

MEASURING THE OPTIMAL GOVERNMENT SIZE THAT CONTRIBUTE TO ECONOMIC GROWTH OF THE MUSLIM COUNTRIES

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ABSTRACT - The issue of a correct 'government size' for economic prosperity of a nation, particularly Muslim nation, is highly linked with the issue of optimal 'role of state'. The present study attempts to utilise more efficient econometric methods on a sample of Muslim countries over a specific period of time in order to investigate relationship between government size and economic growth. It also attempts to identify optimal size of government (role of state) that maximise the economic growth of the countries by applying static and dynamic panel estimations on a widely used 'growth model' for assessing the impact of government size on economic growth. The findings indicate that small size of government contributes more on the economic growth of the countries. The results seem to be more robust by using fixed-effects model as compared to other static or even dynamic models.

Keywords: Government Size; Economic Growth; Panel Regression; Dynamic Panel GMM.

ABSTRAK – Pengukuran Ukuran Pemerintah Optimal yang Berkontribusi terhadap Pertumbuhan Ekonomi di Negara-negara Muslim. *Persoalan tentang 'ukuran pemerintah' yang tepat untuk kemakmuran ekonomi suatu negara, khususnya negara Muslim, berkaitan erat dengan persoalan optimalisasi 'peran negara'. Artikel ini bertujuan mengkaji hubungan antara ukuran pemerintah dengan pertumbuhan ekonomi dengan menggunakan metode ekonometrik yang lebih efisien dengan sampel negara-negara Muslim selama kurun waktu tertentu. Artikel ini juga bertujuan untuk mengidentifikasi ukuran optimal pemerintah (peran negara) yang dapat memaksimalkan pertumbuhan ekonomi negara-negara dengan menerapkan estimasi panel statis dan dinamis dengan menggunakan 'growth model' yang telah banyak digunakan dalam pengukuran dampak ukuran pemerintah terhadap pertumbuhan ekonomi. Hasil kajian menunjukkan bahwa ukuran pemerintah yang kecil dapat memberikan kontribusi lebih besar pada pertumbuhan ekonomi. Hasil kajian lebih meyakinkan dengan menggunakan fixed-effect model dibandingkan dengan model statis atau dinamis.*

Kata Kunci: *Ukuran Pemerintah, Pertumbuhan Ekonomi, Regresi Panel, Panel Dinamis GMM*

INTRODUCTION

The relationship between government size and economic growth has been an ongoing debate among scholars in economic development. The role of government is believed to be a catalyst in promoting rapid economic growth especially in poor countries through development of appropriate legal, administrative, and economic infrastructure. However, few studies found that bigger role of government or government size might lead to lower level of economic growth due to unproductive governmental spending. The negative implications of government activity resulting from inefficiency, excessive taxation, corruption and rent-seeking behaviour are found to be obvious in less developed countries (Ibrahim, 2015). This is with the assumption that the government has been recognised in the industrialized world where a well-developed infrastructure have already been in place for long period of time (Ibrahim & Kamri, 2013). A study by Hansson and Henrekson (1994) found that government transfers, consumption, and total outlays have negative effects, while educational expenditure has a positive effect, and government investment has no effect on private productivity growth. Even Barro (1990) predicted that the unproductive governmental spending will lower the growth rate of GDP, while the effect of productive government expenditure on the growth rate of GDP is ambiguous, depending on how the government behaves and on whether the expenditure ratio is too little or too much.

‘Wagner ([1883] 1958) law’ which postulates that government spending is income elastic and that the ratio of government spending to income tends to grow with economic development is heavily referred to productive government spending such as education, infrastructure, and laws which are the important factors for economic growth. Akitoby et. al (2006) suggested that the Wagner’s law may hold for developed countries, but less likely so for developing countries.

The ambiguity of results over the impact of government size on GDP growth prevailed in most of previous studies iwas owing to their differences in the specification of econometric models too. Besides, it iwas due to different measurement of government size and sample data selection. On methodology, Granger causality tests method was used by Halicioglu (2003) on Turkish data and the study found neither co-integrated nor causal relationship between per capita GDP and government spending shares. In contrast, a study by Abu-Bader and Abu-Quar (2003) found evidence on Granger causality running



from national income to government expenditure and thus support for Wagner's law.

