

## The Potential Role of Sukuk in Promoting Economic Growth: Evidence from Malaysia and Bahrein



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**ABSTRACT:** Due to fixed interest and fixed income, bonds are considered excluded in the Islamic financial system. The sukuk were designed as an alternative to these bonds, meeting the needs of all investors seeking instruments that comply with Islamic law (Shari'ah). Islamic bonds are considered to be the cornerstone of the Islamic financial industry, playing an important role in mobilizing funding and interaction resources for various actors and investment projects. In addition, the sukuk market which is considered as the most popular and sophisticated financial market continues to grow, now constituting a very important source of funds and capital for many governments and companies. The recent development and research on Islamic bonds have shown the importance of this instrument as an alternative to conventional bonds. The objective of this paper is to empirically test the impact of sukuk on the economic growth of Malaysia and Bahrain between 2001-2018. The data were obtained using Bloomberg and World Bank Database. Our results show a positive impact of sukuk on economic growth.

**KEYWORDS:** Sukuk, economic growth, financial development, real GDP, inflation.

### I. INTRODUCTION

In view of the integration into the economy of States including Morocco, Islamic finance is experiencing remarkable growth and can be considered as an alternative complement to traditional finance, with the characteristic of the prohibition of several practices such as *riba* (interest), *gharar* and *mayssir*. It offers various financial products including investment certificates, sukuk, considered among the most important products of this financial industry and which have been able to provide funds for different States and companies, worldwide. They are also used as a liquidity management tool and contribute to strengthening economic growth and development. Indeed, sukuk are the cornerstone of the Islamic finance industry, given their potential for mobilizing financial resources, most of which remain outside the conventional finance circuit. Moreover, the sukuk market, as a financial market, well adapted to the real economy and very popular, continues to progress and is now asserting itself as a significant source of funds and capital for governments and companies.

Sukuk are defined by the AAOIFI in its standard 17 as: "Certificates of equal value representing undivided shares in ownership of tangible assets, usufructs and services, or (in the ownership of) the assets of particular projects or special investment activity". (AAOIFI, 2008).

In Morocco, Article 7-1 (supplementing Section II of Chapter II of Title I of Law 33-06, amended and supplemented by Law No. 05-14), defines sukuk certificates as being: securities representing an undivided right of enjoyment of each holder on eligible assets acquired or to be acquired or investments made or to be made by the issuer of these securities"<sup>1</sup>.

Sukuks have gradually become one of the most dynamic investment tools for raising funds and represent a new development in the global capital market. This instrument is considered by many to be one of the most significant mechanisms for obtaining financing in the international financial markets through structures compliant with Islamic law. It reached a total of 188.12 billion USD in 2021 on global market offerings. Today, sukuks are operated by national and multinational corporations, sovereign administrations, and financial institutions, which issue these sukuks as an alternative to syndicated financing. In fact, the sukuk issues made since 2001 until today have marked the current emergence of this market.

<sup>1</sup> The decree No. 1-08-95 of Chaoual 20, 1429 (October 20, 2008) promulgating Law No. 33-06 relating to the securitization of assets (amended by Law No. 119-12 and by Law No. 05 -14), section II – Sukuk certificates, article 7-1, (pp:8).

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Despite the significant role they can play in reviving the economies of different countries, while also attracting capital from foreign investors to reinvest in various projects likely to bring some stabilization to the economic situation of countries, while contributing to the preservation of its prosperity and well-being, the literature on the effect of these sukuk on economic growth in particular, is still scarce. Most of the limited studies available are descriptive and theoretical. Thus, we have chosen in this work, to be particularly interested in the "Sukuk" component, as products of the capital markets of Islamic finance, and to empirically study their impact on the economic growth of Malaysia and Bahrain, using the fixed effects model while testing the robustness of the results using another measurement technique: the ordinary least squares method. Our results show a positive impact of sukuk on economic growth; knowing, moreover, that similar studies on the subject remain limited. Nevertheless, there we can consider that this study and the analysis of the relationship between growth and sukuk will contribute to enriching the existing empirical literature on this subject.

In empirical terms, the central issue analyzed in our research work is linked to the following main question: What is the impact of sukuk on the economic growth of Malaysia and Bahrain?

### II. LITERATURE REVIEW

The sukuk, as an attractive new investment tool, given the significant role it can play in reviving the economies of countries, they have the possibility of mobilizing capital from domestic and foreign investors to finance various projects. likely to bring some stability to the economic situation of these countries, and to contribute to the preservation of its prosperity and the well-being of the communities. However, the literature related to the impact of sukuk on economic growth, in particular, is still limited.

Although the relationship between financial development and growth remains highly debated, in the academic literature, it is now well established that finance is largely beneficial and favourable to economic growth. That being said, most research in this area has focused on the effect of Islamic banks on economic growth (Goaied and Sassi (2010), Abdul Manap et al. (2012), Masoud & Abusabha (2014), Melloul & al (2017) ...etc.); and the majority of these studies find a positive effect of Islamic banking institutions on economic growth. On the other hand, and as we pointed out previously, the literature dealing with the impact of sukuk on growth remains limited and empirical works are still rare, given that the Islamic financial and banking sector is relatively new compared to the conventional financial and banking sector, hence the limited empirical assessment of whether Islamic financing impact economic growth.

However, some research work has been done on the subject, among which we can cite: the study by Furqani and Mulyani (2009), considered to be one of the first empirical studies that analyzed the relationship between Islamic finance and economic growth. These two authors studied the case of Malaysia using quarterly data from 1997 to 2005. The cointegration test and the vector error correction model (VECM) has been used, obtaining the following findings:

- In the short term, only fixed investments lead to the development of Islamic banking institutions;
- In the long run, there is a significant two-way relationship between Islamic banking finance and fixed investment;
- At the same time, they also find that there is evidence supporting the demand-following hypothesis between GDP and Islamic bank, according to which the increase in GDP causes the development of Islamic banks and not the reverse. Which means that it is the GDP that causes the growth of these Islamic banking institutions.

These findings are consistent and compliant with the theoretical hypothesis through which Islamic banking institutions accelerate, strengthen, and consolidate investment which, if productive, will lead to the development of the real economy.

