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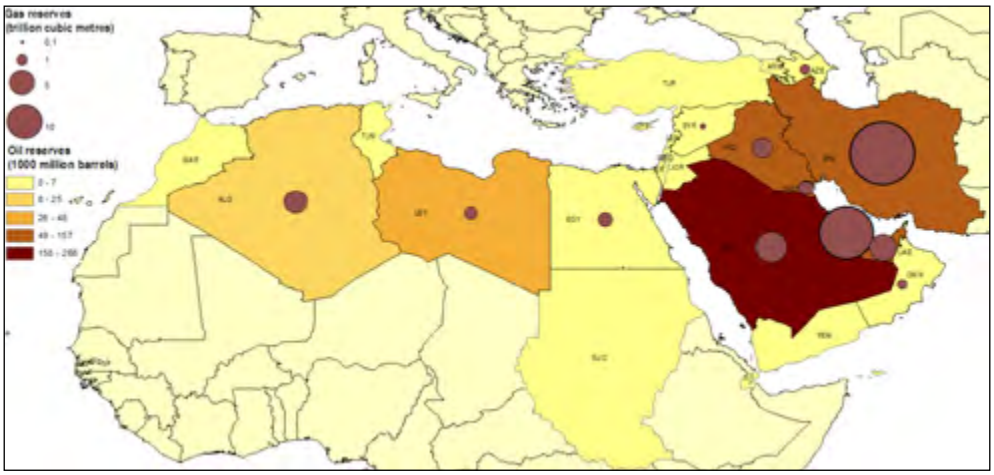
Abstract

This paper investigates the discrepancy between the vast natural resource wealth and the relatively low spending on human development in the Middle East and North Africa (MENA) region. Our results show a robust, significant inverse relationship between natural resource dependence and public health spending, and natural resource dependence and public education spending over time. The effects remain significant after controlling for income, aid, the age structure of the population, and the quality of institutions. Moreover, we find a particularly strong resource curse effect of oil on social spending. Despite the mounting burden on MENA's economic development models due to significant population growth and the pressing need for diversification, countries have been unable or unwilling to convert natural resource wealth into increased social spending. Governments should be strongly encouraged to manage their natural wealth in an accountable and equitable manner that follows international best practice. Correct taxation of natural resource, and especially, oil wealth should provide the governments with adequate budgets to fund a desirable level of public health provision. Finally, the equity of distribution of education spending could be improved.

1. Introduction

While representing only 7.5 per cent of the world's population (World Bank, 2013), the Middle East and North Africa (MENA) region holds 48 and 52 per cent of world oil and gas reserves respectively (BP, 2014). Moreover, several countries have abundant mineral wealth. As such, the region represents one of the most affluent parts of the world.

Figure I : Oil and gas reserves in MENA



Source : BP (2014)

However, though the Human Development Index (HDI) shows that development levels are relatively high in resource-rich MENA countries, Table I illustrates that most MENA resource-rich countries have large negative values for GDP per capita rank minus HDI rank which seems to suggest that these countries have failed to translate their natural-resource fueled economic prosperity into improved standards of living. Comparable observations have been made by other authors as e.g. Aoun (2013).

Table I: Gross National Income (GNI) and Human Development Index (HDI) rankings of MENA countries

	GNI per capita rank	HDI rank	Difference
Algeria*	83	93	-10
Armenia	111	87	24
Azerbaijan*	71	76	-5
Bahrain*	31	44	-13
Cyprus	37	32	5
Djibouti	145	170	-25
Egypt, Arab Rep.	94	110	-16
Iran, Islamic Rep.*	79	75	4
Iraq*	77	120	-43
Israel	34	19	15
Jordan	89	77	12
Kuwait*	3	46	-43
Lebanon	69	65	4
Libya*	50	55	-5
Morocco	115	129	-14
Oman*	18	56	-38
Qatar*	1	31	-30
Saudi Arabia*	12	34	-22
Sudan	143	166	-23
Syrian Arab Republic*	123	118	5
Tunisia	93	90	3
Turkey	60	69	-9
United Arab Emirates*	8	40	-32
West Bank and Gaza	-	-	-
Yemen, Rep.*	140	154	-14

Source: UN statistics 2014.
Note: * Resource-rich MENA countries.

Akkari (2004) similarly points to a negative difference between income and the Oxfam Educational Performance Index ranking for several resource-rich Middle Eastern countries, again leading to the conclusion that resource wealth wasn't converted into extended opportunities for education. Ross et al. (2011) conclude that even though education spending is generally high in the region, a number of resource-poor countries appear to be doing better. Arezki and Nabli (2012) note that while health and education outcomes have significantly improved over the past decades, resource-rich countries have by no means outperformed their resource-poor counterparts. The World Bank (2013) further states that health systems in MENA countries are not delivering results commensurate with wealth levels and low public financing for health compromises access and quality.