The issue of a correct 'government size' for economic prosperity of a nation, which is highly linked with the issue of optimal 'role of state' was not given much attention in previous literature. Only a few studies hadve tested for the influence of government size and economic growth assuming that an inverted-U relationship exists between the scale of government and growth. Examples of those studies are by Ram (1986) and Dar and AmirKhalkhali (2002). Dar and AmirKhalkhali (2002)'s study adopted random coefficients approach to investigate the impact of government size on economic growth in 19 industrialized countries. The findings suggested that a larger government size effects economic growth via its adverse impact on factor productivity. This adverse impact appears to reflect the lower productivity of the capital input in countries with a large government size. But this adverse impact is the weakest for the group of countries with the smallest size of government. It suggested that a small as opposed to a large government could potentially be effective in providing the legal, administrative, and governance structure critical for growth, as well as for offsetting market failures. Ram (1986), on the other hand, found that overall impact of government size on growth is positive in almost all cases using a sample of 115 countries from 1960 to 1980. Besides, results of the study also indicated that the marginal externality effect of government size is generally positive.

The involvement of government in the market is not occasional or temporary from the Islamic point of view. The government should be co-existed in the market together with other economic units on permanent and stable basis and it acts as a planner, supervisor, producer, as well as consumer (Kahf, 1992). Having said the importance of government in Islam is to ensure the efficiency and provide provisions which cannot be accommodated by the market system, its expansion or contraction of role is never allowed to contract beyond the limits established in the Islamic law. Thus, it is expected that there is an optimal size of government which could be adopted to maximise the welfare of the nation, in particular, to maximise the standard of living of a nation. This paper contributes to the literature from three aspects. One, the focus, of study is on the group of Muslim countries in which previous literature hardly analyzed these countries on the issue of government size and economic growth. Two, the study is utilizing more efficient econometric methods on panel data which consist of a sample of Muslim countries over a specific

period of time. It is more efficient than those solely based on time-series data for they may perform poorly in small samples. Three, the current study attempts to investigate relationship between government size and economic growth via panel data among Muslim countries. It attempts to identify optimal size of government (role of state) that maximise the economic growth of the countries, that is, the possibility that inverted-U shape existence between growth and government size.

The remainder of this paper is organized as follows. Section 2 examines the econometric foundations for panel data models such as pooled, fixed effect, and random effects for the static models and dynamic Generalised Moments Method (GMM) model. Section 3 discusses the regression results and evaluates their policy implication. Section 4 then concludes.

METHODOLOGY

Our empirical analysis uses annual data on OIC countries (45 countries) from 2009 through 2013 (see Appendix 1). The countries selected are those which have at least data of a year. We constructed a panel database with information along three dimensions: the GDP per capita growth, general government final expenditure as % of GDP (proxy for government size, GS), and control variables, such as, ratio of investment to GDP and size of labour force as % of total population. Data are sourced from SESTRIC and World Bank. All analyses are conducted using STATA software.

Following is the equation to be estimated:

$$\ln [\text{GDP}]_{(i,t)} = \alpha_{(0,i)} + \alpha_1 [\ln \text{GS}]_{(i,t)} + [\alpha_2 [\ln \text{GS}]_{(i,t)}^2 + \alpha_3 [\ln \text{K}]_{(i,t)} + \alpha_4 [\ln \text{L}]_{(i,t)} + \varepsilon_{(i,t)} \quad (1)$$

where GDP is the GDP per capita growth, GS is general government final consumption expenditure (% of GDP), K is Gross fixed capital formation (in US\$) and L is labour force participation rate, total (% of total population ages 15-64). All variables are transformed into natural logarithm to smoothen the data and to solve the preliminary problems of the data such as outliers and non-stationarity.

The above equation is initially estimated using Pool OLS which treats the data as for a single entity with the assumption that data are homogeneous.



Then, further test is conducted to decide which method is suitable for the data, either Pool OLS or Panel OLS. The decision is based on the result from Bruesh Pagan LM test. If the null hypothesis, that data is homogeneous, is rejected, Panel OLS is adopted. We will apply both Fixed Eeffect (FE) and Random Eeffect (RE) models if Panel OLS is suitable for the data.

