E-ISSN 2240-0524
ISSN 2239-978X

Journal of Educational and Social Research

Vol 9 No 3
September 2019

sciendo

Research Article

Testing the Association between State Capacity and Primary Schooling in the Middle East and North African (MENA) Region, 1971–2014

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Doi: 10.2478/jesr-2019-0021

Abstract

Although the Middle East and North Africa (MENA) region has exhibited substantial progress over the past 40 years in improving primary schooling, marked variations in these achievements are evident within the region. This is an interesting puzzle if we recognize the MENA region is highly homogeneous in terms of religion, politics and socio-economic structure. We argue that in this paper, differences in state capacity–the degree to which MENA states attains desired primary education goals–contribute to these variations. To substantiate our argument, we applied different state capacity indicators and tested their impacts on primary schooling for the period 1971–2014. Empirical findings largely support our observations and results still hold with alternative indicators and model specifications. These findings have policy and academic implications for the study of state capacity, primary education and the MENA region.

Keywords: *State capacity, Primary education, Middle East and North Africa (MENA), Enrollment, Dropout*

1. Introduction

Among the United Nations' (UN) Millennium Development Goals (MDGs) was a statement that all primary school-aged children should be able to finish a "full course of primary schooling" by 2015 (United Nations[UN], 2016, p. 24). The MDGs raised the questions of why primary education cannot be ignored. First, scholars, such as Brown and Hunter (2004); Glewwe (1996); Psacharopoulos and Patrinos (2004) agree that primary education has the highest (economic) return on investment compared to secondary and tertiary education, particularly in developing and less-developed states. Second, primary education is a public service, the outcome of which can be evaluated directly by assessing whether those who need it actually receive this service (Assaad, Salehi-Isfahani, & Hendy, 2015; Brown & Hunter, 2004; Thyne, 2006, p. 736). Third, achieving universal primary education is the goal of many international organizations and governments (Thyne, 2006; UN, 2016). For these reasons, MDGs have focused on primary education. Likewise, we find that emphasizing primary education is merited, particularly in the Middle East and North Africa (MENA) region.[1]

[1] *We follow the division of developing regions of the World Bank, namely Sub-Saharan Africa, East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, and South Asia (World Bank 2018c). There is no universally accepted definition of MENA. Algeria, Egypt, Libya, Morocco, and Tunisia are five political entities widely recognized by international and national agencies as North African*

Regarding the goal of achieving universal primary education, the MENA region has performed moderately well overall. In some cases, it has fared even better than most other areas defined by the World Bank (2018b). The MENA region made the third greatest progress toward net primary education enrolment rate growth (a 23.07% increase from 69.44% during 1976–2014) among all regions worldwide (See Figure A1 in the Appendix). Compared to other developing regions, where states exhibited either high or low performance in educational attainment, the MENA region is notably unique in that it is highly homogeneous in three dimensions: Mostly Islamic, natural resources as the dominant economic sector (Ross, 2008; Sachs & Warner, 2001), and authoritarian regimes (Freedom House, 2017) among others.

Despite those similarities and qualified schooling performances, MENA states exhibit different levels of primary school enrolment and persistence at the national level. For example, Qatar, which once had the highest net primary education enrolment rate in 1971 in the region (out of 11 available countries), was ranked fourth lowest of 17 states in 2014. Figure for Morocco has more than doubled. In most years since 1987, data for the United Arab Emirates (UAE) fluctuated between 85% and 90%. Primary school completion rates varied widely, ranging from 55.27% (Djibouti) to 108.28% (Algeria) in 2012 (World Bank, 2018b).[2]

This raises the question of how we can explain these variations and why some MENA countries performed well in primary education while others did not. Due to the region's overall homogeneity, this paper looks beyond the conventional determinants of primary school enrolment and persistence rates, such as socioeconomic factors, households, school characteristics (Boissiere, 2004; Chaudhary, 2009; El-Sanabary, 1989; Glewwe, Hanushek, Humpage, & Ravina, 2011; Grigoli & Sbrana, 2013; Zhao & Glewwe, 2010), and international assistance (d'Aiglepierre & Wagner, 2013; Dreher, Nunnenkamp, & Thiele, 2008). Instead, in this paper we argue that state capacity is more fundamental than these factors in determining primary schooling in MENA.

Scholars have long discussed about how state capacity shapes positively various development issues (see Literature Review below). We follow a similar line of argument, proposing that the variations of state capacity explains why some MENA states perform better educationally while others do not. To be more specific, to promote educational performance, MENA states with stronger state capacity tend to better reach their populations, eliminate forces unfavourable to education, and allocate and spend education resources. To support our argument, we applied alternative state capacity measures and tested their impacts on a series of primary education indicators for the period 1971—2014. Results support our observations, and these results hold with different state capacity measures and model specifications.

