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Government size, country size, openness and economic growth in selected MENA countries

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Abstract

Purpose – *The purpose of this article is to examine the interconnected relationships between government size, country size, openness and economic growth. In fact, more trade openness increases government size, which plays stabilizer role against external shocks and GDP volatility. More country size leads to lower government share to GDP from one side and less openness from other side, whereas per capita expenditure on public goods is lower, and large markets enjoy more productivity and less incentives for large market to increase openness than the small markets. Finally, economic growth and government have a negative relationship if government size exceeds the optimal size.*

Design/methodology/approach - *We employ three models, which two of them are using 2SLS technique and the third model is using GMM system analysis to examine these relationships in eight selected MENA countries. Our panel data is for the period from 1977-2013 sourced from the World Development Indicators of the World Bank.*

Findings - *Results prove literature proposed hypotheses for the selected region and period, and show that government share to GDP exceeds the optimal size. Moreover, more growth can be realized through more integration in the world economy.*

Research limitations/implications – *Data limitation led to the inclusion of only eight countries of MENA region. We recommend to convert government expenditure to investment and infrastructure instead of social transfer and current expenditure. Furthermore, more studies could be done about the government expenditure structure. In addition, we recommend to minimize government intervention to the market. Finally, growth of government does not improve investment environment or reduce transactions costs, and it crowds out private sector.*

Originality/value – *This is the first work in MENA region, and using recent econometric techniques in subject according to our knowledge.*

Keywords: openness, country size, government size, economic growth and system GMM panel data.

JEL classification: H10, F43, C33

1. Introduction

It widely supposed that more open economies and highly integrated to the world economy have lower government intervention, and this would suggest negative association between openness degree and the government size, (Rodrik, 1998). In fact, many small and highly open countries have high government size such as Austria, Belgium, Norway and others, contrary, USA, Japan, Canada and others have small government spending and trade shares in GDP. The explanation is that government expenditure plays stabilizing role and guarantee government social role against external shocks, (Rodrik, 1998).

In addition, as much as country size is bigger per capita share of public expenditure and publicly provided goods are lower. This indicates a negative relationship between country size and government size. Furthermore, big countries have more resources, bigger markets, higher productivity and less incentives to be open as much as small countries. This suggests a negative relationship between country size from a side and each of government size and trade openness to the world economy from other side.

In fact, the analysis of the government size with respect to the economic growth has recently received a larger attention of empirical analysis. The existence of a relationship between the both variables firstly postulated by the German political economist Adolph Wagner (1911). Low government public expenditure level is important for market functioning, which is the main government role, and hence, government size and economic growth are positively related. On the other hand, high government expenditure rate hinder investment, production and involving in the market due to high tax rates and crowding out the private sector, which reflects a negative relationship between government size and economic growth. Therefore, government size and economic growth are strongly related.

This is first empirical work examines these hypotheses, according our knowledge, in selected MENA countries (Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, and Tunisia) using panel data for the period 1977 to 2013. We employ both two stages least squares and recent econometric method in the subject, which is GMM dynamic panel data system. We

proceed as follows: we review literature, present the models, show methodology and data, then we present estimation and finally conclude.

2. Literature review

Wide spread studies suggest that government size, country size and openness are interconnected. In addition, the previous work has suggested that there is a negative relationship between country size and government size from one side, and between country size and openness, from another side. This suggests the existence of a positive relationship between openness and government size.

The literature suggests that government size tends to be bigger as much as country more open, where government plays stabilizing role and guarantee government social role against external shocks, i.e. increasing trade openness leads to increase the external risks, which cause more volatility in income and consumption. This volatility can be reduced by greater share of government in GDP that comes through social welfare system particularly in the developed countries, (Rodrik, 1998). (Rodrik, 1998) indicates that positive relationship between openness and government size is not affected by the inclusion of other control variables, and prevails for both low and high income level countries. In addition, (Cameron,1978) explained that more open economies have a higher industrial concentration, which causes higher collective bargaining such as labor union and federation. This tends to foster the government transfers such as pensions, employment insurance, social security and job training, which reduce the external shocks and risks. Fatás, and Mihov, (2001) founds a strong negative correlation between government size and output volatility both for the OECD countries and across US states, which indicates stabilizer role of government, and positive relationship between openness and government size. It founds that one percentage point increase in government spending relative to GDP reduces output volatility by eight basis points, and from 13 to 40 basis points for OECD and US states, respectively.