The term "resource curse" is well established in the literature and stands for the paradox that resource-rich countries seem to experience slower growth compared to their resource-poor counterparts (Auty, 1994; Sachs and Warner, 1995). Recently, the resource curse is investigated from a broader angle and negative spill-over effects of resource wealth are found, not only on economic growth, but also on a broader set of development indicators (Bulte et al.,

2005). Carmignani and Avom (2010), for example, find adverse effects of natural resource dependence on social development outcomes. Gylfason and Zoega (2002) and Goderis and Malone (2011) discuss the negative association between natural resource wealth and income inequality. Moreover, even though in theory, large natural capital endowments provide an opportunity to build human capital as the revenues can serve as a new source of finance, several authors suggest that natural capital crowds out human capital (Blanco and Grier, 2012; Cabrales and Hauk, 2011; Gylfason et al., 1999; Gylfason, 2001; Shao and Yang, 2014). Moreover, Gylfason (2001) and Stijns (2006) find that several indicators of natural resource wealth are negatively correlated with public education spending and Cockx and Francken (2014) provide robust evidence of an adverse association between natural resource wealth and public health spending.

This paper contributes to the literature by empirically exploring the link between natural resource, and more specifically oil wealth, and social spending on health and education in MENA. Our findings are in line with the idea that "natural resources may in general hinder the process of human capital creation that is the basis of long term growth" (World Bank, 2011). The next section briefly discusses the literature on the resource curse in the MENA region. The third section depicts the estimation strategy and provides information on the data. The fourth section discusses the empirical results. The fifth section investigates the oil curse more specifically, and the final section concludes.

2. A resource curse in MENA?

Birdsall and Subramanian (2004) argue that while the oil-rich countries of the Middle East have so far escaped some of the worst economic consequences of the resource curse due to their ratio of a relatively small population to a vast amount of oil, the relative prosperity could significantly deteriorate over time due to a decay of the political and economic institutions as a consequence of a fight over oil wealth as illustrated by a country like Venezuela.

The experiences of oil-rich MENA countries in fact served as an inspiration for the theory on "rentier states" (Mahdavy, 1970), which postulates that the availability of "external rents" as government revenues affects economic development as well as state formation and the quality of institutions. Several authors have illustrated that oil rents have strong explanatory power in accounting for weaker governance in the Middle East due to principal-agent problems (Karl, 2007; Ross, 2001; Sala-i-Martin and Artadi, 2002; World Bank, 2003). With larger resource rents, the incentives to collude (between governments and oil companies), to obscure information, to design more complex contracts, and to steer revenues towards special groups will be greater (AFD, 2009).

Deriving directly from the rentier state theory, the "rentier effect" has also been proposed as the main causal mechanism that might explain the association between oil exports and authoritarian rule, a hypothesis that originated from the fact that high-income, resource-rich states in MENA have not become democratic. The effect has given rise to a substantial literature (Barro, 1999; Ross, 2001; Tsui, 2011). According to Ross (2001) the rentier effect has three components: a taxation, spending and group formation effect. In the presence of large oil revenues, governments may be virtually completely autonomous from their society and as such, less likely to tax their population (Schwarz, 2008). The public will in turn be hesitant to demand accountability and representation. Moreover, oil wealth can be used for greater spending on patronage, which is expected to decrease pressure for democratization. With regards to the group formation effect in rentier states, Ross (2001) suggests that government oil wealth impedes the formation of social capital and hence blocks the transition to democracy. Ross (2001) proposed two additional causal mechanisms; the repression effect and the modernization effect. The former entails that oil wealth can be used to finance increased internal safety and thus block democratic pressures. Finally, the third explanation starts from the hypothesis that resource-led growth doesn't produce the type of social change that is conducive to democratization; rising levels of education and specialization.

Arezki and Nabli (2012) conclude that resource-rich MENA countries have been characterized by relatively low and non-inclusive economic growth and high levels of volatility over the past 40 years. Al-Rawashdeh et al. (2013) confirm the existence of an adverse association between dependence on oil and gas exports on GDP per capita growth between 1971 and 2010 in MENA countries. Moreover, the authors find a significant and positive relationship between resource dependence and corruption and a lack of democracy coupled with the need for excessive military spending. Apergis and Payne (2014) provide results for the resource-rich MENA countries with abundant labour[1] that demonstrate uniform support for the oil curse hy-

[1] Countries in the MENA regions are often subdivided into three groups. The Resource Poor Labor Abundant group includes countries that possess less oil resources relative to their overall size, while the population and labor force are abundant like Djibouti, Egypt, Jordan, Lebanon, Morocco, and Tunisia. The Resource Rich Labor Abundant group covers countries like Algeria, Iran, Iraq, Syria, Libya and Yemen. And lastly the Resource Rich Labor Importing group includes those countries which possess oil resources in abundance, while the population and labor forces are scarce such as the Gulf Cooperation Council (GCC) nations including Saudi Arabia, the United Arab Emirates and Qatar (World Bank, 2007; Arezki and Nabli, 2012; Apergis and Payne, 2014).

pothesis over time as the coefficient of oil reserves is negative throughout the period between 1990 and 2013. For the resource-rich labour importing countries on the other hand, the coefficient is positive beyond 2003. The authors hypothesize that these results may reflect that the need to import labor provides additional incentives to create a favorable business climate to the international community.

