Problems with the "Oil Curse" hypothesis and its generalization

Sierra Rayne[a,*], Kaya Forest[b]

[a]*Chemologica Research, 318 Rose Street, PO Box 74, Mortlach, Saskatchewan, Canada, S0H 3E0*
[b]*Department of Environmental Engineering, Saskatchewan Institute of Applied Science and Technology, Palliser Campus, 600-6th Avenue NW, PO Box 1420, Moose Jaw, Saskatchewan, Canada, S6H 4R4*

The concept of an "oil curse" has been widely debated in the literature. Two clear camps have emerged: (1) those that favor the basic hypothesis or a modified version thereof [1–14], and (2) those that find little generalizable empirical evidence for the negative impacts of oil and gas development on the political, socio-economic, and/or environmental trajectories of oil and gas producing nations relative to their non-oil and gas producing counterparts [15–19]. In recent work, Ross [20] has described in detail what he sees as potential supporting material for an effectively generalizable oil curse. However, we present herein a range of concerns regarding any general oil curse hypothesis as outlined in ref. [20]. We find that the following statements (with our approach taking the form of statement from ref. [20] / our evaluation) made in this publication do not appear to be rigorously supported by a breadth and depth of evidence:

p. 4: "Geology is not destiny. Some oil producers have escaped each of these ailments. Nigeria and Indonesia have made transitions to democracy."

According to the Economist Intelligence Unit (EIU) Index of Democracy for 2011 [21], Nigeria was clearly ranked as an authoritarian regime with an overall score of 3.83, placing it 119th in the world. Nigeria was similarly ranked as an authoritarian regime during the EIU surveys in 2006 (3.52; tie for 124th place with Cuba) [22], 2008 (3.53; 124th place) [23], and 2010 (3.47; 123rd place) [24]. It appears that under no reasonable conditions can Nigeria be viewed as having made a transition to democracy.

p. 5: "The scale of oil revenues can be massive. On average, the governments of oil-producing countries are almost 50 percent larger (as a fraction of their country's economy) than the governments of non-oil economies."

If we take general government final consumption expenditure (% of GDP) [25] as a proxy for the size of government, and use Ross' list of oil and gas producing (OP)

countries (i.e., Table 1.1 from ref. [20]), we find no statistically significant difference (p=0.55) in the size of governments (as a fraction of their country's economy) between OP states (15.9±6.4% [mean±SD]) and non-OP (NOP) states (16.6±6.5%). One notes that there are many ways of defining the size of government within a nation's economy (see, e.g., ref. [26] for a comparison of historical government size between Canada and the United States using various metrics), but the absence of detailed expenditure data for all nations precludes such analyses. As shown in Figure 1, we also find no correlation (p=0.70) between the size of government and the 2009 per capita oil income (using data from Table 1.1 from ref. [20]) for oil and gas producing countries.
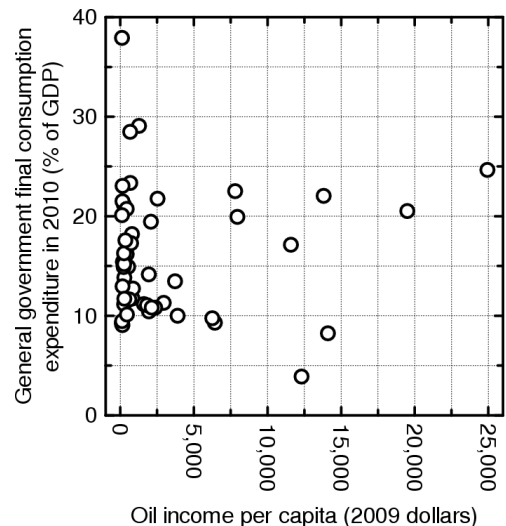

Figure 1: General government final consumption expenditure [25] in 2010 versus 2009 per capita oil income [20].

p. 5: "The real problem is not that growth in the oil states has been slow when it should have been 'normal' but rather that it has been normal when it should have been faster than normal, given the enormous revenues these governments have collected. Two factors can help explain this disappointingly average growth: the failure of the oil

*Corresponding author. Tel.: +1 306 690 0573. E-mail address: sierra.rayne@live.co.uk (S. Rayne).

states to generate more jobs for women - which would have lowered fertility rates and population growth, and boosted per capita income growth; and the inability of their governments to cope with the extraordinary challenges created by revenue volatility."

Two questions arise out of this statement: (1) are population growth rates higher in OP states versus their NOP counterparts?; and, (2) are higher fertility rates the cause of any differences in population growth rates between these two classes of nations? The population growth rate (as percent of population) [27] in OP states was significantly higher than that of NOP states during the 1960s, 1970s, and 2000s, with no statistically significant difference during the 1980s and 1990s.[1] However, the fertility rate (births per woman) [28] was not significantly different between these two groups of nations during any of these five decades.[2] The life expectancy at birth (years) [29] is also not significantly different between these two groups of nations over this timeframe.[3]

One would expect higher net immigration to wealthier nations, and if we assume oil producing nations are wealthier (or at least perceived as wealthier) than non-oil producing nations, one may suspect the oil producing nations to have higher net immigration. Reliable historical net immigration data is difficult to obtain for all countries, although we note that several of the following major oil and gas producing nations are ranked highly in terms of their 2012 net migration rates [30]: Qatar (1st), United Arab Emirates (5th), Bahrain (8th), Australia (17th), Canada (18th), United States (26th), United Kingdom (30th), Brunei (32nd), Denmark (33rd), New Zealand (36th), Netherlands (38th), Norway (43rd), Croatia (45th), Suriname (56th), and Kazakhstan (64th). Using international migrant stock (as percent of population) [31] as a net migration historical proxy, we find no significant difference between oil producing and non-oil producing nations.[4] However, the mortality rate (under 5; per 1,000 live births) [32] has been significantly lower for oil producing nations versus the non-oil producing countries since the early 1980s.[5]

Consequently, one must be cautious in assigning the cause of higher population growth rates among oil producing nations relative to their non-oil producing counterparts. Fertility rates between these two broad groups are not different. Net migration rates may be higher in oil producing nations, as migrants are attracted to the real or perceived higher wealth in such countries. Oil producing nations do have lower mortality rates, and thus, a greater share of their newborns survive early childhood, resulting in increased population growth at equivalent fertility rates. The lower mortality rates in oil producing nations are a potential positive indirect impact of oil wealth.

In addition, the ease of doing business [33],[6] number of secure internet servers [34],[7] number of internet users [35],[8] the efficiency of the customs clearing process [36],[9] the ease of arranging competitively priced shipments [37],[10] the ability to track and trace consignments [38],[11] the percent of rural [39],[12] urban [40],[13] and total [41] [14] populations with access to an improved water source, the lifetime risk of maternal death [42],[15] the percent of the popula-

---

[1]1961-1970: NOP ($2.15\pm1.21\%$) vs. OP ($2.64\pm1.90\%$), significant at p=0.03; 1971-1980: NOP ($1.94\pm1.26\%$) vs. OP ($2.51\pm2.39\%$), significant at p=0.03; 1981-1990: NOP ($1.95\pm1.70\%$) vs. OP ($2.37\pm1.51\%$), not significant at p=0.10; 1991-2000: NOP ($1.48\pm1.28\%$) vs. OP ($1.71\pm1.17\%$), not significant at p=0.25; 2001-2010: NOP ($1.32\pm1.15\%$) vs. OP ($1.95\pm2.01\%$), significant at p=0.006

[2]1961-1970: NOP (5.32 ± 1.86) vs. OP (5.46 ± 1.75), not significant at p=0.62; 1971-1980: NOP (4.80 ± 2.03) vs. OP (4.87 ± 1.92), not significant at p=0.82; 1981-1990: NOP (4.26 ± 2.00) vs. OP (4.21 ± 1.87), not significant at p=0.88; 1991-2000: NOP (3.59 ± 1.82) vs. OP (3.41 ± 1.63), not significant at p=0.53; 2001-2010: NOP (3.04 ± 1.61) vs. OP (2.89 ± 1.40), not significant at p=0.54