Country size and government size negative relationship emerges when we can share the cost of non-rival public goods over larger population, per capita expenditure on these public goods is lower, which means lower government share in GDP, (Alesina and Spolaore 1997). In addition, monetary and financial system, public health, police and juridical system, national parks and other publicly provided goods indicate that per capita costs of these public goods declining as taxpayers increase, and government expenditure share over GDP is decreasing with GDP i.e. smaller countries have larger governments, and vice versa, (Alesina and Wacziarg 1998), Alesina (2003). Furthermore, urbanization may cause higher government spending, which may refer to Wagner's law where "the pressure of social progress" leads to increasing government size. The government increases public expenditure and investments on fields such as education and infrastructure under the rapid urbanization and industrialization, (Cameron,1978).

On the other hand, country size and openness negative relationship emerges where large markets enjoy more productivity through allowing more division of labor, which creates less incentives for large market to increase openness than the small markets, (Alesina et al. 2000).

In fact, the previous literature suggested the existence of the positive relationship between openness and government size, meanwhile, Alesina and Wacziarg (1998) casts doubt on the direct link between both variables that stated by Rodrik (1998), and they argue that mentioned link between both variables is mediated by country size. Anyway, they agreed the stabilizing role of the government in open economies, Alesina and Wacziarg (1998).

A related work by Ram (2009) indicates that while pooled OLS estimates with cross section data support the positive association between openness and government size. It founds that when cross-country heterogeneity is taken into consideration partially through the fixed-effects format, there is little evidence of a negative association of country size with either government size or openness. Therefore, it does not seem likely that positive association between openness and government size arises due to the mediating role of country size as Alesina and Wacziarg (1998) indicated. Hence, it founds the possibility of a direct link between openness and government size along the lines suggested by Rodrik (1998).

A wide literature discussed the optimal size of government and its impact on economic growth. Increasing government expenditure leads to more economic growth, which supported by Keynesian theory. On the other hand, after a specific limit, which is the optimal government size, more government share to GDP impacts negatively on growth. (Lamartina and Zaghini 2011) provided an empirical evidence for a positive relationship between government spending and GDP per capita using panel of 23 OECD countries, which reflects Wagner's law, as mentioned before. They found higher correlation between both variables in low GDP per capita countries suggesting stronger development impacts of government activities comparing to more developed economies, (high GDP per capita countries). Armey (1995) suggested a relationship between ratio of public expenditure to GDP and GDP variation, he formulated the mentioned relationship as "inverted U" shape curve. This argues that at very low level of government expenditure (government size) wouldn't enable government to take care of the market economy, and therefore can't guarantee a positive GDP growth rate. More government expenditure would enhance economic growth. On the other hand, very big government size discourage investment, production and market activities under high tax burden, which hindering economic growth. Moreover, if the productivity of public expenditure less than market economy productivity, with given input of factors of production, a high public expenditure suppresses the GDP growth,

Magazzino, (2012), (Forte and Magazzino 2011). Therefore, there is an optimal government size maximizes economic growth. If government expenditure exceeds that size, both government size and economic growth would associate negatively. On the other hand, if government doesn't exceed the optimal size, both variables relationship would still positive as Keynesian theory suggests. Friedman emphasized the important and positive role of government in a free open society. A suggested optimal size of public share of national income from 15% to 50%, the marginal contribution of the public sector will be negative. This optimal level is based on the country development level, Friedman (1997).