In a different context, Goaied and Sassi (2011) explored the effect of Islamic financing on economic growth, on a panel of data from 16 countries in the Middle East and North Africa (MENA region), using the dynamic panel GMM model over the period 1962-2006. The study found as a result that there is no significant link between the Islamic banking sector and economic growth in the selected markets, and that in some cases the link was even significantly negative precisely in the case of oil-exporting countries. Their study shows that there is a weak association between Islamic banking institutions, in particular, and economic growth and, therefore, do not stimulate growth, but tend to act positively. They demonstrated that the link between financial development and growth is quite heterogeneous in MENA countries where the relationship is negative for oil-exporting MENA countries, and positive, but not significant, in oil-free MENA countries.

In the same context, Abdul Manap et al. (2012), studied the causal link between the development of Islamic banking sector and economic growth for the case of Malaysia from 1998 to 2012 quarterly, using the Toda-Yamamoto and Bootstrap granger noncausality tests. They conclude that there is a two-way relationship between Islamic financial development and economic growth in the sense that it is Islamic financial development that engenders and causes growth and not vice versa. That said, the development of the Islamic financial sector in Malaysia will lead to economic growth.

However, some other studies have shown, that the depth of Islamic banking services has a negative influence on economic growth in the presence of an unfavorable environment. This was one of the findings of the study done by Ayachi et al. (2013), basing their

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analysis on data from a panel of 15 countries between 1990 and 2009. The authors also argue that the impact of the Islamic financial sector on the country's growth indicator is clearly "bright", with the existence of other contributors to growth such as traditional banking institutions. This weak impact may be linked to the relative immaturity of the Islamic financial sector. For his part, Kassim (2016), in order to empirically analyze the effect of Islamic finance on the performance of the main macroeconomic indicators for the case of Malaysia, applied the ARDL model on quarterly data covering the period from 1998 to 2013. He finds that Islamic finance makes an important contribution to the real economy while effectively playing the role of financial intermediation, centralizing and channeling funds to investment activities.

Econometric studies, very limited and as reported above, focus on the relationship between the Islamic financial sector and economic growth; it is, in particular, the in-depth empirical assessment of global Islamic finance examining the link of Islamic banking institutions and economic growth without identifying the relationship between the sukuk market and economic growth, except for a few recent studies. Of course, it should be noted that sukuk are considered one of the most significant sources and means of financing in the Islamic finance industry.

Indeed, the first study on the link between the sukuk market and economic growth is carried out by Echchabi & al. (2016), they conducted an empirical study of financing through the issuance of sukuk, based on a sample of 18 countries (issuer of sukuk certificates) covering the period from 2005 to 2012. These data were analyzed using the non-causality test of Toda and Yamamoto Granger. The results of the study did not identify a significant impact of the sukuk, issued by these countries, on the evolution of the gross national product (economic growth) only when all the countries were combined; otherwise, no impact has been identified for Saudi Arabia and the GCC. A second study on the link between sukuk and economic growth was done by Salem & al. (2016) for the case of Malaysia, based on quarterly data, ranging from 2004 to 2013. They used for their study a neoclassical production function which constitutes the basic theoretical background of the analysis. Two results have been observed: on the one hand, that there is a long-term growth elasticity with respect to the sukuk issuer, estimated within the limit of 0.621; while, on the other hand, this growth is expected to remain within the maximum level of 0.4013 in the long term.

Other empirical work was done in 2017 on the subject of Islamic finance and economic growth, Jobarteh and Ergec (2017) verified the relationship between IF & EG for the case of Turkey between 2005 and 2015 through the VECM econometric method. They found unidirectional, short- and long-term causality that runs from the development of Islamic finance to economic growth. At the same time, Smaoui & Nechi (2017) also studied the link between Islamic finance (represented by the sukuk market) and economic growth using panel data over the period 1995-2015, while applying the GMM econometric model. The results of the study show that the evolution of the Islamic bond market is solidly conducive to economic growth, even after controlling for various measures of financial market development, institutional quality and classical determinants of economic growth, while promoting financial inclusion which will in turn stimulate investment and economic growth.

Zarrouk (2017), further examines the causality between Islamic finance and growth in the UAE based on time series data for the period from 1990 to 2012, he finds that the direction of causality is from financial development to economic growth, where, financial development leads to better progress in real economic activity.

Boukhatem & BenMoussa (2018), empirically examined the impact of Islamic banking funds on economic growth for the case of 13 countries in the MENA region between 2000 and 2014. They concluded that the development and growth of the Islamic financial sector stimulates growth within these countries during the period studied, while finding that this positive impact is hindered by underdeveloped institutional frameworks. The results suggest that governments should consider implementing proactive and supportive economic and institutional policies that focus on Islamic finance.

At the same time, the study by Alkhawaja (2019), was related to the effect of the Islamic bonds market on Turkey's gross domestic product between 2010-2017, through the analysis of reports published by Turk Participation Banks Union (TPBU). The study finds that the issuance of Islamic bonds is not entirely independent of the country's economic situation, as it was severely affected by the decline in the country's gross domestic product in 2015; on the other hand, the government is the main player in the sukuk market in Turkey and the effect of sukuk on the country's gross domestic product has gradually evolved to reach 0.54% in 2017.

Although there is a plethora of research in the field of Islamic finance correlated with its progressive development globally, empirical studies providing the link between Islamic financial development and economic growth remain limited. Most of them deal with the question of the relationship between Islamic banking institutions and economic growth, while studies on the question of whether Islamic bonds are favorable for economic growth are very rare. Knowing that sukuk are considered the most important investment tool in Islamic finance, being characterized by its simplicity, flexibility and diversity. The empirical literature dealing with this question on the link between sukuk and growth seems to be in its infancy and, whose results are often mixed and inconclusive, shows a "space" that our study tries to initiate in order to remedy this limitation, studying the effect of Islamic bonds on economic growth for the economy of Bahrain and Malaysia by controlling for other growth determining variables.

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## III. DESCRIPTION OF THE VARIABLES AND PRESENTATION OF THE EMPIRICAL MODEL

### A. Data presentation

The sample size of our study is limited by the availability of data on Islamic bonds and in particular the quality of the institutional environment and also the variable representing domestic credits. Moreover, our sample was limited to the study both countries as we have already noted: Malaysia and Bahrain, having issued the first sukuk at the world level, and also because the macroeconomic data introduced into the model of growth are more appropriate for them.

We based our study on a basic and standard growth model, using variables measuring the sukuk market and also some other classic control variables taken into account in the empirical literature on the link between Islamic financial development (sukuk) and economic growth. In table 1, we present the source of all the variables selected for our study.

