Applied Economics and Finance; Vol. 10, No. 3; 2023
ISSN 2332-7294 E-ISSN 2332-7308
Published by Redfame Publishing

Energy Subsidies and Social Public Expenditures in Emerging and Developing Countries

Bi Guessan Nestor BRITON[1] & Zié BALLO[2]

[1] PhD Student in Economics, Alassane Ouattara University, Côte d'Ivoire

[2] Department of Economics, Félix Houphouët Boigny University, Côte d'Ivoire

Correspondence: Bi Guessan Nestor BRITON, PhD Student in Economics, Alassane Ouattara University, Côte d'Ivoire. E-mail: gnestorbritonbi@gmail.com

Received: February 2, 2023 Accepted: April 13, 2023 Available online: August 2, 2023

doi:10.11114/aef.v10i3.5903 URL: https://doi.org/10.11114/aef.v10i3.5903

Abstract

This article examines the effect of energy subsidies on social public expenditures for a sample of 57 emerging and developing countries over the period 2004-2019. The results of the system-based GMM approach reveal that energy subsidies negatively and significantly influence social public expenditures in the full panel, the poor, and resource-rich countries in our sample. These results confirm a political implication that consists in rationalizing energy subsidies in order to raise funds to support social public expenditures in emerging and developing countries.

Keywords: energy subsidies, human capital spending, SGMM

1. Introduction

Despite the excessive budgetary cost of energy subsidies, they continue to be supported by many countries, in particular emerging and developing countries over recent decades. On a global scale, the fiscal cost of energy subsidies increased from USD 3631.3 billion in 2010 to USD 8115.03 billion in 2019, an increase of 55.3%, more than half of which went to emerging and developing countries (International Monetary Fund, 2021). Indeed, the objectives of the energy subsidies were to facilitate access to energy for a large segment of the population through a reduction in energy prices both for consumption and for production. But, from experience, the objectives still do not seem to have been achieved insofar as energy subsidies go towards the richest social groups (International Monetary Fund, 2019).

Strong evidence of the control of energy subsidies by wealthy households is verified through their high level of energy consumption. Thus, Salehi-Isfahani and Deutschmann (2015), in a study, realize that in Iran 19.2% of subsidies went to the wealthiest decile and only 6% to the poorest. Just like Cooke et al., (2016) admit that in Ghana 78% of fuel subsidies were attributable to the richest while 3% went to the poorest quintile. They also result in over-consumption of energy, very uncompetitive energy prices, and budgetary imbalances likely to affect social expenditures such as education and health (Fattouh and El-Katiri 2017; Coady and 2017; International Monetary Fund 2019). In an empirical study, Ebeke and Lonkeng Ngouana (2015) find a negative and significant effect of energy subsidies on social spending in low- and middle-income countries. Despite its adverse effects, some countries are reducing public social spending on other budget items, including education and health in favor of energy subsidies (Ebeke and Lonkeng Ngouana 2015; Clements et al., 2013; International Monetary Fund, 2019). This situation is problematic and gives rise to in-depth reflection in this study. Thus, analyzing the effect of energy subsidies on social spending in emerging and developing countries is of particular interest.

Furthermore, the choice of emerging and developing countries is justified by their high concentration of energy subsidies. In 2019, China had the largest energy subsidies at $3,862.4 billion, which compares to the United States ($931.4 billion in subsidies), India ($485.6 billion), Russia ($404.6 billion) and the European Union ($233.6 billion) according to the International Monetary Fund (2021). We contribute to the existing literature on energy subsidies and social spending in emerging and developing countries. However, the main novelty of this document is that it analyzes the effect of energy subsidies on social public expenditures by decomposing it according to natural resource endowments. This will allow public decision-makers to identify more robust policies.

The objective of this study is to extend the existing literature by examining the role of energy subsidies in reducing public spending allocated to both education and health in the case of emerging and developing countries. Specifically, it will examine the effect of energy subsidies on social public expenditures according to natural resource endowments.

Examination of the in-depth literature reveals that this issue has not been the subject of previous studies to our knowledge. To examine the effect of energy subsidies on social public expenditures, this study adopts an econometric approach known as the generalized method of moments, for a period from 2004-2019. This technique is usually used in the presence of a short panel "with a small T and a large N" (Judson and Owen, 1999), known as the generalized method of moments (GMM) of Arellano and Bond (1991) and Arellano and Bover (1995).

