DOES OIL HINDER DEMOCRACY?

By MICHAEL L. ROSS*

INTRODUCTION

POLITICAL scientists believe that oil has some very odd properties. Many studies show that when incomes rise, governments tend to become more democratic. Yet some scholars imply there is an exception to this rule: if rising incomes can be traced to a country's oil wealth, they suggest, this democratizing effect will shrink or disappear. Does oil really have antidemocratic properties? What about other minerals and other commodities? What might explain these effects?

The claim that oil and democracy do not mix is often used by area specialists to explain why the high-income states of the Arab Middle East have not become democratic. If oil is truly at fault, this insight could help explain—and perhaps, predict—the political problems of oil exporters around the world, such as Nigeria, Indonesia, Venezuela, and the oil-rich states of Central Asia. If other minerals have similar properties, this effect might help account for the absence or weakness of democracy in dozens of additional states in sub-Saharan Africa, Latin America, and Southeast Asia. Yet the "oil impedes democracy" claim has received little attention outside the circle of Mideast scholars; moreover, it has not been carefully tested with regression analysis, either within or beyond the Middle East.

I use pooled time-series cross-national data from 113 states between 1971 and 1997 to explore three aspects of the oil-impedes-democracy claim. The first is the claim's validity: is it true? Although the claim has been championed by Mideast specialists, it is difficult to test by examining only cases from the Middle East because the region provides scholars with

Table 1
Index of Oil-Reliant States[a]

1. Brunei (1994)	47.58
2. Kuwait	46.14
3. Bahrain	45.60
4. Nigeria (1991)	45.38
5. Congo, Dem. Rep.	45.14
6. Angola (1996)	45
7. Yemen	38.58
8. Oman	38.43
9. Saudi Arabia	33.85
10. Qatar (1994)	33.85
11. Libya (1988)	29.74
12. Iraq (1983)	23.48
13. Algeria	21.44
14. Venezuela	18.84
15. Syria	15.00
16. Norway	13.46
17. Iran (1983)	11.95
18. Ecuador	8.53
19. Malaysia	5.91
20. Indonesia	5.69
21. Cameroon	5.63
22. Lithuania	4.48
23. Kyrgyz Republic (1996)	4.25
24. Netherlands	3.14
25. Colombia	3.13

[a]Oil reliance is measured by the value of fuel-based exports divided by GDP. Most figures are based on data for 1995 from World Bank (fn. 71).Figures for Brunei, Nigeria, Qatar, Libya, Iraq, and Iran are the most recent available. Since 1995 figures for Angola and Kyrgyz Republic are not available, 1996 figures are reported.

little variation on the dependent variable: virtually all Mideast governments have been authoritarian since gaining independence. Moreover, there are other plausible explanations for the absence of democracy in the Mideast, including the influence of Islam and the region's distinct culture and colonial history. Does oil have a consistently negative influence on democracy once one accounts for these and other variables?

Second, I examine the claim's generality along two dimensions. One is geographic. For obvious reasons the oil-impedes-democracy claim has been explored most carefully by Mideast specialists: ten of the fifteen states most reliant on oil wealth are in the Middle East region (see Table 1). But is oil an obstacle to democracy only in the Mideast, or does it harm oil exporters everywhere? If the hypothesis is true for all oil-rich

TABLE 2
INDEX OF MINERAL-RELIANT STATES[a]

1.	Botswana	35.11
2.	Zambia	24.97
3.	Bahrain	16.39
4.	Chile	12.63
5.	Angola (1996)	11.5
6.	Papua New Guinea	10.13
7.	Togo (1991)	7.79
8.	Bolivia	5.53
9.	Congo, Dem. Rep. (1983)	7.00
10.	Jordan	5.28
11.	Peru	3.84
12.	Central African Republic	3.16
13.	Iceland	3.11
14.	Zimbabwe	3.00
15.	Norway	2.49
16.	Belgium	2.23
17.	Canada	2.22
18.	Australia	2.20
19.	Lithuania	1.96
20.	Jamaica	1.87
21.	Slovak Republic	1.74
22.	South Africa	1.69
23.	Morocco	1.65
24.	Cameroon	1.62
25.	Kyrgyz Republic	1.56

[a]Mineral reliance is measured by the value of nonfuel mineral exports divided by GDP. Most figures are for 1995 based on data from World Bank (fn. 71). The figures for Congo and Togo are the most recent available; the 1996 figure is reported for Angola, since no figure for 1995 is available.

states, then its importance has been underappreciated by other political scientists. If it holds only for states in the Mideast, why is this so?

The other dimension is sectoral: do other types of minerals and other types of commodities have similar effects on governments? While oil exporters tend to be concentrated in the Middle East, exporters of nonfuel minerals are more geographically dispersed (see Table 2). Have these states, too, been rendered less democratic because of resource wealth? Or does petroleum have antidemocratic properties that are not found in other commodities?

Finally, I explore the question of causality: if oil does have antidemocratic effects, what is the causal mechanism? I test three possible explanations: a "rentier effect," which suggests that resource-rich

governments use low tax rates and patronage to relieve pressures for greater accountability; a "repression effect," which argues that resource wealth retards democratization by enabling governments to boost their funding for internal security; and a "modernization effect," which holds that growth based on the export of oil and minerals fails to bring about the social and cultural changes that tend to produce democratic government.

I also have two broader aims. The first is to encourage scholars who study democracy to incorporate the Middle East into their analyses. Many "global" studies of democratization have avoided the Mideast entirely.[1] Influential studies by Przeworski and Limongi and Przeworski, Alvarez, Cheibub, and Limongi simply drop the oil-rich Mideast states from their database.[2] There is, however, no sound analytical reason for scholars of democracy to exclude these states from their research, and doing so can only weaken any general findings. It also tends to marginalize the field of Middle East studies.

My second aim is to address the literature on the "resource curse." Many of the poorest and most troubled states in the developing world have, paradoxically, high levels of natural resource wealth. There is a growing body of evidence that resource wealth itself may harm a country's prospects for development. States with greater natural resource wealth tend to grow more slowly than their resource-poor counterparts.[3] They are also more likely to suffer from civil wars.[4] This article suggests as well that there is a third component to the resource curse: oil and mineral wealth tends to make states less democratic.

[1] See, for example, Guillermo O'Donnell, Philippe C. Schmitter, and Lawrence Whitehead, eds., *Transitions from Authoritarian Rule: Prospects for Democracy* (Baltimore: Johns Hopkins University Press, 1986); D. Larry Diamond, Juan J. Linz, and Seymour Martin Lipset, eds., *Democracy in Developing Countries* (Boulder, Colo.: Lynne Rienner, 1988); Ronald Inglehart, *Modernization and Postmodernization* (Princeton: Princeton University Press, 1997).

[2] Adam Przeworski and Fernando Limongi, "Modernization: Theories and Facts," *World Politics* 49 (January 1997); Adam Przeworski, Michael Alvarez, José Antonio Cheibub, and Fernando Limongi, "What Makes Democracies Endure?" *Journal of Democracy* 7 (January 1996); idem, *Democracy and Development: Political Institutions and Well-Being in the World, 1950–1990* (New York: Cambridge University Press, 2000).

[3] Jeffrey D. Sachs and Andrew M. Warner, "Natural Resource Abundance and Economic Growth," Development Discussion Paper no. 517a (Cambridge: Harvard Institute for International Development, 1995); idem, "The Big Push, Natural Resource Booms and Growth," *Journal of Development Economics* 59 (February 1999); Carlos Leite and Jens Weidmann, "Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth," IMF Working Paper, WP/99/85 (1999); Michael L. Ross, "The Political Economy of the Resource Curse," *World Politics* 51 (January 1999); R. M. Auty, *Resource Abundance and Economic Development* (Oxford: Oxford University Press, 2001).

[4] Paul Collier and Anke Hoeffler, "On Economic Causes of Civil War," *Oxford Economic Papers* 50 (October 1998); Indra de Soysa, "The Resource Curse: Are Civil Wars Driven by Rapacity or Paucity?" in Mats Berdal and David M. Malone, eds., *Greed and Grievance: Economic Agendas in Civil Wars* (Boulder, Colo.: Lynne Rienner, 2000).

I begin by outlining the oil-impedes-democracy claim and the limitations of previous work on the topic. I then draw on earlier case studies of oil-rich states to specify three causal mechanisms that might explain how oil makes governments more authoritarian. The next section presents a model of regime types and describes the research design. I then present the results of the validity and generality tests and follow that with a discussion of the results of tests on the causal mechanisms and a conclusion.

THE CONCEPT OF THE "RENTIER STATE"

Area specialists often describe most of the governments of the Mideast and North Africa as "rentier states," since they derive a large fraction of their revenues from external rents.[5] More than half of the government's revenues in Saudi Arabia, Bahrain, the United Arab Emirates, Oman, Kuwait, Qatar, and Libya have, at times, come from the sale of oil. The governments of Jordan, Syria, and Egypt variously earn large locational rents from payments for pipeline crossings, transit fees, and passage through the Suez Canal. Workers' remittances have been an important source of foreign exchange in Egypt, Yemen, Syria, Lebanon, Tunisia, Algeria, and Morocco, although these rents go (at least initially) to private actors, not the state. The foreign aid that flows to Israel, Egypt, and Jordan may also be considered a type of economic rent.

Economists in the early twentieth century used the term "rentier state" to refer to the European states that extended loans to non-European governments.[6] Mahdavy is widely credited with giving the term its current meaning: a state that receives substantial rents from "foreign individuals, concerns or governments."[7] Beblawi later refined this definition, suggesting that a rentier state is one where the rents are paid by foreign actors, where they accrue directly to the state, and where "only a few are engaged in the generation of this rent (wealth), the majority being only involved in the distribution or utilization of it."[8]

[5] Throughout this article I use the term "Middle East" to include North Africa. I adopt the World Bank's definition of this region: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, and Yemen.

[6] According to Lenin, "The rentier state is a state of parasitic, decaying capitalism, and this circumstance cannot fail to influence all the socio-political conditions of the countries concerned." V. I. Lenin, "Imperialism, the Highest Stage of Capitalism," in Robert C. Tucker, ed., *The Lenin Anthology* (New York: W. W. Norton, 1975).