[3]1961-1970: NOP (56.0 ± 11.9) vs. OP (57.0 ± 11.0), not significant at p=0.61; 1971-1980: NOP (59.7 ± 11.2) vs. OP (61.0 ± 10.1), not significant at p=0.45; 1981-1990: NOP (62.9 ± 10.6) vs. OP (64.8 ± 9.3), not significant at p=0.27; 1991-2000: NOP (64.8 ± 11.0) vs. OP (67.4 ± 9.0), not significant at p=0.13; 2001-2010: NOP (67.5 ± 10.9) vs. OP (69.6 ± 8.8), not significant at p=0.21

[4]1960: NOP (8.5 ± 12.8) vs. OP (6.0 ± 7.8), not significant at p=0.21; 1970: NOP (8.9 ± 13.1) vs. OP (7.8 ± 13.3), not significant at p=0.61; 1980: NOP (9.4 ± 14.1) vs. OP (9.9 ± 17.7), not significant

at p=0.84; 1990: NOP (10.5 ± 15.3) vs. OP (11.0 ± 19.1), not significant at p=0.85; 2010: NOP (11.5 ± 17.0) vs. OP (11.2 ± 17.3), not significant at p=0.90

[5]1971-1980: NOP (121 ± 89) vs. OP (93 ± 65), not significant at p=0.06; 1981-1990: NOP (94 ± 78) vs. OP (64 ± 53), significant at p=0.02; 1991-2000: NOP (76 ± 68) vs. OP (47 ± 48), significant at p=0.01; 2001-2010: NOP (58 ± 54) vs. OP (36 ± 42), significant at p=0.02

[6]2010: OP (92.7 ± 52.7) vs. NOP (92.2 ± 50.2), not significant at p=0.96; 2011: OP (92.9 ± 60.1) vs. NOP (92.2 ± 50.0), not significant at p=0.93

[7]2010: OP (270 ± 598) vs. NOP (417 ± 1326), not significant at p=0.44

[8]2010: OP (37 ± 28) vs. NOP (34 ± 28), not significant at p=0.57

[9]2010: OP (2.6 ± 0.6) vs. NOP (2.6 ± 0.6), not significant at p=0.85

[10]2010: OP (2.9 ± 0.4) vs. NOP (2.8 ± 0.5), not significant at p=0.51

[11]2010: OP (2.9 ± 0.6) vs. NOP (2.9 ± 0.7), not significant at p=0.72

[12]1990: OP (70.8 ± 22.4) vs. NOP (71.8 ± 27.3), not significant at p=0.82; 1995: OP (72.5 ± 21.8) vs. NOP (73.9 ± 25.6), not significant at p=0.72; 2000: OP (74.4 ± 21.3) vs. NOP (76.7 ± 23.5), not significant at p=0.55; 2005: OP (76.5 ± 21.2) vs. NOP (79.6 ± 21.9), not significant at p=0.38; 2010: OP (78.8 ± 21.2) vs. NOP (81.8 ± 20.9), not significant at p=0.24

[13]1990: OP (91.8 ± 12.3) vs. NOP (90.4 ± 15.4), not significant at p=0.56; 1995: OP (92.1 ± 11.8) vs. NOP (91.0 ± 14.5), not significant at p=0.63; 2000: OP (92.1 ± 11.8) vs. NOP (92.1 ± 11.7), not significant at p=0.87; 2005: OP (92.9 ± 10.3) vs. NOP (93.5 ± 10.3), not significant at p=0.72; 2010: OP (93.4 ± 10.0) vs. NOP (94.4 ± 8.6), not significant at p=0.52

[14]1990: OP (81.8 ± 17.9) vs. NOP (78.4 ± 23.5), not significant at p=0.35; 1995: OP (82.9 ± 17.5) vs. NOP (80.2 ± 22.0), not significant at p=0.42; 2000: OP (84.2 ± 17.0) vs. NOP (82.6 ± 19.7), not significant at p=0.60; 2005: OP (85.6 ± 16.4) vs. NOP (85.1 ± 17.7), not significant at p=0.85; 2010: OP (86.6 ± 16.0) vs. NOP (87.0 ± 16.3), not significant at p=0.89

[15]1990: OP (1.48 ± 2.38) vs. NOP (1.90 ± 2.54), not significant at p=0.31; 1995: OP (1.37 ± 2.52) vs. NOP (1.59 ± 2.21), not signif-

tion with access to improved sanitation facilities [43],[16] the amount of public [44] [17] and private [45] [18] health expenditures (as a percent of GDP), male [46] [19] and total [47] [20] labor participation rates, the prevalence of undernourishment [48],[21] the adolescent fertility rate [49],[22] male [50] [23] and female [51] [24] adult mortality rates, and female life expectancy at birth [52] [25] all do not differ significantly between oil producing and non-oil producing nations. Despite equivalent health indicators as OP countries, NOP nations have significantly higher total public plus private health expenditures (as a percent of GDP) [53],[26] female labor participation rates [54] [27] and the female percentage of the total labor force [55] [28] are lower in oil producing countries, and the depth of hunger [56] [29] is higher in non-oil producing countries. Overall, these statistics challenge any generalizable notion of a so-called "oil curse."
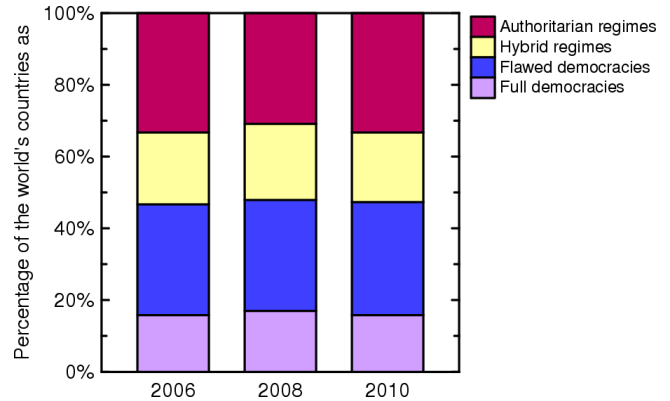

Figure 2: Percentage of the world's countries classified as full democracies, flawed democracies, hybrid regimes between authoritarian regimes and flawed democracies, and authoritarian regimes in 2006 [22], 2008 [23], and 2010 [24].

pp. 64 "Scholars also agree that the number of democracies has grown over time. In the 1970s, the world had three dictatorships for every democracy. By the early 1990s, the number of democracies surpassed the number of dictatorships. Today almost 60 percent of the world's countries are democracies."

Figure 2 shows the percentage of the world's countries classified as "full democracies," "flawed democracies," "hybrid regimes between authoritarian regimes and flawed democracies," and "authoritarian regimes" using the EIU Index of Democracy for 2006 [22], 2008 [23], and 2010 [24]. As is clear, only a small number of countries are full democracies ($\sim$16%), whereas about 33% of all countries are authoritarian regimes, $\sim$19% are hybrid regimes, and $\sim$32% are flawed democracies. More than half ($\sim$53%) of the world's countries are either authoritarian or hybrid regimes. Figure 3 shows the percentage of the world's population living in the various regime classifications during 2006 [22], 2008 [23], and 2010 [24]. Only about 12% of the world's population live in full democracies, compared to $\sim$37% living under authoritarian regimes, $\sim$14% under hybrid regimes, and $\sim$38% under flawed democracies. Thus, about half the world's population live under authoritarian or hybrid regimes.