The rest of the paper is organized as follows. The literature review is in section 2 while section 3 focuses on data analysis and study methodology. Section 4 presents the results and discussions of the study. The conclusions and resulting policy implications are presented in section 5.

2. Literature Review

Wagner's (1883) theoretical analysis of the determinants of public social expenditure argues that as an economy grows, it is accompanied by an intensive increase in activities. Sagarik (2014) presents Wagner's law (1883) in three dimensions, the first of which relates to the promotion of industrialization, the second to the increase in household income and, the last to the monopoly of the private sector which must be under the control of the public sector.

Thus, each of these dimensions has been adopted in the literature by authors to examine economic growth and other macroeconomic variables on public social expenditure (Dorf and Freiholtz 2014; Eggoh and Sossou 2015; Jibir and Aluthge 2019; Kotera and Okada 2017; Attari and Javed 2013). Maluleke 2017; Nganyi and Atheru (2019) find a positive and insignificant effect of domestic debt on public spending in developing countries. Turan and Mesut (2016) find a positive and significant effect of trade on social spending in South Korea, while a negative effect is observed in Turkey. Haile and Niño-Zarazúa (2018) study the effect of social spending on education and health on the overall well-being of low- and middle-income countries for the period 1990-2009. The results of the 2SLS, FE and SGMM estimators indicate that social spending has a positive and significant effect on welfare. Mussagy and Babatunde (2015) assessed the relationship between public expenditure on education and economic growth in Mozambique over the period 1996 to 2012. The results admit a negative effect of education expenditure on growth. Aladejare (2019) indicated that the main determinants of government spending in Nigeria are attributable to oil prices and revenues. Providing summary, economic growth, democracy, corruption, political instability, population growth, oil income, oil price, inflation, trade openness, and life expectancy are the main determinants of social spending. However, the energy subsidies variable seems to be overlooked in the analysis of the determinants of public social spending.

Due to the multitude of articles and comprehensive surveys on energy subsidies, we focus on the most recent. Indeed, energy subsidies constitute a significant part of the budget in countries, in particular emerging and developing countries (International Monetary Fund, 2019; Moerenhout 2022; McCulloch and Yang 2020), and in some cases comparable to the budgets allocated to social spending on education and health (Clements et al., 2013; Ebeke and Lonkeng Ngouana 2015). Sdralevich et al., (2014) revealed that energy subsidies are powerful pro-cyclical destabilizers in countries importing oil resources. Fattouh and El-Katiri (2017) report that in Egypt, total public expenditure on energy subsidies was equal to combined expenditure on health and education; as were fuel subsidies in Jordan before the 2008 fuel price reform. Foo and Salim (2020); Moghaddam and Wirl (2018); Kojima (2016) provide detailed surveys of single country and/or multi-country studies that address energy subsidies. For example, Ebeke and Lonkeng Ngouana (2015) find a negative correlation between energy subsidies and social spending on education and health in 109 low- and middle-income countries. They also find that oil rents are a positive externality of energy subsidies to improve social spending on human capital. Awan and Faraz 2019 studied the effect of electricity subsidies on household welfare in Pakistan. They conclude that electricity subsidies have a much more favorable effect on wealthier social groups. Using a stochastic approach, Badli et al. (2020) confirm the inefficiency of fuel subsidies on public social spending in Indonesia between 1996-2017. Hahn and Metcalfe (2021) study the efficiency and equity of energy subsidies in the case of an American company. They conclude that natural gas subsidies appear to reduce household welfare. In addition, no study has mentioned the effect of energy subsidies on social public expenditures according to the natural resource endowments of countries, particularly emerging and developing countries to our knowledge.

3. Methodology and Data

This section has two main axes. The first concerns the presentation of the data and the second presents the methodology adopted in the study.

3.1 Data

This paper focuses on a panel of 57 emerging and developing countries covering the period from 2004-2019. The choice of the time dimension is linked to the availability of data on energy subsidies. Energy subsidies are taken from the International Monetary Fund database and, the other variables of the study are taken from two sources, namely the World Development Indicator (WDI) for social spending on education and health, the trade openness, inflation, GDP growth per capita, and the Freedom House Democracy Index.