[7] Hussein Mahdavy, "The Patterns and Problems of Economic Development in Rentier States: The Case of Iran," in M. A. Cook, ed., *Studies in Economic History of the Middle East* (London: Oxford University Press, 1970), 428.

[8] Hazem Beblawi, "The Rentier State in the Arab World," in Hazem Beblawi and Giacomo Luciani, eds., *The Rentier State* (New York: Croom Helm, 1987), 51. Note that this definition excludes

Claims about the rentier state can be sorted into two categories: those that suggest oil wealth makes states less democratic and those that suggest oil wealth causes governments to do a poorer job of promoting economic development. Often the two are conflated. This article focuses on the first claim.

According to Anderson, "The notion of the rentier state is one of the major contributions of Middle East regional studies to political science."[9] Indeed, some scholars of democracy now use a version of this argument to account for the otherwise puzzling states of the Middle East. Huntington, for example, suggests that the democratic trend may bypass the Middle East since many of these states "depend heavily on oil exports, which enhances the control of the state bureaucracy."[10] Others have adapted the "rentier state" idea to oil-rich countries outside the Middle East.[11]

The claim that oil wealth per se inhibits democratization has not been subjected to careful statistical tests, however, as most quantitative studies of democracy simply overlook it as an explanatory variable. And the handful that even acknowledge that oil-rich states have odd properties do little to explain why. Przeworski and his collaborators, for example, drop countries from their database if their "ratio of fuel exports to total exports in 1984–1986 exceeded fifty percent"—an eccentric criterion that excludes six oil-rich states, all of which are located on the Arabian Peninsula.[12] Barro's study of democracy includes a dummy variable for states "whose net oil exports represent a minimum of two-thirds of total exports and are at least equivalent to approximately one percent of world exports of oil."[13] The Barro oil dummy is statistically significant and negatively correlated with democracy. But as in the analyses of Przeworski et al., the dummy variable uses an arbitrary cut-

workers' remittances. As Chaudhry notes, large flows of remittances have different political implications than do large oil rents. See Kiren Aziz Chaudhry, *The Price of Wealth: Economies and Institutions in the Middle East* (Ithaca, N.Y.: Cornell University Press, 1997).

[9] Lisa Anderson, "The State in the Middle East and North Africa," *Comparative Politics* 20 (October 1987), 9.

[10] Samuel P. Huntington, *The Third Wave: Democratization in the Late Twentieth Century* (Norman: University of Oklahoma Press, 1991), 31–32.

[11] See, for example, Olle Törnquist, "Rent Capitalism, State, and Democracy: A Theoretical Proposition," in Arief Budiman, ed., *State and Civil Society in Indonesia,* Monash Papers on Southeast Asia, no. 22 (1990); Douglas A. Yates, *The Rentier State in Africa: Oil Rent Dependency and Neocolonialism in the Republic of Gabon* (Trenton, N.J.: Africa World Press, 1996); Terry Lynn Karl, *The Paradox of Plenty: Oil Booms and Petro-States* (Berkeley: University of California Press, 1997); John Clark, "Petro-Politics in Congo," *Journal of Democracy* 8 (July 1997); idem, "The Nature and Evolution of the State in Zaire," *Studies in Comparative International Development* 32 (Winter 1998).

[12] See Przeworski et al. (fn. 2, 2000), 77.

[13] Robert J. Barro, "Determinants of Democracy," *Journal of Political Economy* 107 (December 1999).

point to distinguish between "oil states" and "non–oil states" and implies that oil has little or no influence on regime type until some threshold is reached.

Qualitative studies of the oil-impedes-democracy hypothesis also have important limitations. The vast majority have been country-level case studies of oil-rich states in the Mideast. Although many have been empirically rich and analytically nuanced, the Mideast is nevertheless a difficult place to test this claim, since virtually all oil-rich Mideast governments have been highly authoritarian since gaining independence. The absence of variation on the dependent variable—as well as on Islam, an important control variable—has made testing difficult. It has also allowed Mideast specialists to neglect tasks that would help sharpen and refine the oil-impedes-democracy claim—defining the key variables better, specifying the causal arguments in falsifiable terms, and outlining the domain of relevant cases to which their arguments apply. As a result, the notion of the rentier state has suffered from a bad case of conceptual overstretch: assertions about the influence of oil on Middle East politics have become so general that their validity has been diluted. As Okruhlik observes, "The idea of the rentier state has come to imply so much that it has lost its content."[14]

One way to restore the usefulness of an overstretched concept is by testing it statistically. I thus evaluate one core facet of the rentier state concept—the oil-impedes-democracy claim—with three questions. First, is there a statistically valid correlation between oil and authoritarianism once other germane variables are accounted for? Second, can the claim be generalized both beyond the Middle East and beyond the case of oil? Finally, if oil thwarts democracy, what is the causal mechanism?

Proponents of the oil-impedes-democracy hypothesis naturally suggest both that it is valid and that it can be generalized to oil exporters outside the Middle East. Some also imply that other types of commodities have similar effects. Nothing in Beblawi's definition, which is widely accepted among Mideast specialists, restricts the set of rentier states to oil exporters. In fact, the definition appears to cover many mineral exporters on the grounds that (1) minerals tend to generate rents, (2) the rents are largely captured by states via export taxes, corporate taxes, and state-owned enterprises, and (3) mineral extraction employs relatively little labor. The same definition, however, implies that exporters of agricultural commodities will not be rentier states.

[14] Gwenn Okruhlik, "Rentier Wealth, Unruly Law, and the Rise of Opposition," *Comparative Politics* 31 (April 1999), 308.

This is because (1) agricultural commodities generally do not produce rents, (2) export revenues in most cases go directly to private actors, not the state, and (3) agricultural production is more labor intensive and hence employs a larger fraction of the population for a given value of exports.[15]

CAUSAL MECHANISMS

At least three causal mechanisms might explain the alleged link between oil exports and authoritarian rule. The first comes largely from Mideast specialists and might be called the "rentier effect." A close reading of case studies suggests a second mechanism: a "repression effect." Modernization theory implies a third possible cause, which I call the "modernization effect."

THE RENTIER EFFECT

The first causal mechanism comes from the work of Middle East scholars, who have pondered this issue for over two decades.[16] In general they argue that governments use their oil revenues to relieve social pressures that might otherwise lead to demands for greater accountability. Case studies describe three ways this may occur.[17]

The first is through what might be called a "taxation effect." It suggests that when governments derive sufficient revenues from the sale of oil, they are likely to tax their populations less heavily or not at all, and the public in turn will be less likely to demand accountability from—and representation in—their government.[18]

The logic of the argument is grounded in studies of the evolution of democratic institutions in early modern England and France. Historians and political scientists have argued that the demand for representation in government arose in response to the sovereign's attempts to raise

[15] Note that, by contrast, dependency theory suggests that developing states are politically constrained by their reliance on the export of *all* types of primary commodities to advanced industrialized states. See, for example, Fernando Henrique Cardoso and Enzo Faletto, *Dependency and Development in Latin America* (Berkeley: University of California Press, 1979); Peter Evans, *Dependent Development: The Alliance of Multinational, State, and Local Capital in Brazil* (Princeton: Princeton University Press, 1979); Kenneth A. Bollen, "World System Position, Dependency, and Democracy: The Cross-National Evidence," *American Sociological Review* 48 (August 1983).

[16] Perhaps they have thought about it too carefully. Chaudhry (fn. 8), notes that "theories of the rentier state far outstrip detailed empirical analysis of actual cases" (p. 187).

[17] Case studies often conflate these three effects. I treat them here as separate mechanisms to clarify their logic.

[18] Giacomo Luciani, "Allocation vs. Production States: A Theoretical Framework," in Beblawi and Luciani (fn. 8).

taxes.[19] Some Mideast scholars have looked for similar correlations between variations in tax levels and variations in the demand for political accountability. Crystal found that the discovery of oil made the governments of Kuwait and Qatar less accountable to the traditional merchant class.[20] Brand's study of Jordan argued that a drop in foreign aid and remittances in the 1980s led to greater pressures for political representation.[21] Yet not all Middle East specialists have been persuaded: Waterbury argues that "neither historically nor in the twentieth century is there much evidence [in the Middle East] that taxation has evoked demands that governments account for their use of tax monies. Predatory taxation has produced revolts, especially in the countryside, but there has been no translation of tax burden into pressures for democratization."[22]

A second component of the rentier effect might be called the "spending effect": oil wealth may lead to greater spending on patronage, which in turn dampens latent pressures for democratization.[23] Entelis, for example, argues that the Saudi Arabian government used its oil wealth for spending programs that helped reduce pressures for democracy.[24] Vandewalle makes a similar argument about the Libyan government.[25] And Kessler and Bazdresch and Levy find that the Mexican oil boom of the 1970s helped prop up—and perhaps prolong—one-party rule.[26] While all authoritarian governments may use

[19] Charles Tilly, ed., *The Formation of National States in Western Europe* (Princeton: Princeton University Press, 1975); Robert Bates and Da-Hsiang Donald Lien, "A Note on Taxation, Development, and Representative Government," *Politics and Society* 14 (January 1985); Philip T. Hoffman and Kathryn Norberg, eds., *Fiscal Crises, Liberty, and Representative Government, 1450–1789* (Stanford, Calif.: Stanford University Press, 1994).

[20] Jill Crystal, *Oil and Politics in the Gulf: Rulers and Merchants in Kuwait and Qatar* (New York: Cambridge University Press, 1990).

[21] Laurie A. Brand, "Economic and Political Liberalization in a Rentier Economy: The Case of the Hashemite Kingdom of Jordan," in Iliya Harik and Denis J. Sullivan, eds., *Privatization and Liberalization in the Middle East* (Bloomington: Indiana University Press, 1992).

[22] John Waterbury, "Democracy without Democrats? The Potential for Political Liberalization in the Middle East," in Ghassan Salamé, ed., *Democracy without Democrats? The Renewal of Politics in the Muslim World* (New York: I. B. Tauris, 1994), 29.