On page 82 of ref. [20], Ross notes that the press freedom index of OP states in 2006 was inferior (i.e., less free press) to that of NOP states. This lower freedom of the press in OP states can be extended up to the present as shown by the comparative press freedom indices between the two groupings by year since 2002 (note that lower press freedom indices indicate a higher degree of press freedom).[30] However, the corruption perceptions indices between OP and NOP states have not differed significantly

at p=0.56; 2000: OP (1.06±1.92) vs. NOP (1.28±1.84), not significant at p=0.48; 2005: OP (0.85±1.60) vs. NOP (1.01±1.47), not significant at p=0.85; 2010: OP (0.68±1.29) vs. NOP (0.79±1.18), not significant at p=0.58

[16]1990: OP (70.8±28.2) vs. NOP (63.3±34.0), not significant at p=0.16; 1995: OP (72.4±27.7) vs. NOP (64.6±33.2), not significant at p=0.14; 2000: OP (74.4±27.5) vs. NOP (66.6±32.3), not significant at p=0.13; 2005: OP (76.4±27.4) vs. NOP (68.8±31.3), not significant at p=0.13; 2010: OP (77.7±27.0) vs. NOP (70.5±30.6), not significant at p=0.14

[17]2001-2010: OP (3.4±2.1) vs. NOP (3.9±2.3), not significant at p=0.16

[18]2001-2010: OP (2.3±1.6) vs. NOP (2.7±1.5), not significant at p=0.12

[19]1991-2000: OP (76.4±6.6) vs. NOP (76.6±8.1), not significant at p=0.84; 2001-2010: OP (75.0±7.2) vs. NOP (75.2±8.4), not significant at p=0.91

[20]1991-2000: OP (61.4±9.1) vs. NOP (64.0±10.9), not significant at p=0.13; 2001-2010: OP (62.1±9.6) vs. NOP (64.2±10.7), not significant at p=0.22

[21]1992: OP (14.7±15.1) vs. NOP (18.2±15.9), not significant at p=0.19; 1997: OP (13.3±13.7) vs. NOP (17.6±15.2), not significant at p=0.09; 2002: OP (12.1±11.1) vs. NOP (16.3±14.4), not significant at p=0.07; 2008: OP (10.7±9.8) vs. NOP (14.4±12.8), not significant at p=0.07

[22]2001-2010: OP (60±47) vs. NOP (65±51), not significant at p=0.55

[23]2001-2010: OP (216±109) vs. NOP (237±129), not significant at p=0.28

[24]2001-2010: OP (146±98) vs. NOP (175±141), not significant at p=0.16

[25]1961-1970: OP (58.9±11.9) vs. NOP (58.1±12.5), not significant at p=0.67; 1971-1980: OP (63.1±11.0) vs. NOP (62.0±11.9), not significant at p=0.56; 1981-1990: OP (67.1±10.2) vs. NOP (65.5±11.2), not significant at p=0.37; 1991-2000: OP (69.4±10.0) vs. NOP (67.5±11.6), not significant at p=0.31; 2001-2010: OP (71.6±9.5) vs. NOP (70.0±11.7), not significant at p=0.38

[26]2001-2010: OP (5.9±2.8) vs. NOP (6.8±2.3), significant at p=0.02

[27]1991-2000: OP (45.0±16.4) vs. NOP (51.7±17.1), significant at p=0.02; 2001-2010: OP (47.8±16.0) vs. NOP (53.5±16.1), significant at p=0.03

[28]1991-2000: OP (35.6±11.8) vs. NOP (40.3±8.7), significant at p=0.003; 2001-2010: OP (37.4±11.4) vs. NOP (41.8±7.8), significant at p=0.003

[29]1992: OP (193±72) vs. NOP (209±75), not significant at p=0.19; 1997: OP (188±67) vs. NOP (207±72), not significant at p=0.11; 2002: OP (184±61) vs. NOP (204±70), not significant at p=0.08; 2008: OP (177±59) vs. NOP (199±67), significant at p=0.05

[30]2002: OP (31.0±22.6) vs. NOP (25.7±23.4), not significant at p=0.21; 2003: OP (31.6±23.5) vs. NOP (24.2±22.7), not significant at p=0.06; 2004: OP (35.0±25.0) vs. NOP (26.3±23.9), significant at p=0.03; 2005: OP (31.7±23.7) vs. NOP (25.3±23.6), not significant
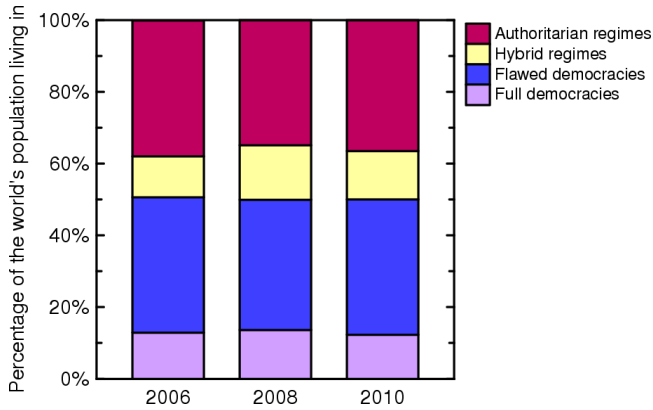
Figure 3: Percentage of the world's population living in full democracies, flawed democracies, hybrid regimes between authoritarian regimes and flawed democracies, and authoritarian regimes in 2006 [22], 2008 [23], and 2010 [24].

since 2003.[31] Thus, while oil producing nations generally have a less free press, their public sector institutions are not perceived as any more corrupt when compared to their non-oil producing counterparts.

pp. 74-75 "Countries that transited to democracy early and remained democratic, like the Dominican Republic, Turkey, Portugal, and Spain, had little or no oil ... Thankfully, oil wealth does not necessarily stop democratization ... Venezuela's 1958 transition is at the top of the list. The next three oil producers to democratize were Nigeria (1979), Ecuador (1979), and the Republic of Congo (1992); all of these transitions were later reversed. Nigeria and Ecuador subsequently returned to democracy, but only after their oil income fell to much lower levels. This highlights the unusual quality of Venezuela's success. Since Venezuela's 1958 transition, no country with more oil income than Mexico in 2000 has become and remained democratic."

In Table 3.2 of ref. [20], Ross ranks Bolivia as an example of a country that has had a successful transition to democracy and maintained its democratic status as of 2010. In 2010 [24], the EIU Index of Democracy ranked

Bolivia as a hybrid regime, and not as a democratic state. As well, Nigeria is currently an authoritarian regime according to the EIU 2010 [24] and 2011 [21] democracy index rankings. Similarly, the EIU ranked both Ecuador and Venezuela as hybrid regimes, and not democracies, in both 2010 [24] and 2011 [21]. These errors appear to undercut Ross' general analysis of democratic transitions among oil producing countries since 1946.

p. 76 "Perhaps figure 3.4 can provide a simpler answer. It compares the average democracy scores of long-term oil producers to all other countries over time. Democracy scores range from one to ten, with higher scores indicating greater democracy. The numbers are based on a widely used measure of democracy, called Polity IV. Until the early 1980s, the oil and non-oil states had virtually identical scores; since then, the gap between the two has steadily widened."

In contrast, and using index value and country ranking data from the EIU Index of Democracy reports in 2006 [22], 2008 [23], 2010 [24], and 2011 [21], we find that there are no statistically significant differences in the democracy indices [32] or the country rankings [33] between OP and NOP states over this period.

p. 79: "In partially democratic Iran, gasoline and electricity subsidies cost the government - in revenues it would have otherwise collected, had the energy been sold at market prices - a remarkable 20 percent of the GDP in 2007-8, or the equivalent of about $3,275 for a family of four."

It is difficult to understand how Iran could be classified as "partially democratic" during 2007-2008 under any ranking system. According to the EIU Index of Democracy for 2008 [23], Iran was clearly ranked as an authoritarian regime with an overall score of 2.83, placing it 145th in the world. Iran was similarly ranked as an authoritarian regime during the EIU surveys in 2006 (2.93; tie for 139th place with Swaziland) [22], 2010 (1.94; tie for 158th place with Libya) [24], and 2011 (1.98; 159th place) [21]. It appears that under no reasonable conditions could Iran have been considered "partially democratic" either during 2007-2008, or in the short-term period preceding or following this date.

p. 76 "Latin America seems to be unaffected by the antidemocratic powers of petroleum ... all of Latin America's oil producers (like almost all of its non-oil producers) are now democracies."

