III.1. Sample and data collection:

We will use a balanced panel covering a total of three countries over a period of four years (2014Q1 to 2018Q4). The data of Islamic finance was drawn from quarterly datasets of the Islamic Financial Services Board (IFSB) database. Other data will be collected from the IMF database, the Indonesian central bank and Brunei's ministry of finance and economy. Since all countries (Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia) have different currencies, all the quarter financial values are converted in US dollar using appropriate average exchange rates according to the IMF database for each quarter.

III.2. Variables:

III.2.1. Variables of the Islamic banking financial performance based on CAMELS model:

Table 2, shows all the variables of the Islamic banking financial performance based on the CAMELS model.

Concerning earning ability in CAMEL model, we have focused on this parameter by using three major indicators since most studies have focused on the profitability (earnings) by using three earning indicators (ROA, ROE, NPM) as proxies for the banking performance, return on assets (ROA) and return on equity (ROE) based on the literature (Tabash,2019; Rabaa & Younes, 2016; Khan et al., 2014; Yazdani, 2011; Zarrouk et al., 2016; Olson & Zoubi, 2017; Adekola, 2016; Djalilov & Piesse, 2016; Setyawati et al., 2017; Alharbi, 2017), in which higher ratios of ROA and ROE indicate better performance (Zarrouk et al., 2016), and the third indicator is net profit margin (or net revenue margin) NPM which is similar to net interest margin (Zarrouk et al.,2016) according to the studies of (Tabash,2019; Yazdani, 2011; Alharbi, 2017; Zarrouk et al., 2016; Olson & Zoubi, 2017), in which NPM examines the success of bank's investment decisions as contrasted to its debt situations and reflects how efficiently the bank's funds are being intermediated (Zarrouk et al., 2016). Thereby, higher ratio of NPM also indicates better performance. Whereas, the rest parameters of CAMELS model were adopted by only a single individual indicator according to the previous studies as it shown in table 2.

III.2.2. The economic growth variable (indicator):

all of studies in this research have agreed on choosing GDP as proxy for the Economic Growth , only the literature of (Kassim, 2016) who considered industrial production index as a proxy for economic growth and the literature of (Yazdani, 2011) who considered all of Trust among banks, people and the government, relationship of markets and financial institutes, Globalization of financial activities, Independence of Central Bank as an endogenous factors of economic growth. Thus, following most studies, we will take both the gross domestic product (GDP) as a proxy independent indicator of economic growth.

III.2.3. Macroeconomics variables (factors):

In order to avoid the problem of biasness due to omitted variables, other variables are included in the model to control the possible effects of other growth determining factors which will be adopted based on the previous studies: consumer price index (CPI) as a proxy of inflation (Rabaa & Younes, 2016; Djalilov & Piesse, 2016; Setyawatiet al., 2017; (Zarrouk et al., 2016; Kassim, 2016), trade openness (Boukhatem & Moussa, 2018), Gross Fixed Capital Formation (GFCF) (Kassim, 2016).

Thus, the variables for the estimation model are:

Dependent variable: GDP
Independent Variables: ROA, ROE, NPM, CAR, LIQ, MAN, SEN
Control variables*:* Trade, GFCF, CPI

III.3. Estimating model:

According to the literature review, most studies have agreed to adopt panel regression models such as Panel GMM, Panel regression (Fixed-effects), thus, we will apply the panel GMM estimation.

A basic problem in empirical analysis of economic growth is which control variables to include in the model. This is the result of what Brock & Durlauf, (2001) have named an open-ended theory or causal relationship between one variable and economic growth, this theory indicates that is impossible to rule out the connection between another variable and economic growth, and that's what Durlauf & Quah, (1999) confirmed before, they proposed over 90 variables for potential variables of economic growth. However, the primary goal in this article is not to contribute to all theories of economic growth, but to analyze whether and how Islamic banking performance affects economic growth in a frame of endogenous growth. For this purpose, we specify the minimal model for economic growth. Therefore, following the previous studies that are related to the subject, we have adopted the possible macroeconomics factors as control variables in order to avoid the problem of biasness. Thus, the general model to be estimated in a frame of endogenous growth model is:

$$Y_{it} = \alpha_0 + \alpha_i P_{it} + \beta_i X_{it} + \xi_{it} \qquad \forall \qquad \xi_{it} = v_i + \mu_{it} \qquad (1)$$