3.2 Estimation Method

At the beginning of the regression analyses, the model is initially estimated by the ordinary least square's method, without or with the fixed and random effects by country, as well as with the temporal effects. However, a number of econometric problems arise with this type of estimator, insofar as it ignores the endogeneity of variables and the cross-sectional dependence between individuals. Under these conditions, it is not practical to use the OLS estimation technique which turns out to be less robust Arellano and Bond (1991) and Baltagi (2008), given that it can lead to biased results due to the presence of the lagged dependent variable on the right of the equation and above all correlated with the error term.

Inspired by the limits of the OLS estimator, we adopt the GMM estimation technique developed by Holtz-Eakin and Rosen (1988), Arellano and Bond (1991) and Arellano and Bover (1995). The choice of the GMM approach is based on its ability to overcome the previously observed limitations. Indeed, the generalized method of moments is consistent with groups of countries where the number of individuals (N) is greater than the number of time series (T) (Judson and Owen 1999). This implies that N is strictly greater than T, and turns out to be one of the essential conditions for the application of the GMM method. The model takes the following form:

$$DKH_{i,t} = \sigma_0 \quad \sigma_1 DKH_{i,t-1} \quad + \sigma_2 ESUBV_{i,t} \quad + \quad \sum_{j=1}^{n=6} \lambda_j X_{j,i,t-1} \quad + \quad \eta_i \quad + \quad \varepsilon_{i,t} \quad + \qquad [1]$$

i = 1,……..……,N ; t = 1,……..,T

Where, $ESUBV_{i,t}$ represents the energy subsidies of country i in period t ; $DKH_{i,t}$ denotes the sum of social spending on education and health of country i in period t ; X is the vector of the control variables (inflation, democracy, GDP growth per capita, trade openness and squared GDP growth per capita) ; η_i is the country-specific effect et ε_{it} is the error term et σ_0 is a constant.

4. Results and Discussions

In this section, we will interpret the results obtained using the stata 16 software. First, we will analyze the results of the descriptive statistics reported in Tables 1. And finally, we will discuss the results of the study reported in Table 2.

4.1 Descriptive Statistics

Table 1 presents the summary results of the descriptive statistics . One of the major objectives of descriptive statistics is to find from the means that the variables are comparable, and also from the standard deviations that they (variables) vary significantly. Therefore, possible relationships could be inferred from the corresponding estimates.

Table 1. Summary of descriptive statistics

Types of samples	Variables	Obs.	Mean.	Std. Dev.	Min	Max
Global sample	Social spending	756	6.245	2.715	1.081	16.699
	Energy subsidies	884	1.690	2.697	0	19.222
Resource-rich	Social spending	231	5.755	2.307	1.679	13.519
	Energy subsidies	282	2.471	3.518	0	19.222
Non-resource-rich	Social spending	525	6.460	2.852	1.081	16.699
	Energy subsidies	602	1.324	2.117	0	14.764

Source: Authors based on the overall results reported in appendix A3,A4&A5

The standard deviation of energy subsidies in countries with high natural resource endowments (3.518) is much larger than those of countries with low resource endowments (2.117) and the entire panel (2.697) considered. This implies that countries rich in natural resources tend to subsidize energy more than countries with a low natural resource endowment. On the other hand, countries with a better endowment in natural resources record the lowest standard deviations in terms of social spending.

To sum up, only the standard deviations of the energy subsidies of the full panel and of the countries endowed with natural resources are the most remarkable while those of the poor countries are less significant and require further analysis. To this end, one could draw the conclusion that the policy of energy subsidies in emerging and developing economies would result in less favorable effects on social expenditure. However, it is important to remember that the

conclusions drawn from the previous descriptive analysis are only presumptive. Thus, we will try to verify them empirically using a dynamic approach called the generalized method of moments (GMM) in the next section.

4.2 Analysis and Discussion of Results

The results in Table 2 illustrate that one-period lagged social spending is positive and statistically significant in the model specifications, implying the dynamic nature of our equations.