This paper is organized as follows: In Section 2, we offer a review of the literature on how state capacity affects social, economic, and political development, as well as education. We then in Section 3 develop our argument. Sections 4 and 5 conduct, present and discusses empirical analyses. Section 6 concludes.

2. State Capacity, National Development and Primary Education in MENA

Previous research has demonstrated the efficacy of state capacity for handling social, political, and economic challenges. Overall, states with stronger capacity are better able to formulate, implement, and organize forces and resources for certain development goals. They can also handle domestic

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states. In addition to these five states, the World Bank (2018d) adds Djibouti, and the United Nations High Commissioner for Refugees (UNHCR 2016) includes Western Sahara and Mauritania, but excludes Djibouti. The U.S. Energy Information Administration (USEIA 2016) has Sudan and South Sudan. In this paper, we cover all political entities mentioned by these agencies, and add Turkey and Cyprus (Europa Publications Various years) due to their geographical proximity, regional affiliation, and cultural similarity. This yields 26 states and political entities. See Table A1 in the Appendix for a complete list.

[2] *Figure A2 in the Appendix provides further information on these variations in net enrolment and completion rates in primary education across MENA states from 1971 to 2014 (or the earliest and latest years for which data are available (World Bank 2018b).*

opposition forces that intend to trigger or escalate rebellion. In such situations, the general rationale of the findings of previous research is that a stronger state can reach its citizens by providing them with public goods to ease their grievances toward the government (Benson & Kugler, 1998; Fearon & Laitin, 2003; Thyne, 2006).

Stronger state capacity can also address issues, such as fertility rates and sanitation, and can assist economically disadvantaged areas in fulfilling development goals. Gizelis (2009) examined the impact of state capacity on HIV/AIDS, and found that higher state capacity strengthens the ability of governments to change and shape human behaviour, promote prevention programs, and absorbs short-term political costs when implementing long-term health promotion policies. Similarly, Boussalis, Nelson and Swaminathan (2012) examined the incidence of malaria in India. Their findings indicate that incidences of malaria tend to be higher in rice-producing regions, but can be contained when higher government capacity enables the improvement of irrigation systems.

Some research in this field examines the link between state capacity and economic performance (Knutsen, 2013; Arbetman & Kugler, 1997, Part II). Feng and Chen (1997) identified how variability in state capacity functioned as a signal of macro-political uncertainty in 40 less-developed states, and deterred private investment. Leblang (1997) argued that government is critical when an economy begins to expand. Knutsen (2013) discussed the individual and complementary effects of democracy and state capacity on economic development. Finally, Bockstette, Chanda and Putterman (2002) explored whether states with a longer history of state-level institutions exhibit favourable economic performance. Empirical findings confirm that they do.

Additionally, scholars have found that stronger state capacity is associated with improved environmental performance and disaster management. Ward and his colleagues (Ward, Cao, & Mukherjee, 2014; Cao & Ward, 2015) observed that, overall, state capacity strengthens environmental public goods across regime types. In both democratic and authoritarian states, governing elites tend to offer both infrastructural and environmental public goods to their people. Similarly, Lin (2015) found that stronger state capacity improves management of natural disasters, particularly in democratic regimes.

With regard to education, some studies have been conducted on state capacity and education and a positive connection conforming to the aforementioned observations can also be found. Hanson and Sigman (2013); Hanson (2015)'s main argument regarding state capacity is that, provided state capacity is sufficiently strong, there is no need for rulers to provide educational services to the public, because effective bureaucracy can do so automatically. Knutsen (2013) reported similar results derived from using the gross primary education enrolment ratio as a public service indicator. His findings support the argument that stronger state capacity contributes to higher enrolment ratios worldwide. Furthermore, Mok (2007, p. 6) observed how the state changed from being a "market constructor" to a "market facilitator" has enabled East Asian states in the age of globalization to adjust their roles in higher education, and increase their efforts toward achieving educational reform.

We follow the similar line of argument to propose that MENA states with stronger state capacity tend to perform well in primary schooling. In general, a politically capable MENA state tends to better reach its population, eliminate forces unfavourable to primary schooling, and more efficiently allocate and spend education resources. Let us explain each in turn.

Firstly, MENA states with stronger state capacity tend to provide greater access to primary schooling due to their ability to reach their populations. Despite its high homogeneity, the MENA region exhibits several vastly different characteristics across states. Geographically, the MENA region has political entities that are characterized by mountainous terrain in over a quarter of their respective territories, as well as states that are majority desert. Moreover, it includes states with a population density of over 500 people/km2, and others, in which fewer than four people reside in the same land unit (World Bank, 2018b).