---

at p=0.11; 2006: OP (33.0±25.0) vs. NOP (24.5±22.4), significant at p=0.03; 2007: OP (37.3±25.4) vs. NOP (29.0±23.3), significant at p=0.04; 2008: OP (36.8±27.4) vs. NOP (27.0±24.4), significant at p=0.02; 2009: OP (36.8±27.4) vs. NOP (27.0±24.4), significant at p=0.02; 2010: OP (39.6±26.6) vs. NOP (27.6±22.4), significant at p=0.003; 2011: OP (51.4±38.9) vs. NOP (34.1±32.7), significant at p=0.003

[31]2003: OP (4.25±2.45) vs. NOP (4.21±-2.21), not significant at p=0.93; 2004: OP (4.08±2.36) vs. NOP (4.21±2.16), not significant at p=0.75; 2005: OP (4.03±2.34) vs. NOP (4.10±2.11), not significant at p=0.84; 2006: OP (3.99±2.29) vs. NOP (4.11±2.07), not significant at p=0.76; 2007: OP (3.87±2.30) vs. NOP (4.04±2.00), not significant at p=0.61; 2008: OP (3.89±2.31) vs. NOP (4.11±2.02), not significant at p=0.53; 2009: OP (3.92±2.33) vs. NOP (4.08±2.00), not significant at p=0.66; 2010: OP (3.96±2.33) vs. NOP (4.03±1.99), not significant at p=0.83; 2011: OP (4.33±2.30) vs. NOP (4.22±1.97), not significant at p=0.76

[32]2006: OP (5.04±2.41) vs. NOP (5.74±2.16), not significant at p=0.06; 2008: OP (5.10±2.43) vs. NOP (5.75±2.13), not significant at p=0.08; 2010: OP (5.02±2.45) vs. NOP (5.67±2.09), not significant at p=0.08; 2011: OP (5.06±2.42) vs. NOP (5.69±2.04), not significant at p=0.08

[33]2006: OP (94±51) vs. NOP (79±47), not significant at p=0.06; 2008: OP (94±52) vs. NOP (80±46), not significant at p=0.08; 2010: OP (93±52) vs. NOP (79±46), not significant at p=0.07; 2011: OP (94±53) vs. NOP (79±46), not significant at p=0.07

Various definitions of Latin America exist. For the purposes of this analysis, we will use the list of countries provided by the Latin American Network Information Center (LANIC) at the University of Texas (http://lanic.utexas.edu/subject/countries/). On page 20 of ref. [20], Ross lists the following Latin American and Caribbean oil and gas producing countries by their 2009 oil income per capita: Trinidad, Venezuela, Ecuador, Suriname, Mexico, Argentina, Colombia, Bolivia, Brazil, and Cuba. Using the 2010 [24] and 2011 [21] EIU Indices of Democracy for each of these countries, it is clear [34] that - in contrast to what Ross claims - not all of Latin America's oil producers are now democracies. Indeed, none of Latin America's oil producers are full democracies, and we see several members that are hybrid regimes between authoritarian regimes and flawed democracies, and one clear authoritarian regime. We can also consider the remaining Latin American countries that are not classified as oil and gas producers and their respective 2010 and 2011 democracy indices and regime types (where available).[35] Among all the Latin American countries (whether oil producers or not), only two nations (Costa Rica and Uruguay) are full democracies. Of the 24 Latin American countries with available 2011 democracy indices [21], 8.3% are full democracies, 58.3% are flawed democracies, 29.2% are hybrid regimes, and 4.2% are authoritarian regimes. This distribution is not consistent with claiming "almost all" of Latin America's nations are democracies.

p. 120: "Oil states in the rest of the developing world have fewer working women, although the difference is much smaller. One reason for this gap is that non-oil states export more manufactured goods, and thus have more factory jobs for women."

A logical failing appears to exist in the argument that

because "non-oil states export more manufactured goods, [they] have more factory jobs for women." Factory jobs for women in the manufacturing sector should not - on face - depend on whether the manufactured goods in question are for export or domestic use. In other words, we should be more interested in comparing the total size of the manufacturing sectors between oil producing and non-oil producing states.

The proposition that "non-oil states export more manufactured goods" than oil states can be tested. Manufactures exports (as a percent of merchandise exports) [57] of NOP states are higher than that of OP states: NOP ($47.4 \pm 30.0\%$) vs. OP ($27.5 \pm 26.2\%$), significant at $p < 0.001$. Similarly, manufactures imports (as a percent of merchandise imports) [58] of NOP states ($61.4 \pm 11.5\%$) are lower than that of OP states ($69.8 \pm 11.1\%$; $p < 0.001$). However, the size of the value-added manufacturing sector (as a percent of GDP) [59] does not differ between oil and non-oil producing nations: OP ($12.7 \pm 6.6\%$) vs. NOP ($13.0 \pm 7.7\%$), not significant at $p = 0.85$.

pp. 124-126: The following three figures from ref. [20] purport to illustrate how "women in the Middle East are impeded by oil, [and] not by Islam, or the region's distinctive culture and history": "Figure 4.4. Oil and female labor force participation in the Middle East, 1993-2002," "Figure 4.5. Oil and female suffrage in the Middle East, 1940-2010," and "Figure 4.6. Oil and female parliamentary seats in the Middle East, 2002."

In these plots, we find that the percentage of women in the labor force, the length of time women have had the right to vote, and the percentage of parliamentary seats held by women are negatively correlated (generally in an exponential relationship) with per capita oil income. To illustrate his hypothesis, Ross [20] uses data from the following list of countries (alongside each country is provided its 2011 EIU democracy index regime classification [21]): Djibouti, authoritarian regime; Morocco, authoritarian regime; Tunisia, hybrid regime; Lebanon, hybrid regime; Syria, authoritarian regime; Iran, authoritarian regime; Jordan, authoritarian regime; Libya, authoritarian regime; Iraq, hybrid regime; Egypt, hybrid regime; Oman, authoritarian regime; Algeria, authoritarian regime; Saudi Arabia, authoritarian regime; Yemen, authoritarian regime; Bahrain, authoritarian regime; United Arab Emirates, authoritarian regime; Kuwait, authoritarian regime; and Qatar, authoritarian regime.

None of these countries are democracies, and all but four are authoritarian regimes (the remaining four are hybrid regimes between an authoritarian regime and a flawed democracy). What real meaning can the right to vote and/or parliamentary representation have in an authoritarian regime? Nothing of any real human rights value, since the very nature of the regime itself means the government has no respect for the basic human rights of its citizens. Thus, such comparisons lead to essentially nonsensical discussions about the meaning of the right to vote

---

[34]Trinidad: 2010 (7.16, flawed democracy), 2011 (7.16, flawed democracy); Venezuela: 2010 (5.18, hybrid regime), 2011 (5.08, hybrid regime); Ecuador: 2010 (5.77, hybrid regime), 2011 (5.72, hybrid regime); Suriname: 2010 (6.65, flawed democracy), 2011 (5.72, flawed democracy); Mexico: 2010 (6.93, flawed democracy), 2011 (6.93, flawed democracy); Argentina: 2010 (6.84, flawed democracy), 2011 (6.84, flawed democracy); Colombia: 2010 (6.55, flawed democracy), 2011 (6.63, flawed democracy); Bolivia: 2010 (5.92, hybrid regime), 2011 (5.84, hybrid regime); Brazil: 2010 (7.12, flawed democracy), 2011 (7.12, flawed democracy); and Cuba: 2010 (3.52, authoritarian regime), 2011 (3.52, authoritarian regime)