[23] Lam and Wantchekon develop a formal model that makes a similar point, that resource wealth can impede democracy by enhancing the distributive influence of an elite. Ricky Lam and Leonard Wantchekon, "Dictatorships as a Political Dutch Disease" (Manuscript, Department of Political Science, Yale University, January 1999).

[24] John P. Entelis, "Oil Wealth and the Prospects for Democratization in the Arabian Peninsula: The Case of Saudi Arabia," in Naiem A. Sherbiny and Mark A. Tessler, eds., *Arab Oil: Impact on the Arab Countries and Global Implications* (New York: Praeger, 1976).

[25] Dirk Vandewalle, *Libya since Independence: Oil and State-Building* (Ithaca, N.Y.: Cornell University Press, 1998).

[26] Carlos Bazresch and Santiago Levy, "Populism and Economic Policy in Mexico, 1970–82," in Rudiger Dornbusch and Sebastian Edwards, eds., *The Macroeconomics of Populism in Latin America* (Chicago: University of Chicago Press, 1991); Timothy P. Kessler, *Global Capital and National Politics: Reforming Mexico's Financial System* (Westport, Conn.: Praeger, 1999).

their fiscal powers to reduce dissent, these scholars imply that oil wealth provides Middle East governments with budgets that are exceptionally large and unconstrained.[27] Rulers in the Middle East may follow the same tactics as their authoritarian counterparts elsewhere, but oil revenues could make their efforts at fiscal pacification more effective.

The third component might be called a "group formation" effect. It implies that when oil revenues provide a government with enough money, the government will use its largesse to prevent the formation of social groups that are independent from the state and hence that may be inclined to demand political rights. One version of this argument is rooted in Moore's claim that the formation of an independent bourgeoisie helped bring about democracy in England and France.[28] Scholars examining the cases of Algeria, Libya, Tunisia, and Iran have all observed oil-rich states blocking the formation of independent social groups; all argue that the state is thereby blocking a necessary precondition of democracy.[29]

A second version of the group-formation effect draws on Putnam's argument that the formation of social capital—civic institutions that lie above the family and below the state—tends to promote more democratic governance.[30] Scholars studying the cases of Algeria, Iran, Iraq, and the Arab Gulf states have all suggested that the government's oil wealth has impeded the formation of social capital and hence blocked a transition to democracy.[31]

Whether Mideast states use their oil revenues to *deliberately* inhibit group formation is a matter of some disagreement. In the case of Libya, First suggests "there is not a consistent policy against the development of

[27] Lisa Anderson, "Peace and Democracy in the Middle East: The Constraints of Soft Budgets," *Journal of International Affairs* 49 (Summer 1995).

[28] Barrington Moore, *Social Origins of Dictatorship and Democracy* (Boston: Beacon Press, 1966).

[29] On Algeria, see Clement Henry Moore, "Petroleum and Political Development in the Maghreb," in Sherbiny and Tessler (fn. 24); on Libya, see Ruth First, "Libya: Class and State in an Oil Economy," in Petter Nore and Terisa Turner, eds., *Oil and Class Struggle* (London: Zed Press, 1980); also on Libya, see Vandewalle (fn. 25); on Tunisia, see Eva Bellin "The Politics of Profit in Tunisia: Utility of the Rentier Paradigm?" *World Development* 22 (March 1994); and on Iran, see Hootan Shambayati, "The Rentier State, Interest Groups, and the Paradox of Autonomy: State and Business in Turkey and Iran," *Comparative Politics* 26 (April 1994).

[30] Robert Putnam, *Making Democracy Work: Civic Traditions in Modern Italy* (Princeton: Princeton University Press, 1993).

[31] On Algeria, see John P. Entelis, "Civil Society and the Authoritarian Temptation in Algerian Politics," in Augustus Richard Norton, ed., *Civil Society in the Middle East,* vol. 2 (Leiden: E. J. Brill, 1995); on Iran, see Farhad Kazemi, "Civil Society and Iranian Politics," in Norton; on the Gulf states, see Jill Crystal, "Civil Society in the Arab Gulf States," in Norton; on Iraq, see Zuhair Humadi, "Civil Society under the Ba'th in Iraq," in Jillian Schwedler, ed., *Toward Civil Society in the Middle East?* (Boulder, Colo.: Lynne Rienner, 1995). Other scholars have argued that the weakness of civil society in the Middle East has hampered a transition to democracy, without suggesting that oil wealth is the source of this weakness.

an indigenous bourgeoisie, but the growth of this class is in practice constrained by the state's own economic ventures and its links with international capital."[32] Chaudhry, by contrast, argues that in the 1970s the Mideast governments used their oil revenues to develop programs that were "explicitly designed to depoliticize the population. . . . In all cases, governments deliberately destroyed independent civil institutions while generating others designed to facilitate the political aims of the state."[33]

Collectively, the taxation, spending, and group-formation effects constitute the rentier effect. Together they imply that a state's fiscal policies influence its regime type: governments that fund themselves through oil revenues and have larger budgets are more likely to be authoritarian; governments that fund themselves through taxes and are relatively small are more likely to become democratic.

THE REPRESSION EFFECT

A close reading of case studies from the Mideast, Africa, and Southeast Asia suggests that oil wealth and authoritarianism may also be linked by repression. Citizens in resource-rich states may want democracy as much as citizens elsewhere, but resource wealth may allow their governments to spend more on internal security and so block the population's democratic aspirations. Skocpol notes that much of Iran's pre-1979 oil wealth was spent on the military, producing what she calls a "rentier absolutist state."[34] Clark, in his study of the 1990s oil boom in the Republic of Congo, finds that the surge in revenues allowed the government to build up the armed forces and train a special presidential guard to help maintain order.[35] And Gause argues that Middle East democratization has been inhibited in part by the prevalence of the *mukhabarat* (national security) state.[36]

There are at least two reasons why resource wealth might lead to larger military forces. One may be pure self-interest: given the opportunity to better arm itself against popular pressures, an authoritarian government will readily do so. A second reason may be that resource wealth causes ethnic or regional conflict; a larger military might reflect the government's response. Mineral wealth is often geographically con-

[32] First (fn. 29), 137.

[33] Kiren Aziz Chaudhry, "Economic Liberalization and the Lineages of the Rentier State," *Comparative Politics* 27 (October 1994), 9.

[34] Theda Skocpol, "Rentier State and Shi'a Islam in the Iranian Revolution," *Theory and Society* 11 (April 1982).

[35] Clark (fn. 11, 1997).

[36] F. Gregory Gause II, "Regional Influences on Experiments in Political Liberalization in the Arab World," in Rex Brynen, Bahgat Korany, and Paul Noble, eds., *Political Liberalization and Democratization in the Arab World,* vol. 1, *Theoretical Perspectives* (Boulder, Colo.: Lynne Rienner, 1995).

centrated. If it happens to be concentrated in a region populated by an ethnic or religious minority, resource extraction may promote or exacerbate ethnic tensions, as federal, regional, and local actors compete for mineral rights. These disputes may lead to larger military forces and less democracy in resource-rich, ethnically fractured states such as Angola, Burma, the Democratic Republic of Congo, Indonesia, Nigeria, Papua New Guinea, Sierra Leone, and South Africa. This mechanism would be consistent with the research of Collier and Hoeffler and de Soysa, who find that natural resource wealth tends to make civil war more likely.[37]

THE MODERNIZATION EFFECT

Finally, a third explanation can be derived from modernization theory, which holds that democracy is caused by a collection of social and cultural changes—including occupational specialization, urbanization, and higher levels of education—that in turn are caused by economic development.[38] Different scholars emphasize different clusters of social and cultural changes. Perhaps the most carefully shaped position comes from Inglehart, who argues that two types of social change have a direct impact on the likelihood that a state will become democratic:

> 1. Rising education levels, which produce a more articulate public that is better equipped to organize and communicate, and
> 2. Rising occupational specialization, which first shifts the workforce into the secondary sector and then into the tertiary sector. These changes produce a more autonomous workforce, accustomed to thinking for themselves on the job and having specialized skills that enhance their bargaining power against elites.[39]

Although modernization theory does not address the question of resource wealth per se, an implicit corollary is that if economic development does not produce these cultural and social changes, it will not result in democratization. As Inglehart notes: "Is the linkage between development and democracy due to wealth per se? Apparently not: if democracy automatically resulted from simply becoming wealthy, then Kuwait and Libya would be model democracies."[40] In other words, if resource-led growth does not lead to higher education levels and

[37] See Collier and Hoeffler (fn. 4); de Soysa (fn. 4).

[38] Seymour Martin Lipset, "Some Social Requisites of Democracy: Economic Development and Political Legitimacy," *American Political Science Review* 53 (March 1959); Karl W. Deutsch, "Social Mobilization and Political Development," *American Political Science Review* 55 (September 1961); Inglehart (fn. 1).

[39] Inglehart (fn. 1), 163.

[40] Ibid., 161.

greater occupational specialization, it should also fail to bring about democracy. Unlike the rentier and repression effects, the modernization effect does not work through the state: it is a social mechanism, not a political one.

The rentier, repression, and modernization effects are largely complementary. The rentier effect focuses on the government's use of fiscal measures to keep the public politically demobilized; the repression effect stresses the government's use of force to keep the public demobilized; and the modernization effect looks at social forces that may keep the public demobilized. All three explanations, or any combination of them, may be simultaneously valid.[41]

MODEL SPECIFICATION AND RESEARCH DESIGN

To test the oil-impedes-democracy claim, I present a model to predict regime types and test it using a feasible generalized least-squares method with a pooled time-series cross-national data set, which includes data on all sovereign states with populations over one hundred thousand between 1971 and 1997. The model includes five causal variables that according to previous studies are the most robust determinants of democracy. It also includes variables that measure a state's oil and mineral wealth to see if they add explanatory power.

The basic regression model is:

$$Regime_{i,t} = a_1 + b_1(Oil_{i,t-5}) + b_2(Minerals_{i,t-5}) + b_3(Log\ Income_{i,t-5})$$
$$+ b_4(Islam_i) + b_5(OECD_i) + b_6(Regime_{i,t-5}) + b_7(Year_1) \ldots + b_{33}(Year_{26})$$

where i is the country and t is the year.