Where:

Y_{it} is the measure of Economic growth for country i at time t. P_{it} are Islamic banking performance variables for country i at time t. X_{it} are macroeconomics variables for country I at time t. α_0 is a constant term, α_i and β_i are coefficients. ξ_{it} is an error term, with v_i is the unobserved Islamic banking performance effect and μ_{it} the idiosyncratic error.
Islamic banking performance shows a tendency to persevere over time, due to obstacles to asset quality, market structure failures and/or macroeconomics shocks on GDP (Athanasoglou et al., 2008). Therefore, we adopt a dynamic specification of the model by including a lagged dependent variable among the regressors (Arellano, 2003; Croissant & Millo, 2019). The regression of equation (1) augmented with lagged GDP is:

$$Y_{it} = \alpha_0 + \partial Y_{i,t-1} + \alpha_i P_{it} + \beta_i X_{it} + \xi_{it} \qquad (2)$$

Where $Y_{i,t-1}$ is the one-quarter lagged GDP and ∂ measures the speed of adjustment to equilibrium.

III.4. Econometric methodology:

The estimation problem raised by the potential existence of unobserved individual effects, the endogeneity and the correlation between regressors and lagged variable, make fixed or random effects not appropriate for the estimation. These methods produce biased and inconsistent estimates (Baltagi & Kao, 2001). Arellano & Bond (1991) estimated the specific model in first difference, which can remove the unobserved individual effect. The estimation uses all available lagged values of the dependent variable and lagged values of the exogenous regressors as instrument. However, the endogeneity of the explanatory variables might still be existing.

Blundell & Bond (1998) confirmed that, when the dependent variable and the explanatory variables are persistent over time, lagged levels of these variables are weak tools for the regression equation in differences. Later, they improved a new method which is called the GMM system estimator and included lagged levels and lagged differences as instruments. Roodman (2009) and Bond (2002) specified that GMM

as system estimation can solve the problems correlated to endogeneity, unobserved heterogeneity, autocorrelation and omitted variable bias. Therefore, in our paper, the system GMM estimator is used to conduct the empirical analysis.

We want to fit the model:

$$Y = \mathbf{x}'\beta + \varepsilon \qquad \qquad \forall \qquad \qquad E(\varepsilon|\mathbf{z}) = \mathbf{0} \tag{3}$$

Where β is a support vector of coefficients, y and $\boldsymbol{\varepsilon}$ are random variables, $\mathbf{x} = (\mathbf{x}_1,....,\mathbf{x}_k)'$ is a column vector of k regressors, $\mathbf{z} = (\mathbf{z}_1,....,\mathbf{z}_j)'$ is column vector of j instruments, x and z can share elements, and $\mathbf{j} \geq \mathbf{k}$. We use $\mathbf{X, Y,}$ and $\mathbf{Z}$ to signify matrices of N observations for x, $\mathbf{y}$, and z, and we state $\mathbf{E = Y - X\beta}$. Given an estimation, $\hat{\beta}$, the experimental residuals are $\hat{E} = (\hat{e}_1,...., \hat{e}_N)' = \mathbf{Y} - \mathbf{X}\hat{\beta}$. We make no statement at this point about $\mathbf{E}(\mathbf{EE}'|\mathbf{Z}) = \Omega$ excepting that it exists. Roodman (2009)

In the GMM, one defines that magnitude through a generalized metric, based on a positive semidefinite quadratic form. Let A be the matrix for such a quadratic form. Then the metric is

$$\|E_N(\mathbf{z}\varepsilon)\|A = \left\|\frac{1}{N}z'\hat{E}\right\| \equiv N\left(\frac{1}{N}z'\hat{E}\right)' A\left(\frac{1}{N}z'\hat{E}\right) = \frac{1}{N}\hat{E}'z_A z'\hat{E} \tag{4}$$