[35]Dominican Republic: 2010 (6.20, flawed democracy), 2011 (6.20, flawed democracy); Haiti: 2010 (4.00, hybrid regime), 2011 (4.00, hybrid regime); Jamaica: 2010 (7.21, flawed democracy), 2011 (7.13, flawed democracy); Costa Rica: 2010 (8.04, full democracy), 2011 (8.10, full democracy); El Salvador: 2010 (6.46, flawed democracy), 2011 (6.47, flawed democracy); Guatemala: 2010 (6.05, flawed democracy), 2011 (5.88, hybrid regime); Honduras: 2010 (5.76, hybrid regime), 2011 (5.84, hybrid regime); Nicaragua: 2010 (5.73, hybrid regime), 2011 (5.56, hybrid regime); Panama: 2010 (7.15, flawed democracy), 2011 (7.08, flawed democracy); Chile: 2010 (7.67, flawed democracy), 2011 (7.54, flawed democracy); Guyana: 2010 (6.05, flawed democracy), 2011 (6.05, flawed democracy); Paraguay: 2010 (6.40, flawed democracy), 2011 (6.40, flawed democracy); Peru: 2010 (6.40, flawed democracy), 2011 (6.59, flawed democracy); and Uruguay: 2010 (8.10, full democracy), 2011 (8.17, full democracy)

and parliamentary representation in authoritarian countries where, clearly, these concepts are meaningless (or else, by definition, the regime would not be authoritarian).

On pages 127-130, Ross [20] goes on to compare the status of women in Algeria, Morocco, and Tunisia. Algeria has substantial per capita oil income, whereas Tunisia and Morocco do not. Algeria and Morocco are authoritarian regimes, while Tunisia (which has a slightly higher per capita oil income than Morocco) is a hybrid regime. Oil income per capita clearly does not influence the regime type among these three countries. Ross [20] argues that conditions are better for women in Morocco and Tunisia (the lower oil income per capita countries) since they have higher labor participation rates and hold a greater percentage of parliamentary seats in these two countries when compared to the more oil wealthy Algeria. Again, we can raise the question of what - if any - real human rights meanings can be ascribed to the right to vote and parliamentary representation in non-democratic states?

Per capita gross domestic product (GDP) on a purchasing power parity (PPP) basis [60] in 2010 among the three countries was as follows (in current international dollars): Tunisia, $9,550; Algeria, $8,433; and Morocco, $4,712. The 2010 gross national incomes per capita on a PPP basis (in current international dollars) [61] were as follows: Tunisia, $9,060; Algeria, $8,100; and Morocco, $4,600. Thus, Algeria is far wealthier than Morocco, and this must have some positive effects on women. Namely, both Algeria and Morocco are authoritarian regimes with no basic levels of respect for human rights in either country. While Morocco has more female representatives in its authoritarian regime and has a higher female labor force participation rate, does this necessarily translate into better living conditions for women when compared against a wealthier country? The answer is undoubtedly controversial, but also certainly more complicated than Ross' statistics suggest.

We can also look at the relative rankings of each country on the following indices [62]: Human Development Index: Tunisia (94th), Algeria (96th), and Morocco (130th); Gender Inequality Index: Tunisia (45th), Algeria (71st), and Morocco (104th); Global Gender Gap Index: Tunisia (108th), Algeria (121st), and Morocco (129th). Thus, none of these countries have acceptable gender rights records, and despite its much higher oil wealth, Algeria outperforms Morocco. Ergo, there appears to be no general correlations between oil wealth in the Middle East/North Africa and gender rights.

To probe this issue further, Figures 4, 5, and 6 show the relationships between 2009 per capita oil income [20] for the Middle Eastern and North African countries listed above and the corresponding 2011 Human Development, Gender Inequality, and Global Gender Gap indices [62]. Note that higher values of the Human Development and Global Gender Gap indices are desirable, whereas lower values of the Gender Inequality Index are desirable. The correlations in the three figures presented herein are about
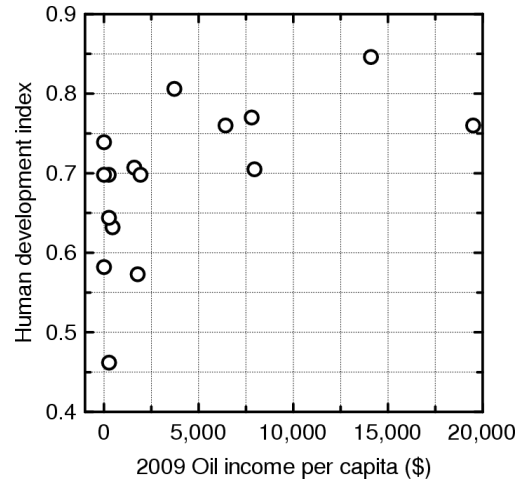

Figure 4: Relationship between the 2011 Human Development Index [62] and the corresponding 2009 per capita oil income [20] for Morocco, Tunisia, Lebanon, Syria, Iran, Jordan, Libya, Iraq, Egypt, Oman, Algeria, Saudi Arabia, Yemen, Bahrain, United Arab Emirates, and Kuwait.

equivalent in quality to the correlations that Ross [20] presents in Figures 4.4, 4.5, and 4.6 of his book. However, Figures 4, 5, and 6 appear to indicate that increasing oil wealth in the Middle East and North Africa actually improves gender rights, rather than degrades them (i.e., completely the opposite of what Ross argues).

p. 131: "Oil wealth does not necessarily harm the status of women. It depends on whether women have opportunities to work in the service sector, which typically grows in tandem with oil revenues. Seven countries have produced significant quantities of oil and gas, but still made faster progress on gender equality than we would expect based on their income: Norway, New Zealand, Australia, Uzbekistan, Turkmenistan, Syria, and Mexico ... Perhaps the most interesting exceptions are Syria and Mexico: women in both states have benefited from many years of rule by secular, left-of-center parties that showed an interest in women's rights ... Both good fortune and a committed government can sometimes counteract the perverse effects of oil on the status of women."

To compare in any way the issue of gender equality in Norway, New Zealand, and Australia against that of Uzbekistan, Turkmenistan, and Syria is problematic. Norway, New Zealand, and Australia are all full democracies, having three of the top six 2011 [21] EIU democracy index scores among all countries. In contrast, Uzbekistan, Turkmenistan, and Syria are all authoritarian regimes, with 2011 democracy indices of 1.74 (164th place), 1.72 (165th place), and 1.99 (tie for 157th place with Guinea-Bissau) out of 167 ranked nations, respectively, making these three countries among the least free places on the planet. What kind of gender equality can exist, or be sought, in nations that are so authoritarian? The concept essentially becomes meaningless within this context. Ross states that
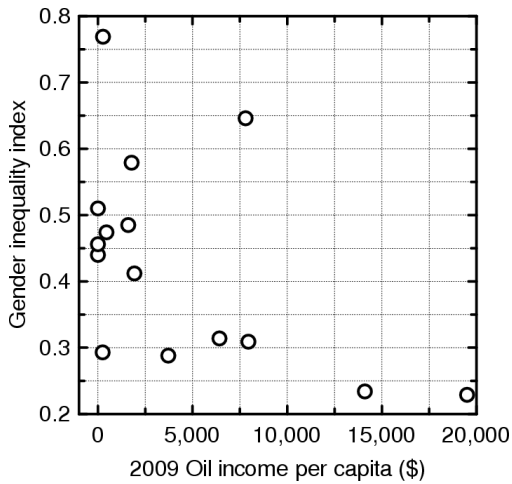
Figure 5: Relationship between the 2011 Gender Inequality Index [62] and the corresponding 2009 per capita oil income [20] for Morocco, Tunisia, Lebanon, Syria, Iran, Jordan, Libya, Iraq, Oman, Algeria, Saudi Arabia, Yemen, Bahrain, United Arab Emirates, and Kuwait.
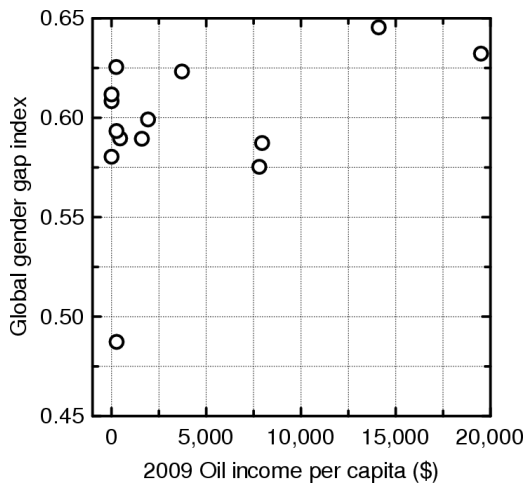