Besides, the study will apply the Dynamic panel (Generalized Moment Method) GMM to obtain robust results. This model is dynamic in the sense that it includes lag of dependent variable as an independent variable and there are instrumental variables included in the model to capture the problem of endogeneity. The Dynamic panel GMM is also chosen since cross-section data is bigger than time-series data ($N > T$). Dynamic panel GMM that used in this study is conducted for both step 1, when data are homogeneous, and step 2, when data are heterogeneous. It is also conducted using first generation and second generation GMM. The former is not giving flexibility of chosen instrumental variables which are exogenous while the latter is giving more flexibility to select the exogenous instrumental variables. The models are tested for auto-correlation problem and over-identifying restrictions. Autocorrelation existence test is conducted using Arellano-Bond test and over-identifying restrictions is tested using Hansen test.

In order to identify the optimal government size that maximizes the economic growth, the focus is on the coefficients of α_1 and α_2 . If both coefficients are significant and have positive and negative signs, respectively, we could identify the 'optimal' government size that contributes maximum level of growth from the sample data.

RESULTS AND ANALYSIS

Figure 1 displays the trend of GDP per capita in all selected Muslim countries in study from 2009 until 2013. Most of the countries hadve a constant trend of GDP per capita throughout those years except for Afghanistan and Qatar which recently are declining and sharp increasing for the UAE. Unlike GDP per capita, government size, which measured by general government final expenditure as % of GDP, varies from one country to another country (see Figure 2). Large government size wais noticed for Algeria, Brunei, Bukina Faso, Iraq, Jordon, Kyrgyz Republic, Morocco, Oman, Saudi Arabia, Tunisia and Uzbekistan as compared to other countries. The declining trend of government size could be seen in UAE, Qatar, Oman, Mali, Guinea, Guyana,

Jordan, Kazakhstan, Kuwait, Burkina Faso, Cameroon, Chad and Algeria, while the rest of the countries, in general, weare having quite similar size constantly.