3. Estimation strategy and data

The debate on the existence of the resource curse has put forward important methodological concerns. Several authors have argued that as the research is prone to omitted variable bias it is paramount to move from cross-country to panel evidence (Manzano and Rigobon, 2001; Collier and Goderis, 2007; Lederman and Maloney, 2008). We therefore base our analysis upon a panel dataset for the period of 1995 to 2009, constructed for the aim of this research. In line with Brunschweiler and Bulte (2009), Bhattacharyya and Hodler (2010), Bhattacharyya and Collier (2013) and Cockx and Francken (2014) we have subdivided the data into three five year periods; from 1995 to 1999, from 2000 to 2004 and finally from 2005 to 2009. The use of five year averages will allow us to handle annual volatility and measurement errors. Descriptive statistics are summarized in Tables II and III.

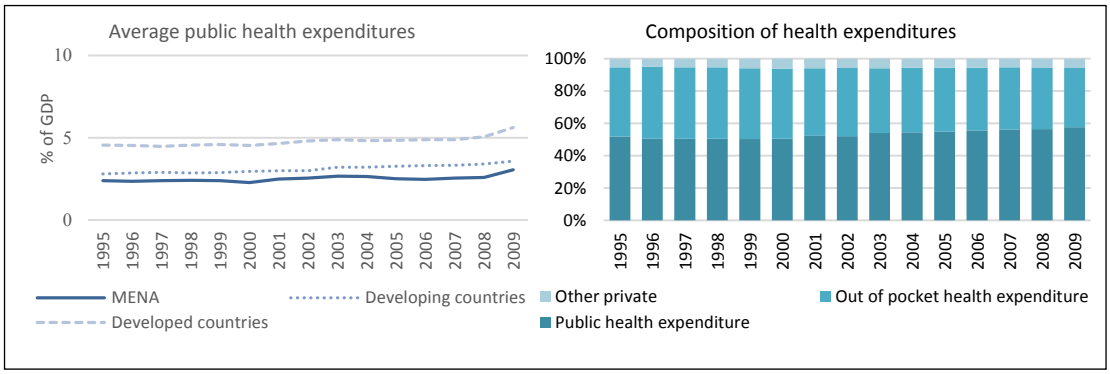
3.1. Dependent variables

3.1.1. Public Health expenditures

We use the World Bank data on public health expenditures as a percentage of GDP (*Public Health Expenditures*), which are derived from the World Health Organization's National Health Accounts. Public health spending consists of "recurrent and capital spending from government budgets, external borrowings and grants and social health insurance funds" (World Bank, 2014). This spending therefore includes spending from development assistance for health as well as from domestic resources.

As is reflected in Figure II, even compared to the developing countries' average, MENA countries on average had worryingly low levels of government spending on health care during the last 15 years. Government health spending in this region hasn't reached the 5 per cent level, , suggested as an indicator by the WHO (Savedoff, 2007). Moreover, the composition of health expenditures has remained relatively constant over time with household out-of-pocket spending accounting for nearly half of total health expenditures, indicating that many individuals lack financial protection or insurance against illness. Consequently, the financial burden of health care is likely to force part of the population into poverty, or forgo health care altogether.

Figure II : Health expenditures in MENA



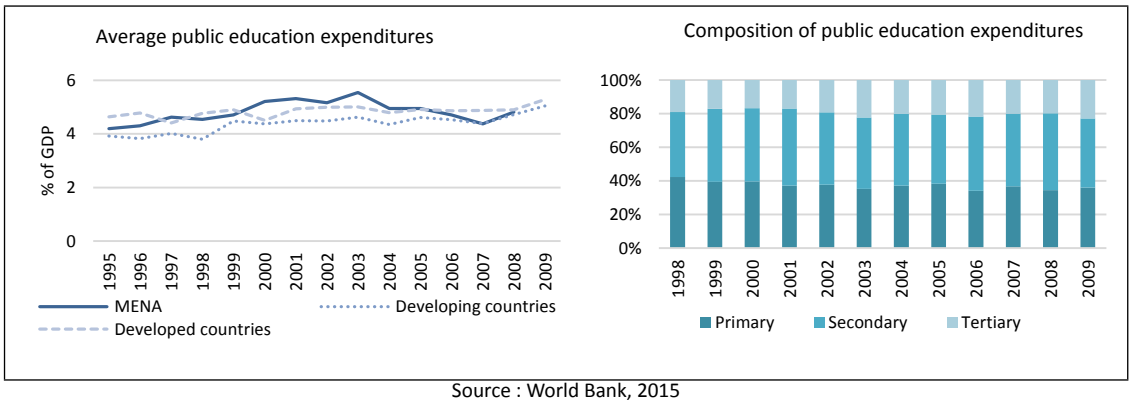
Source : World Bank, 2015

3.1.2. Public Education expenditures

To capture the government's commitment to education, we use the World Bank data on public spending on education as a percentage of GDP (*Public Education Expenditures*), which are derived from the UNESCO Institute for Statistics (UIS) who collect information annually from official national statistical authorities. Public expenditure on education consists of current and capital spending on both public and private education institutions, education administration and transfers or subsidies. It includes expenditures funded by transfers from international sources to the government (UIS, 2014).