The dependent variable, *Regime,* is derived from the Polity98 data set constructed by Gurr and Jaggers.[42] Gurr and Jaggers compile two 0–10 interval scale variables, DEMOC and AUTOC; the former differentiates between states that are relatively democratic, while the latter variable differentiates between authoritarian states. Since the two indicators contain separate, nonoverlapping types of information about each country year, I combine them into a single measure by subtracting

---

[41] A fourth explanation has been offered by U.S. vice president Richard Cheney, a political scientist by training: "The problem is that the good Lord didn't see fit to put oil and gas reserves where there are democratic governments." Cited in David Ignatius, "Oil and Politics Mix Suspiciously Well in America," *Washington Post,* July 30, 2000, A31.

[42] Each of the variables is defined more precisely in Appendix 1. Ted R. Gurr and Keith Jaggers, "Polity 98: Regime Characteristics, 1800–1998," http://www.bsos.umd.edu/cidcm/polity/, 1999 (consulted March 1, 2000).

the autocracy measure from the democracy measure.[43] I then rescale it as a 0–10 variable, with 10 representing "most democratic."

Oil and *Minerals* are the independent variables; they measure the export value of mineral-based fuels (petroleum, natural gas, and coal) and the export value of nonfuel ores and metals exports, as fractions of GDP. These variables capture both the importance of fuels and minerals as sources of export revenue and their relative importance in the domestic economy.[44]

The right-hand side of the equation also includes five control variables designed to capture the factors most robustly associated with regime type, for which indicators are available for most of the countries and years. The first is *Income,* measured as the natural log of per capita GDP corrected for purchasing power parity (PPP), in current international dollars. Per capita income has been widely accepted as a correlate of democracy since Lipset; its validity has been confirmed in more recent tests by Burkhart and Lewis-Beck, Londregan and Poole, Przeworski and Limongi, and Barro.[45]

The second control variable is *Islam,* which denotes the Muslim percentage of the state's population in 1970.[46] Previous studies have suggested that states with large Muslim populations tend to be less democratic than non-Muslim states.[47] Of all the religious categories tested by Barro, Islam (measured the same way with the same data set) had by far the largest and most statistically significant influence on a state's regime type.[48] Placing *Islam* in this model has special importance

[43] Here I am following the practice of John B. Londregan and Keith T. Poole, "Does High Income Promote Democracy?" *World Politics* 49 (October 1996).

[44] *Oil* and *Minerals* are similar to the indicators used by Sachs and Warner (fn. 3, 1995) and by Leite and Weidmann (fn. 3) in their studies of the influence of resource wealth on economic performance. While Sachs and Warner combine fuels, nonfuel minerals, and agricultural goods into a single variable, I consider them as separate variables to see if their regression coefficients (and hence their influence on regime types) differ.

[45] Lipset (fn. 38); Ross E. Burkhart and Michael S. Lewis-Beck "Comparative Democracy: The Economic Development Thesis," *American Political Science Review* 88 (December 1994); Londregan and Poole (fn. 43); Przeworski and Limongi (fn. 2); Barro (fn. 13).

[46] In virtually all cases, the figure for 1980 (the only other year for which data were available) was identical to the 1970 figure.

[47] Salamé (fn. 22); Seymour Martin Lipset,"The Social Requisites of Democracy Revisited," *American Sociological Review* 59 (February1994); Manus Midlarsky, "Democracy and Islam: Implications for Civilizational Conflict and the Democratic Peace," *International Studies Quarterly* 42 (December 1998).

[48] Barro (fn. 13). Observers offer different arguments to explain the negative correlation between democracy and Islamic populations (−.38). See, for example, Hisham Sharabi, *Neopatriarchy: A Theory of Distorted Change in Arab Society* (New York: Oxford University Press, 1988); Bernard Lewis, "Islam and Liberal Democracy," *Atlantic Monthly* 271 (February 1993); and Michael Hudson, "The Political Culture Approach to Arab Democratization: The Case for Bringing It Back In, Carefully," in Brynen, Korany, and Noble (fn. 36). Although they are negatively correlated for the period covered by this data set (1971–97), it is not obvious that they will continue to be negatively correlated in the future. Two

because many states with great mineral wealth also have large Muslim populations, not only in the Middle East but also in parts of Asia (Indonesia, Malaysia, Brunei) and Africa (Nigeria). The simple correlation between *Oil* and *Islam* is 0.44.

The third control variable is OECD, a dummy that is coded 1 for states that are members of the Organization for Economic Cooperation and Development (excluding newer members Mexico and South Korea) and 0 for all others. Previous researchers have found that the advanced industrialized states of the OECD are significantly more likely to be democratic in the post–World War II era than the states of the developing world, even after the influence of income and other factors are accounted for.[49] There is no consensus on why this is so. It has variously been attributed to the West's unique historical trajectory;[50] the cultural influence of Protestantism;[51] the residual effects of Western colonialism on non-Western states;[52] and a "world system" that constrains the prospects of states in the non-Western "periphery."[53] Conceivably any antidemocratic effects from *Oil* and *Minerals* might be spurious and merely reflect the location of most fuel- and mineral-exporting states in the non-Western world. The OECD dummy helps account for any of these Western-specific effects, without taking a position on the mechanisms behind it.

The fourth control variable is $Regime_{t-5}$, which is the dependent variable lagged by five years. Placing it on the right-hand side of the model has three purposes. First, the most important influence on a state's regime type may often be its own peculiar history; $Regime_{t-5}$ helps capture any country-specific historical or cultural features that may be missed by the other right-hand-side variables. Second, including $Regime_{t-5}$ helps turn the equation into a change model, transforming the dependent variable from regime type to the change in a country's regime type over a given five-year period. This helps ensure that the re-

states with large Islamic populations, Nigeria and Indonesia, have recently moved toward democracy, and some of the most important prodemocracy forces in other Islamic states (including Algeria, Egypt, Jordan, and Malaysia) are often classified as Islamic "traditionalists" or "fundamentalists." It is instructive to recall that until the "third wave" of democratization began in the mid-1970s, democracy and Catholicism were negatively correlated.

[49] See Burkhart and Lewis-Beck (fn. 45); Londregan and Poole (fn. 43); Przeworski and Limongi (fn. 2).

[50] See Moore (fn. 28).

[51] See Lipset (fn. 38); Huntington (fn. 10).

[52] See Robert A. Dahl, *Polyarchy: Participation and Opposition* (New Haven: Yale University Press, 1971).

[53] See Immanuel Wallerstein, *The Modern World-System* (New York: Academic Press, 1974); Bollen (fn. 15); Burkhart and Lewis-Beck (fn. 45).

gression will indeed measure both time-series and cross-sectional changes in regime types. Third, $Regime_{t-5}$ helps address the problem of serial correlation that tends to bedevil pooled time-series cross-sectional data sets.[54]

Finally, the model includes a set of twenty-six dummy variables, one for each year covered by the data (1971–97), less one to mitigate autocorrelation. These are designed to capture two types of time-specific effects. The first is the cold war, which may have blocked many transitions to democracy. The second are contagion effects that influenced states at different times in Southern and Eastern Europe, Latin America, and sub-Saharan Africa, where early transitions to democracy appeared to boost the likelihood of subsequent transitions in proximate states.

The tests were run with a feasible generalized least-squares process using Stata 6.0.[55] Since I include a lagged dependent variable on the right-hand side of the equation, I correct for first-order autocorrelation using a panel-specific process, which allows the degree of autocorrelation to vary from country to country.

I use a five-year lag for all independent and control variables. The lag gives more confidence that the causal arrow is pointing in the right direction; it also enables me to look for factors that have an enduring impact on regime types. As I illustrate below, using shorter lags does not change the results of the basic model, but it does increase the absolute value of the coefficient of the lagged dependent variable relative to the other explanatory variables. Hence with a one-year lag, a country's current regime type becomes overwhelmingly a function of its regime type in the previous year, while the influence of other variables is artificially suppressed.[56]

RESULTS

For the basic model described below, Stata is able to utilize 2,183 country-year observations from 113 states, out of a possible 3,752 observations from 158 states. The data for each of the variables are summarized in Appendix 2.

[54] James A. Stimson, "Regression in Space and Time: A Statistical Essay," *American Journal of Political Science* 29 (November 1985); Nathaniel Beck and Jonathan N. Katz, "What to Do (and Not to Do) with Time-Series Cross-Section Data," *American Political Science Review* 89 (September 1995).

[55] Beck and Katz (fn. 54) recommend using ordinary least squares with "panel-corrected standard errors" when working with panel data if the number of units is less than the number of time points. In this data set the number of units (113) exceeds the number of time points (27).

[56] Christopher H. Achen, "Why Lagged Dependent Variables Can Suppress the Explanatory Power of Other Independent Variables" (Paper presented at the annual meeting of the Political Methodology Section of the American Political Science Association, Los Angeles, July 20–22, 2000).

TABLE 3
RESOURCE WEALTH AND DEMOCRACY[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3	4
Regime	.253***	.894***	.25***	.246***
	(.0203)	(.00846)	(.0203)	(.0204)
Oil	−.0346***	−.0078***	−.0339***	−.0393***
	(.0051)	(.0024)	(.00506)	(.00543)
Minerals	−.0459***	−.00718*	−.0438***	−.0455***
	(.00778)	(.00317)	(.0081)	(.00804)
Income (log)	.922***	.119***	.935***	.965***
	(.105)	(.0342)	(.106)	(.107)
Islam	−.018***	−.0031***	−.0178***	−.0173***
	(.00208)	(.000665)	(.0021)	(.00211)
OECD	1.47***	.176*	1.42***	1.44***
	(.308)	(.0781)	(.305)	(.308)
Food	—	—	.0244*	—
			(.0102)	
Agriculture	—	—	—	.042
				(.0239)
Observations	2183	2498	2182	2178
States	113	115	113	113
Log likelihood	−3133	−3283	−3129	−3123

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

[a]All independent and control variables are entered with five-year lags, except in column 2, where they are entered with a one-year lag. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using a panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

The results of the basic model are reported in Table 3, column 1. All of the variables are highly significant with the expected signs.[57] Both *Oil* and *Minerals* have strong antidemocratic effects; these effects are of roughly the same magnitude, although the *Minerals* coefficient is somewhat larger.[58]

[57] Most of the coefficients for the year dummies are also significant: for years 1971–89 the coefficients are negative and range from marginally to highly significant; for 1990 the coefficient is negative but not significant; and for years 1991–96 the coefficients are positive, although all but one (1994) are not significant.