MENA states that lack capacity may not be able to offer primary schooling to all children because they cannot reach all the citizens within their territory. Sudan is a typical example. According to the Fragile State Index (FSI) (Messner et al., 2016), Sudan is one of the world's weakest states. Nomadic groups exhibit the lowest primary school enrolment rates compared to rural and urban children. In 4 out of 15 administrative regions (Blue Nile, Gadarif, Kassala, and Sinnar), almost none (nearly 100%) of the nomadic children attend school (The United Nations

Children's Fund[UNICEF], 2014, p. 33–34, Figure 2.8). Uneven distribution of primary school enrolment rates marks the government's inability to provide public services to children.

Additionally, household registration systems are a critical factor for educational attainment, particularly in narrowing rural-urban educational inequality (Wu, 2011; Wu & Treiman, 2004). Strong registration systems rely greatly on the specific mechanisms of capable governments, such as creating incentives, imposing penalties to parents, and eliminating forces unfavourable to such processes. A strong state can overcome the various obstacles to complete population censuses. For example, focusing on birth registration rates is critical for predicting population censuses, and is highly related to primary school enrolment. Governments cannot determine how many school-aged children are out of school without comprehensive and thoroughly enforced registration. Yemen is the most severe case in the MENA region, with approximately 17% of children unregistered at birth (UNICEF, 2013, p. 17). This low registration rate explains why its primary schooling performs largely worse than its neighbouring states.

Moreover, stronger state capacity can improve primary schooling by eliminating forces unfavourable to primary education, such as poverty, political instability, child labour and gender inequality. The literature reviewed in the beginning of this Section has confirmed that stronger state capacity is positively associated with better economic well-being and political stability. In MENA, child labour is also a serious issue. Within this region child labour (as a percentage of all children) could range from 8.4% to 15% or higher (International Labour Organization[ILO], 2013, 2016; UNICEF, 2016). These figures are only lower than world's poorest region, sub-Saharan Africa.

Gender inequality is also another critical issue in MENA, as has been repeatedly confirmed (World Bank, 2018b; Kelly & Breslin, 2010; Ross, 2008). Kelly (2010, p. 1–2) states that "It is, however, in the MENA region that the gap between the rights of men and those of women has been the most visible and severe." Ross (2008, 2012, Chapter 4) noted an indirect link between gender status and education: Higher female labour force participation encourages female school enrolment and raises the literacy rates of women; if females are able to raise household income, families tend to invest more in their education (Ross, 2008, p. 107). However, women in the MENA region are underrepresented in the workforce due to the oil-centric economic structure. This can lead to girls being deprived of their education rights and their chances to finish primary school courses.

A politically capable MENA state may prevent children from leaving schools and penalize parents and employers who force children to work beyond their hour limits if child labour is legal (such as in the entertainment industry). Additionally, while a natural resource-based economy as argued by Ross (2008, 2012) is correlated with lower female labour force participation and investment in female education, scholarly evidence has proven that state capacity are better able to promote gender equality and empower women (Horowitz, 2009; Htun & Weldon, 2010).[3] In Kuwait, women are now able to work at the Ministry of Justice (Human Rights Watch, 2012). Bahrain has also started diversifying its economic structure before its oil reserves are exhausted (Giddens, 2011, p. 217–218). These steps will further improve primary schooling and lower dropout rates among girls.

Thirdly, MENA states with stronger state capacity can improve their primary education performance by efficient educational resource allocation and spending. Scholars have confirmed that school quality, indicated by factors such as the pupil-teacher ratio and distance from home to school, affects primary school attendance and completion (Kabubo-Mariara & Mwabu, 2007; Onphanhdala, 2010). Politically capable MENA states are better able to allocate appropriate or even more education resources to primary education, and are more willing to invest in school districts that receive relatively sparse education resources. Moreover, they can target spending effectively, optimizing the use of limited primary education budgets. Such states can train, and then hire, well-qualified teachers, build more primary schools and buildings, and replace outdated equipment. Tuition fees for financially challenged children can be waived, and free primary education can be provided.

[3] *Figure A3 in the Appendix shows correlations of FSI and the percentage of child labour (dashed line, UNICEF 2016) and gender parity index (GPI) in primary schools (percentage, gross) (solid line, World Bank 2018) during 2006–2014. The two lines clearly indicate that higher FSI scores (i.e., weaker states) correspond with higher ratios of child labor and lower GPIs in primary education.*

Sometimes, primary education resources are disproportionately allocated to the wealthy classes and urban areas. This is the exact reason why we offer an explanation of the variations in primary education in the MENA region. Education spending can be improperly allocated due to *bureaucratic inefficiency or corruption*, both of which are elements of weak states (Thyne, 2006, p. 736, *emphasis added*). This is the case in MENA states, such as Sudan and Yemen. In both countries, higher proportions of children from poorer families, children living in rural areas, and girls are out of school than children from wealthier families, urban children, and boys, respectively (UNICEF, 2014, p. 33).