**Table 1: Description & sources of variables**

Variables	Label	Mesures	Sources
<b>Economic growth</b>	GGDP	Growth of real GDP (constant 2010 US\$)	World Bank (World Development Indicators)
<b>Volume of sukuk</b>	SVGDP	Ratio of sukuk issued to GDP	Bloomberg & Zawya Reuters
<b>Financial development</b>	FD	Net domestic credit ratio (constant 2010 US\$)	World Bank (World Development Indicators)
<b>Inflation</b>	Inf	Annual percentage change in the Consumer Price Index	World Bank (World Development Indicators)
<b>Institutional quality<sup>2</sup></b>	IQ (IQ_PER & IQ_GOV)	Rule of Law Indicator	World Bank (World Bank Governance Indicators)
<b>Government consumption</b>	GC	Ratio of general government final consumption expenditure (constant 2010 US\$) to GDP	World Bank (World Development Indicators)
<b>Investment Channel (Gross Capital Formation)</b>	GCF	Real GCF (constant 2010 US\$) to GDP	World Bank (World Development Indicators)
<b>Foreign direct investment</b>	FDI	Net real FDI (constant 2010 US\$) to GDP	World Bank (World Development Indicators)
<b>Trade openness (Imports &amp; Exports)</b>	I&E	Ratio of imports & exports (constant 2010 US\$) to GDP	World Bank (World Development Indicators)
<b>Education</b>	Educ	Primary school enrollment rate	World Bank (World Development Indicators)
<b>Real GDP per capita</b>	GDPP	Ratio of real GDP divided by population	World Bank (World Development Indicators)

Source: auteur.

For this study, panel data were used: the dependent variable represented by real GDP growth, and the explanatory variables represented by the volume of sukuk, financial development, and other macroeconomic variables: foreign direct investment,

<sup>2</sup> This indicator measures compliance with the law and the strength of the impartiality of the regulatory and/or legal system. It is widely used in the literature. Two measures were chosen for this variable:

- Governance score (-2.5 to +2.5) estimate of governance measured on a scale of approximately -2.5 to +2.5. Higher values correspond to better governance;

- The percentile rank (0-100) indicates the rank of the country among all the countries in the world. 0 corresponds to the lowest rank and 100 corresponds to the highest rank.

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inflation, trade openness (imports and exports), general government consumption expenditure...etc. These data are collected from Bloomberg, Zawya Reuters and the World Bank database.

### B. The econometric specification of the study

We empirically test the impact of sukuk issuance on economic growth in Malaysia and Bahrain. The analysis uses data from the two countries ranging from 2001 to 2018. For our analysis, we generally follow Imam and Kpodar (2015) to assess the impact of the two countries' sukuk issuances on the GDP growth of Malaysia and Bahrain.

This study uses the following regression equation:

$$(1) \Delta \log GDP_{it} = \alpha_i + \beta \text{Sukuk}_{it} + \gamma \text{Financial Development}_{it} + \delta \text{Macro Indicators}_{it} + u_i + e_{it}$$

We estimate our panel model using the fixed effects estimator. We regress GDP growth on sukuk issuance controlling financial development and macroeconomic factors in a panel data setup to analyze the relationship between them.

$\alpha_i$ : the intercept.

$\beta \ \gamma \ \delta$ : represent the coefficients to be determined (the coefficients are the estimates of the parameters);

$u_i$ : is the country specific effect.

$e_{it}$ : the residual;  $i$ : is used for the country ( $i=1, \dots, n$ );  $t$ : represents the period.

### IV. METHODOLOGY

We estimate our model using the fixed effects estimator (also called the covariance model) in order to control for country specific effects, and therefore for omitted variables and/or unobserved time-invariant characteristics (management, geographical location, culture and traditions) (Baltagi, 2005; Wooldridge, 2001; Hill & al., 2019). This "fixed effects" model is a statistical model in which the model parameters are fixed. We will determine the general form of the parameter estimators.

The first step of the study is first to present the descriptive statistics (which are used to present a summary of the statistics on the data used in the econometric analysis for both countries, this takes into account the averages of the sample, maximums, minimums, standard deviations, etc.), as well as the correlations and determine, moreover, the stationarity of the variables to check whether they are stationary or not (contain a unit root or not); that is, establish the order of integration of the variables. Descriptive statistics, correlation and stationarity are shown in Tables 2, 3 and 4, respectively. For stationarity and/or unit root tests, the Dickey-Fuller (1979) (ADF test) and Phillips-Perron (1988) (PP test) are applied. It should be noted that before the control of the stationarity, we observed the transverse dependence in our variables by applying the "transversal dependence test" generally the "Pesaran CD test" (Table 4). After testing the stationarity of our variables, we started estimating our equation, while verifying the violation of the estimated regression hypotheses. The method of ordinary least squares (OLS) for panel data (Pooled OLS) was also used.

Our hypotheses are:

H0: The variable has no impact on the dependent variable;

H1: The variable has a non-zero impact on the dependent variable (positive or negative).

We explained the potential relationship of each variable with the dependent variable while explaining our specifications. Eviews 11 software was used for our estimations and results.

### V. PRESENTATION OF RESULTS

#### A. Descriptive analysis

First, we present our descriptive statistics of all the variables selected for both countries and used in our regression model. Table 2 presents all of these statistics.

**Table 2: Descriptive statistics of the variables used in the estimation for the period (2001-2018)**

This table presents the descriptive statistics of our main selected variables:

	GGDP	SVGDP	FD	I&E	Inf	GC	GCF	FDI	IQ_PER	IQ_GOV	EDUC	GDPP
M.*	4.925786	9.279632	0.985638	1.498248	2.236862	13.02959	24.18199	- 0.546272	65.85544	0.479434	99.60469	9.516053
M.**	5.250695	5.755899	1.108474	1.506095	2.104390	12.84736	23.97378	- 0.032663	64.85149	0.478165	98.69443	9.369818
Max	7.967920	30.87133	1.436413	1.904612	5.440782	16.60523	34.53410	10.04330	74.51923	0.709429	105.5840	10.01841

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Min	-1.525099	1.145308	0.393688	1.159975	-0.495540	11.30308	15.61339	-10.45464	60.09615	0.258339	94.86897	8.869547
S.D	1.804419	6.931781	0.386235	0.185559	1.217191	1.551347	3.653376	3.987858	3.498932	0.095728	3.149495	0.446511

Source: author.

\*: Mean; \*\*: Median; Max: Maximum; Min: Minimum; S.D: Standard Deviation.

Note: numbers with the (-) sign on the table 2 represent negative numbers.