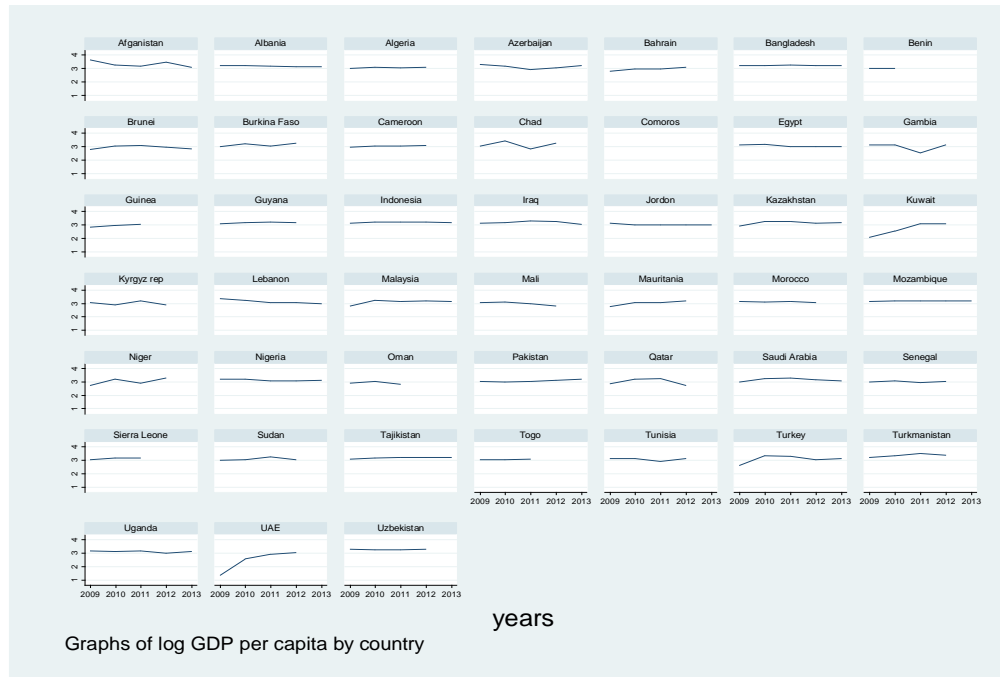


Figure 1: Graphs of ln(GDP per capita) by country

As for the group of OIC member countries, GDP per capita was declining from 4.28% in 2010 to 3.39% in 2011 and it declined further to 2.95% in 2012. As for government size, general government final expenditure (as % of GDP) was also declining from 2009 to 2011 from 14.06% to 12.92% of GDP. Though, overall group of countries experiences both declining trends of GDP per capita and government expenditure, individual countries trends were not necessarily similar. There were countries that were having lower trend of GDP per capita and increasing government size such as Lebanon and Kyrgyz Republic. Increasing GDP per capita with lower size of government experienced by UAE, Kuwait, Burkina Faso, Chad, Kazakhstan, Mauritania and Niger.



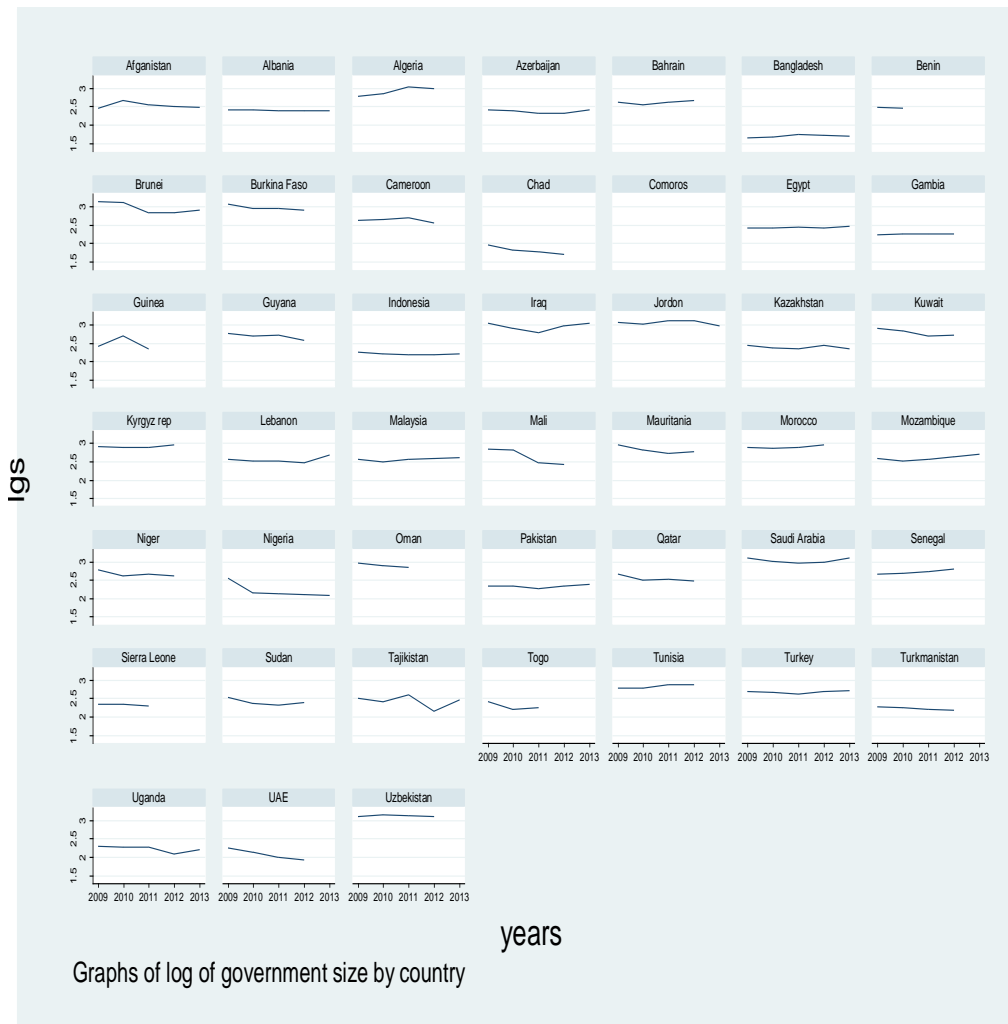


Figure 2: Graphs of $\ln(\text{general government final consumption expenditure})$ by country

The present section analyzes the results from regression of panel data using static and dynamic panel data estimations. The regression is conducted based on equation (1).