Intervening to address this improper or uneven distribution of education resources is precisely how state capacity can play a role. For example, in Cyprus, the share of the total government education budget expended on primary education is less than 30%, on average (World Bank, 2018b). Yet primary education in Cyprus is free and compulsory. Law 113(I)/1999 further requires the government to take sole responsibility for caring for children with special needs (United Nations Educational, Scientific, and Cultural Organization[UNESCO], 2012). Cyprus now has among the highest primary education performance in the MENA region.

To conclude, we argue that state capacity can explain the variations in MENA primary education for the aforementioned reasons. In the following two sections, we will offer statistical support to these arguments.

3. Research Design

3.1 Variables

3.1.1 Dependent variables: Primary school enrolment (net and gross), intake, and dropout rates

We applied net and gross primary school enrolment rates, the intake ratio to grade one of primary education, and the dropout rate as the set of dependent variables (Net, Gross, Intake, Dropout). These data were released by UNESCO's UIS.Stat (http://data.uis.unesco.org/) and retrieved from *EdStats: Education Statistics* (EdStats), published by the World Bank (2018a). The reason for selecting not only the enrolment rate, but also the intake and dropout rates, was straightforward. Goal 2 of the MDGs was not only to "*achieve* universal primary education" but also to be able to "*complete* a full course of primary schooling" (UN, 2016, p. 24, *emphasis added*). This indicates that the purpose of Goal 2 is twofold: to ensure that all children are able to enter primary school, and that they do not leave school before finishing all of their courses. Goal 2 therefore justifies our selection of these four primary education indicators.

By definition, net and gross enrollment rates of primary is the ratio of total enrollment to the size of the age group that corresponds to the primary level of education, and the ratios of the enrolled school-aged children to the population of the corresponding school age, respectively. Intake is the ratio in first grade of primary school of the number of new entrants over the population of the official primary entrance age. Dropout is simply the percentage of those who are not enrolled in primary school. Definitions of Gross and Intake make the percentages of both higher than 100 possible. Finally, data availability of these four variables covers 1971–2014 for all MENA states except Western Sahara.[4]

3.1.2 Independent variable: State capacity

Selecting the state capacity variable is notably challenging. Hanson (in press); Hanson and Sigman (2013); Hendrix (2010) discussed 19, 24, and 15 different indicators, respectively. This diversity is

[4] *We have noted that some scholars are focusing on universal basic skills and learning outcomes (Asadullah and Chaudhury 2015; Hanushek and Woessmann 2015), like the Organization for Economic Co-operation and Development's Programme for International Student Assessment (PISA). However, we still consider that the choice of the four indictors in this paper are superior in terms of coverage and meeting Goal 2 of MDGs.*

indicative of the productiveness of analyses of state capacity, but also highlights the difficulty in selecting appropriate indicators.

Of the available indicators, we selected revenue collection capability as a proxy for state capacity. Revenue collection capability is appropriate for a combination of reasons. First, revenue collection capability has been widely accepted by scholars as indicative of the ability to penetrate society. Many articles we reviewed in Section 2 apply this indicator. Soifer (2012, p. 590) concluded that "[m]ost common, however, are various measures of the state's ability to extract revenue-scholars use many different operationalizations of the state's extractive power as measures of overall capacity." Herbst (2000, p. 113) argued that "There is no better measure of a state's reach than its ability to collect taxes. If a state does not effectively control a territory, it certainly will not be able to collect taxes in a sustained and efficient manner." The second criterion is data availability. Revenue capability datasets cover a longer period than that investigated in our study. Indicators that are repeatedly applied by scholars may be more reliable. Following established practices also helps us to avoid selection bias.[5]

Based on these criteria, we decided to apply Relative Political Capacity (RPC) as a state capacity indicator in our article (Kugler & Tammen, 2012; Arbetman-Rabinowitz et al., 2013). RPC is composed of three indicators: relative political extraction (RPE), relative political allocation (RPA), and relative political reach (RPR). RPR denotes the ability of the government to mobilize people, and RPA indicates the prioritization of government expenditure on public goods. However, only RPE is appropriate for taxation capability. RPE is the ratio of actual fiscal revenues obtained by the government to those predicted:

$$\text{RPE} = \frac{Actual\ Extraction_i}{Predicted\ Extraction_i},$$

where *i* denotes states. If the ratio is higher than 1, the government is considered politically capable; otherwise, it is politically weak (Kugler & Arbetman, 1997, p. 22–23).[6] We anticipate that the higher the RPE score a MENA state receives, the higher its primary school enrolment and intake rates are, and the lower its dropout rates are.