Table 2. Effect of energy subsidies on social public expenditures : SGMM estimations

	Full Panel	**Resource-rich**	**Non-resource-rich**
Social spending (t-1)	0.9075***	0.8923***	0.8803***
	(0.0105)	(0.0238)	(0.0147)
Energy subsidies	**-0.0504*** **	**-0.0569** **	**-0.0265*** **
	(0.0148)	**(0.0232)**	**(0.0085)**
Trade	0.0023***	-0.0027	0.0051***
	(0.0008)	(0.0026)	(0.0011)
Democracy	1.2813***	3.3538***	2.0119***
	(0.1695)	(0.8511)	(0.3683)
Inflation	-0.0219***	-0.0123*	-0.0281***
	(0.0079)	(0.0268)	(0.0033)
Gdppcgwth	-0.0730***	-0.0643***	-0.0933***
	(0.0106)	(0.0212)	(0.0045)
SqGdppcgwth	0.0100***	0.0138***	0.0124***
	(0.0011)	(0.0032)	(0.0007)
Constant	0.5583***	0.7214***	0.4420***
	(0.0718)	(0.1369)	(0.0561)
AR (1) test (p value)	-4.45 (0.000)	-2.71 (0.005)	-3.57 (0.000)
AR (2) test (p value)	0.83 (0.406)	-0.10 (0.924)	1.45 (0.147)
Hansen test (p value)	41.49 (0.121)	9.58 (0.227)	36.78 (0.219)
Instruments	40	18	39
Number of countries	57	18	39
Observations	527	160	367

Source : Authors from stata 16 Note: Standard deviation in brackets * p < 10%, ** p < 5%, *** p < 1%

The results in Table 2 show that energy subsidies are negative, suggesting that they negatively influence social spending in the reference sample, in resource-rich and resource-poor countries. In resource-rich countries, a 5% increase in energy subsidies results in a 0.0569% decrease in social spending. While in countries poor in natural resources, a 1% increase in energy subsidies leads to a decrease of 0.0265% in social expenditure. These results are consistent with those in Tables 1, where the standard deviations of social spending in non-resource-rich countries are higher than in resource-rich countries. They are also consistent with the empirical analysis of Ebeke and Lonkeng Ngouana (2015).

In fact, the downward trend in social spending on education and health is due to poor allocation of budgetary resources, corruption, political instability and armed rebellion which very often confront countries with strong natural resource endowments. So that the priority for the decision-makers is to direct a significant part of the budgetary resources of the State to the purchase of weapons to ensure the security of the goods and services of people and the population to the detriment of the social expenditure of education and health. Trade has a positive and statistical effect on social spending on education and health in almost all model specifications. We assume that this positive effect would be due to the volatility of prices of products from developing economies on the world market. This finding is consistent with the results of the empirical study by Turan and Mesut (2016). For democracy, the results indicate a positive and statistically significant effect on social expenditure on human capital in all specifications of the model. We assume that the institutional variable has substantially affected social spending on education and health. This result is consistent with the literature of Kotera and Okada (2017) which argues that a democratic political regime would lead to improved social spending on human capital. Inflationary pressure is one of the serious macroeconomic problems that many emerging and developing countries sometimes face, and is less favorable to the macroeconomic indicators of these countries. The empirical results of this study confirm this state of affairs through a negative and significant effect of inflation on social expenditure on human capital in all specifications of the model. Indeed, a 10% increase in inflation contributes to a considerable decrease in social expenditure on human capital by 0.219%, 0.123% and 0.281% respectively. Moreover, this result could translate into a failure of the monetary system of most of these countries in terms of quality, efficiency, and availability of asymmetric information (Sassi and Goaied 2013; Law and Singh 2014). This result corroborates the empirical hypothesis of Attari and Javed (2013). GDP growth per capita has a negative and significant impact on social spending on education and health in all specifications of the model. This result seems to be surprising, but on the other hand, agrees with the literature of Devarajan and Zou (1996); Mussagy and Babatunde (2015) and Eggoh and Sossou (2015). Indeed, it could be explained by the degree of inefficiency with which these expenditures are converted into a stock of human capital and the low quantity of resources devoted to each component of human capital. Also, spending

on human capital can be considered as an input in the production of health and education. Therefore, the negative effect of education and health on growth can be justified by the inefficiency of the human capital production process (Grossman, 1972). On the other hand, the growth of GDP per capita squared is positive and significant in all specifications of the model.