Figure 6: Relationship between the 2011 Global Gender Gap Index [62] and the corresponding 2009 per capita oil income [20] for Morocco, Tunisia, Lebanon, Syria, Iran, Jordan, Egypt, Oman, Algeria, Saudi Arabia, Yemen, Bahrain, United Arab Emirates, and Kuwait.
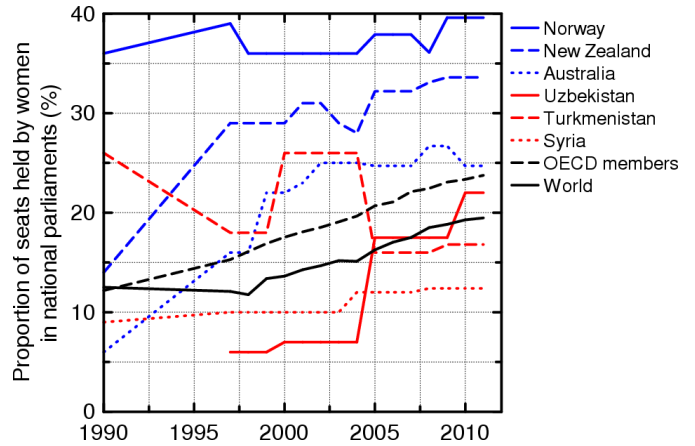

Figure 7: Historical proportion of seats held by women in national parliaments [63] in Norway, New Zealand, Australia, Uzbekistan, Turkmenistan, and Syria, as well as the global and OECD averages.

Syria's regime has benefited women. How is this possible in the absence of any basic level of human rights for any citizens, regardless of age, sex, or other classification system? The proposition seems nonsensical.

Figures 7 and 8 show the proportion of seats held by women in national parliaments [63] and the share of women employed in the nonagricultural sector [64] for these six countries, as well as OECD member states and the global average, since records began in 1990. In neither case does it appear that Syria's rulers have significantly benefited women, either relative to western nations or even against the global average. Indeed, in 2011, 12.4% of seats in Syria's national parliament were held by women. By contrast, the global average was 19.5%, the Arab nation average was 11.0%, and the Middle East and North African average was 9.0%. Similarly, in 2009 (the latest year for which data is available), women comprised 15.3% of non-agricultural sector employment in Syria. The global average was 36.3% (2005 data is the latest available; Syria was at 16.1% in 2003 and 16.3% in 2007 - no data is available for this country between 2004 and 2006), the Arab nation average was 16.6% (2006 data is the latest available), and the Middle East and North African average was 18.7% (2004 data is the latest available).

The purported gender equality uniqueness of Syria is also challenged by considering the data of other Middle Eastern and North African oil and gas producing nations. While data on the share of women employed in the nonagricultural sector [64] is sparse for these countries, the following comparisons can be made using the latest years available: Kuwait, 23.2% in 1998 (Syria was 16.1% in 2001 and 15.2% in 1991); United Arab Emirates, 20.1% in 2008 (Syria was 16.3% in 2007 and 15.3% in 2009); Oman, 21.9% in 2008; Saudi Arabia, 14.7% in 2007; Libya, 15.8% in 2001; Qatar, 9.8% in 2009; Iran, 16.1% in 2005 (Syria was 16.1% in 2003 and 16.3% in 2007); Algeria, 16.8% in 2007; Bahrain, 9.8% in 2009; Egypt, 18.1% in 2009; Iraq,
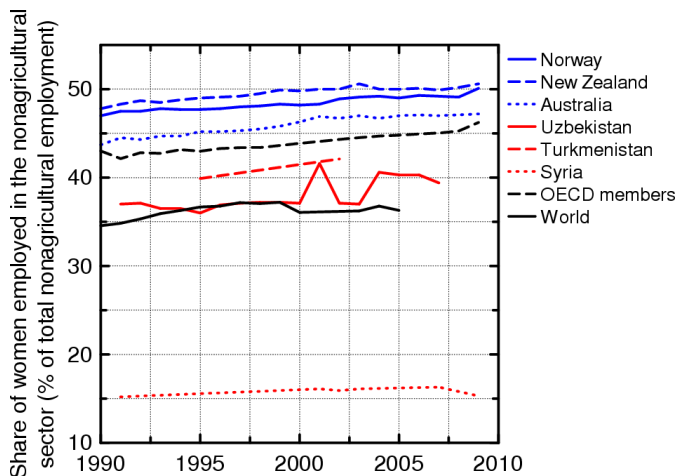
Figure 8: Historical share of women employed in the nonagricultural sector [64] in Norway, New Zealand, Australia, Uzbekistan, Turkmenistan, and Syria, as well as the global and OECD averages.

12.1% in 2008; Yemen, 6.2% in 2007; and Tunisia, 25.0% in 2003. Syria appears about average in terms of other oil and gas producing nations in this region when it comes to the share of women employed in the nonagricultural sector.

Since the government is non-democratic, the proportion of seats held by women in national parliaments has no real human rights based meaning in a strictly authoritarian regime. Consequently, allowing women to hold a parliamentary seat in an authoritarian regime makes a mockery of gender equality issues. As Ross notes, oil producing nations [36] do have a generally lower proportion of seats held by women in national parliaments in the Middle East and North Africa when compared to their non-oil producing counterparts.[37] Syria has a lower proportion of seats held by women in its national parliament than the UAE, Iraq, and Tunisia, and thus, does not appear to be special among oil and gas producing nations in the region. One generally notes that the proportion of seats held by women in national parliaments is low in this region regardless of whether or not the country is oil and gas producing.

p. 141: "These results are generally consistent with hypothesis 4.2, which suggests that petroleum income will reduce female political influence under certain conditions. They are also consistent with a key part of the model in chapter 4: that petroleum reduces the number of women in legislatures because it reduces their presence in the workforce."

---

[36]Kuwait, 7.7% in 2011 (Syria was 12.4% in 2011); United Arab Emirates (UAE), 22.5% in 2011; Oman, 0% in 2011; Saudi Arabia, 0% in 2011; Libya, 7.7% in 2011; Qatar, 0% in 2011; Iran, 2.8% in 2011; Algeria, 7.7% in 2011; Bahrain, 2.5% in 2011; Egypt, 1.8% in 2010 (Syria was at 12.4%); Iraq, 25.2% in 2011; Yemen, 0.3% in 2011; and Tunisia, 27.6% in 2011

[37]Niger, 13.1% in 2011; Eritrea, 22.0% in 2011; Mali, 10.2% in 2011; Mauritania, 22.1% in 2011; Morocco, 10.5% in 2011; Jordan, 10.8% in 2011; Lebanon, 3.1% in 2011; and Turkey, 14.2% in 2011

There appears to be no statistically significant difference (p=0.96) in the 2009 proportion of seats held by women in national parliaments [63] between oil and gas producing nations and non-oil and gas producing nations. Oil and gas producing nations have a proportion of seats held by women in national parliaments of 17.1±12.1%, while the corresponding value for non-oil and gas producing nations is 17.1+/-10.6%.

p. 202: "A more powerful explanation for slower-than-expected growth is that petroleum wealth tends to choke off opportunities for women … One consequence is that women in oil-rich countries have unusually high fertility rates, which leads to faster population growth and slower per capita economic growth."