[58] These results were unaffected by the inclusion of other variables that are sometimes significant in democracy regressions, including educational attainment, status as a former British colony, Catholic population, and trade openness. Only the last variable was significant. When run with a random-effects process, a Hausman test produces a chi^2 of 466 and a P value of 0.000. When run with a fixed-effects process, however, none of the right-hand-side variables—except for the lagged dependent variable and Log Income—are significant.
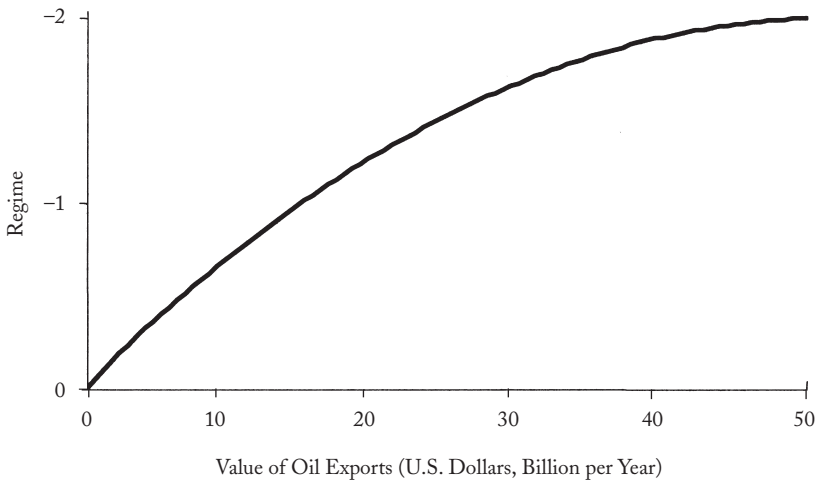
FIGURE 1
IMPACT OF OIL EXPORTS ON REGIME

[a] This figure shows the net predicted impact of oil exports on the 0–10 variable *Regime,* for a hypothetical country of twenty million people with a per capita income of $1,720 dollars a year, which is the sample mean. Note the scale on the Y-axis is negative.

The results suggest that the antidemocratic properties of oil and mineral wealth are substantial: a single standard deviation rise in the *Oil* variable produces a .49 drop in the 0–10 democracy index over the five-year period, while a standard deviation rise in the *Minerals* variable leads to a .27 drop. A state that is highly reliant on oil exports—at the 1995 level of Angola, Nigeria, or Kuwait—would lose 1.5 points on the democracy scale due to its oil wealth alone. A state that was equally dependent on mineral exports would lose 2.1 points.

The model also implies, however, that the impact of any new oil or mineral wealth may be partly offset by a rise in income. To complicate matters, the influence of *Oil* and *Minerals* on *Regime* is nonlinear, and the magnitude of their impact depends on the state's prior level of income.[59]

As Figure 1 shows, the marginal influence of *Oil* on *Regime* is larger when oil exports are a small fraction of the economy, and it drops as the country grows more reliant on oil. While Barro and Przeworski et al. imply that oil wealth matters only when exports reach extraordinarily

[59] These effects occur because *Income* is entered in the model as a logarithmic function and because an oil discovery will influence both the numerator and the denominator in the *Oil* variable.
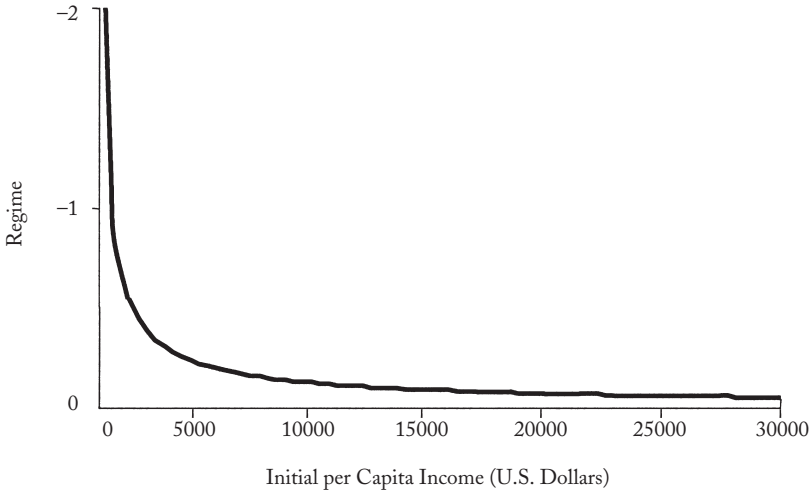
FIGURE 2
IMPACT OF $10 BILLION ANNUAL RISE IN OIL EXPORTS ON REGIME, BY INITIAL
PER CAPITA INCOME

ª This figure shows the net predicted impact of a $10 billion rise in oil exports on the 0–10 variable *Regime,* by initial per capita income, for a hypothetical country with a population of twenty million, with no prior oil exports. Note the scale on the Y-axis is negative.

high levels, this test suggests the opposite: barrel for barrel, oil harms democracy more in oil-poor countries than in oil-rich ones.

The test also implies that oil and mineral wealth cause greater damage to democracy in poor countries than in rich ones (see Figure 2). Imagine a country whose per capita income is $800 a year—about the level of Chad, Mozambique, and Yemen—with a population of twenty million and no oil exports. Suppose prospectors find an oil field that produces $10 billion of petroleum each year, all of which is exported. The new oil would simultaneously boost per capita income (a prodemocratic effect) and raise the *Oil* variable (an antidemocratic effect). The model predicts that after five years the government would become less democratic, losing about .93 on the 0–10 democracy scale. A comparable discovery in a state whose initial per capita income was $1,720—the sample mean—would lose .54 points; if the per capita income were $8,000—about the level of Mexico and Malaysia—the same oil field would be associated with a drop of just .16 in *Regime.* This pattern is consistent with the observation that large oil discoveries appear

to have no discernible antidemocratic effects in advanced industrialized states, such as Norway, Britain, and the U.S., but may harm or destabilize democracy in poorer countries.

To determine how general and robust these effects are, I carry out five additional tests. First, to see whether the results are sensitive to the duration of the lag on the right-hand-side variables, I run the same model using one-year lags on all the explanatory variables (Table 3, column 2). All of the variables remain significant, although the absolute value of the coefficient on the lagged regime type variable grows, and the absolute values and significance of the coefficients on the other variables are reduced, perhaps artificially.[60]

Next, to see whether other types of commodity exports also inhibit democratization, I add two variables to the model: *Food,* which measures the value of all food exports as a fraction of GDP, and *Agriculture,* which measures the value of all nonfood agricultural exports as a fraction of GDP. As columns 3 and 4 of Table 3 show, the coefficients on *Food* and *Agriculture* are both positive—unlike *Oil* and *Minerals,* which are negative. These findings are consistent with the rentier state thesis: oil and other minerals impede democracy, but other primary commodities—which generate few or no rents, produce less export income for the state, and employ a larger fraction of the labor force—do not.

The third test is designed to see whether the model is heavily influenced by the inclusion of small states in the sample. Some of the states most dependent on oil have small populations, including Brunei and the Persian Gulf states of Bahrain, Kuwait, Qatar, and the United Arab Emirates; it would not be surprising if they had a large influence on the magnitude and significance of the *Oil* variable. To determine this, I placed a dummy variable, *Large States,* in the model; it was coded 0 if a state's population was below one million and 1 otherwise. The results are displayed in Table 4, column 1. The coefficient on the population dummy is positive and significant at the 0.05 level, indicating that small states *do* tend to be less democratic than large ones; yet its inclusion has only a tiny influence on the *Oil* and *Minerals* coefficients and leaves them highly significant.

The fourth test looks at whether the apparent effects of *Oil* and *Minerals* are caused by cultural or historical impediments to democratization that are specific to the Middle East and sub-Saharan Africa, two regions where these states are most heavily concentrated. I add two dummy variables to the regression, *Mideast* and *SSAfrica,* which were

---

[60] See Achen (fn. 56).

TABLE 4
RESOURCE WEALTH AND DEMOCRACY[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3
Regime	.255***	.209***	.227***
	(.0203)	(.0205)	(.0203)
Oil	−.0333***	−.0209***	−.0138*
	(.00511)	(.00512)	(.00557)
Minerals	−.0439**	−.0265***	−.0336***
	(.00802)	(.00718)	(.00761)
Income (log)	.947***	.789***	.895***
	(.105)	(.117)	(.112)
Islam	−.0178***	−.00538	−.013***
	(.00209)	(.0033)	(.00238)
OECD	1.41***	1.6***	1.39***
	(.306)	(.31)	(.286)
Large States	.828*	—	—
	(.406)		
Mideast	—	−3.65***	—
		(.386)	
SSAfrica	—	−1.62***	−.998***
		(.2)	(.194)
Arabian Peninsula	—	—	−3.74***
			(.49)
Observations	2183	2183	2183
States	113	113	113
Log likelihood	−3133	−3086	−3100

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level
  [a]All independent and control variables are entered with five-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

coded 1 if the states were classified by the World Bank as residing in these regions and 0 otherwise. While the lagged dependent variable helps control for unspecified country-level effects—which might crudely be summarized as "the country's history"—*Mideast* and *SSAfrica* test for additional region-level effects, or "the region's history."

The results are listed in column 2 of Table 4. The coefficients for both *Mideast* and *SSAfrica* are large, negative, and highly significant. The coefficients on the *Oil* and *Minerals* variables are again reduced but remain highly significant. The *Islam* variable loses significance, due to its high correlation with the *Mideast* variable (=.65).