According to the descriptive statistics table, the means of all the variables are all positive except for FDI; the standard deviations are also positive and have very close values. We observe that the average growth rate of the countries composing our sample is 4.9% (almost 5%) over the study period (2001-2018), ranging from a minimum of (-1.5%) to a maximum of 7.9% (almost 8%). Note that the average proceeds of Islamic bonds issues reached 9.28% of gross domestic product for both countries. However, we note that the other variables (education, inflation, financial development, FDI) show a slight variation, not to say large, during the period studied. We also note that the maximum rate of the volume of sukuk in relation to GDP reached a rate of 30.87% in 2018 against 1.14% in 2001 for both countries (Malaysia & Bahrein), which explains a dazzling growth in the level of sukuk issuance since their appearance, with a standard deviation of 6.9%.

### B. Study of the correlation of variables

We present, in table 3, our correlation matrix which represent the correlation coefficients for all the variables selected for our study and used in our main regressions.

**Table 3: Correlation matrix**

This table presents the correlation coefficients for the variables used in our main regression models. The sampling period is from 2001 to 2018. The definitions of our variables are shown in Table 1.

	GGDP	SVGDP	FD	I&E	INF	GC	GCF	FDI	IQ_PER	IQ_Gov	EDUC	GDPP
GGDP	1.000000											
SVGDP	-0.086687	1.000000										
FD	-0.112389	0.570425	1.000000									
I&E	-0.079027	0.064580	0.173522	1.000000								
INF	0.380289	0.011037	0.032676	0.078512	1.000000							
GC	-0.413876	0.183367	0.065943	0.413910	0.043234	1.000000						
GCF	0.207465	-0.036705	0.041868	-0.265704	0.375386	0.286747	1.000000					
FDI	-0.114744	0.408566	0.238197	0.030360	-0.115302	-0.073518	-0.218955	1.000000				
IQ_PER	0.193349	0.054155	0.035532	-0.407395	-0.237048	-0.143156	-0.155203	0.224207	1.000000			
IQ_GOV	0.320342	-0.050398	-0.105592	-0.518448	-0.193270	-0.586666	-0.312759	0.225697	0.800019	1.000000		
EDUC	0.034137	0.647206	0.588193	-0.180652	-0.017428	0.064217	-0.033661	0.217399	0.495879	0.240444	1.000000	
GDPP	-0.037229	-0.452577	-0.870044	-0.292292	-0.057691	0.277111	0.179444	-0.256708	0.131562	0.027971	-0.331339	1.000000

Source: author.

Note: numbers with the (-) sign on the table 3 represent negative numbers.



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We observe that the volume of sukuk and I&E are negatively, but weakly, correlated with the growth of the gross domestic product (economic growth). Financial development, FDI, consumer spending and GDP per capita are respectively negatively correlated with growth, unlike education and the quality of institutions which are positively correlated with growth. This simple illustration suggests and/or shows a positive and negative correlation between the different variables and economic growth. We also note that the volume of sukuk is positively correlated with financial development and education with, respectively, a correlation coefficient of  $(0.57 \approx 0.6)$  and  $(0.65)$ . While financial development is positively but weakly correlated with all variables except for GDP per capita with which there is a strong but negative correlation and a weak negative correlation with the quality of institutions. However, this step as a preliminary to the analysis of the correlation between our variables is certainly insufficient to judge and conclude.

### C. Test of cross-sectional dependence and study of stationarity of variables

#### 1. The cross-sectional dependence test

Before testing the stationarity of our variables, i.e. whether they are stationary or not stationary (contain a unit root or not). The sample variables were first examined and/or observed, using the Cross-Sectional Dependence Test of Pesaran (2004). This test will allow us to test the cross-sectional dependence of each datum and/or variable. In the case of the presence of a cross-sectional dependence in the variables, the application of 2nd generation unit root tests (Alper & Cetenak, 2018) such as Breitung (2000), Pesaran CIPS (Cross-sectional Augmented Im-Pesaran-Shin) and/or CADF (Cross-section Augmented Dickey-Fuller) (Pesaran, 2007) is required. If the variables do not suffer from cross-dependency, first-generation unit root tests are performed such as LLC (Levin, Lin and Chu, 2002), Hadri (2000), IPS (Im-Pesaran-Shin, 2003), ADF Fisher type and/or PP, etc.

**Table 4: The cross-sectional dependency test**

Variables	The Pesaran CD test	
	Statistic	P-Value
GGDP	1.625369	0.1041
SVGDP	-0.565575	0.5717
FD	0.751207	0.4525
I&E	-1.976981**	0.0480
INF	0.639465	0.5225
GC	3.892654*	0.0001
GCF	0.393054	0.6943
FDI	-1.372273	0.1700
IQ-RANK	1.152680	0.2490
IQ-GOV	-0.016632	0.9867
EDUC	1.063443	0.2876
GDPP	-0.216933	0.8283

Source: author.

\*Statistically significant at the 1% level.

\*\* Statistically significant at the 5% level.

Table 4 presents the results of the cross-sectional dependence test for each variable in our model. The null hypothesis (H0) is that there is no cross-sectional dependence, and the alternative hypothesis (H1) is that there is cross-sectional dependence.

H0: No CSD.

H1: Presence of CSD.

We reject the null hypothesis (H0) if the probability (P-Value) is less than 0.05 (5%). If the probability (P-Value) is greater than 0.05 (5%) the null hypothesis is accepted and the alternative hypothesis is rejected. Table 4 clearly indicates that there is an absence of cross-sectional dependence for all variables except for trade openness (I&E) and for consumption expenditure (GC), thus justifying the use of the test of first-generation unit root.

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## 2. Unit root tests

In order to test whether our variables are stationary or not, it is necessary to apply the first generation unit root tests: Levin, Lin and Chu (2002); Im-Pesaran-Shin (2003); Fisher type test using ADF and PP test (Maddala & Wu (1999), and Choi (2001)). Note that for unit root tests the lags (or number of lags) are determined automatically by EvIEWS 11.

The hypotheses, for all of these tests, null (H0) and alternative (H1) used for our study are as follows:

H0: our variable has a unit root (not stationary);

H1: our variable does not have a unit root (stationary).

When the probability (P-Value) is less than 0.05 (5%) we reject our null hypothesis (H0), while when it is greater than 0.05 (5%) we accept it. The fact of not rejecting the null hypothesis implies that the linear combination of variables is not stationary. The results of the unit root tests are shown in table 5.