The mentioned controversial literature in the subject shows the importance of detection the relationship between government size and economic growth and the relationship between variables in MENA area during the mentioned period, especially, we don't find empirical work participate in answering these questions for the subject and region. Therefore, we examine trade openness, government size and country size relationship from one side. On the other hand, we detect the relationship between government size and economic growth. We apply two models of contemporaneous equations using two stages least squares method. In addition, we run a dynamic panel analysis to detect these relationships.

3. The Empirical Models

Trade openness: it's supposed to be associated positively with the government size, and negatively with country size. Openness is namely sum of exports and imports over the GDP, such as used exclusively in the past literature. More openness is potentially causes more external shocks and more income, consumption and GDP volatility.

Country size: it's supposed to be associated negatively with each of openness and government size. Population is the proxy of country size as used in the previous literature widely. Larger size causes larger market, more productivity and more resources from a side, and more taxpayers and less per capita expenditure on public goods from other side that causes less openness and less government share to GDP, respectively.

Government size: in addition to the last mentioned relationships, it's supposed to be associated negatively with economic growth when government size exceeds optimal government size, from a side, and positively when government size still less than the optimal size. For our sample, we predict a negative relationship between both variables whereas government size is relatively high compared to sample development level. In addition, the expenditure structure tends to more current and transfer payments than capital and investment expenditures. Government expenditure share over GDP is the proxy of the government size, such as used in the literature widely.

Economic growth: it's supposed to be associated negatively or positively with government size. GDP per capita growth is the proxy of economic growth such as used in the previous literature, its suitable for sample income level.

Basing on the previous empirical literature in the field, we derive three models for the empirical examination. The first model, shown in equations 1 and 2, detects the relationship between firstly, country size and trade openness from one side and government size from other side. Secondly, it detects the relationship between country size and trade openness. The second model, shown in equations 3, 4 and 5, includes the same relations, in addition to the relationship between government size and economic growth. Both models, first and second, are system equation model and estimated using Two Stage Least Squares (2SLS) method. The third model, shown in equations 6 and 7 detect transversely the relationship between government size and economic growth. In addition, it shows the relationships of each of country size an openness government size and economic growth. It's a dynamic model run dynamic panel data system, which is Arellano Bover Blundell Bond.

4. Two stage least squares estimation

4.1 Model One

Estimation of openness and government size equations individually might endure simultaneous equations bias due to some of the explanatory variables might not be truly exogenous. Consequently, we estimate the equations of openness and government size equations simultaneously. Equations 1 and 2 are used in the simultaneous analysis.

$$\mathbf{ln\ GOVsize} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{ln\ POP} + \boldsymbol{\beta_2}\mathbf{ln\ OPEN} + \boldsymbol{\epsilon} \quad (1)$$

$$\mathbf{ln\ OPEN} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \mathbf{ln\ GOVsize} + \boldsymbol{\alpha_2}\mathbf{ln\ POP} + \boldsymbol{\upsilon} \quad (2)$$

Where: GOVsize is government size that is ratio of government expenditure to GDP. POP is a population as a proxy of country size. OPEN is the trade openness measured by the sum of exports plus imports as a share of GDP. And ϵ and v are error terms. The parameters β_1, β_2 and α_1 , α_2 represent the elasticities of GOVsize and OPEN with respect to POP, OPEN and GOVsize, POP, respectively.

We aim to detect the relationship between government size and openness from one side, which expected to be positive. On the other hand, we detect the relationship between country size and each government size and trade openness, which expected to be negative for each.