As can be derived from Figure II, the MENA region is characterized by high levels of government spending on education. There are however, some concerns about the equity of the distribution of education expenditures across different levels of education with a bias towards investment in tertiary education (Tansel and Kazemi, 2000).

Figure III : Public spending on education in MENA



Source : World Bank, 2015

3.2. Natural resources

There are various explanations as to why natural resource wealth could negatively affect public spending on health and education.

First of all, natural resource revenues have been argued to represent an important source of "unearned state income" that entails little organizational and political effort in working with citizens and therefore allows for a certain degree of state autonomy and unaccountability. This disconnect could decrease the need to gain citizens' support, which consequently diminishes incentives to be responsive to citizens' needs and provide public goods such as health and education. Bornhorst et al. (2009) find that large natural resource endowments reduce domestic revenue efforts. McGuirk (2013) corroborates these findings and hypothesizes that in the pres-

ence of high natural resource rents, leaders lower the burden of taxation in order to reduce demand for democratic accountability. Similarly, Collier (2006) states that lower domestic tax effort in resource-rich countries diminishes the incentive for public scrutiny of the government. Bellin (2004) notes that access to rentier income from natural resource extraction in MENA countries has allowed the state to "pay itself first" and prioritize military and security spending while education expenditures remain flat. Ross et al. (2011) similarly conclude that throughout history, a number of MENA countries have fit this description of "rentier states" and that an abundant source of nontax revenues may lead to increased military spending that detracts from resources available to other sectors and facilitates repression of the population. Al-Rawashdeh et al. (2013) find that almost all Gulf States in fact consistently spend a greater share of their GDP on the military than the global average.

Second, Gylfason (2001) argues that natural resource wealth gives rise to a disregard for human capital development and myopic behavior. Papyrakis and Gerlagh (2004) similarly claim that natural resource wealth creates a false sense of security and weakens the perceived need for growth-promoting strategies such as investment in health and education.

Finally, the large fluctuations in commodity prices render government revenues in resource dependent countries highly volatile. Arezki and Nabli (2012) find that over the last five decades macroeconomic volatility in resource-rich MENA countries was twice as high as in resource-poor countries in the region. Such volatility contributes to poor planning and leads to boom and bust in public spending (Lane, 2003; van der Ploeg and Poelhekke, 2009).

We derive our indicator of natural resource dependence from the World Bank database on the Changing Wealth of Nations, which comprises a set of "comprehensive wealth" accounts, including elaborate estimates for natural capital[2], for over 150 countries. In line with Cockx and Francken (2014), Cabrales and Hauk (2011), the World Bank (2011) and Gylfason (2001) we use the share of natural capital in total national wealth[3] (*Resource Dependence*) to take into account a country's structural reliance on natural resources.

3.3. Additional control variables

We control for the effect of income as it has been argued to be an important positive determinant of government expenditures. According to Wagner's law there exists a positive association between economic development and government public spending as a percentage of GDP over time. Most of the literature on the determinants of health expenditures focus on the relationship between income and health care spending (Lago-Peñas et al., 2013; Costa-Font et al., 2011; Clemente et al., 2004). Several authors have also established a positive wealth effect for government spending on education (Busemeyer, 2007; Akanbi and Schoeman, 2010). We take into account the effect of income by including the logarithm of World Bank data on GDP per capita reported in constant 2005 US Dollar, at the start of every five year period (*GDP*).

As there is considerable international support focused on mobilizing additional resources for financing health and education, we want to control for the effect of aid. Supplements to income can be assumed to relax macroeconomic budget constraints and increase resources available for public social spending. Moreover, we hypothesize that as donors stress the importance of health and education, government priorities may shift. Murthy and Okunade (2009)

[2] Natural capital wealth is defined as the sum of wealth, calculated as the net present value over a 25 year time horizon for renewable natural resources and over the time to exhaustion for non-renewable resources, stemming from crop, pasture land, timber and non-timber forest, protected areas, oil, natural gas, coal and minerals (bauxite, copper, lead, nickel, phosphate, tin, zinc, gold, silver and iron ore) (World Bank, 2011).

[3] Wealth is defined as the present value of future consumption that is sustainable, discounted at a rate of time preference of 1.5 percent, over 25 years (World Bank, 2011).

demonstrate that aid is an important positive determinant of health care expenditures in Africa. Another line of thought is related to concerns about fungibility of aid, in which case aid would have a depressing effect on domestic spending on health and education. Van de Sijpe (2012) however finds that aid in both sectors leads to at most, a small displacement of a recipient's domestic public spending. To control for the effect of aid, we include five year averages of the OECD/DAC Creditor Reporting System (CRS) data on one year-lagged Official Development Assistance commitments as a percentage of GDP (*Aid*). We assume zero-values for countries for which aid flows are not reported in the OECD/DAC database.