The tests: Levin, Lin and Chu (2002); Im-Pesaran-Shin (2003) (Table 5); Fisher type test using ADF and PP test (Maddala & Wu (1999); and Choi (2001)) presented in annex 1, reveal that all the variables are not stationary at the levels and that they must be differentiated. Therefore, it clearly appears that they are stationary at their first differences at a confidence level of 1% as shown in table 5. That said, the null hypothesis is rejected for all variables.

**Table 5: Unit root tests - LLC test & IPS test**

Variables	LLC test: Levin, Lin and Chu (2002)				IPS test: Im-Pesaran-Shin (2003)			
	At level		1 <sup>st</sup> Diff.		At level		1 <sup>st</sup> Diff.	
	Stat.	P-Value	Stat.	P-Value	Stat.	P-Value	Stat.	P-Value
GGDP	-3.23627	0.0006	-5.22216*	0.0000	-2.553559*	0.0053	-4.41443*	0.0000
SVGDP	-0.50526	0.3067	-5.58133*	0.0000	-0.65900	0.2549	-4.54593*	0.0000
FD	0.74319	0.7713	-3.47698*	0.0003	1.36016	0.9131	-2.99319*	0.0014
I&E	-0.38767	0.3491	-4.28209*	0.0000	-0.05913	0.4764	-2.73197*	0.0031
INF	-4.09906*	0.0000	-5.01000*	0.0000	-4.06308*	0.0000	-5.28230*	0.0000
GC	-1.46364	0.0716	-4.31164*	0.0000	-0.41362	0.3396	-3.64570*	0.0001
GCF	-0.34899	0.3635	-5.16199*	0.0000	-0.32066	0.3742	-4.58975*	0.0000
FDI	-1.61244	0.0534	-4.75774*	0.0000	-1.98746**	0.0234	-4.89286*	0.0000
IQ-RANK	-1.19023	0.1170	-1.02825	0.1519	-0.82946	0.2034	-3.48447*	0.0002
IQ-GOV	-1.61244	0.0534	-4.75774*	0.0000	-1.98746**	0.0234	-4.89286*	0.0000
EDUC	0.80878	0.7907	-3.81965*	0.0001	0.91643	0.8203	-3.10401*	0.0010
GDPP	-0.00609	0.4976	-2.77681*	0.0027	0.44180	0.6707	-2.57718*	0.0050

Source: author.

All panel unit root tests were performed with one intercept for all variables.

Automatic lag length (number of lags) selection based on Schwarz criterion.

\*Statistical significance at the 1% level.

\*\*Statistical significance at the 5% level.

\*\*\*Statistical significance at the 10% level.

The next stage of our study will be devoted to regression analysis by assessing the impact of sukuk issuance on economic growth. To do so, we started the regression analysis using the fixed effects model and the ordinary least squares method (Pooled OLS) and we ended the study with an analysis of the different results obtained.

## D. Regression analysis

### 1. The least squares method and the fixed effects model

The results of the regressions on the impact of Islamic bonds on economic growth for Malaysia and the Kingdom of Bahrain for the period from 2001 to 2018 are presented in table 6, thus including the results of the estimations via the two econometric techniques:

- The ordinary least squares method (Pooled OLS) on panel data without taking into account the countries to which they belong.
- The fixed effects model, which controls for country-specific unobservable effects that do not vary over time, and which affect a country's economic growth.



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The results of the Pooled OLS estimation are presented in columns 1 to 3, while those of the fixed effects estimator are presented in columns 4 to 6. For each set of regressions, the first specification runs the model of base with all the control variables (columns 1 and 4) except education, while the following specifications: columns 3 and 6, add the variable of education measured by the rate of primary schooling. Values in parentheses (Table 6) are standard deviations.

**Table 6: Impact of sukuk on economic growth**

This table presents the results of estimated regressions, using the ordinary least squares method and the fixed effects model, for Malaysia and Bahrain for the period from 2001 to 2018. Our dependent variable is economic growth, and the independent variables include sukuk as % of GDP, financial development, and macroeconomic indicators. The definitions of our variables are shown in Table 1. Standard errors are consistent with heteroscedasticity and clustered at the year level. The estimates use 31 observations. \*\*\*, \*\*, \* refer to significance levels of 1, 5 and 10% respectively.

Variables	Pooled OLS			Fixed Effects Model		
	(1)	(2)	(3)	(4)	(5)	(6)
SVGDP	0.076248 (0.016503)***	0.064000 (0.018186)***	0.064654 (0.025431)**	0.092109 (0.043022)**	0.078365 (0.041116)*	0.081614 (0.031389)**
FD	-1.626335 (0.559088)***	-1.181604 (0.568468)**	-1.791743 (0.833071)**	-0.240084 (2.611035)	0.069990 (2.304171)	-0.192778 (2.737008)
I&E	6.622323 (1.868094)***	6.195891 (2.242449)**	6.779392 (1.960172)***	7.218692 (2.946204)**	6.730080 (3.138114)**	7.498690 (3.278775)**
INF	0.372238 (0.142278)**	0.325675 (0.111741)***	0.357548 (0.133900)**	0.410957 (0.187174)**	0.360854 (0.159789)**	0.400822 (0.177548)**
GC	-0.985354 (0.163295)***	-0.656178 (0.138427)***	-0.996960 (0.170441)***	-1.138908 (0.443675)**	-0.796572 (0.367700)**	-1.178196 (0.504350)**
GCF	0.298309 (0.097682)***	0.304790 (0.127499)**	0.303573 (0.099909)***	0.290375 (0.093622)***	0.297374 (0.122181)**	0.295016 (0.094375)***
FDI	-0.088234 (0.040384)**	-0.084573 (0.034707)**	-0.081284 (0.036758)**	-0.091155 (0.042320)**	-0.087126 (0.035489)**	-0.083744 (0.036565)**
IQ-RANK	0.280031 (0.093013)***		0.257921 (0.073939)***	0.278916 (0.090980)***		0.253573 (0.069170)***
IQ-GOV		10.99005 (3.061706)***			10.92566 (2.945340)***	
EDUC			0.054945 (0.125150)			0.062509 (0.133640)
Constant	-17.79802 (8.987980)*	-8.650849 (6.129621)	-21.71886 (15.36525)	-18.02726 (9.292065)*	-8.858707 (6.424529)	-22.52681 (16.51110)
Observations	31	31	31	31	31	31
Number of countries	2	2	2	2	2	2
R-Squared	0.658692	0.610040	0.661050	0.660551	0.611556	0.663549

Source: computed by Eviews.