3.1.3 Control variables

We also included a set of control variables in the model. We focused more on macro-level indicators, such as social and economic explanations, than micro-level indicators, such as household or school characteristics.

For this reason, and on the basis of the articles we reviewed (Ansell, 2008; Avelino, Brown, & Hunter, 2005; Brown & Hunter, 2004; Stasavage, 2005), we applied the following variables as controls: democracy, GDP per capita, trade openness, children aged 0-14 (as a percentage of the population), pupil-teacher ratio, total population, urbanization (as a percentage of the population), civil conflicts, and fuel exports (as a percentage of merchandise exports). All variables, unless specified, were obtained from the World Bank (2018b).

Research indicates that democratic and newly democratized states are willing to spend more on primary education than other education levels (Ansell, 2008; Brown & Hunter, 2004; Lake & Baum, 2001; Stasavage, 2005). We tested whether variations in political performance determine primary school enrolment, intake, and dropout rates across MENA entities. Thus, we utilized the polity2 score from the Polity IV project (Marshall, Gurr, & Jaggers, 2016), in which every state is scored annually on a -10 to +10 ordinal scale: -10 denotes the least democratic and +10 the most. We test if higher levels of democracy are positively or negatively associated with improved primary education.

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[5] Some may raise the question of taxation capability indicator is not appropriate since oil-rich Arab States do not collect tax. This is misleading. With only an exception, Bahrain, most MENA states still collect tax from either individuals or companies, or both. See Table A2 in Supplementary Appendix for further information about the average income and corporate tax rates between 2006 and 2014 for all available MENA states.

[6] This version of RPE covers 1970–2013 and does not include Western Sahara, West Bank and Gaza, and South Sudan, thereby reducing the number of MENA states from 26 to 23.

A set of two economic variables was included. First, GDP per capita (current US$) tested if different levels of economic wealth shape primary school attainment and dropout rates. We applied the natural logarithm of GDP per capita (ln GDP PC). The second economic variable was Trade Openness, measured as a percentage of GDP. We expect that if a MENA state is more open economically to the world, its primary education is better. The two demographic variables were Urbanization, which was measured as urban population as a percentage of total population, and the natural log of total population (ln Pop).

Furthermore, the two school characteristics were children aged 0-14 as a percentage of the total population (Children < 15), and the pupil-teacher ratio in primary schools (PT Ratio). We also control another variable relative to conflict since war could destroy schools and make it harder for children to attend schools (Blattman & Miguekl, 2010; Lai & Thyne, 2007). We create a variable of *civil war* which is coded as 1 when civil war(s) occurs or continues in the given year, otherwise is 0. We retrieved data from the UCDP/PRIO Armed Conflict Dataset, version 18.1 (Eck, Kristin, & Pettersson, 2018; Gleditsch, Wallensteen, Eriksson, Sollenberg, & Strand, 2002), and solely carried the types of civil war and internationalized civil war.

Petroleum has long dominated the economic structure of the MENA region. We speculated that it may also affect human capital formation by influencing primary education. Descriptive statistics of all the variables are available in Table A4 of the Appendix.

Finally, it should be notified that not every political entity within the MENA region had yearly data and some of them even did not report data at all (such as Western Sahara). Moreover, some states did not report value until they became independent, such as Djibouti (1977) or South Sudan (2011). Thus, though 26 MENA political entities and 44 years of investigation suggest 1,144 observations, the actual number is indeed lower.

3.2 Model specification

We examined primary school enrolment, intake, and dropout rates for 26 MENA states and political entities for 1971–2014. Therefore, the data structure is a time-series, and is cross-country in nature. We selected a time-series cross-section model with fixed effects (FE). We applied the Hausman test to reach the conclusion that the FE model is more suitable than the random effects (RE) model in this paper (The results of the Hausman test is reported in the Table A3 of the Appendix). Moreover, we believe that the variable not covered in the right-hand side of the equation is country-specific. Thus, the FE model is merited here.

However, the recent evidence argues that in testing the TSCS data, the RE model outperforms the FE one for a variety of reasons. These reasons include the former allows us to model variables "measured at the higher level" (Bell & Jones, 2015, p. 135–136), is better in controlling for omitted variables that are different across states but constant over time, and allows us to test the effects of (nearly) consistent variables, such as Democracy in this paper, on our outcome variables. Thus, presenting results from both models prevents us from model selection bias.