To derive the implied GMM estimate, call it $\hat{\beta}_A$, we solve the minimization problem $\hat{\beta}_A = argmin_{\hat{\beta}}\|z'\hat{E}\|A$ whose solution is determined by $\mathbf{0} = d/(d\hat{\beta})\|z'\hat{E}\|A$. Expanding this derivative with the chain rule gives

$$\mathbf{0} = \frac{d}{d\hat{\beta}}\|Z'\hat{E}\|A = \frac{d}{d\hat{E}}\|Z'\hat{E}\|A\frac{d\hat{E}}{d\hat{\beta}} = \frac{d}{d\hat{E}}\left\{\frac{1}{N}\hat{E}'(ZAZ')\right\}\frac{d(Y-X\hat{\beta})}{d\hat{\beta}} = \frac{2}{N}\hat{E}'ZAZ^1(-X) \tag{5}$$

The last step uses the matrix identities $d\frac{Ab}{db} = A$ and $d\frac{(b'Ab)}{db} = 2b'A$ where $\mathbf{b}$ is a column

vector, and $\mathbf{A}$ is a symmetric matrix. Dropping the factor of -2/N and transposing,

$$\mathbf{0} = \hat{E}ZAZ'X = \left(Y - X\hat{\beta}_A\right)' ZAZ'X = Y'ZAZ'X - \hat{\beta}'X'ZAZ'X$$
$$\Rightarrow X'ZAZ'X\hat{\beta}_A = X'ZAZ'Y$$
$$\Rightarrow \hat{\beta}_A = (X'ZAZ'X)^{-1}X'ZAZ'Y \tag{6}$$

This is the GMM estimator defined by $\mathbf{A}$. It is linear in $\mathbf{Y}$, whereas $\mathbf{A}$ weights moments Roodman (2009).

IV. <u>Results and discussion:</u>

Table 3, shows that the effect of return on assets (p value of ROA: $0.048 \approx 0.05$) on economic growth is statistically very closer to the p value 0.05 , so we can't make a decision whether be ROA is strongly significant to the economic growth in a significance level of 5%, but in a significance level of 10%, we can consider return on assets as significant to the economic growth.

Concerning effect of return on equity on economic growth (GDP) is statistically significant and positive (p value of ROE: 0.029 is strongly fewer than 0.05) consistently with what Bourke (1989) had confirmed, that banks with high profitability stay well capitalized, and the increasing in capital stock due to the banking profitability leads to economic growth according to the endogenous growth theory (Romer, 2011) , also tabash (2019) found the same significant positive relationship between ROE and GDP .

For the effects of other CAMELS financial ratios, (Net profit margin (NPM), Capital Adequacy Ratio (CAR), Asset Quality (AQ), Management (MAN), Liquidity assets ratio (LIQ), Sensitivity to market risks (SEN)) are not statistically significant on economic growth (GDP).

For other macro-economic variables, only the CPI is significant and negative to economic growth as expected (p value of CPI: 0.044 is fewer than 0.05), while trade and gross fixed capital formation are not significant. also, the coefficient of lagged GDP and constant were not significant.

Concerning the one-step system GMM diagnostics, Table 4 reports the empirical results of the estimation of dynamic panel system GMM method. The instruments in this case are chosen from the lagged endogenous and explanatory variables, CAMELS financial ratios are chosen as Independent variables, GDP is chosen as the dependent variable and other macro-economic factors are selected as control variables.

In order to test the validity of the selected instruments, we perform the Sargan test of over-identifying restrictions proposed by Arellano and Bond (1991), According to Sargan test of over-identifying restrictions, the p-value is insignificant (Prob > chi2 = 0.849), so all the instruments as a group are exogenous and the overall validity of instruments is significant, table.4.

According to Arellano- Bond test outputs, the error term of the differenced equation is not serially correlated at both of the first order AR (1) (Pr > Z = 0.099) and second order AR (2) (Pr > Z = 0.379), table.4.