**Table 7: Impact of sukuk on economic growth**

This table presents the results of the regressions estimated using the ordinary least squares method and the fixed effects model for Malaysia and Bahrain for the period from 2001 to 2018. Our dependent variable is economic growth, and the independent variables include sukuk as % of GDP, financial development and macroeconomic indicators. The definitions of our variables are shown in Table 1. Standard errors are consistent with heteroscedasticity and clustered at the year level. The estimates use 31 observations. \*\*\*, \*\*, \* refer to significance levels of 1, 5 and 10% respectively.

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Variables	Pooled OLS			Fixed Effects Model		
	(1)	(2)	(3)	(4)	(5)	(6)
SVGDP	0.081887 (0.022544)***	0.081533 (0.025221)***	0.079975 (0.025611)***	0.089800 (0.040160)**	0.075479 (0.037318)*	0.085960 (0.033659)**
FD	0.183419 (3.021721)	3.088738 (3.313793)	0.056068 (2.761284)	0.742454 (4.052224)	2.629661 (4.116581)	0.498697 (3.501817)
I&E	7.918606 (3.715261)**	9.715161 (4.394173)**	7.865092 (3.509775)**	8.107008 (4.125735)*	9.561542 (4.601393)*	7.987427 (3.792879)**
INF	0.379039 (0.149737)**	0.353491 (0.128418)**	0.376635 (0.148853)**	0.399055 (0.177097)**	0.338287 (0.156898)**	0.397945 (0.176117)**
GC	-1.240817 (0.573078)**	-1.341327 (0.629978)**	-1.227623 (0.534504)**	-1.297207 (0.680479)*	-1.294973 (0.694663)*	-1.271390 (0.618911)*
GCF	0.293603 (0.088380)***	0.301052 (0.108557)**	0.294595 (0.089928)***	0.289835 (0.088580)***	0.304310 (0.108284)**	0.291952 (0.089955)***
FDI	-0.083545 (0.036789)**	-0.078392 (0.033252)**	-0.082865 (0.036605)**	-0.085578 (0.039965)**	-0.087126 (0.035489)**	-0.083927 (0.037074)**
IQ-RANK	0.250857 (0.069354)***		0.249519 (0.069759)***	0.253197 (0.073508)***		0.249335 (0.069554)***
IQ-GOV		9.261989 (1.996924)***			9.247987 (2.016797)***	
EDUC			0.007518 (0.074988)			0.026561 (0.109843)
GDPP	1.897815 (3.504202)	4.596783 (3.883344)	1.788002 (3.216748)	1.706843 (3.315286)	4.711436 (3.752723)	1.248475 (2.938033)
Constant	-34.28497 (36.06367)	-52.25126 (40.65535)	-33.86750 (34.49595)	-32.74850 (34.15972)	-53.24481 (39.42032)	-30.70706 (30.25860)
Observations	31	31	31	31	31	31
Number of countries	2	2	2	2	2	2
R-Squared	0.663801	0.648948	0.663828	0.664280	0.649234	0.664553

Source: computed by Eviews.

### VI. DISCUSSION OF THE RESULTS

The analysis of the results presented in table 6 concerns the estimates of the different econometric specifications using the Pooled OLS method and the fixed effects model using the country fixed effects. It should be recalled that the country fixed effects control for the unobserved heterogeneity of each country, which is invariant over time and which can affect economic growth. For example, the geographic location, traditions, culture, and demographic structure of a country can be controlled using country fixed effects. Also, it should be noted that for each series of regressions, the specification is estimated using the financial development control variables and the macroeconomic variables. It can be seen that all the results of the specifications of our model confirm the result put forward in the economic literature and in empirical studies which report that financial deepening via the issuance of sukuk is of great importance for economic growth, allowing it to be stimulated. Moreover, table 6 shows that the coefficient of SVGDP is positively and significantly correlated with economic growth at the 1% threshold in specifications 1 and 2, at the 5% threshold for specifications 3, 4 and 6 and at the 10% for specification 5. These results suggest that the issuance of Islamic bonds stimulates economic growth because the coefficient of these Islamic bonds normalized by GDP is positive. Specifically, the sukuk coefficient using a fixed effects model suggests that a one percentage point increase in the sukuk/GDP ratio increases economic growth by 9 basis points (specification 4) over the course of a year. This finding confirms the theoretical predictions cited in our literature review, which argue that Islamic bonds have a positive effect on economic growth.

While the coefficients of the financial development indicator, represented by the net domestic credit ratio, are negative in all specifications except for specification (5) which means a positive but non-significant correlation between this indicator and the

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economic growth ; these results do not indicate the well-known positive association between financial development and economic growth, specifically the positive link between domestic credits and/or granted by national banks and economic growth (Akpanung & Babalola (2011); Rahimzadeh (2012)). However, this result is consistent with the result obtained in the study of Barajas et al. (2013) recalling the positive link between financial development and/or financial sector development and economic growth, which is still weaker in MENA (including Bahrain), the authors conclude that the lack of financial inclusion in these countries can illuminate the weakening of growth and its slowdown. While Bhattacharya and Wolde (2012) argue that the low access to long term credit is one of the main factors explaining and justifying this slowdown in MENA.

In the same vein, the coefficient of trade openness (imports & exports) is positively significant in all our specifications, as long as the country opens up to its trade, GDP growth accelerates, it is as countries become more open to international trade, economic growth increases. This finding confirms the results of most empirical studies that conclude that there is a positive impact between trade openness and economic growth (Krueger, 1978; Bhagwati, 1978). New models of endogenous growth explain a positive relationship between trade openness and economic growth resulting from the international diffusion of advanced technologies (Coe & Helpman, 1995; Romer, 1994). Our results confirm that there is a positive effect between trade openness and economic growth, as proven in other studies (Hye, Wizarat & Lau, 2016; Ouahhabi & Zouiri, 2019). A country with a higher degree of trade openness has a greater capacity to use the technologies generated in advanced economies, and this capacity leads them to grow faster than a country with a lower degree of trade openness (Keho, 2017). However, our results do not confirm the prediction that trade openness seems to have an ambiguous effect on growth with a counter-intuitive sign, arguing that it could lead to weak growth making countries more susceptible to exogenous shocks, particularly in presence of a strong concentration of exports (Imam & Kpodar, 2015) or having a negative relationship with economic growth leading to its weakness (Lawal & al., 2016)<sup>3</sup>.