There appears to be no statistically significant difference (p=0.66) in the 2009 fertility rates [28] between oil and gas producing nations and non-oil and gas producing nations. Oil and gas producing nations have a fertility rate (births per woman) of 2.78±1.28, while non-oil and gas producing nations have a fertility rate of 2.88±1.50.

p. 205: "The second impediment to faster growth is inappropriate government policies - particularly policies that fail to offset the volatility of oil revenues … This volatility can hurt economic growth by creating uncertainty about the future, which in turn discourages private-sector investment. Volatility is more harmful for low-income states than high-income ones, partly because their financial markets are less sophisticated and hence less able to help investors hedge against risks. In commodity-exporting developing states, volatility in the terms of trade has historically kept investors away, causing these countries to fall further behind the United States and Europe. One recent study found that natural resource exports typically have a positive direct effect on growth, but a larger, indirect, negative effect due to the economic volatility they create. Yet economic volatility alone cannot be blamed for slow growth; volatility in the oil states is driven by fluctuations in the government's resource revenues, and governments have - at least in theory - the ability to smooth out these fluctuations. If benevolent accountants instead of politicians ran oil-rich governments, their economies would be a lot steadier. The failure of oil-funded governments to stabilize their economies is one of the central puzzles of the resource curse."

Between 2001 and 2010 - a period during which oil prices varied substantially (see Figure 9) - the standard deviation of per capita GNI annual growth was not different (p=0.94) between OP states (3.53±2.34%) and NOP states (3.56±1.99%). Similarly, the average annual per capita GNI growth over this period did not differ (p=0.94) between OP (2.92± 2.63%) and NOP (2.96±2.53%) states. The relative standard deviation (RSD) of annual per capita GNI growth between 2001 and 2010 also did not differ (p=0.12) between OP (213±258%) and NOP (107±335%) states.
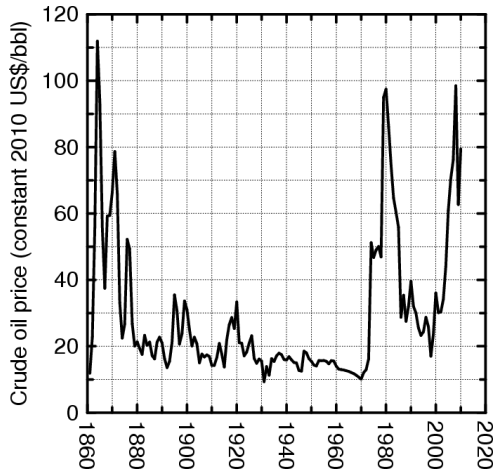
Figure 9: Historical world price [65] of crude oil in constant 2000 US$/bbl.

Average per capita GDP annual growth between 2001 and 2010 did not differ (p=0.17) between OP (3.26±3.65%) and NOP (2.58±2.47%) states. The standard deviation of per capita GDP annual growth over this period did differ (p=0.04) between OP (4.31±4.10%) and NOP (3.35± 1.94%) states, but the corresponding RSD did not differ (p=0.21; OP [-291±3,674%] vs. NOP [140±831%]). Overall, although petroleum production plays a major role in the global economy, its effects on the relative economic performance of oil and non-oil producing nations is often overstated - particularly with regard to economic volatility.

p. 232: "The Middle Eastern countries have different amounts of petroleum wealth, however, and their petroleum wealth is strongly correlated with both their democratic accountability and gender rights ... In general, countries with less oil and gas have more democratic freedoms and gender rights, while countries with more oil and gas have less democracy and worse conditions for women."

Figure 10 relates the EIU Index of Democracy for 2010 [24] and 2011 [21] with the corresponding 2009 per capita oil income [20] for the following countries: Iran, Jordan, Yemen, Tunisia, Djibouti, Algeria, Lebanon, Egypt, Morocco, Libya, Kuwait, United Arab Emirates, Syria, Iraq, Bahrain, Oman, Saudi Arabia, and Qatar. There are no significant correlations (p>0.05) between 2009 per capita oil income and the corresponding 2010 or 2011 democracy indices.

p. 233: "At least six Muslim-majority countries have recently been classified as democracies: Turkey, Mali, Senegal, Bangladesh, Comoros, and Indonesia."

According to the EIU Index of Democracy scores and global ranks in 2006 [22], 2008 [23], 2010 [24], and 2011 [21]
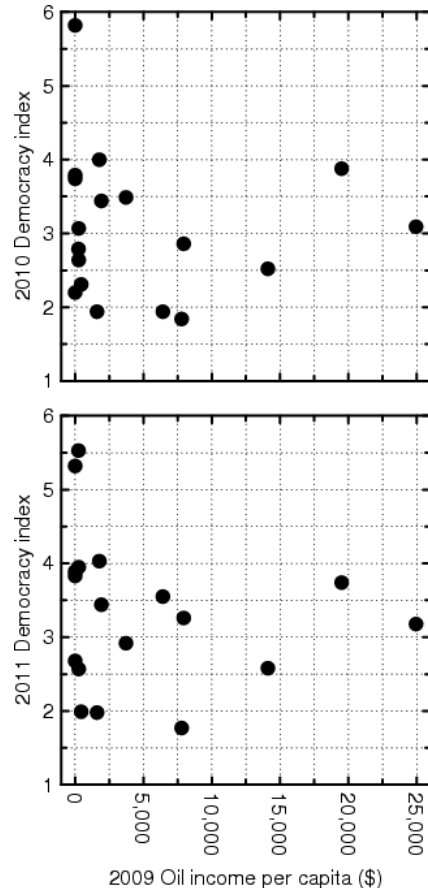

Figure 10: Relationships between the 2010 [24] and 2011 [21] EIU Index of Democracy scores for Iran, Jordan, Yemen, Tunisia, Djibouti, Algeria, Lebanon, Egypt, Morocco, Libya, Kuwait, United Arab Emirates, Syria, Iraq, Bahrain, Oman, Saudi Arabia, and Qatar and the corresponding 2009 per capita oil income [20].

9

for Turkey,[38] Senegal,[39] Bangladesh,[40] and Comoros,[41] none of these nations can be clearly ranked as a recently classified democracy.

Overall, we find no significant evidence to support a generalizable concept of an oil curse. Our conclusions are consistent with others that have been previously published in the literature on this topic (see, e.g., ref. [15–19]). In general, our results do not seek to dismiss concerns regarding the potential impacts of oil and gas development on some regions, but rather to illustrate that any such impacts do not appear to be universal in either their direction or magnitude. Similar to what other groups have found, we see evidence that - in some cases - increased oil and gas development appears to correlate with improved socio-economic indicators. In other cases, the evidence is ambiguous at best in light of the large numbers of confounding variables that are effectively impossible to rigorously account for in order to obtain clear and unequivocal negative causal mechanisms between oil and gas development and the status of a society.

References

[1] A. Gelb, Oil Windfalls: Blessing Or Curse?, Oxford University Press: London, UK, 1988.

[2] T. Karl, The Paradox of Plenty: Oil Booms and Petro-States, University of California Press: Berkeley, CA, USA, 1997.

[3] M. Ross, Does oil hinder democracy?, World Politics 53 (2001) 325–361.

[4] U. Bartsch, M. Cuc, H. Malothra, M. Katz, Lifting the Oil Curse: Improving Petroleum Revenue Management in Sub-Saharan Africa, International Monetary Fund: New York, NY, USA, 2004.

[5] O. Bayulgen, Foreign investment, oil curse, and democratization: A comparison of Azerbaijan and Russia, Business and Politics 7 (2005) 1–37.

[6] T. Friedman, The First Law of Petropolitics, Foreign Policy May/June (2006) 28–36.