V.   Conclusion:
while most studies had mentioned that the performance of Islamic banks is measured by the profitability (Alkhazaleh, 2017; Djalilov & Piesse, 2016; Olson & Zoubi, 2017; Rabaa & Younes, 2016; Setyawati et al., 2017; Tabash, 2019; Yazdani, 2011), our study is measuring the Islamic banking performance by the CAMELS model to find the exact relationship between the Islamic banking performance and economic growth. By applying dynamic panel one-step system GMM method, we found that only return on equities (ROE) is statistically significant and positive on the economic growth (gross domestic product (GDP)), thus, we concluded that Islamic banking performance through the profitability had a significant positive effect on economic growth, but through capital adequacy, assets quality, management, liquidity, sensitivity to market risk, we found that Islamic banking performance is not significant to economic growth, therefore, those ratios still incomplete to make a positive contribution on economic growth in all of Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia, thus, the Islamic banks should stimulate those performance factors to accomplish a significant influence to economic growth.

Focusing only on the relationship between the Islamic banking performance and economic growth, we controlled the empirical model with other macro-economic variables to omit the possible biasness, and as expected, we found that the coefficient of consumer price index (CPI) which is the proxy variable of inflation is statistically significant and negative to economic growth.

According to our study in which the Islamic banking performance is framed in the CAMELS model, the real exogenous factor of Islamic banking performance for the economic growth is the profitability (earnings). Therefore, there is a positive relationship between the Islamic banking profitability and economic growth, if we adopt only the profitability as a measure of the Islamic banking performance, thus, we conclude that there is a positive relationship between the Islamic banking performance and economic growth in general consistently with what Tabash (2019) and Rabaa (2016) had determined, when they adopted only the profitability as a measure for the Islamic banking performance, they found a positive relationship between the Islamic banking performance and economic growth.

As answer to the question if there is a link between the Islamic banking performance and economic growth in all of Malaysia, Indonesia, Brunei, Turkey and Saudi Arabia, and based on the system GMM method, there is no strong link between economic growth and Islamic banking performance since most CAMELS financial performance factors are not significant to the economic growth, Therefore, we reject the significant link between the Islamic banking performance and economic growth in the frame of endogenous growth.

Appendices:

Table 1: parameters of CAMELS model

PARAMETER	DEFINITION
CAPITAL ADEQUACY (C)	Capital Adequacy is a measure of the capital to manage the risk based on the value of the bank assets.
ASSET QUALITY (A)	Asset quality is the instability of the solvency banking caused by the unsettled bank assets impacted by high nonperforming loans.
MANAGEMENT EFFICIENCY (M)	Management is measuring the efficiency level of company to minimize costs and increase profits for prevention the possibility of bank failures
EARNINGS (E)	Earning is a measurement of profitability and There is an assessment of the earnings along with their level relation to peers. One objective is to evaluate the impact on the bank's capital of internally produced funds.
LIQUIDITY (L)	Liquidity is the banks' ability of to pay short-term obligations.
SENSITIVITY TO MARKET RISK (S)	Sensitivity to market risk is a measure of how sensitive the bank's asset, liability and net worth values are to the changes in market condition like interest rate, foreign exchange and inflation risk.

- Sources adapted from (Altan et al., 2014; Karim et al., 2018; Munir et al., 2017; Peltonen et al., 2015; Sahut & Mili, 2011)