On the other hand, all the inflation coefficients display the positive and significant sign in all the specifications of both models. A certain level of inflation is good for growth, but after a certain threshold, inflation harms economic growth. Mubarik (2005) found that low and stable inflation promotes economic growth and vice versa. Our results confirm the findings of the study done by (Umaru and Zubairu, 2012), but contradict the results of several economic studies which have estimated the existence of a negative relationship between the two macroeconomic variables: Inflation and economic growth (Shitundu and Luvanda, 2000). In the 1970s, countries with high inflation, especially Latin American countries, began to experience a decline in growth rates and thus caused the emergence of views indicating that inflation has negative effects on the economic growth instead of positive effects (Kasidi & Mwakanemela, n.d). Basically, the rate of economic growth mainly depends on the rate of capital formation and the rate of capital formation depends on the rate of saving and investment (Datta and Kumar, 2011). But the link between these two variables (inflation and growth) remained one of the most important macroeconomic issues.

Similarly, Ahmed (2010) argues that this link has been argued in various economic literatures and these arguments have shown differences with respect to the condition of the order of the world economy. In accordance with these policies, the increase in total demand has also led to an increase in production and inflation. However, inflation was not seen as a problem during this period, but rather seen as a positive impact on economic growth, which was widely accepted (Kasidi & Mwakanemela, n.d). In the midst of these views, Phillips, for the first time introduced the hypothesis that high inflation positively affects economic growth by lowering unemployment rates (Idem, n.d). It is essential for policymakers to remove uncertainty and doubt about the relationship between inflation and growth because several works and studies on this subject remain inconclusive; and, as already mentioned, numerous empirical studies confirm the existence of a positive or negative link between these two macroeconomic variables.

However, the coefficient on government consumption expenditure is negative in both models and significant at 1% in our first model and 5% in the fixed-effects model. This finding that government consumption expenditure has a negative impact on growth is well consistent with the result of the study done by Barro (1989) who, in his negatively endogenous growth model, argues that economic growth (growth of gross domestic product) is related to government consumption expenditure. He further argues that public consumption introduces disparities and distortions, by not providing a compensating stimulus to investment and economic growth. He also maintained that there is a minimal link between growth and the volume of government investment expenditure and productive activities which, according to him, should contribute positively to growth; while public consumption expenditure is expected to brake this growth. On the other hand, our result contradicts the Keynesian hypothesis according to which expanding government spending increases the rate of economic growth, suggesting that any kind of such spending can positively contribute to growth. Thereby, government spending is seen as an exogenous force that alters aggregate output (Loizides and Vamvoukas, 2005).

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<sup>3</sup> They find a long-term negative impact of trade openness on economic growth but a positive effect on growth in the short-term. Moreover, a bidirectional causality was found between the two variables.

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Similar to economic theories that present two opposing positions of public consumption expenditure on development and economic growth, empirical work on the subject has also shown that the effect of public expenditure on growth can be negative or positive. Our results are added to the results of the studies of Filipovic (2005) and Nurudeen & Usman (2010) and, confirm the prediction of Cook and Uchida (2003), whereby, higher public consumption expenditures are linked and/or associated with political corruption, waste and depletion of public resources, and to an oversized government; which should have a negative impact on growth and, in the same direction, leads to fragile and weak economic growth. In contrast, studies done by Wu et al. (2010) and Alshahrani & Alsadiq (2014) show a positive impact between the two macroeconomic variables.

Contrary to the generally accepted premise that FDI has a positive relationship with economic growth (Hussain & Haque, 2016; Choi & Baek, 2017), in the sense that they play an important role. Foreign capital, engaged under the right conditions, can help reduce the gap between capital needs and national savings, increase skill levels in the host economy, improve access to markets and contribute to technology transfer and good governance (Abbes, Mostéfa, Seghir, & Zakarya, 2015).

FDI also increases the supply of funds for domestic investments, encourages the creation of new jobs, enhances technology transfer and increases total economic growth (Dritsaki and Stiakakis, 2014). At the same time, and as reported in the literature, FDI is considered as a major driver of economic growth (Türkcan & al., 2008); however, our results show the opposite, they present a negative relationship between the two variables, our coefficients are negative and significant at a threshold of 5% in all the regressions. Moreover, there are some empirical studies that affirm a similar relationship between FDI and economic growth (Sharafat, 2014). Note that the well-known dependency theory claims that FDI has a negative impact on economic development (Dutt, 1997). Other experts believe that FDI can unnecessarily overflow investments in the country creating an overburdened and/or crowded investment environment leading to inflation of the recipient country's interest rate (Eller, Haiss & Steiner 2005). Contrary to modernization theory which argues that FDI contributes positively to economic growth in developing countries, in particular because it responds to the demand for capital formation (Mello, 1999); as it also asserts that FDI transfers knowledge, technology, skills and management ideas, which enhance overall economic growth.

However, the relationship between FDI and economic growth can be bidirectional, according to the study of Türkcan & al. (2008), the endogenous relationship between these two variables was examined for 23 OECD countries for the period 1975-2004, their empirical results suggest that FDI positively affects the economic growth rate and that the economic growth rate positively affects FDI inflows, which indicates that economic growth further stimulates the growth rate of FDI inflows and that the growth rate of FDI in turn stimulates economic growth.

Regarding the results for gross capital formation, presented in table 6, show that there is a positive and significant impact at a level of 10% in most specifications between this variable and economic growth. This seems to be consistent with the economic literature according to which that gross capital formation contributes to sustainable economic growth (Pavelescu, 2008). This variable (GCF) is in fact adopted as another element and/or another potential actor of economic growth playing naturally a primordial role in the process of growth and development, by determining the national production capacity which, in turn, affects the said growth. In general, the literature has been enriched by various pioneering studies such as Solow (1957), Kaldor (1961) which examined and studied the effect of capital accumulation on economic growth in growth theories. According to Onyinye & al. (2017), the effect of capital accumulation on economic growth depends on the intensity of the determinants of capital accumulation such as savings, foreign direct investment and interest rates; insufficient capital accumulation is one of the most important factors limiting the sustainable growth of countries. The neoclassical synthesis established that for an economic agent, saving plus borrowing must equal the acquisition of assets, it follows that in a closed economy national saving and domestic investment will always be equal (Idem, 2017). Therefore, a high rate of capital formation leads to a high rate of productivity which generates growth (Babalola, 2003). Insufficient capital formation has been cited as the main obstacle to sustainable economic growth (Owolabo & Ajavi, 2013). Growth models such as those developed by (Romer, 1986; Lucas, 1988) predict that an increase in capital accumulation can lead to a permanent increase in growth rates. Several studies examining the link between capital formation and growth have come to the same results as ours: Bal, Dash and Subhasish (2016); Erum and Hussain (2019); Awodumi and Adewuyi (2020) have all shown that capital formation affects and/or impacts positively economic growth.