For the final test, I use a new dummy, *Arabian Peninsula,* in place of the *Mideast* dummy; it was coded 1 for the seven states of the Arabian Peninsula (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, the United Arab Emirates, and Yemen) and 0 otherwise. Conceivably the *Mideast* dummy is too broad, since it attempts to capture the effects of residing in a region that is socially and geologically diverse. The antidemocratic effects of oil might be somewhat more restricted to the Arabian Peninsula, which is dominated by monarchies, sparsely populated, and endowed with spectacular oil wealth. Using *Arabian Peninsula* instead of *Mideast* reduces the problem of collinearity with *Islam,* although *Arabian Peninsula* and *Oil* remain highly collinear (simple correlation =.74). Still, while including the *Arabian Peninsula* dummy reduces the magnitude of the *Oil* coefficient by about 60 percent, *Oil* remains significant at the 0.05 level.

These tests support both the validity and the generality of the oil-impedes-democracy claim. They suggest the following: that a state's reliance on either oil or mineral exports tends to make it less democratic; that this effect is not caused by other types of primary exports; that it is not limited to the Arabian Peninsula, to the Middle East, or to sub-Saharan Africa; and that it is not limited to small states. These findings are generally consistent with the theory of the rentier state.

Area specialists might also feel vindicated in noting that in these tests the most powerful impediments to democracy include the variables *Regime$_{t-5}$, Mideast,* and *Arabian Peninsula,* which represent the accumulation of historical and cultural factors in each country, and in the Arabian Peninsula and Mideast regions, that are not captured by income, resource wealth, Islam, or non-Western status. This underscores the critical importance of case studies in explaining regime types.

CAUSAL MECHANISMS

To test the three causal mechanisms I add to the basic model a series of intervening variables, lagged by one year. Adding new variables reduces the sample size from 2,183 observations to between 2,183 and 426 observations. As the sample shrinks, it becomes increasingly skewed toward states that are relatively wealthy, democratic, and Western, introducing a pronounced sample bias. To minimize this problem, after running each of the following regressions, I run a second regression using the same reduced sample, but without the intervening variable. I then compare the two regressions. If the intervening variable is valid, it should be statistically significant, and—if the *Oil* and *Minerals* variables

are significant in the reduced sample—its inclusion should reduce the absolute values of the *Oil* and *Minerals* coefficients. This provides at least a crude test of some of the causal mechanisms.

RENTIER EFFECT

To test the rentier hypothesis, I use three indicators. For the taxation effect I use the variable *Taxes,* which is the percentage of government revenue collected through taxes on goods, services, income, profits, and capital gains. The taxation effect implies that states that fund themselves through these assorted personal and corporate taxes (and hence have higher values on the *Taxes* variable) should be more democratic; conversely, states that fund themselves through other means (such as trade taxes, parastatals, external grants, and right-of-way fees) should be more authoritarian. The variable is constructed from data collected by the International Monetary Fund and covers 104 of the 113 states in the basic model.

To test the spending effect I use *Government Consumption,* which measures government consumption as a percentage of GDP; this includes all current spending for purchases of goods and services (including wages and salaries) by all levels of government. If the spending effect is valid, higher levels of government spending should result in less democracy. The data cover 104 states and are compiled by the World Bank, which in turn collects information from the OECD, national statistical organizations, central banks, and World Bank missions.

The third variable is *Government/GDP,* which measures the share of GDP accounted for by government activity, in 1985 international prices; the data are from Summers and Heston.[61] This final indicator is one way to look for a group-formation effect. Proponents of this effect imply that as governments increase in size (relative to the domestic economy) they are more likely to prevent the formation of civic institutions and social groups that are independent from the government, and that the absence of these groups will hinder a transition to democracy.[62] Without good indicators for civic institutions or social groups, this hypothesis cannot be tested directly with regression analysis. Still, the *Government/GDP* variable offers an indirect test: the greater the government's size (as a fraction of GDP), the less likely that independent social groups will form.

---

[61] Robert Summers and Alan Heston, "Penn World Tables, Version 5.6," http://cansim.epas. utoronto.ca;5680/pwt/pwt.htm/, 1999 (consulted March 1, 2000).

[62] Of course, a larger budget may not be the only cause of such government actions, but it is the only cause that can be linked to resource wealth in an obvious way.

TABLE 5
THE RENTIER EFFECT[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3
Regime	.259***	.243***	.251***
	(.021)	(.0211)	(.0203)
Oil	−.0223***	−.0323***	−.0351***
	(.00647)	(.00544)	(.00511)
Mineral	−.0157	−.0463***	−.0369***
	(.0113)	(.00677)	(.00675)
Income (log)	1.005***	.889***	.857***
	(.104)	(.112)	(.106)
Islam	−.0165***	−.0191***	−.0161***
	(.00205)	(.00218)	(.00212)
OECD	1.19***	1.57***	1.53***
	(.272)	(.314)	(.303)
Taxes	.02***	—	—
	(.00373)		
Government Consumption	—	−.0305***	—
		(.00866)	
Government/GDP	—	—	−.0332***
			(.00739)
Observations	1698	2121	2168
States	104	110	111
Log likelihood	−2320	−3036	−3107

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

[a]Independent and control variables are entered with five-year lags; intervening variables (*Taxes, Government Consumption, Government/GDP)* are entered with one-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

As Table 5 shows, the coefficient on *Taxes* is highly significant and positive: as the rentier effect implies, higher personal and corporate taxes are strongly associated with more democratic government. Moreover, the inclusion of *Taxes* produces a 17 percent drop in the *Oil* coefficient, which implies that the taxation effect may account for part of the antidemocratic influence of *Oil*.[63] While it is possible that causality also runs the other way—that regime type influences taxation—it should be in the opposite direction: more democratic governments

[63] The *Minerals* variable is not significant in this sample, making it difficult to draw inferences about the mineral-exporting states.

should be less disposed to fund themselves through personal and corporate taxes, given their unpopularity.

The effect of taxes on regime types turns out to be strictly short term: when *Taxes* is introduced into the model with a two- or three-year lag, its coefficient quickly drops in size and loses significance. This implies that tax increases have only short-term effects on democracy: people tend to respond to tax hikes right away or not at all.[64]

The *Government Consumption* variable is also highly significant in the hypothesized direction (Table 5, column 2). When *Government Consumption* is included in the model, *Oil* and *Minerals* drop slightly, by 7 and 6 percent, respectively. The spending effect appears to last longer than the taxation effect: the *Government Consumption* variable has much the same effect on regime type after three years as it does after one.

These results are not likely caused by endogeneity. While there is evidence that regime type influences levels of government consumption, it is in the opposite direction found here: democratic governments tend to favor higher levels of social spending than their authoritarian counterparts.[65]

Finally, *Government/GDP* is also highly significant with the hypothesized sign: the larger the government, the less movement toward democracy over the following five years. Its inclusion has no effect on the *Oil* variable but produces a 12 percent drop in the *Minerals* variable (Table 5, column 3).

In short, the results are consistent with all three aspects of the rentier effect.

REPRESSION EFFECT

I use two variables to test the hypothesis that resource wealth causes governments to arm themselves more heavily against popular pressures. The first is *Military/GNP,* which measures the size of the military budget as a fraction of GNP. The data were originally collected by the Arms Control and Disarmament Agency (ACDA) of the U.S. government and

---

[64] Note that other studies have found that a government's reliance on personal and corporate tax revenues is strongly and negatively influenced by per capita income: poor states tend to rely on trade taxes, rich ones on personal and corporate taxes. See William Easterly and Sergio Rebelo, "Fiscal Policy and Economic Growth," *Journal of Monetary Economics* 32 (December 1993); Howell H. Zee, "Empirics of Cross-Country Tax Revenue Comparisons," *World Development* 24 (October 1996). Since per capita income is included in the model, the actual effect of *Taxes* on regime types is probably larger than the coefficient in this regression suggests.

[65] David S. Brown and Wendy Hunter, "Democracy and Social Spending in Latin America, 1980–92," *American Political Science Review* 93 (December 1999).

cover 101 states between 1985 and 1995.[66] Since resource-rich states tend to have government budgets that are atypically large relative to the size of their economies, this is a better indicator than military spending as a fraction of government spending.

The second variable is *Military Personnel*, which measures the size of the military as a fraction of the labor force; it includes some paramilitary forces "if those forces resemble regular units in their organization, equipment, training, or mission." The data are also from ACDA and are available from 1985 to 1995 for 105 of the states in the database. Unlike the *Military/GNP* measure, this indicator helps control for variations in military wages and the presence of conscription across states.

When *Oil, Minerals,* and *Income* are regressed on *Military/GNP* directly (with a five-year lag), the behavior of oil exporters and mineral exporters diverges. Oil exports are indeed positively and significantly correlated with military spending, as the repression hypothesis suggests; but mineral exports are negatively and significantly associated with military spending. Neither variable is significantly linked with *Military Personnel.*

When *Military/GNP* is placed in the basic model of regime types, its coefficient is negative and marginally significant at the 0.10 level; its inclusion produces a 6 percent drop in the *Oil* coefficient (Table 6). The *Military Personnel* coefficient is negative and highly significant, although it paradoxically induces a 7 percent rise in *Oil*. In both samples the *Minerals* coefficient is not significant and cannot be interpreted. Overall, it appears that oil wealth may be linked to higher levels of military spending, which in turn tends to impede democracy, as the repression effect suggests. But there is no evidence of a similar pattern for mineral wealth; nor is there evidence to support the claim that oil or mineral wealth leads to higher levels of military personnel.

Why do oil-rich governments invest as much as they do on their militaries? Is it to repress popular pressures, or is it a response to higher levels of instability? To address this question I use data from the Political Risk Services Group, a private firm that uses subjective measures to gauge investment risks for its clients. It produces a 0–6 measure of *Ethnic Tensions,* which measures "the degree of tension within a country attributable to racial, nationality, or language divisions." Scores are available for 102 states between 1982 and 1997. Higher values indicate less ethnic tension. When added to the model—first separately, then

----

[66] Since the data cover only eleven years, the maximum number of possible observations for these regressions drops from 3,752 to 1,642.