Both health and education spending can easily be argued to be affected by the age structure of the population. Traditionally, higher age is associated with more health care utilization[4] (Yang et al., 2003; Dormont et al., 2006). Moreover, population ageing exerts an influence on the political prioritization, which could result in a demand for higher public health spending (Breyer et al., 2010). In analyses of public expenditure on education, the proportion of the population aged 65 and above is commonly added as a control (Besley and Case, 2003; Archibald and Feldman, 2006; Grob and Wolter, 2007). It has been hypothesized that the preference for education spending diminishes with an ageing population. Another line of arguments however, stresses that a rising number of elderly may exert a positive effect on education spending, to the extent that the elderly want to seek to raise the training of young workers, so that they generate a larger pool of resources from which pension and other social transfers can be funded and to improve the quality of services they receive (Richman and Stagner, 1986). To control for the effect of age distribution on public health and on public education expenditures, we add the proportion of the total population aged 65 and above (*Pop.>65)* to our regression analysis. The data are gathered from the World Bank World Development Indicators (WDI) database.

Finally, we want to control for good governance and the quality of institutions as potential determinants of public goods provision. The World Bank (2003) states that accountability as a basis of good governance in particular is relevant in the MENA region. Delavallade (2006) in turn hypothesizes that unaccountability of political leaders may give rise to opportunities for public agents to support rent generating sectors to the detriment of the social sectors. Similarly, several authors have linked electoral competition to the growth of government social spending (Comiskey, 1993; Hecock, 2006; Stasavage, 2005). In line with Delavallade (2006) and Cabrales and Hauk (2011), we will take this into account by including the "freedom" indicator from Freedom House (*Freedom*), that is calculated as the mean of the political rights and the civil liberties index. According to Freedom House political rights "enable people to participate freely in the political process and include the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the electorate". Civil liberties allow for the freedoms of expression and belief, associational and organizational rights, rule of law, and personal autonomy without interference from the state (Freedom House, 2012). The freedom indicator varies between one and seven, one representing the most free and seven the least free.

[4] This assumption is not without dispute. It has been suggested that proximity to death represents the main determinant of health care costs (see for example Seshamani and Gray, 2004).

In sum, the baseline empirical model is of the following form:

$$Public\ Education\ Expenditure_{it} = \beta_0 + \beta_1 Resource\ Dependence_{it} + \beta_2 GDP_{it} + \beta_3 Aid_{it} + \beta_4 (Pop.>65)_{it} + \beta_5 (Freedom)_{it} + \alpha_i + \varepsilon_{it}$$

where i represents a country, t time, α_i the country fixed effect and ε the error term. To investigate government health spending, *Public Education Expenditure* is replaced by *Public Health Expenditure*.

We have restricted our sample only on the basis of data availability for our indicators of choice. While the WHO National Health Account System provides a dataset on public health expenditures with relatively few missing values, the data on public education expenditures are considerably less complete. We therefore opted to work with two different samples. Descriptive statistics for the health and education expenditure analyses are summarized in Tables II and III respectively.

Table II: Descriptive statistics (sample 1)

	Obs.	Countries	Mean	Std. Dev			Minimum	Maximum
				Overall	Between	Within		
Public health expenditures	50	18	2.5525	1.1306	1.1218	0.2777	0.8544	5.2745
Resource Dependence	50	18	30.5598	23.7946	22.8430	8.7083	1.4442	107.0754
Oil Dependence	50	18	15.1707	16.7161	16.0799	5.5862	0	61.2266
GDP	50	18	8.4335	1.3398	1.35089	0.1254	6.1835	10.7357
Aid	50	18	1.6471	2.5863	2.6451	0.8666	0	10.5618
Pop.>65	50	18	4.7189	2.7339	2.9188	0.2566	0.5679	11.2753
Freedom	50	18	4.498	2.01641	2.1189	0.2438	1	7

Source: WHO, World Bank, Freedom House.
Countries : Algeria, Armenia, Azerbaijan, Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Kuwait, Morocco, Oman, Saudi Arabia, Sudan, Syria, Tunisia, Turkey, UAE

Table III: Descriptive statistics (sample 2)

	Obs.	Countries	Mean	Std. Dev			Minimum	Maximum
				Overall	Between	Within		
Public education expenditures	39	17	8.4803	1.2407	1.2859	0.1306	6.7732	10.7206
Resource Dependence	39	17	28.5127	21.8036	21.0108	6.7667	1.4442	76.3709
Oil Dependence	39	17	16.4031	18.0943	16.6625	5.8787	0	61.2266
GDP	39	17	8.4803	1.2407	1.2859	0.1306	6.7732	10.7206
Aid	39	17	1.4497	2.3438	2.5710	0.4654	0	10.5618
Pop.>65	39	17	5.2929	2.79437	2.9603	0.2577	1.0005	11.2753
Freedom	39	17	4.1872	2.0973	2.0584	0.2557	1	7

Source: UIS, World Bank, Freedom House.
Countries : Algeria, Armenia, Azerbaijan, Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Kuwait, Morocco, Oman, Saudi Arabia, Syria, Tunisia, Turkey, UAE.