As expected, better institutional quality boosts economic growth, with the institutional quality coefficient being highly significant at the 10% threshold in all positive sign regressions. This seems to have a positive impact on growth. Our results clearly indicate that this variable is significantly related to growth, which does not contradict the evidence presented in the empirical literature on institutional quality; according to which institutional quality has an important role to play in stimulating economic activities and accelerating economic growth, especially in emerging markets where great efforts have been made to improve institutional quality (Nguyen et al., 2018). The results therefore support the main hypothesis, namely that institutional quality has a positive impact on economic growth.

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Barro (1996) argues that institutional quality exerts no influence on the growth of developed countries, because they are already sufficiently advanced and no further changes would have a considerable long-term impact. Nevertheless, the majority of studies agree that this variable “institutional quality” is important and must be taken into account when assessing the drivers of growth; among these studies we cite those of: Bhattacharya & al. (2017) and Salman & al. (2019). Our conclusion agrees with all the results of these studies showing that institutional quality plays an important role in improving economic progress and its growth.

Moreover, our results show that education is not significantly related to economic growth in both models, where the coefficient is positive but statistically insignificant. This finding is also consistent with the study done by Barro (1991) and Mankiw et al., (1992) who investigated the link between education and economic growth by examining variations in enrollment rates while using a single sample representative of industrialized and less developed countries. These two studies concluded that schooling has a clearly positive impact on the growth rate of real GDP. To these two studies is added the study done by Barro and Sala-i-Martin (1995, 2004); according to them, growth depends positively on the initial quantity of human capital in the form of schooling; just like Krueger and Lindahl (2001) who show that increasing in the level of education improves economic growth in the short term. This series of studies in addition to other studies using panel data, examining the impact of education on growth did not detect a significant relationship between the rate of increase of educational capital and the rate of economic growth as well as our result. They suggested that the positive results of previous cross-sectional studies were due to omitted variable biases, not controlling for country specific effects (Odit & al., 2010). Overall, our results show that only financial development represented by the ratio of net domestic credit, public consumption expenditure, and FDI that seem to exert a negative impact on growth; while the rest of the variables impact positively and significantly economic growth, including Islamic bonds, which show a positive and significant effect on economic growth in all our specifications of both econometric models. In total, the two models we used explain 61% to 66% of the variability of economic growth rates.

To test the robustness of our results we included another variable, GDP per capita, and as can be seen in table 7, our basic variable SVGDP is positively significant in all our specifications of the two models: fixed effect and pooled OLS. We can therefore conclude that these results are robust to the inclusion of a few other variables such as education, GDP per capita (table 7) and the use of another econometric technique: The ordinary least squares method (Pooled OLS). Thus, we can conclude that sukuk have a positive impact on economic growth.

### CONCLUSION

For this article we have examined the effect of sukuk on the economic growth of Malaysia and Bahrain covering the period of 2001-2018. For this, we used the fixed effects model and the ordinary least squares method. Sukuk are characterized according to one single dimension: the volume of sukuk measured by total sukuk issuance as a percentage of GDP for both countries. The results indicate that there is a positive impact of sukuk on economic growth, thus playing an important role in stimulating economic growth, even after controlling for various other measures: financial development, quality of institutions, education, as well as other determinants of economic growth that are often used in the empirical literature on financial development and growth. This is a solid and robust result according to various specifications. This finding is also encouraging because, despite the rapid growth of sukuk, these Islamic bonds still represent a relatively average share of the economy and the overall size of the financial system, yet they establish a positive effect on growth. It can therefore be concluded that the increase in the volume of sukuk issuances can contribute to stimulate economic growth while also draining the savings of populations who do not wish to invest in conventional and/or interest rate bonds. Noting that sukuk, as an important segment of Islamic finance, are spreading further in several countries globally.

### ANNEXES:

#### Annex 1: Unit root tests – Fisher ADF test & Fisher PP test

Variables	Fisher ADF test				Fisher PP test			
	At level		1 <sup>st</sup> Diff.		At level		1 <sup>st</sup> Diff.	
	Stat.	P-Value	Stat.	P-Value	Stat.	P-Value	Stat.	P-Value
<b>GGDP</b>	-3.23627*	0.0006	22.9746*	0.0001	-2.553559*	0.0053	45.0490*	0.0000
<b>SVGDP</b>	5.03523	0.2837	23.3927*	0.0001	4.95214	0.2922	24.2465*	0.0001
<b>FD</b>	1.26187	0.8678	15.2893*	0.0041	1.40660	0.8430	15.3060*	0.0041
<b>I&amp;E</b>	4.60568	0.3302	14.3867*	0.0062	1.78205	0.7758	11.5001**	0.0215
<b>INF</b>	21.1623*	0.0003	27.3118*	0.0000	28.7359*	0.0000	275.151*	0.0000



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<b>GC</b>	4.52018	0.3402	18.9346*	0.0008	4.68504	0.3212	18.3726*	0.0010
<b>GCF</b>	3.67765	0.4514	23.6700*	0.0001	3.46617	0.4830	23.6250*	0.0001
<b>FDI</b>	11.98746**	0.0186	25.3804*	0.0000	13.1161**	0.0107	39.4503*	0.0000
<b>IQ-RANK</b>	5.45378	0.2438	18.2678*	0.0011	5.29524	0.2583	30.0070*	0.0000
<b>IQ-GOV</b>	11.8344**	0.0186	25.3804*	0.0000	13.1161**	0.0107	39.4503*	0.0000
<b>EDUC</b>	1.75374	0.7809	16.2936*	0.0026	1.93155	0.7483	14.3117*	0.0064
<b>GDPP</b>	3.84255	0.4277	14.0080*	0.0073	2.23220	0.6931	14.4785*	0.0059

All panel unit root tests were performed with one intercept for all variables.

Automatic lag length (number of lags) selection based on Schwarz criterion.

\* Statistical significance at the 1% level.

\*\*Statistical significance at the 5% level.

\*\*\*Statistical significance at the 10% level.

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