TABLE 6
THE REPRESSION EFFECT[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3
Regime	.414***	.334***	.34***
	(.032)	(.0314)	(.0262)
Oil	−.0591***	−.0679***	−.0517***
	(.00566)	(.00632)	(.00609)
Minerals	.0169	−.00344	−.000964
	(.0272)	(.0179)	(.0201)
Income (log)	.848***	.822***	.824***
	(.132)	(.145)	(.117)
Islam	−.0173***	−.0158***	−.0263***
	(.00266)	(.00235)	(.00251)
OECD	−.071	−.00168	−.0957
	(.332)	(.355)	(.3)
Military/GNP	−.0366	—	—
	(.0197)		
Military Personnel	—	−.09**	—
		(.0304)	
Ethnic Tensions	—	—	−.0254
			(.0485)
Observations	841	874	1167
States	101	105	102
Log likelihood	−1228	−1293	−1642

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

   [a]All independent and control variables are entered with five-year lags; intervening variables (*Military/GNP, Military Personnel, Ethnic Tensions*) are entered with one-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

together with *Military/GNP*, and finally controlling for ethnolinguistic fractionalization—the *Ethnic Tensions* variable is not statistically significant (Table 6, column 3). In other words, tensions caused by racial, national, or language divisions do not explain why oil-rich states spend so heavily on repression.

MODERNIZATION EFFECT

To test the modernization hypothesis I use eleven indicators to determine whether abnormally low levels of occupational specialization, education, health services, media participation, and urbanization can help

explain the dearth of democracy in the resource-rich states. The large number of indicators allows me to test both Inglehart's version of modernization theory and earlier versions described by Lerner, Deutsch, and Lipset.

According to Inglehart, occupational specialization and education are the key links between economic growth and democracy. To measure occupational specialization I look at the number of men and women in the economy's secondary (industrial) and tertiary (services) sectors as a fraction of the men and women in the economically active population. These data are drawn from the International Labor Organization and cover 76 of the 113 states used in the basic model.

For educational levels, I use figures on the enrollment of men and women in secondary school as a fraction of the corresponding age group in the population at large and figures on college enrollment as a fraction of the population. Both data sets are collected by national governments and assembled by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Figures on secondary enrollment are available for forty-eight countries; figures on college enrollment are available for ninety-six countries.

Early proponents of modernization theory suggested that improvements in a population's physical health can also lead to democratization.[67] More recently Inglehart has argued that as a population's basic nutritional and health needs are satisfied, they will increasingly turn to "postmaterialist" values, including a desire for self-expression and individual freedom; this value shift, in turn, will facilitate more democratic government.[68] Earlier scholars measured the quality of a population's health by using the number of doctors per capita. Here I use life expectancy at birth, a measure that also accounts for nutrition levels and the distribution of health services across the population. The underlying data are compiled by several UN agencies and cover ninety states.

In Lipset's classic analysis, the greater a society's level of "media participation," the more likely it is to be democratic.[69] Lipset measured media participation using telephones, radios, and newspaper copies per capita. To update these indicators slightly, I measure both the number of telephone mainlines and televisions per capita. Data on telephone mainlines and televisions are collected by the International Telecom-

---

[67] Daniel Lerner, *The Passing of Traditional Society* (New York: Free Press, 1958); Deutsch (fn. 38).
[68] Inglehart (fn. 1).
[69] Lipset (fn. 38).

TABLE 7
THE MODERNIZATION EFFECT[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3	4
Regime	.529***	.462***	.513***	.604***
	(.0316)	(.0408)	(.0336)	(.0324)
Oil	−.0182	−.116	−.0187	−.0315
	(.0221)	(.0202)	(.0207)	(.0234)
Minerals	.146*	.112	.0952	.115
	(.0666)	(.0635)	(.0657)	(.0714)
Income (log)	−.251	.565*	−.408	3.8
	(.305)	(.271)	(.343)	(.344)
Islam	−.0121	−.0154**	−.0232***	−.000534
	(.0082)	(.00545)	(.00652)	(.0104)
OECD	.752*	.652	1.13**	.391
	(.419)	(.432)	(.372)	(.419)
Men in Industry	.0733***	—	—	—
	(.0143)			
Women in Industry	—	.0814***	—	—
		(.0166)		
Men in Services	—	—	.0685***	—
			(.0155)	
Women in Services	—	—	—	−.0185***
				(.00512)
Observations	626	615	622	629
States	75	75	76	76
Log likelihood	−878	−772	−835	−921

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

[a]All independent and control variables are entered with five-year lags; intervening variables (*Men in Industry, Women in Industry, Men in Services, Women in Services*) are entered with one-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

munications Union and are available for 113 and 110 states, respectively, and cover virtually all country years in the data set.

Finally, Lipset also suggested that higher levels of urbanization will lead to higher levels of democracy. To measure urbanization I use the fraction of a state's population currently living in urban areas. The data, collected by the United Nations, are available for all 113 states.

The results from these regressions are reported in Tables 7, 8, and 9. All of the variables measuring occupational specialization are highly

TABLE 8
THE MODERNIZATION EFFECT[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3
Regime	.378***	.378***	.34***
	(.0449)	(.0451)	(.0334)
Oil	−.0158	−.0168	−.033***
	(.00966)	(.00952)	(.00991)
Minerals	.0251	.0255	.0517
	(.0431)	(.0433)	(.0325)
Income (log)	.258	.364	.678***
	(.296)	(.29)	(.19)
Islam	−.0393***	−.0385***	−.0348***
	(.00507)	(.00479)	(.00407)
OECD	.159	.187	−.0759
	(.345)	(.336)	(.436)
Male Secondary Enrollment	.004	—	—
	(.00856)		
Female Secondary Enrollment	—	.000812	—
		(.00882)	
College Enrollment	—	—	−.00289
			(.0105)
Observations	426	426	688
States	48	48	96
Log likelihood	−566	−563	−1109

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

[a]All independent and control variables are entered with five-year lags; intervening variables (*Male Secondary Enrollment, Female Secondary Enrollment, College Enrollment*) are entered with one-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

significant and positively associated with democracy, as predicted by proponents of modernization theory. The evidence that oil and mineral wealth influence occupational specialization, however, is somewhat weak.[70] The variables measuring education, life expectancy, urbanization, and televisions per capita are not significant, while the measure of

[70] Neither *Oil* nor *Minerals* is significantly correlated with democracy in these reduced samples, which makes it hard to be confident about these results. When *Oil* and *Minerals* are regressed on each of the four variables for occupational specialization (with *Income* and *Islam* included as control variables), the results are mixed: *Oil* is negatively correlated with *Men in Industry* but positively correlated with *Women in Industry; Minerals* is not significantly correlated with *Men in Industry* and is negatively, but weakly, linked to *Women in Industry*.

TABLE 9
THE MODERNIZATION EFFECT[a]
(DEPENDENT VARIABLE IS REGIME)

	1	2	3	4
Regime	.194***	.196***	.413***	.253***
	(.0232)	(.0225)	(.0516)	(.0203)
Oil	−.0463***	−.04***	.0247	−.0346***
	(.00609)	(.00551)	(.039)	(.00509)
Minerals	−.00929	−.0085	−.0376	−.0441***
	(.016)	(.0152)	(.0605)	(.008)
Income (log)	1.24***	.882***	1.07***	.983***
	(.119)	(.134)	(.315)	(.149)
Islam	−.0194***	−.023***	−.0104	−.0174***
	(.00214)	(.00231)	(.0168)	(.00213)
OECD	2.96***	1.75***	−.041	1.51***
	(.482)	(.351)	(.412)	(.31)
Telephones	−.00543***	—	—	—
	(.00118)			
TVs	—	−.00096	—	—
		(.00079)		
Life Expectancy	—	—	.00378	—
			(.0616)	
Urban	—	—	—	−.00278
				(.005)
Observations	1830	1831	777	2183
States	113	110	103	113
Log likelihood	−2830	−2676	−857	−3133

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

[a]All independent and control variables are entered with five-year lags; intervening variables (*Telephones, TVs, Life Expectancy, Urban*) are entered with one-year lags. Standard errors are in parentheses below the coefficients. Feasible Generalized Least Squares regressions run with Stata 6.0; corrected for first-order autocorrelation using panel-specific process. Each regression is run with dummy variables for every year (but one) covered by the data.

telephones per capita is highly significant but negatively correlated with democracy.

There are at least two ways to interpret these results. One is that the modernization effect is essentially valid but that occupational specialization is the only real causal mechanism behind it, with the other correlates of modernization being epiphenomenal. A second interpretation is that in resource-rich countries both the modernization effect and the spending effect occur simultaneously: relatively few people are drawn into the industry and service sectors; yet thanks to its large revenues,

the government can generously subsidize education, health care, and other services. The result is that the public enjoys generous social services yet is politically hampered by two antidemocratic forces: a lack of occupational specialization and a government that uses its fiscal powers to dampen dissent.

The results of these tests are at least weakly consistent with each of the three causal mechanisms. Collectively, they provide quantitative backing for the rentier effects described by a generation of Mideast specialists, for the repression effects observed in the case studies above, and for a modified form of the modernization thesis. Still, the causality tests rely on data that are incomplete and potentially biased, so the results should be treated as suggestive, not conclusive.

Conclusion

This article has four main findings. First, the oil-impedes-democracy claim is both valid and statistically robust; in other words, oil *does* hurt democracy. Moreover, oil does greater damage to democracy in poor states than in rich ones, and a given rise in oil exports will do more harm in oil-poor states than in oil-rich ones. Hence, oil inhibits democracy even when exports are relatively small, particularly in poor states.

Second, the harmful influence of oil is not restricted to the Middle East. Oil wealth has probably made democratization harder in states like Indonesia, Malaysia, Mexico, and Nigeria; it may well have the same affect on the oil-rich states of Central Asia.