Table 1 simply presents the results from panel data estimations using pool OLS, fixed-effect and random-effects models. In specific, the regression includes the squared of $\ln\text{GS}$ in order to capture the possible estimation of optimal government size from the data in study. Equation (1) from the table shows that both $\ln\text{GS}$ and $\ln\text{GS}^2$ are not significant though the signs of both coefficients are as expected. The only variable contributes to the economic growth of Muslim countries is size of labour force, however the negative sign is not as expected since theoretically, it is assumed that labour positively contributes to higher growth of the nation.

Due to the unfavourable results obtained, further test is conducted to determine the suitability of the model used via panel data. Breush and Pagan LM test is conducted and as shown in the table, the Chi-square statistic rejects the null hypothesis that Pool OLS should be used assuming homogeneous data. This result implies that the data should be better analyzed using panel regression either Fixed Effects (FE) or Random Effects (RE) models. Hausman test is used to determine the selection between FE and RE models. The Hausman test suggests FE model to be used since the statistic is significant and rejecting the null hypothesis that RE is efficient.

Equation (2) and (3) display both results from FE and RE estimations. Similar as in equation (1) of Pool OLS, the focus variables of government size and squared of government size in FE model (equation 2) are not significant. Interestingly, variable of labour now is with expected sign (positive) and extremely significant. RE estimation in equation (3) produces almost similar results as in Pool OLS estimation.

Since it is expected that there is no inverted U-shaped relationship between $\ln GS$ and $\ln GDP$ per capita, as the coefficients of both variables are not significant, the study attempts to analyse again the data using similar models but without the inclusion of $\ln GS^2$. The results are displayed on Table 2.

At this stage of analysis, the pool OLS again is conducted and the results displayed on column equation (1) of Table 2. The results show that government size negatively affects economic growth with 5% level of significance, which implies that the smaller government size better contributes to larger economic growth among the Muslim nations. However, similar as in previous model, labour contributes negatively to economic growth with 5% level of significance which is not as expected. Again, selection of model is done based on the Breush and Pagan LM test and the result of the test suggests that panel estimations should be used either using FE or RE models. Hausman test statistic suggests the use of FE model since the null hypothesis that RE is efficient is rejected. Equation (2) from Table 2 is our focus estimation in which it could be seen that coefficient of government size variable is highly significant and negative which indicates again that small size of government contributes more on the economic growth of the countries. Besides, labour is also found to be an important factor contributes to economic growth and positively contributes to growth as expected in theories. As of RE estimations in equation (3), the results are



almost similar as in pool OLS estimation of equation (1). Thus, without inclusion of squared variable term in the regression, the results seem to be more robust by the use of FE model.

Further analysis is conducted to look at possibility of better results using dynamic panel GMM as mentioned in the methodology section. Table 3 displays the results based on the regression which not includes the squared government size (lnGS2) as prior regressions found that the variable is not significantly contributing to the growth, in which it implies there is no non-linearity of variables within the data.

Table 1: Static panel data estimations: inclusion of lnGS2

Variable	Dependent Variable: ln(GDP per capita)		
	(1)	(2)	(3)
constant	4.68*** (6.87)	-23.15** (-1.99)	4.75*** (5.44)
ln(general government final consumption expenditure)	0.18 (0.32)	0.51 (0.34)	0.19 (0.28)
ln(general government final consumption expenditure)_square	-0.71 (-0.53)	-2.58 (-0.70)	-0.86 (-0.51)
ln(ratio of investment to GDP)	-0.009 (-0.94)	0.03 (0.40)	-0.007 (-0.55)
ln(size of labour force)	-0.29** (-2.51)	6.39*** (2.28)	-0.29** (-1.98)
<i>Number of observations</i>	163	163	163
<i>Adjusted R²</i>	0.02	0.0147	0.0437
<i>Type of model</i>	Pool	Fixed	Random
<i>Breush & Pagan LM test</i>	Chi-sq stat. = 13.48 (p-value=0.0001)		
<i>Hausman test</i>	Chi-sq stat. = 16.89 (p-value=0.002)		

Notes:

1. t-statistic in parentheses for pool and fixed-effects regressions and z-statistic in parentheses for random-effects regression.
2. The type of model either fixed or random-effects is based on Hausman test.
3. *** significant at 1% level
** significant at 5% level

*significant at 10% level.