To avoid reverse causality and the endogeneity issue, we also set all independent and control variables to a one-year lag.[7] The default model is based on that of Baltagi (2008, p. 13):

$$y_{it} = \alpha_i + \beta RPE_{it-1} + \gamma C_{it-1} + u_{it},$$

where *i* denotes all MENA states, *t* denotes time, and C stands for all control variables applied in this paper. Furthermore, $u_{it} = \mu_i + \nu_{it}$, that μ_i is unobservable individual effects and ν_{it} is the remainder disturbance. The only difference between the FE and RE models is in the FE model, μ_i is assumed fixed and in the RE model it is assumed to be random in order to avoid "the loss of degrees of freedom" Baltagi (2008, p. 17). Yet, all explanatory and control variables are independent of μ_i and ν_{it}. Finally, we also consider the first-order autoregressive AR(1) process[8]

[7] *We also test to see if significant difference exists across units (in other words, no panel effect). If the answer is no, then the ordinary least squares (OLS) model is more suitable than the RE model. The Breusch-Pagan Lagrange multiplier (LM) test shows there is significant difference across units, so the RE model is our default model.*

[8] *Our model failed to pass the test of serial correlation by Wooldridge. Thus, the AR(1) process is incorporated.*

and accommodate unbalanced panels and unequally spaced data. We conducted the locally best invariant LBI (Baltagi & Wu, 1999) test and calculated the Durbin-Watson statistic for autocorrelation (Bhargava, Franzini, & Narendranathan, 1982).

4. Statistical Results and Discussion

Our statistical results are seen in Tables 1 (FE model) and 2 (RE model). First, our main independent variable, RPE, has the expected effects on all four dependent variables. All coefficients of RPE are significant statistically at least at the 99% confidence level, holding all other variables constant. First, when we look at the gross enrolment rate, a unit increase in RPE can lead to a 4.002% increase, if primary schools enroll overaged and/or under-aged children. This figure slightly increases to 4.005% when we look at Net, if a MENA state's RPE is one unit stronger. The impact of RPE on Intake reaches statistical significance at the 99% confidence level, and a unit increase in RPE is associated positively with a 8.436% increase in Intake, holding all other variables constant. Finally, Dropout is negatively associated with stronger RPE, leading to a 4.555% lower rate if an MENA state can strengthen its RPE by one unit. All of these results demonstrate that a stronger state in terms of the extractive capacity is better able to have more children enrolled in primary schools, and have fewer of them left schools. Furthermore, these empirical results strongly support our argument that the strength of state capacity can explain variations in primary school attendance and dropout rates in the MENA region.

We now direct our attention to the control variables. The first variable, Democracy, is positively associated with Gross, Net, and Intake and negatively associated with Dropout. These results fit our initial expectation. Though the overall MENA region has few democracies and limited democratic experience, countries with democratic practice can do better in promoting primary education than their autocratic counterparts.

The results of ln GDP PC also suggest a positive relationship between the level of economic wellbeing and primary education by reaching statistical significance at a 95% confidence level and higher. This demonstrates that when personal income (logged) is improved by one unit, Gross, Net and Intake increase by 4.457%, 2.517%, and 5.054%, respectively, when all other variables are held constant. Furthermore, students are also prevented from leaving school, with Dropout being reduced by 2.264% when GDP per capita (logged) is one unit higher, holding all other variables intact.[9]

The second economic variable, Trade Openness, somewhat has negative effects on primary school indicators and all but Model 3 reach statistical significance. This indicates that globalization, in terms of increased economic exchanges, has negative effect on primary education in the MENA region. Thus, a further investigation may be required to clarify the relationship between Trade Openness and primary schooling.

All coefficient signs of two demographic variables, Urbanization and ln Pop, have positive signs across all four outcome variables. In addition, only one of them (ln Pop in Model 2) attains statistical significance at the 99% confidence level. The implications here are that a larger population size and higher degree of urbanization help promote Net, Gross, and Intake and reduce Dropout percentages, holding all other variables constant.

Civil War, however, reaches mixed results and none of these results is significantly different from 0. This contradicts our expectation and previous findings that domestic instability does harm to primary education. A further investigation of the relationship between civil war and education is merited.

The first school-related characteristic, PT Ratio, is positively associated with primary education indicators over. Thus, with all other variables constant, teaching one more child per class leads to a 0.555% increase in Net, 0.610% increase in Gross, and 0.891% increase in Intake, but a 0.561% decrease in Dropout. These results imply that, at least in the MENA region, a larger class size is beneficial to enrolling primary school-aged students and keeping them in school.

[9] *Additionally, GDP per head has been applied by some scholars as an alternative indicator of state capacity, such as by Fearon and Laitin (2003); Lacina (2006).*

Furthermore, a higher proportion of children aged 0–14 (Children < 15) was found to have mostly detrimental effects on primary schooling indicators examined in the paper. However, only one of them attained statistical significance at the 95% confidence level. This may be the result of the "youth bulge" in the MENA region–in other words, the growth of the young population has not been accompanied by an adequate expansion of educational institutions (World Bank, 2014).