4.2 Model Two

Estimation of openness and government size equations individually might endure equations bias due to some of the explanatory variables might not be truly exogenous. Consequently, we estimate the

equations of openness and government size equations simultaneously. Equations 1, 2 and 3 are used in the simultaneous analysis.

$$\mathbf{ln\ GOVsize} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{ln\ POP} + \boldsymbol{\beta_2}\mathbf{ln\ OPEN} + \boldsymbol{\epsilon} \quad (3)$$

$$\mathbf{ln\ OPEN} = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1}\ \mathbf{ln\ GOVsize} + \boldsymbol{\alpha_2}\mathbf{ln\ POP} + \boldsymbol{\upsilon} \quad (4)$$

$$\mathbf{ln\ GOVsize} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\mathbf{ln\ POP} + \boldsymbol{\beta_2}\mathbf{ln\ OPEN} + \boldsymbol{\beta_3}\mathbf{ln\ Growth} + \boldsymbol{\Upsilon} \quad \mathbf{(5)}$$

where: in addition to last variables in model 1, growth is economic growth proxied by GDP per capita growth. And ϵ, v and Y are error terms. The parameters β_1, β_2, β_3 and α_1, α_2 represent the elasticities of GOVsize and OPEN with respect to POP, OPEN, Growth and GOVsize, POP, respectively.

5. Dynamic Panel Data System

5.1 Model Three

In addition, we use the dynamic panel data GMM system approach which estimates the parameters from a system of equations. This method is important for the dynamic panel data analysis, and it the first use, according our knowledge, in the empirical studies related to subject and region. It shows the transversely connection between equations 6 and 7 for the areas and time zone mentioned before.

$$\Delta\ \mathbf{ln\ GOVsize} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\ \Delta\ \mathbf{ln\ GOVsize}_{t-1} + \boldsymbol{\beta_2}\ \Delta\ \mathbf{ln\ POP} + \boldsymbol{\beta_3}\ \Delta\ \mathbf{ln\ OPEN} + \boldsymbol{\beta_4}\ \Delta\ \mathbf{ln\ Growth} + \mu + \Delta\nu_t \quad (6)$$

$$\Delta\ \mathbf{ln\ Growth} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1}\ \Delta\ \mathbf{ln\ Growth}_{t-1} + \boldsymbol{\beta_2}\ \Delta\ \mathbf{ln\ POP} + \boldsymbol{\beta_3}\ \Delta\ \mathbf{ln\ OPEN} + \boldsymbol{\beta_4}\ \Delta\ \mathbf{ln\ GOVsize} + \mu + \Delta\nu_t \quad (7)$$

Where: $GOVsize_{t-1}$ and $Growth_{t-1}$ are the lagged variables of both dependent variables. These lagged independent variables are strong explanatory variables can explain the dependent variables. μ represents the unobserved country specific effects, and ν_t is the standard error. DPD system takes into consideration the cross country heterogeneity raise from pooled OLS estimation with cross section data. In addition, DPD system analysis provides more coherent estimation compared to fixed or random effect models, which addresses several biases related to heterogeneity across countries and time, Mitze (2010).

6. Econometric Methodology

The Two-Stage Least Squares (2SLS) is a well-known econometric technique and widely used in the literature. In fact, it used to estimate the parameters of a simultaneous equations when errors across the equations are not correlated and the equations concerned are over-identified or exactly identified, Mishra, (2008). Estimation of government size and openness equations individually might endure simultaneous equations bias due to some of the explanatory variables might not be truly exogenous. Consequently, we estimate the three equations simultaneously

Arellano-Bover, Blundell-Bond is a recent econometric technique, which is dynamic panel data system (DPD system) analysis. This method is based on the generalized method of moment GMM technique that has been widely used in empirical estimation of dynamic panel data models.

Blundell and Bond (1998) proposed system GMM estimators to overcome the inconsistent instrumental variables estimators caused by weak instruments. Firstly, they showed that the level GMM estimators by Arellano and Bover (1995) are free from weak instruments when even the parameters concerning the lagged variables is close to unity, and then combined the moment conditions, which are used in first differencing, and the level GMM estimators to improve the efficiency of the estimators, Hayakawa, (2005)

The dynamic panel data is GMM systems approach that estimates the parameters from a system of equations: the first differenced model using lagged levels of government size as instruments for the lagged difference of government size and growth, and the level model using lagged differences of government size as instruments for the lagged level of government size firstly, (similarly to growth). Secondly, use the difference instrumental variables in the model, Arellano and Bover, (1995); Arellano and Bond (1998); Blundell and Bond, (1998). Therefore, we run dynamic panel data system analysis, which is Arellano Bover Blundell Bond. In fact, we rely on the DPD system estimation to detect the relationship between government size and economic growth.