Table 2: Static panel data estimations: no inclusion of $\ln GS^2$

Variable	Dependent Variable: $\ln(\text{GDP per capita})$		
	(1)	(2)	(3)
constant	4.75*** (7.13)	-23.58** (-2.04)	4.83*** (5.69)
$\ln(\text{general government final consumption expenditure})$	-0.11** (-1.97)	-0.52*** (-2.65)	-0.15** (-2.10)
$\ln(\text{ratio of investment to GDP})$	-0.008 (-0.90)	0.04 (0.48)	-0.006 (-0.52)
$\ln(\text{size of labour force})$	-0.29 (-2.51)**	6.52** (2.33)	-0.29** (-2.01)
<i>Number of observations</i>	163	163	163
<i>Adjusted R²</i>	0.027	0.015	0.042
<i>Type of model</i>	Pool	Fixed	Random
<i>Breush & Pagan LM test</i>	Chi-sq stat. = 13.52 (p-value=0.0001)		
<i>Hausman test</i>	Chi-sq stat. = 16.65 (p-value=0.0008)		

Notes:

1. t-statistic in parentheses for pool and fixed-effects regressions and z-statistic in parentheses for random-effects regression.
2. The type of model either fixed or random-effects is based on Hausman test.
3. *** significant at 1% level
 ** significant at 5% level
 * significant at 10% level

In Table 3, five equations are estimated using dynamic panel GMM of first generation and second generation. As mentioned earlier in methodology section, the former is not giving flexibility of chosen instrumental variables which are exogenous while the latter is giving more flexibility to select the exogenous instrumental variables. Both methods also applied for the assumption of homogeneous data (step 1) and heterogeneous data (step 2). It is expected that lag of dependent variable is significant with positive sign. Unfortunately, in all five equations, the lag dependent variable is insignificant with mixed sign. Other independent variables are also insignificantly contributes to economic growth though the results of Sargan test in all equations suggest that over-identifying restriction are valid. Nonetheless, the



results of Arellano-Bond test for AR(1) in first difference in equation (3), (4) and (5) indicate the existence of autocorrelation in all equations .

Table 3: Results of dynamic panel GMM estimations: no inclusion of $\ln GS^2$

Variable	Dependent Variable: $\ln(\text{GDP per capita})$				
	(1) <i>One step</i> (1st generation)	(2) <i>Two step</i> (1st generation)	(3) <i>One step diff.</i> GMM (2nd generation)	(4) <i>Two step diff.</i> GMM (2nd generation)	(5) <i>One step</i> System GMM (2nd generation)
constant	-1.60 (-0.05)	14.07 (0.69)			4.52*** (2.79)
$\ln(\text{GDP per capita})_{t-1}$	-0.097 (-0.27)	0.09 (0.37)	-0.02 (-0.12)	0.08 (0.43)	-0.14 (-1.05)
$\ln(\text{general government final consumption expenditure})$	-0.21 (-0.94)	-0.24 (-1.31)	-0.98 (-0.93)	-0.63 (-0.65)	-0.09 (-0.57)
$\ln(\text{ratio of investment to GDP})$	0.08 (0.82)	0.02 (0.30)	-0.10 (-0.35)	-0.005 (-0.02)	0.002 (0.17)
$\ln(\text{size of labour force})$	0.89 (0.11)	-2.64 (-0.53)	-1.05 (-0.12)	-4.76 (-0.56)	-0.20 (-0.76)
<i>Sargan test stat. (p-value)</i>		2.98(0.225)	5.47(0.485)	5.47(0.485)	16.61(0.165)
<i>Arellano-Bond test of order 1 (p-value)</i>			-2.54(0.011)	-2.00(0.045)	-2.45(0.014)
<i>No. of observation</i>	77	77	77	77	119
<i>No. of group</i>	40	40	40	40	42

Notes:

1. z-statistic in parentheses
2. *** significant at 1% level
** significant at 5% level
* significant at 10% level.