Finally, Fuel had somewhat pessimistic signs toward primary schooling. Though most results are statistically insignificant, Fuel as a proportion of merchandize exports has negative impacts on promoting enrollment and intake rates, and on preventing dropout. These findings are consistent with the "natural resource curse" theory (Sachs & Warner, 1995, 2001), that countries with abundant natural resource endowments tend to exhibit lower performance in social, economic, and political development (Deacon, 2011; Ross, 2015). Though the signs of coefficients across the four models generally show a pessimistic signal, all four results fail to reach statistical significance. This means human capital formation in the form of primary schooling is possible even if countries are oil-rich.

Statistical results from the RE model in Table 2 are largely consistent with what we found in Table 1. For example, a unit increase in RPE, holding all else constant, is positively associated with a 3.210%, 2.808%, 2.751% increase in Gross, Net and Intake rates, respectively, and negatively associated with a 3.487% decrease in Dropout rates. Similarly, a more democratic regime has positive impact on all four education indicators, though now results are statistically insignificant. Moreover, two economic indicators have generally similar results as with Table 2, except for Openness in Model 7. This similarity can also be witnessed when we pay attention to two demographic variables, that Population size and the degree of urbanization are positively associated with better education performance in the MENA region. While the results for the PT ratio, and Fuel provided further support for the discussion of the link of these two variables and education, it is still unclear how civil war generally promotes education performance. Results for Children under 15 as a percentage of total population still remained mixed.

Table 1: State Capacity (RPE) and Primary Schooling in MENA, 1971-2014 (FE Model)

	(1) Gross	(2) Net	(3) Intake	(4) Dropout
RPE	4.002***	4.005***	8.436**	-4.555***
	(3.76)	(3.94)	(3.31)	(-4.55)
Democracy	0.172	0.0940	0.666*	-0.114
	(1.62)	(0.73)	(2.45)	(-0.89)
ln GDP PC	4.457***	2.517*	5.054*	-2.264*
	(4.21)	(2.40)	(2.40)	(-2.19)
Trade Openness	-0.0469*	-0.0496**	-0.0389	0.0445*
	(-2.48)	(-2.62)	(-0.92)	(2.39)
Civil War	1.159	0.355	-2.108	-0.407
	(1.66)	(0.53)	(-1.36)	(-0.62)
ln Pop	2.352	4.000**	2.232	0.420
	(1.39)	(2.90)	(1.35)	(0.31)
Urbanization	0.258	0.0269	0.297	0.130
	(0.82)	(0.11)	(1.23)	(0.52)
PT Ratio	0.109	0.212	-0.208	-0.147
	(0.94)	(1.44)	(-0.70)	(-1.01)
Children < 15	0.0671	-0.175	-0.0874	0.466
	(0.24)	(-0.63)	(-0.27)	(1.69)
Fuel	-0.0439*	-0.0173	-0.0108	0.0273
	(-1.99)	(-0.81)	(-0.22)	(1.30)
Constant	10.20***	11.64***	5.669***	-7.038***
	(22.41)	(27.38)	(4.50)	(-16.83)
Observations	416	329	335	329
No. of States	20	20	20	20
Wald χ^2	18.41***	19.79***	31.70***	4.32***

t statistics in parentheses
* $p < .05$, ** $p < .01$, *** $p < .001$

Table 2: State Capacity (RPE) and Primary Schooling in MENA, 1971-2014 (RE Model)

	(5) Gross	(6) Net	(7) Intake	(8) Dropout
RPE	3.210**	2.808**	2.751	-3.487***
	(2.92)	(2.72)	(1.19)	(-3.41)
Democracy	0.112	0.0921	0.388	-0.0943
	(1.06)	(0.77)	(1.76)	(-0.79)
ln GDP PC	4.641***	3.172**	4.142*	-3.041**
	(4.54)	(3.15)	(2.20)	(-3.04)
Trade Openness	-0.0386*	-0.0518**	0.00116	0.0459*
	(-2.02)	(-2.75)	(0.03)	(2.46)
Civil War	0.939	0.305	-3.464*	-0.305
	(1.29)	(0.45)	(-2.28)	(-0.45)
ln Pop	5.341***	3.730*	5.149***	-3.962**
	(3.38)	(2.54)	(3.31)	(-2.66)
Urbanization	0.505***	0.417**	0.0765	-0.419**
	(3.81)	(3.17)	(0.48)	(-3.17)
PT Ratio	0.247*	0.198	0.0825	-0.160
	(2.14)	(1.47)	(0.34)	(-1.20)
Children < 15	0.0220	-0.333	-0.324	0.433*
	(0.10)	(-1.65)	(-1.21)	(2.14)
Fuel	-0.0424	-0.0193	-0.0101	0.0221
	(-1.94)	(-0.94)	(-0.26)	(1.07)
Constant	-64.71*	-19.60	-15.93	117.9***
	(-1.99)	(-0.62)	(-0.39)	(3.70)
Observations	436	349	355	349
No. of States	20	20	20	20
Wald χ^2	111.03***	93.25***	57.32***	106.49***