5. Conclusion

This study examines the effect of energy subsidies on social public expenditures in 57 emerging and developing countries for the period 2004-2019. The main results of the system-based GMM approach revealed that energy subsidies negatively and significantly affect social spending in the full panel, the poor, and resource-rich countries (with an accentuated effect in resource-rich countries).

Our findings have important policy implications. Decision-makers must reallocate public resources to spending considered more productive, such as social spending on education and health. They should also rationalize energy subsidies in order to raise funds to support other social spending such as education and health in emerging and developing countries, in particular, in resource-rich countries where energy subsidies are less beneficial to social spending on human capital.

In addition, these countries in question will need more effective policies likely to guarantee the spending allocated to education and health, by introducing stricter laws that impose transparency in the management of energy subsidies.

Finally, as energy subsidies and inflation have been shown to reduce social spending, policymakers in the countries included in our sample need to focus on trade and democracy to improve social spending issues in education and health in emerging and developing countries.

Acknowledgements

We are grateful to Dr. Yohou Hermann from the World Bank for valuable comments. The ideas developed in this document are those of the authors and do not necessarily reflect those of their respective institutions.

References

Aladejare, S. A. (2019). Testing the Robustness of Public Spending Determinants on Public Spending Decisions in Nigeria. *International Economic Journal, 0*(0), 1-23. https://doi.org/10.1080/10168737.2019.1570302

Arellano, M., & Stephen, B. (1991). Some Tests of Specification for Panel Carlo : Monte Carlo Evidence and an Application to Employment Equations. *Oxford University Press, 58*, 277-97. https://doi.org/10.2307/2297968

Arellano, M., & Olympia, B. (1995). Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics, 68*(1), 29-51. https://doi.org/10.1016/0304-4076(94)01642-D

Attari, M., Irfaf, N. J., & Attiya, Y. J. (2013). Inflation, Economic Growth and Government Expenditure of Pakistan: 1980-2010" *5*(13), 58-60. https://doi.org/10.1016/S2212-5671(13)00010-5

Awan, H. S, G. Samad, & N. Faraz. (2019). Welfare Analysis of Electricity Subsidies in Pakistan. *PIDE Working Papers 164*, 22.

Badli, S., Raja, M., Nazamuddin, Muhammad, N., T. Zulham, Jumadil, S. S., & Helmi, N. (2020). Investigating the Efficiency of Government Expenditure on Energy Consumption (Fuel) Subsidy Policy in Indonesia: An Application of Stochastic Frontier Model. *International Journal of Energy Economics and Policy, 10*(4), 161-65. https://doi.org/10.32479/ijeep.9507

Baltagi, B. H. (2008). *Econometric Analysis of Panel Data, 4th Edition, Chichester: John Wiley & Sons*., *5.* https://doi.org/10.3109/00498257509056115

Clements, B., David, C., Stefania, F., Sanjeev, G., Trevor, A., & Carlo, S. (2013). *La Réforme Des Subventions à l ' Énergie: Enseignements et Conséquences*.

Coady, D., Ian, P., Louis, S., & Shang, B. P. (2017). How Large Are Global Fossil Fuel Subsidies? *World Development, 91,* 11-27. https://doi.org/10.1016/j.worlddev.2016.10.004

Cooke, Edgar F. A., Sarah, H., Luca, T., John, C., & Abdel, R. El Lahga. (2016). Estimating the Impact on Poverty of Ghana's Fuel Subsidy Reform and a Mitigating Response. *Journal of Development Effectiveness, 8*(1), 105-28. https://doi.org/10.1080/19439342.2015.1064148

Devarajan, S., Vinaya, S., & Heng-fu, Z. (1996). The Composition of Public Expenditure and Economic Growth. *Monetary Economics, 37.* https://doi.org/10.1016/0304-3932(96)01249-4

Dorf, J., & Martina, F. (2014). *Corruption and Health in Sub-Saharan Africa.*

Ebeke, C., & Constant, L. N. (2015). Energy Subsidies and Public Social Spending: Theory and Evidence. *IMF,*

15(101), 1. https://doi.org/10.5089/9781475580747.001

Eggoh, J., Hilaire, H., & Gilles-Armand, S. (2015). Education, health and economic growth in african countries. *Journal of economic development, 40*(1), 93-111. https://doi.org/10.35866/caujed.2015.40.1.004

Fattouh, B., & Laura, E. K. (2017). A Brief Political Economy of Energy Subsidies in the Middle East and North Africa. *International Development Policy,* 1-11.