Table 2: CAMELS (sub) criteria commonly used

CAMELS parameters	CALCULATION	literature (source)
Capital adequacy	Capital Adequacy Ratio (CAR) = BASEL Ratio $$CAR\ (\%) = \frac{Total\ regulatory\ capital}{Risk\ weighted\ assets}$$	(Altan et al., 2014a; Karim et al., 2018; Wanke et al., 2016)
Assets quality	Asset Quality (AQ) = Gross nonperforming financing ratio $$AQ\ (\%) = \frac{Gross\ nonperforming\ financing}{Total\ financing}$$	(Alqahtani et al., 2017; Karim et al., 2018; Altan et al., 2014; Lahrech et al., 2014; Sahut & Mili, 2011)
Management	Management (MAN) = Cost to Income $$MAN\ (\%) = \frac{Operating\ costs}{Gross\ income}$$	(Alqahtani et al., 2017; Dincer et al., 2011; Munir et al., 2017; Peltonen et al., 2015)
Earnings	Return on assets (ROA) $$ROA(\%) = \frac{Net\ income}{Total\ assets}$$	(Altan et al., 2014; Alqahtani et al., 2017; Dincer et al., 2011; Karim et al., 2018; Wanke et al., 2016)
	Return on equity (ROE) $$ROE\ (\%) = \frac{Net\ income}{Equity}$$	(Altan et al., 2014; Dincer et al., 2011; Karim et al., 2018; Lahrech et al., 2014; Munir et al., 2017; Peltonen et al., 2015)
	Net profit margin (NPM) $$NPM\ (\%) = \frac{Net\ income}{Gross\ income}$$	(Altan et al., 2014; Karim et al., 2018; Wanke et al., 2016)
Liquidity	Liquidity assets ratio (LIQ) $$LIQ\ (\%) = \frac{Liquid\ assets}{Total\ assets}$$	(Alqahtani et al., 2017; Altan et al., 2014; Dincer et al., 2011; Karim et al., 2018; Lahrech et al., 2014; Peltonen et al., 2015)
Sensitivity to market Risk	Sensitivity to market risks (SEN) = Net foreign exchange (FX) open position to capital $$SEN\ (\%) = \frac{Net\ foreign\ exchange\ (FX)\ open\ position}{Total\ regulatory\ capital}$$	(Dincer et al., 2011; Erol et al., 2014; Gasbarro et al., 2002; Karim et al., 2018; Roman & Șargu, 2013)

- Source adapted from the literatures.

Table 3: Panel system GMM estimation output:

Dynamic panel-data estimation, one-step system GMM				
NUMBER OF OBS = 92			*OBS PER GROUP: MIN = 16*	
NUMBER OF GROUPS = 5			*NUMBER OF INSTRUMENTS = 40*	
F (12, 79) = 145.81			*AVG = 18.40*	
PROB > F = 0.000			*MAX = 19*	
Variables	*Coefficients*	*Standard Error*	*t - stat*	*P> |t|*
Logged GDP	0.3651691	0.2462917	1.48	0.142
ROA	-1.28e+07	6391176	-2.01	0.048
ROE	1344551	606424.5	2.22	0.029
NPM	-200432.1	130696.4	-1.53	0.129
CAR	798193.6	441092.5	1.81	0.074
AQ	-58645.37	806866.3	-0.07	0.942
MAN	-19133.63	81741.79	-0.23	0.816
LIQ	29910.16	84740.73	0.35	0.725
SEN	-73015.72	150586.6	-0.48	0.629
trade	-117574.8	81208.04	-1.45	0.152
GFCF	0.192758	0.3104096	0.62	0.536
CPI	-762.346	372.2433	-2.05	0.044
Constant	185295.1	178750.7	1.04	0.303

- Panel system GMM output using STATA 16

Table 4: Dynamic Panel one-step system GMM diagnostics outputs:

Serial correlation tests			
Arellano – Bond test for AR (1) in first differences		Z = -1.65	Pr > Z = 0.099
Arellano – Bond test for AR (1) in first differences		Z =-0.88	Pr > Z = 0.379
The overall validity of the instruments			
Sargan Test of over-identifying restrictions		Chi2 (27) = 19.55	Prob > chi2 = 0.849
Difference-in-Sargan tests of exogeneity of instrument subsets:			
GMM Instruments for levels	Sargan test excluding group	Chi2 (9) = 6.54	Prob > chi2 = 0.685
	Difference (null H = exogenous)	Chi2 (18) = 13.01	Prob > chi2 = 0.791
IV (trade GFCF CPI)	Sargan test excluding group	Chi2 (24) = 12.83	Prob > chi2 = 0.969
	Difference (null H = exogenous)	Chi2 (3) = 6.72	Prob > chi2 = 0.081

- Dynamic Panel one-step system GMM diagnostics outputs using STATA 16

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