4. Empirical results

4.1. The impact of natural resource dependence on public spending on health and education

Before proceeding to the results, here are some remarks about the data analysis. In line with Murshed (2004), Manzano and Rigobon (2006), Collier and Goderis (2007), Haber and Menaldo (2011 Bhattacharyya and Collier (2013) and Cockx and Francken (2014), we have opted to include country-specific fixed effects, as these will effectively control for all unobservable time-invariant country characteristics. To address any remaining within-country correlation, we use cluster-robust standard deviations. We check for collinearity with the diagnostic tool developed by Besley, Kuh and Welsch (1980) and find that the conditioning numbers are well below the suggested cut-off value of 30, indicating that there are no problems with collinearity.

Table IV: Results fixed effects regressions on Public Health Expenditures

Res.Dep	-0.0141**	-0.0159***	-0.0152**	-0.0156**	-0.0158**
	(0.013)	(0.002)	(0.022)	(0.013)	(0.011)
GDP		0.9419***	0.9532***	0.6672***	0.5369**
		(0.000)	(0.000)	(0.000)	(0.020)
Aid			0.0185	0.0172	0.0156
			(0.730)	(0.761)	(0.793)
Pop.>65				0.2121	0.2054
				(0.154)	(0.112)
Freedom					-0.2747**
					(0.012)
Obs.	50	50	50	50	50
Countries	18	18	18	18	18
Within R^2	0.1958	0.3732	0.3760	0.3973	0.4514
Between R^2	0.3282	0.1964	0.1974	0.2244	0.1250
Overall R^2	0.3089	0.1799	0.1821	0.2473	0.1640

Notes:
Res. Dep. stands for *Resource Dependence*.
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

The regression results summarized in Table IV confirm the existence of a resource curse effect on public health spending in the MENA region. Natural resource dependence, measured as the share of natural capital in total national wealth, has a significantly negative effect on public education expenditures relative to GDP. This adverse effect remains highly significant even after controlling for the effects of income, aid, the age structure of the population and freedom. According to these estimations, keeping all other factors constant, a ten per cent increase in the share of natural capital in total national wealth (*Resource Dependence*), which corresponds for example to the difference between Bahrain (41.45%) and Algeria (52.28%) in 2005, is associated with an average decrease of public health expenditures of approximately 0.16 per cent of GDP. Bearing in mind that the average expenditure on health for this region was only 2.57 per cent of GDP during this period, this represents a considerable difference.

The additional controls all have the expected sign. In line with the literature, our results reaffirm the hypothesized role of income in explaining health spending variation. The coefficient for the logarithm of GDP per capita is highly significant and positive. We find no significant effect of the share of ODA in GDP. It has been argued however, that poverty reduction is not the

main motivation for development assistance in this region, rather aid allocation is substantially influenced by donors' domestic political considerations, (Collier and Dollar, 2002; Harrigan et al., 2006).We further note that the indicator of freedom, is significant at the five per cent level. The negative coefficient indicates that a higher score on the seven point indicator, which corresponds to poorer performance with regards to civil liberties and political rights, is associated with lower public health spending.

Next, we investigate the effect of natural resource dependence on public education spending relative to GDP. Table V summarizes the main regression results.

Table V: Results fixed effects regressions on Public Education Expenditures

Res.Dep	-0.0302**	-0.0329**	-0.0349**	-0.0288**	-0.0295**
	(0.047)	(0.029)	(0.020)	(0.035)	(0.040)
GDP		0.4224	0.9343	-0.8273	-0.5038
		(0.244)	(0.237)	(0.392)	(0.633)
Aid			0.1846	0.0048	0.0510
			(0.347)	(0.982)	(0.813)
Pop.>65				0.8986**	0.8466*
				(0.040)	(0.058)
Freedom					0.2134
					(0.358)
Obs.	39	39	39	39	39
Countries	17	17	17	17	17
Within R^2	0.1994	0.2123	0.2283	0.3512	0.3632
Between R^2	0.0692	0.0230	0.0017	0.0439	0.0635
Overall R^2	0.0625	0.0782	0.0373	0.0101	0.0244

Notes:
Res. Dep. stands for *Resource Dependence*.
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

We find evidence of a strong, statistically significant, negative relationship between natural resource dependence and public education spending, indicating the existence of a public education spending resource curse in the MENA region. In line with the hypothesis put forward by Richman and Stagner (1986), our results further indicate that a larger share of the population aged 65 and above is associated with higher public education spending. Perhaps most important for the purpose of this paper, controlling for income, aid, age distribution and freedom doesn't alter the significance or the magnitude of the adverse effect of *Resource Dependence*. According to the regression model including all additional controls, keeping all else fixed a ten per cent increase in the share of natural capital in total national wealth corresponds to a decrease in government spending on education of approximately 0.29 per cent of GDP. While at first sight, the effect appears to be large compared to the previously established health spending resource curse effect, we note that government spending on education has been particularly high in this region, with an average of 8.48 per cent of GDP for this period.