7. Data

This paper uses panel data of selected MENA countries (Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Syria, and Tunisia) for the period 1977 to 2013. We use openness, government size, country size and economic growth variables. Trade openness measured by the sum of exports plus imports as a share of GDP. Government size is ratio of government

expenditure to GDP. Population is a proxy of country size. GDP per capita growth is the proxy of economic growth. The proxies of our variables are widely used in the previous literature. We use each of openness, government size and economic growth as dependant variables as shown in models before. These variables, in addition to country size, are used as independent variables in the simultaneous equations, and transversely (government size and economic growth) in the dynamic model to detect the relationships of the variables. In addition, we have both government size and economic growth, which are the lagged variables of the two dependent variables in the dynamic model. All raw data of variables were collected from World Development Indicators of the World Bank. All variables are taken in logarithm. We use the variables in algorithm to get the elasticities, guarantee linearity and reducing any potential multicollinearity.

8. Results

The following tables show the estimation results of the previous three models, respectively. In addition, we provide a comparison between the different estimations. This provides more understanding for the relationships between the variables, and ensure or at least indicates more robustness of the estimations.

Table 1: Two Stage Least Squares estimation for equations 1 and 2.

	Pop	Open	Constant	F statistics	RMSE
Gov. Size	-.132***	.095**	.427	78.4***	.204
	(-8.13)	(2.08)	(1.65)		
	Gov	Pop	Constant	F statistics	RMSE
Open	.188**	-.199***	3.34***	87.05***	.286
	(2.08)	(-8.91)	(11.3)		

Figures in parentheses are t statistics. R^2: 0.4 and 0.42 for equation one and two, the symbols ***, **,* indicate significance at 1%, 5%, and 10% levels respectively.

Table 1 shows model one estimation. It shows highly and significant F-statistics and low root mean square errors RMSE, which presents model validity. All variables coefficients are significant at 5% at least, and R^2 is 0.4 and 0.42 for both equations, respectively. Estimation shows a positive relationship between openness and government size in both equations that in line with the literature. Increasing openness 1% increases government size of around 0.1%, meanwhile, increasing government size of 1% has stronger impact, which increases openness of 0.19%. Government spending share over GDP increase increases imports through government final consumption expenditure, which increases openness.

On the other hand, country size is associated negatively with each government size and openness that agrees the previous literature.

Table 2: Two Stage Least Squares estimation for equations 3, 4 and 5.

	Pop	Open	Growth	Constant	F statistics	RMSE
Gov. Size	-.133***	.095**	----	.45*	77.63***	.2
	(-8.09)	(2.06)		(1.7)		
	Gov	Pop		Constant	F statistics	RMSE
Open	.189**	-.2***	----	3.3***	84.91***	.29
	(2.06)	(-8.75)		(11.1)		
	Pop	Open	Growth	Constant	F statistics	RMSE
Gov. Size	-.13***	.108**	-.014**	.42	53.62***	.2
	(-7.91)	(2.32)	(-1.94)	(1.58)		

Figures in parentheses are t statistics. R^2: 0.4, 0.42 and 0.41 for equation one, two and three, the symbols ***, **,* indicate significance at 1%, 5%, and 10% levels respectively.

Table 2 shows model 2 estimation. It shows a robust model and it shows a very close parameters with identical relationships to model one. In addition, it shows a negative relationship between government size and economic growth as shown in the third equation. This indicates that the government size in the sample exceeding the optimal government size, which reflects in a negative association with economic growth. All variables coefficients are statistically significant at 5% at least. 1% increase in openness increases government size by around 0.1%. Meanwhile, 1% increase in country size decreases government size and openness by 0.13 and 0.2 respectively.