Foo, N., Lean, H. H., & Salim, R. A. (2020). *What are the determinants of fuel subsidies in Asia-Pacific Economic Cooperation countries?* (No. 1176). ADBI Working Paper Series.

Grossman, M. (1972). *On the Concept of Health Capital and the Demand for Health.* https://doi.org/10.1086/259880

Hahn, R. W., & Robert, D. M. (2021). Efficiency and Equity Impacts of Energy Subsidies. *American Economic Review, 111*(5), 1658-88. https://doi.org/10.1257/aer.20180441

Haile, F., & Miguel, N. Z. (2018). Does Social Spending Improve Welfare in Low-Income and Middle-Income Countries? *Journal of International Development, 30*(3), 367-98. https://doi.org/10.1002/jid.3326

Holtz-Eakin, D., Whitney, N., & Harvey, S. R. (1988). Estimating Vector Autoregressions with Panel. *Society, 56*(6), 1371-95. https://doi.org/10.2307/1913103

International Monetary Fund. (2019). Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. *IMF Working Papers, 19*(89), 1. https://doi.org/10.5089/9781484393178.001

International Monetary Fund. (2021). *IMF Energy Subsidies Database.*

Jibir, A., & Chandana, A. (2019). Modelling the Determinants of Government Expenditure in Nigeria. *Cogent Economics and Finance, 7*(1). https://doi.org/10.1080/23322039.2019.1620154

Judson, R. A., & Owen, A. L. (1999). Estimating dynamic panel data models: a guide for macroeconomists. *Economics letters*, *65*(1), 9-15.

Kojima, M. (2016). Fossil Fuel Subsidy and Pricing Policies: Recent Developing Country Experience. *Fossil Fuel Subsidy and Pricing Policies: Recent Developing Country Experience*, no. January. https://doi.org/10.1596/1813-9450-7531

Kotera, G., & Keisuke, O. (2017). How Does Democratization Affect the Composition of Government Expenditure?" *Journal of Economic Behavior and Organization, 137,* 145-59. https://doi.org/10.1016/j.jebo.2017.03.004

Law, S. H., & Nirvikar, S. (2014). Does Too Much Finance Harm Economic Growth? *Journal of Banking Finance, 41*, 36-44. https://doi.org/10.1016/j.jbankfin.2013.12.020

Maluleke, G. (2017). The Determinants of Government Expenditure: Analysis of the Empirical Literature from 1995 To 20161. *Acta Universitatis Danubius. Œconomica*, *13*(2), 212-219.

McCulloch, N., Tom, M., & Joonseok, Y. (2020). *Fuel Subsidy Reform and the Social Contract in Nigeria: A Micro-Economic Analysis*. https://doi.org/10.1016/j.enpol.2021.112336

Moerenhout, T. (2022). "Energy Subsidies," 545–65. https://doi.org/10.1007/978-3-030-86884-0_27

Moghaddam, H., & Franz, W. (2018). Determinants of Oil Price Subsidies in Oil and Gas Exporting Countries. *Energy Policy, 122*(July), 409-20. https://doi.org/10.1016/j.enpol.2018.07.045

Mussagy, I. H., & Musibau, A. B. (2015). Government spending on education and economic growth in mozambique : a cointegration approach.

Nganyi, S. M., Jagongo, A., & Atheru, G. K. (2019). Determinants of government expenditure on public flagship projects in Kenya. *International Journal of Economics and Finance*, *11*(6), 133-144. https://doi.org/10.5539/ijef.v11n6p133

Sagarik, D. (2014). Educational Expenditures in Thailand: Development, trends, and distribution. *Citizenship, Social and Economics Education*, *13*(1), 53-66. https://doi.org/10.2304/csee.2014.13.1.54

Salehi-Isfahani, D., Bryce, W. S., & Joshua, D. (2015). The Reform of Energy Subsidies in Iran: The Role of Cash Transfers. *Emerging Markets Finance and Trade, 51*(6), 1144-62. https://doi.org/10.1080/1540496X.2015.1080512

Sassi, S., & Mohamed, G. (2013). Financial Development , ICT Diffusion and Economic Growth : Lessons from MENA Region. *Telecommunications Policy, 37*(4-5), 252-61. https://doi.org/10.1016/j.telpol.2012.12.004

Sdralevich, C., Randa, S., Younes, Z., & Giorgia, A. (2014). *Subsidy Reform in the Middle East and North Africa*. *IMF*. https://doi.org/10.5089/9781498350433.087

Turan, T., & Karakas, M. (2016). The effect of trade openness and income on the size of a government. *Transylvanian*

Review of Administrative Sciences, *12*(47), 164-178.