To sum up, the analysis using dynamic panel GMM does not improve the robustness of the model developed earlier using static panel estimation of FE and RE. In other words, the robust results from the regression is only the results from FE model without the inclusion of $\ln GS^2$, i.e. equation (2) from Table 2. From the results, it could be inferred that in a case of Muslim countries, a small government could potentially be more efficient resulting from fewer policy-induced distortions, the greater discipline of market forces which fosters efficiency of resource used, and the absence of crowding-out

effects that weaken the incentives to create new capital which embodies new technologies (Dar & AmirKhalkhali, 2002). Nevertheless, positive labour contribution to economic growth seems to be very important among Muslim countries. It is believed that this is due to nature of most Muslim countries which are labour-intensive countries. Having said that labour and small size of government are the main contributors of growth, the role of government in the labour market seems very crucial. This includes the involvement of government in increasing human capital for the countries development.

The results also indicate the important of private sector role to promote growth in most Muslim countries. A larger government size is likely to be detrimental to efficiency and growth because of inefficient governmental operation, regulatory process imposes excessive burdens and costs on the economic system and many fiscal and monetary policies tend to distort economic incentives and lower productivity of the system (Ram, 1986). According to Kahf (1998), in Islam, the revealed guidance determines the areas of public interests, i.e. the economic objectives of the Islamic government. It also provides the constraints and criteria that guide the dynamic process of government behaviour. The role of government in Islam should therefore be viewed on the creation of work environment provided for all firms, projects, and individuals. It could be shown in the areas of contract enforcement and the law of market reward, enlarging the marketable human capital, creation and enhancement of development-conducive institutions and policies, measures for increasing the productivity of the poor and improving the efficiency of the market. By providing a favourable environment for investment and production, the state will help private sector to realize development and growth objectives to alleviate poverty and improve standard of living. The role of the state in this case is to supervise economic activities so as to prevent unfair competition, fraud, tax evasion, smuggling, corruption, etc.

CONCLUSION

The importance of government in Islam is to ensure the efficiency and provide provisions which cannot be accommodated by the market system. However, its expansion or contraction of role is never allowed to contract beyond the limits established in the Islamic law. Therefore, the size of government must be suitable for the development of the country. The critical role of governments for economic growth has also been gaining increasing



attention in the past half century. While many studies widely confirmed the institutional role of government in economic growth, the evidence from causal relationship is less conclusive. Different model specifications and sample data were contributed to the uncertainty of results in these studies. Studies which attempted to test the inverted-U relationship between government size and economic growth to determine optimal government size were also very rare, particularly studies on Muslim countries.

The present study attempts to utilise more efficient econometric methods on a sample of Muslim countries over a specific period of time in order to investigate relationship between government size and economic growth. It also attempts to identify optimal size of government (role of state) that maximise the economic growth of the countries by applying static and dynamic panel estimation. The findings indicate that small size of government contributes more on the economic growth of the countries. Besides, labour is also found to be an important factor that contributes to economic growth and positively contributes to growth as expected in theories. The results seem to be more robust by using fixed-effects model as compared to other static or even dynamic models, such as difference GMM or system GMM of one step or two steps. However, the study is unable to identify any optimal size of government for economic growth even with the attempt to include non-linear variable in the model.

Overall, our findings suggest that a smaller government size affects economic growth via productive government expenditure on growth rate and efficiency of resource used and efficiency of the public sector particularly among the Muslim countries.

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APPENDIX 1

Selected OIC countries in study

No.	Country	No.	Country
1	Afghanistan	27	Morocco
2	Albania	28	Mozambique
3	Algeria	29	Niger
4	Azerbaijan	30	Nigeria
5	Bahrain	31	Oman
6	Bangladesh	32	Pakistan
7	Benin	33	Qatar
8	Brunei	34	Saudi Arabia
9	Burkina Faso	35	Senegal
10	Cameroon	36	Sierra Leone
11	Chad	37	Sudan
12	Comoros	38	Tajikistan
13	Egypt	39	Togo
14	Gambia	40	Tunisia
15	Guinea	41	Turkey
16	Guyana	42	Turkmenistan
17	Indonesia	43	Uganda
18	Iraq	44	United Arab Emirates (UAE)
19	Jordan	45	Uzbekistan
20	Kazakhstan		
21	Kuwait		
22	Kyrgyz Rep.		
23	Lebanon		
24	Malaysia		
25	Mali		
26	Mauritania		