t statistics in parentheses
* $p < .05$, ** $p < .01$, *** $p < .001$

To avoid selection bias and test different versions of state capacity (Hanson, in press; Hanson & Sigman, 2013; Hendrix, 2010), we also conducted several robustness checks by replacing our main explanatory variables with three alternative indicators, namely, ICRG's Quality of government (1985-2014), Linzer and Staton (2015*a*, 2015*b*)'s Judicial Independence Index (JII, 1971-2013), and Mousseau (2017)'s Contract Intensity of National Economies (CINE, 1971-2011). Statistical results still hold after we conducted robustness checks. Due to page limits, this section is presented in the Appendix (Section A2). We briefly explain each in turn.

The first dataset can been seen as the degree to which a government can combat corruption, maintain social order and the rule of law, and have a good quality of bureaucracy. This indicator is with a range of 0—1, that higher values denotes better government quality. Data were retrieved from Teorell et al. (2018) and covers the period of 1985-2014.

Second, judicial independence, the second alternative indicator of state capacity, is an essential part of the rule of law, which upholds state function by protecting personal rights and impartially enforcing laws and regulations. As Boies (2006, p. 57, p. 58) highlights:

> *The rule of law … provides that the rule applied to a particular case must be reasonably predictable. And it provides that the rule must be predictable without regard for the identity of the parties. … Judicial independence … reduces the likelihood that basic legal protections will fall victim to the passions of the moment."*

Finally, the CINE dataset measures the intensity of contract enforcement. In a contract-intensive entity, the people value the enforcement of contracts seriously, and the government takes responsibility for enforcing contracts and punishing those who do not honor contracts (Mousseau, 2009, 2012). In other words, the degree to which a government can punish those who break contracts or fail to honor contracts may indicate how well the government can attain certain policy

goals. Therefore, the application of CINE should be appropriate. All of these three indicators are continuous, and higher values denote stronger state capacity.[10]

We now turn to the results of the robustness checks (Tables A5—A10), and discuss only the results for state capacity indicators. In the first four columns of Table A5, higher JII is positively associated with better education performance. Though the results became mixed when we applied the RE model in Table A6, none of these four models are statistically significant. Consistent and robust results are found for ICRG (Tables A7 and A8). Holding all other variables constant, for example, a unit increase in ICRG leads to a 30.82% increase in the intake rate, or a 19.59% decrease in dropout rate at the error level of 0.001, respectively. Finally, if a MENA state is abler to enforce a contract (the contract intensity indicator), then it displays better performance at promoting gross and net enrolment and intake rates, and can prevent school-aged children from leaving school.

In short, by using different state capacity indicators, we can still confirm a positive relationship between state capacity and primary schooling in the MENA region. This lends substantial support to our initial observations and arguments.

5. Conclusion

This study aimed to explain variations in primary school attendance, intake, and dropout rates in the MENA region from 1971 to 2014 by applying state capacity as explanation. A MENA state with stronger state capacity can better reach its population, eliminate possible forces unfavorable to primary education, and utilize education resources. Empirical findings support our argument. In the next two paragraphs, we present policy implications and directions for future research.

First, primary education can be improved by strengthening the state capacity. This can be a challenging task, because if a state is politically incapable, then it may face additional domestic problems that further weaken its ability. However, consolidating a state's capability is the task that each political leader must undertake. We have demonstrated that, despite the homogeneity of the economic, political, and religious characteristics of the MENA region, states nevertheless demonstrate variations in primary school enrolment, intake, and dropout rates. However, all these indicators can be appropriately strengthened, or reduced, if the MENA state is politically capable.

Finally, further discussion of state capacity and education is merited. The applicability of the preceding arguments to Sub-Saharan Africa, where all 48 states (if Sudan and South Sudan are included) demonstrate higher variations in political, social, economic, and religious practices, could be investigated. We could also examine whether the arguments are applicable to higher levels of education. This is a challenging and worthwhile task that we believe political scientists and education experts will find worthy of further exploration.

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[10] *Summary statistics for these three indicators are presented in Table A4 in the Appendix.*

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