This indicates again to the positive relationship between openness and government size. These coefficients amounts are very close to model one results.

Table 3: Dynamic Panel Data System estimation for equations 6 and 7.

	L. Gov. Size	Pop	Open	Growth	Constant	chi2
Gov. Size	.74***	-.07***	.06**	-.011***	.72***	845.48***
	(21.59)	(-4.21)	(2.03)	(-3.83)	(2.94)	
H0: overidentifying restrictions are valid						274.8***
Arellano-Bond test for zero autocorrelation in first-differenced errors					Level 1	-1.9**

H0: no autocorrelation					Level 2	-.003***
	L. Growth	Pop	Open	Gov. Size	Constant	chi2
Growth	.33***	-.32	1.64***	-1.9***	3.1	72.3***
	(6.58)	(-1.33)	(3.25)	(3.15)	(.84)	
H0: overidentifying restrictions are valid						301.7***
Arellano-Bond test for zero autocorrelation in first-differenced errors					Level 1	-2.6**
H0: no autocorrelation					Level 2	-.023***

Figures in parentheses are z statistics. The symbols ***, **,* indicate significance at 1%, 5%, and 10% levels respectively.

Table 3 shows model 3 estimation. It shows a robust model, all variables coefficients are significant at 5% at least, except country size in the second equation. The lagged variables of government size and economic growth show the influence of past behavior of government and economy in the current government expenditure and current growth. In fact, current government size is strongly influenced by previous size. These coefficients in line with literature and expectation. Openness is associated positively with government size and growth whereas 1% increase in openness increases both variables by 0.06% and 1.6%, respectively. This agrees literature and our previous discussion. This indicates that more open countries have larger governments, besides, more openness and integration to the world economy is strongly enhancing economic growth. An increase of 1% of country size decreases government size of 0.07%, which indicates that larger countries have smaller governments. Furthermore, government size and economic growth are negatively associated, which indicates that governments in the sample exceeded the optimal size. A 1% increase in the ratio of government expenditure to GDP decreases GDP per capita growth of around 2%. Also, we can conclude that an increase in openness of 10% increases government size of 0.6%, which decrease growth of around 1% (0.6 * 1.9), meanwhile, there is a direct increase of growth of 16.4% as a result of openness increase of 10%. This causes a net increase of GDP per capita growth of around 15%. The concept behind that more open economy is more attractive to FDI and penetrate more foreign markets.

Finally, as shown in table 3, the null hypothesis of no autocorrelation can't be rejected for the first and second order as shown in Arellano-Bond test for zero autocorrelation in first-differenced errors. In addition, Sargant test shows that all moment restrictions are satisfied for the dynamic specifications can't be rejected. This means that the instruments are valid, model is robust and correctly specified.

9. Conclusions

Country size associated negatively with openness, which related positively with government size. This shows the negative relationship between country and government size that proved directly also. These propositions have been proved in government size and openness equations in the three model. In addition, the selected countries can realize more growth through more integration in the world economy. There is can be shown through the positive relationship between openness with economic growth.

As shown in results, we found negative relationship between government size and economic growth, which is one of main interest in this work. This negative relationship shows that the selected countries lay on the downward part of Armey curve, which means growth of government does not improve investment environment or reduce transactions costs or it crowds out private sector. Hence, we recommend to minimize government intervention to the market. On the other hand, this evidence suggests that government payments structure of large current and transfer payments impacts negatively on growth. It recommended to shift payments from public spending consumption towards public investment spending on education, transports, health and R & D, which increases income, welfare, reduce cost of doing business, enhance private sector work environment and facilitating market production. In addition, government should build legal and institutional factors such as maintain law effectiveness and enforceable of property rights. These suggestions could be potential for further studies. Finally, these recommendations enhance more openness and integration to world economy, which support growth. This increases government size and convert it into optimal size.

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