4.2. Robustness checks

We check whether our results are corroborated in regressions including time fixed effects (see Table A1, Appendix). As such, we control for unobserved effects that vary over time as well as over countries. We continue to find strong support for the existence of a health

spending resource curse, though the coefficient for natural resource dependence has decreased slightly in terms of magnitude. The effect of natural resource dependence on public education expenditures is not robust to including time fixed effects (see Table A1, Appendix). Further results however indicate, that the inclusion of time fixed effects is not necessary in both analyses[5].

We also want to control for the possibility that government spending depends on previous expenditures. We therefore use annual data for all our variables and develop a dynamic regression specification where we include the lag of expenditures on health and education respectively as an explanatory variable. To fully capture the dynamic nature of our 15 year panel, we are obliged to refrain from using our preferred measure of natural resource dependence, the share of natural capital in total wealth, and replace it with a similar indicator; the share of natural resource rents[6] in GDP. Similar measures have been used by authors such as Atkinson and Hamilton (2003), Collier and Hoeffler (2005), de Soysa and Neumayer (2007).

As traditional panel data estimators are no longer consistent, we apply the instrumental variables first difference estimator proposed by Anderson and Hsiao (1982) in line with Lederman and Maloney (2007). Controlling for this dynamic relation doesn't alter our main results; the negative coefficient for natural resource dependence remains highly significant in the regression on public health expenditures as well as public education spending (see Table A2, Appendix).

[5] For both regressions, a test on the joint significance of the dummies' coefficients clearly indicates that the hypothesis that the intercept is constant over all periods cannot be rejected.

[6] Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.

5. Extension : The unfulfilled promise of oil

While the Middle East and North Africa is a resource diverse region, the resource-rich countries have a particularly unusual abundance of oil. MENA is endowed with more than half of total oil reserves and contributed to over 35 per cent of world oil production in 2013 (BP Statistical Review, 2014). At the same time, oil has been argued to create an extreme case of the resource curse. Even relative to other commodities, direct linkages are few and real oil prices are exceptionally volatile. According to Karl (2007) other special characteristics include its depletability, particularly high capital intensity and technological sophistication, its enclave nature and the exceptional generation of profits that accrue to the state and to private actors. It has been argued that especially the concentration of the extraction and revenue patterns of oil generate a "curse". Several researchers have in fact indicated that only natural resources that are extracted from a narrow geographic zone and generate easily appropriable rents give rise to "heightened economic and social divisions and weakened institutional capacity" (Isham et al., 2005) and breed corruption (Bhattacharyya and Hodler, 2010). Sala-i-Martin and Subramanian (2013) similarly conclude that oil in particular has a deleterious impact on institutional quality. Schubert (2006) states that oil dependence leads to a skewing of political forces and increases rent-seeking behavior. Oil in particular has also been associated with authoritarianism and conflict (Ross, 2001; Ross, 2004). Finally, Blanco and Grier (2012) find that only petroleum exports appear to have a negative effect on human capital accumulation in Latin-America.

To explore to what extent the reliance on this particular commodity influences government spending on health and education, we repeat our analysis with *Oil Dependence* rather than *Resource Dependence* as our main variable of interest. Again we measure dependence by looking at the share of oil wealth in total national wealth.

Table VI: Results fixed effects regressions on Public Health Expenditures

Oil. Dep.	-0.0067 (0.568)	-0.0229** (0.021)	-0.0266*** (0.004)	-0.0267*** (0.005)	-0.0264*** (0.002)
GDP		1.3408*** (0.000)	1.5346*** (0.000)	1.5555*** (0.000)	1.4256*** (0.000)
Aid			0.1069* (0.087)	0.1070* (0.088)	0.1060 (0.111)
Pop.>65				-0.0127 (0.923)	-0.0170 (0.896)
Freedom					-0.2476** (0.039)
Obs.	50	50	50	50	50
Countries	18	18	18	18	18
Within R^2	0.0180	0.2781	0.3832	0.3832	0.4272
Between R^2	0.0955	0.1648	0.1886	0.1853	0.1655
Overall R^2	0.0780	0.1437	0.1735	0.1693	0.1671

Notes:
Oil Dep. stands for *Oil Dependence.*
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

Table VI summarizes our main results for public health expenditures. We find that after controlling for income, aid, age structure of the population and freedom, the effect of oil dependence is highly significant and has a considerably larger impact on public health expenditures. Compared to the previously established effect of natural resource dependence as a whole,

the coefficient is nearly twice as large in terms of magnitude. Keeping all else equal, a ten per cent increase in the share of oil wealth in total national wealth, which corresponds roughly to the difference between the United Arab Emirates (26.35 %) and Oman (36.31 %) in 2005, is associated with a decrease of public health spending of approximately 0.26 per cent of GDP. Other coefficients also seem to be plausibly estimated and are similar to what we found before.