[7] R. Looney, Can Iraq overcome the oil curse?, World Economics 7 (2006) 21–44.

[8] S. Schubert, Revisiting the oil curse: Are oil rich nations really doomed to autocracy and inequality?, Oil and Gas Business (2006) 1–16.

[9] N. Shaxson, Oil, corruption and the resource curse, International Affairs 83 (2007) 1123–1140.

[10] M. Ross, Blood barrels: Why oil wealth fuels conflict, Current 503 (2008) 35–37.

[11] M. Basedau, J. Lay, Resource curse or rentier peace? The ambiguous effects of oil wealth and oil dependence on violent conflict, Journal of Peace Research 46 (2009) 757–776.

[12] D. Treisman, Rethinking Russia: Is Russia cursed by oil?, Journal of International Affairs 63 (2010) 85–102.

[13] R. Ahmed, A critical analysis of the role of oil in hindering transition towards democracy in the Middle East, Information, Society and Justice 3 (2010) 95–105.

[14] S. Aslaksen, Oil and democracy: More than a cross-country correlation?, Journal of Peace Research 47 (2010) 421–431.

[15] S. Townsend, Friedman's First Law fails: Oil prices don't predict levels of freedom, Available online at http://www.ibis4.com/documents/EPSJ-Friedmanlaw.pdf.

[16] M. Alexeev, R. Conrad, The elusive curse of oil, The Review of Economics and Statistics 91 (2009) 586–598.

[17] N. Donner, The myth of the oil curse: Exploitation and diversion in Equatorial Guinea, Afro-Hispanic Review 28 (2009) 21–42.

[18] R. Wacziarg, The First Law of Petropolitics, Economica 79 (2012) 641–657.

[19] S. Rayne, K. Forest, The non-generalizability of The First Law of Petropolitics, viXra (2013) 1303.0186.

[20] M. Ross, The Oil Curse: How Petroleum Wealth Shapes the Development of Nations, Princeton University Press: Princeton, New Jersey, USA, 2012.

[21] The Democracy Index 2011: Democracy Under Stress, Economist Intelligence Unit: London, UK, 2011.

[22] L. Kekic, The Economist Intelligence Unit's Index of Democracy, Economist Intelligence Unit: London, UK, 2007.

[23] The Economist Intelligence Unit's Index of Democracy 2008, Economist Intelligence Unit: London, UK, 2008.

[24] Democracy Index 2010: Democracy in Retreat, Economist Intelligence Unit: London, UK, 2010.

[25] General government final consumption expenditure (% of GDP), The World Bank Group: Washington, DC, USA, 2012.

[26] J. Ferris, S. Winer, Just how much bigger is government in Canada? A comparative analysis of the size and structure of the public sectors in Canada and the United States, 1929-2004, Social Science Research Network (2006) doi:10.2139/ssrn.949033.

[27] Population growth (annual %), The World Bank Group: Washington, DC, USA, 2012.

[28] Fertility rate, total (births per woman), The World Bank Group: Washington, DC, USA, 2012.

[29] Life expectancy at birth, total (years), The World Bank Group: Washington, DC, USA, 2012.

[30] Net migration rate, in: The World Factbook, Central Intelligence Agency: Washington, DC, USA, 2012.

[31] International migrant stock (% of population), The World Bank Group: Washington, DC, USA, 2012.

[32] Mortality rate, under-5 (per 1,000 live births), The World Bank Group: Washington, DC, USA, 2012.

[33] Ease of doing business index (1=most business-friendly regulations), The World Bank Group: Washington, DC, USA.

[34] Secure Internet servers (per 1 million people), The World Bank Group: Washington, DC, USA, 2012.

[35] Internet users (per 100 people), The World Bank Group: Washington, DC, USA, 2012.

[36] Logistics performance index: Efficiency of customs clearance process (1=low to 5=high), The World Bank Group: Washington, DC, USA, 2012.

[37] Logistics performance index: Ease of arranging competitively priced shipments (1=low to 5=high), The World Bank Group: Washington, DC, USA, 2012.

[38] Logistics performance index: Ability to track and trace consignments (1=low to 5=high), The World Bank Group: Washington, DC, USA, 2012.

[39] Improved water source, rural (% of rural population with access), The World Bank Group: Washington, DC, USA, 2012.

[40] Improved water source, urban (% of urban population with access), The World Bank Group: Washington, DC, USA, 2012.

[41] Improved water source (% of population with access), The World Bank Group: Washington, DC, USA, 2012.

[42] Lifetime risk of maternal death (%), The World Bank Group: Washington, DC, USA, 2012.

---

[38] 2006 (5.70, 88th, hybrid regime); 2008 (5.69, 87th, hybrid regime); 2010 (5.73, 89th, hybrid regime); 2011 (5.73, 88th, hybrid regime)

[39] 2006 (5.37, 94th, hybrid regime); 2008 (5.37, 93rd, hybrid regime); 2010 (5.27, 95th, hybrid regime); 2011 (5.51, 93rd, hybrid regime)

[40] 2006 (6.11, tied for 75th with Peru, flawed democracy); 2008 (5.52, 91st, hybrid regime); 2010 (5.87, 83rd, hybrid regime); 2011 (5.86, 83rd, hybrid regime)

[41] 2006 (3.90, tied for 115th with Morocco and Egypt, authoritarian regime); 2008 (3.58, 123rd, authoritarian regime); 2010 (3.41, tied for 126th with Cameroon, authoritarian regime); 2011 (3.52, tied for 126th with Cuba, authoritarian regime)

[43] Improved sanitation facilities (% of population with access), The World Bank Group: Washington, DC, USA, 2012.

[44] Health expenditure, public (% of GDP), The World Bank Group: Washington, DC, USA, 2012.

[45] Health expenditure, private (% of GDP), The World Bank Group: Washington, DC, USA, 2012.

[46] Labor participation rate, male (% of male population ages 15+), The World Bank Group: Washington, DC, USA, 2012.

[47] Labor participation rate, total (% of total population ages 15+), The World Bank Group: Washington, DC, USA, 2012.

[48] Prevalence of undernourishment (% of population), The World Bank Group: Washington, DC, USA, 2012.

[49] Adolescent fertility rate (births per 1,000 women ages 15-19), The World Bank Group: Washington, DC, USA, 2012.

[50] Mortality rate, adult, male (per 1,000 male adults), The World Bank Group: Washington, DC, USA, 2012.

[51] Mortality rate, adult, female (per 1,000 female adults), The World Bank Group: Washington, DC, USA, 2012.

[52] Life expectancy at birth, female (years), The World Bank Group: Washington, DC, USA, 2012.

[53] Health expenditure, total (% of GDP), The World Bank Group: Washington, DC, USA, 2012.

[54] Labor participation rate, female (% of female population ages 15+), The World Bank Group: Washington, DC, USA, 2012.

[55] Labor force, female (% of total labor force), The World Bank Group: Washington, DC, USA, 2012.

[56] Depth of hunger (kilocalories per person per day), The World Bank Group: Washington, DC, USA, 2012.

[57] Manufactures exports (% of merchandise exports), The World Bank Group: Washington, DC, USA, 2012.

[58] Manufactures imports (% of merchandise imports), The World Bank Group: Washington, DC, USA, 2012.

[59] Manufacturing, value added (% of GDP), The World Bank Group: Washington, DC, USA, 2012.

[60] GDP per capita, PPP (current international $), The World Bank Group: Washington, DC, USA, 2012.

[61] GNI per capita, PPP (current international $), The World Bank Group: Washington, DC, USA, 2012.

[62] Social Institutions and Gender Index, OECD Development Centre: Paris, France, 2012.

[63] Proportion of seats held by women in national parliaments (%), The World Bank Group: Washington, DC, USA, 2012.

[64] Share of women employed in the nonagricultural sector (% of total nonagricultural employment), The World Bank Group: Washington, DC, USA, 2012.

[65] Statistical Review of World Energy, BP: London, UK, 2011.