Wagner. (1883). Three Extracts on Public Finance Translated and Reprinted in R. A. Musgrave and A.T. Peacock (Eds), Classics in the Theory of Public Finance. London: Macmillan." *Classic in the Theory of Public Finance*.

APPENDIX

Table A.1. List of emerging and developing countries

Albania	Dominican Republic	Mauritania
Algeria	Ecuador	Mexico
Angola	El Salvador	Moldova
Armenia	Gabon	Mozambique
Azerbaijan	Georgia	Myanmar
Bangladesh	Ghana	Nepal
Belarus	Guatemala	Pakistan
Benin	Haiti	Paraguay
Bolivia	Honduras	Peru
Botswana	India	Philippines
Brazil	Indonesia	Rwanda
Burkina Faso	Jordan	Sri Lanka
Cambodia	Kazakhstan	Tanzania
Cameroon	Kenya	Thailand
China	Kyrgyz Republic	Togo
Colombia	Lebanon	Ukraine
Congo, Republic of	Lesotho	Vietnam
Costa Rica	Madagascar	Zambia
Côte d'Ivoire	Mali	Zimbabwe

Table A.2. List of countries according to natural resource endowments

Resource-rich	**Non-resource-rich**	
Algeria	Albania	Jordan
Angola	Armenia	Kyrgyz Republic
Botswana	Azerbaijan	Lebanon
Brazil	Bangladesh	Lesotho
Cameroon	Belarus	Mali
Congo, Republic of	Benin	Mexico
Côte d'Ivoire	Bolivia	Moldova
Gabon	Burkina Faso	Myanmar
Ghana	Cambodia	Nepal
India	China	Pakistan
Kazakhstan	Colombia	Paraguay
Kenya	Costa Rica	Peru
Madagascar	Dominican Republic	Philippines
Mauritania	Ecuador	Rwanda
Mozambique	El Salvador	Sri Lanka
Tanzania	Georgia	Thailand
Zambia	Guatemala	Togo
Zimbabwe	Haiti	Ukraine
	Vietnam	
	Indonesia	
18	**39**	

Table A3. Descriptive statistics for full panel

Variable	Obs.	Mean.	Std. Dev.	Min	Max
Public spending	756	6.245	2.715	1.081	16.699
Energy subsidies	884	1.690	2.697	0	19.222
Trade	905	74.548	32.523	0.167	210.40
Democracy	912	0.101	0.116	0	0.690
Inflation	900	6.336	10.165	-3.749	255.305
Gdppcgwth	912	3.031	4.005	-18.491	32.997
sqGdppcgwth	884	25.217	57.625	0.0004	1088.806

Table A4. Descriptive statistics resource-rich countries

Variable	Obs.	Mean.	Std. Dev.	Min	Max
Public spending	231	5.755	2.307	1.679	13.519
Energy subsidies	282	2.471	3.518	0	19.222
Trade	285	71.085	25.308	22.105	148.586
Democracy	288	0.081	0.075	0	0.272
Inflation	281	7.841	15.832	-2.430	255.305
Gdppcgwth	288	2.089	4.160	-18.491	18.065
sqGdppcgwth	288	21.615	39.990	0.0014	341.922

Table A5. Descriptive statistics non-resource-rich countries

Variable	Obs.	Mean.	Std. Dev.	Min	Max
Public spending	525	6.460	2.852	1.081	16.699
Energy subsidies	602	1.324	2.117	0	14.764
Trade	620	76.140	35.254	0.167	210.400
Democracy	624	0.110	0.131	0	0.690
Inflation	619	5.653	5.938	-3.749	59.219
Gdppcgwth	624	3.466	3.858	-14.379	32.997
sqGdppcgwth	624	26.879	64.112	0.0004	1088.806