Similar to what we found for public health spending, the results of the regression on public education expenditures summarized in Table VII, show strong support for the existence of an oil curse on public education expenditures. The coefficient for oil dependence is highly significant in all the regression specifications and is considerably larger compared to the previously established effect of natural resource dependence as a whole. According to these estimates, keeping all else fixed a ten per cent increase in the share of oil wealth in total national wealth is on average associated with a decline in government spending on education of approximately 0.36 % of GDP.

Table VII : Results fixed effects regressions on Public Education Expenditures

Oil. Dep.	-0.0338**	-0.0436***	-0.0451***	-0.0348***	-0.0361**
	(0.019)	(0.001)	(0.001)	(0.010)	(0.016)
GDP		0.8544*	1.2825	-0.4191	-0.0510
		(0.083)	(0.157)	(0.709)	(0.967)
Aid			0.1518	-0.0095	0.0402
			(0.496)	(0.969)	(0.872)
Pop.>65				0.7898*	0.7288
				(0.083)	(0.106)
Freedom					0.2252
					(0.353)
Obs.	39	39	39	39	39
Countries	17	17	17	17	17
Within R^2	0.1892	0.2329	0.2439	0.3316	0.3450
Between R^2	0.0374	0.0012	0.0006	0.0376	0.0585
Overall R^2	0.0163	0.0457	0.0259	0.0100	0.0289

Notes:
Oil Dep. stands for *Oil Dependence.*
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

6. Conclusion

This paper contributes to the 'resource curse' literature by empirically investigating how vast natural resource endowments affect government priorities and in particular public spending on human development in the Middle East and North Africa (MENA) region. Using a panel dataset covering the period from 1995 to 2009, we find a robust, significant inverse relationship between natural resource dependence and public health spending on the one hand, and natural resource dependence and public education spending, on the other hand. The effects remain significant after controlling for income, aid, the age structure of the population, and the quality of institutions. Furthermore, our findings indicate that increased reliance on oil wealth in particular, gives rise to this resource curse effect of reduced government prioritization of social spending in MENA countries.

The robust and strong adverse association between natural resource and oil dependence and public health expenditures is especially worrying given the already exceptionally low average levels of government health spending in this region. While the regional average for public education expenditures on the other hand is relatively high, the finding that natural resource dependence is associated with lower government education spending remains cause for concern especially since Tansel and Kazemi (2003) find that oil-rich MENA countries also tend to have higher inequity in the distribution of resources among different education levels.

Moreover, MENA's economic development models are under significant pressure due to a strong population growth and the need for diversification. However, for sustainable pro-poor growth to occur, adequate investment in health and education are paramount . Correct taxation of natural resource, and especially, oil wealth should provide the governments with adequate budgets to fund a desirable level of public health provision.

The establishment of the existence of a resource and oil curse effect on government social spending in MENA is in line with the rentier state theory and points to the importance of government accountability. We note however , that governments in MENA countries appear to be particularly reluctant to increase transparency and accountability about natural resource revenues, as only 2 countries in the region currently adhere to the EITI Standard. Governments should be strongly encouraged to manage their natural wealth in an accountable and equitable manner that follows international best practice and which promotes sustainable growth in the long run.

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Appendix

Table A1: Results fixed effects regression Public Health and Education Expenditures (including time fixed effect)

	Public Health Exp.	*Public Edu. Exp.*
Res.Dep	-0.0153**	-0.0261
	(0.011)	(0.115)
GDP	0.6428*	0.8360
	(0.074)	(0.557)
Aid	0.0247	0.1556
	(0.691)	(0.510)
Pop.>65	0.2708	0.5613
	(0.037)	(0.342)
Freedom	-0.2493*	0.0052
	(0.056)	(0.969)
Time fixed effects		
2000-2004	-0.0926	0.3133
	(0.470)	(0.386)
2005-2009	-0.0990	-0.2076
	(0.551)	(0.718)
Obs.	50	39
Countries	18	17
Within R^2	0.4656	0.4765
Between R^2	0.1290	0.0218
Overall R^2	0.1680	0.0357

Notes:
Res Dep. stands for Resource Dependence.
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

Table A2: Results IV regression Public Health and Education Expenditures

	Public Health Exp.	*Public Edu.Exp.*
Public Health Expenditures $_{t-1}$	-1.2430* (0.089)	
Public Education Expenditures $_{t-1}$		0.6988 (0.186)
Res.Dep	-0.0146*** (0.007)	-0.0454*** (0.002)
GDP	-1.3696* (0.064)	0.0469 (0.981)
Aid	-0.0122 (0.316)	-0.0042 (0.941)
Pop.>65	0.2392 (0.502)	0.2322 (0.779)
Freedom	0.0793 (0.560)	0.2206 (0.417)
Obs.	270	93
Countries	24	15
Within R^2	0.2370	0.2495
Between R^2	0.7285	0.8189
Overall R^2	0.2978	0.5636

Notes:
Public Health Exp., Public Edu.Exp. and Res.Dep. stand for Public Health Expenditures, Public Education Expenditures and Resource Dependence respectively
*, **, *** denote statistical significance at 10%, 5% and 1% respectively.
Reported p-values are based on cluster-robust standard errors.

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