The third finding is that nonfuel mineral wealth also impedes democratization. While the major oil exporters are concentrated in the Mideast, major mineral exporters are scattered across Africa, Asia, and the Americas; this group includes many states where progress toward democracy has been halting or elusive, including Angola, Chile, the Democratic Republic of Congo, Cambodia, and Peru.

Each of these findings runs counter to the assumptions of earlier scholars that the antidemocratic effects of oil—if they existed—were restricted to the Middle East, that they influenced only states that were almost wholly dependent on oil, and that they did not extend to the mineral-rich states.

The fourth finding is that there is at least tentative support for three causal mechanisms that link oil and authoritarianism: a rentier effect, through which governments use low tax rates and high spending to dampen pressures for democracy; a repression effect, by which governments build up their internal security forces to ward off democratic

pressures; and a modernization effect, in which the failure of the popu-
lation to move into industrial and service sector jobs renders them less
likely to push for democracy. The links between mineral wealth and au-
thoritarianism are more elusive: the mineral exporters appear to suffer
from a rentier effect but not a repression effect, and there is only weak
evidence that they are afflicted by a modernization effect.

Collectively, these findings should help vindicate two very different
theories of comparative politics: modernization theory, which after
falling out of favor in the 1970s and 1980s made a strong comeback in
the 1990s; and the theory of the rentier state, which has long been
championed by Middle East area specialists but overlooked by scholars
of democratization.

They also highlight the value of bringing cross-national quantitative
studies into closer contact with area studies. Global studies of democ-
racy have generally overlooked the Mideast, a practice that is difficult
to justify methodologically (since it arbitrarily truncates the researcher's
sample of states) and one that has contributed to a belief that the Mid-
dle East region is sui generis. Of course, the history and culture of the
Mideast *are* exceptional: note the enormous coefficient on the *Mideast*
dummy variable in Table 4. But excluding Middle Eastern states from
large-N studies of democracy can only widen the gap between area
studies and the rest of political science. It also deprives mainstream po-
litical science of the many insights developed by area studies scholars—
insights that, like the oil-impedes-democracy claim, may turn out to
have general applications.

Finally, these findings have implications for the fate of resource-rich
states across the developing world. Many of the world's most troubled
states have high levels of oil and mineral wealth. Earlier studies have
shown that resource wealth tends to reduce economic growth and to in-
crease the likelihood of civil war. This article suggests there is a third
component to "resource curse": authoritarian rule.

These three effects may interact in pernicious ways, creating a "re-
source trap." Authoritarian governments may be less able to resolve do-
mestic conflicts and hence more likely to suffer from civil war. Slow
growth may make domestic unrest tougher to resolve; civil wars, in
turn, wreak economic havoc. There is nothing inevitable about the re-
source curse: states like Malaysia, Chile, and Botswana have done rela-
tively well despite their oil and mineral wealth. Yet most others have
found—like King Midas—that their resource wealth can be an unex-
pected source of grief.

APPENDIX 1: DEFINITION OF VARIABLES[71]

Regime is a 0–10 variable indicating a country's regime type, with 0 as a perfect autocracy and 10 a full democracy. It is taken from the Polity 98 data set compiled by Gurr and Jaggers, who assign a 0–10 indicator for both level of autocracy and level of democracy.[72] Each is a composite of underlying variables that measure the way chief executives are recruited, whether they gain office through competitive elections, whether nonelites may obtain executive office, and whether they are constrained by, and accountable to, other actors. Following Londregan and Poole, I transform these two measures into a single indicator by subtracting the autocracy measure from the democracy measure and by rescaling the resulting −10 to 10 scale as a 0 to 10 scale.[73] For the six states with populations greater than one million for which Gurr and Jaggers offer no indicators (Austria, Cameroon, Democratic Republic of Congo, Libya, Sierra Leone, and Switzerland), I use data from Freedom House (1972–98) instead, summing their measures for "political rights" and "civil liberties" and converting the results to the 0–10 scale.

Log Income is the natural log of real per capita GDP, in current international dollars. Most of the data come from Summers and Heston; missing values have been imputed using data from the World Bank.[74]

Oil is the export value of mineral-based fuels as a percentage of GDP. Mineral-based fuels include petroleum, natural gas, and coal, as classified under SITC revision 1, section 3. Following the practice of Sachs and Warner, I corrected the export figures for Singapore and Trinidad to reflect *net* exports, since both states are transshipment points for raw materials extracted in nearby states.[75] The values for both states were set at 0.01.

Minerals is the export value of nonfuel minerals as a percentage of GDP; it includes all ores and metals classified under SITC revision 1, sections 27, 28, and 68. Following the practice of Sachs and Warner, I corrected the export figures for Singapore and Trinidad to reflect *net* exports, since both states are transshipment points for raw materials extracted in nearby states.[76] The values for both states were set at 0.01.

---

[71] Unless otherwise indicated, the data below were derived from World Bank, "World Development Indicators," CD-ROM (Washington, D.C.: World Bank, 1999).
[72] Gurr and Jaggers (fn. 42)
[73] Londregan and Poole (fn. 43).
[74] Summers and Heston (fn. 61).
[75] Sachs and Warner (fn. 3, 1999).
[76] Ibid.

Islam is the percentage of the population whose professed religious affiliation in 1970 was Muslim.[77]

OECD is a dummy variable coded 1 for the following states and 0 for all others: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

Agriculture is the export value of all nonfood agricultural raw materials, as a percentage of GDP. This includes all commodities classified as falling in SITC revision 1, section 2 (excluding divisions 22, 27, and 28).

Food is the export value of all edible agricultural commodities, as a percentage of GDP. This includes all commodities classified as falling in SITC sections 0, 1, and 4, and division 22.

Large States is a dummy variable coded 1 for states with populations over one million at any point between 1971 and 1997, and 0 otherwise.

Mideast is a dummy variable coded 1 for the following states and 0 otherwise: Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, and Yemen.

SSAfrica is a dummy variable coded 1 for states classified by the World Bank as residing in sub-Saharan Africa and 0 otherwise.

Arabian Peninsula is a dummy variable coded 1 for the states on the Saudi Arabian peninsula (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, the United Arab Emirates, and Yemen) and 0 otherwise.

Men in Industry and *Women in Industry* indicate the fraction of the total working population of each gender group working in activities defined by the ILO as "industry." This includes mining and quarrying (including oil production), manufacturing, electricity, gas and water, and construction, corresponding to major divisions 2–5 (ISIC revision 2) or tabulation categories C–F (ISIC revision 3). The data are compiled by the World Bank's Development Data Group using an ILO database corresponding to table 2a in its *Yearbook of Labour Statistics*.

Men in Services and *Women in Services* indicate the fraction of the total working population of each gender group working in activities defined by the ILO as "services." Services include wholesale and retail trade and restaurants and hotels; transport, storage, and communications; financing, insurance, real estate, and business services; and community, social, and personal services, corresponding to major divisions 6–9 (ISIC

---

[77] David B Barrett, ed., *World Christian Encyclopedia* (New York: Oxford University Press, 1982).

revision 2) or tabulation categories G–P (ISIC revision 3). The data are compiled by the World Bank's Development Data Group using an ILO database corresponding to table 2a in its *Yearbook of Labour Statistics*.

Male Secondary Enrollment and *Female Secondary Enrollment* indicate the fraction of males and females enrolled in secondary school, relative to their numbers in the population. The data are reported to the United Nations Educational, Scientific, and Cultural Organization (UNESCO) by national education authorities.

College Enrollment indicates the fraction of the population enrolled in college. The data are reported to UNESCO by national education authorities.

Life Expectancy indicates the life expectancy at birth of both males and females. The underlying figures are from the United Nations Department of Economic and Social Affairs, Population and Vital Statistics Report; demographic and health surveys from national sources; and United Nations Children's Fund (UNICEF), *The State of the World's Children, 1999*.

Urban is the midyear population of areas defined as urban in each country and reported to the United Nations, expressed as a fraction of the total population. The data are from from the United Nations, *World Urbanization Prospects: The 1996 Revision*.

Telephones is the number of telephone mainlines (that is, separate lines to a given household or firm) per thousand people. The data are derived from the International Telecommunication Union (ITU), *World Telecommunication Development Report*.

TVs is the number of televisions per thousand people, according to an annual questionnaire sent to member countries by the ITU. The data are derived from the ITU, *World Telecommunication Development Report.*

Taxes is the percentage of government revenue raised through taxes on goods, services, income, profits, and capital gains. The data are collected by the IMF.

Government Consumption, expressed as a percentage of GDP, includes "all current expenditures for purchases of goods and services by all levels of government, excluding most government enterprises. It also includes capital expenditure on national defense and security." The data are collected from the OECD and from national statistical organizations and central banks by visiting and resident World Bank missions; they are published by the World Bank.

Government/GDP is the share of GDP accounted for by government activity, in 1985 international prices. The data are from the Penn World Tables.

Military/GNP measures the size of the military budget as a fraction of

GNP. The data cover 1985–95; they were originally collected by the Arms Control and Disarmament Agency (ACDA) of the U.S. government.

Military Personnel measures the size of the military as a percentage of the labor force; it includes some paramilitary forces "if those forces resemble regular units in their organization, equipment, training, or mission." The data are also from ACDA and cover 1985–95.

Ethnic Tensions is a 0–6 interval-level variable that measures "the degree of tension within a country attributable to racial, nationality, or language divisions." The data cover 97 states between 1982 and 1997; the codings are carried out by a private firm, the Political Risk Services Group, and published in their monthly *International Country Risk Guide;* they are also available as the IRIS-3 computer database. The monthly data have been changed into annual data by taking the mean of the twelve monthly values.

APPENDIX 2:
SUMMARY OF VARIABLES

Variable	Obs.	Mean	Std. Dev.	Min	Max
Regime	3752	4.48	3.79	0	10
Log Income	3316	7.45	1.2	4.53	10.43
Oil	2322	5.5	14.1	0	115.6
Minerals	2865	2.25	5.8	0	55.1
OECD	4528	.163	.369	0	1
Islam	4336	25	36.6	0	99.7
Food	2511	5.73	6.23	0	45.9
Agriculture	2504	1.68	2.88	0	31.6
Men in Industry	814	29.4	12.7	.4	66.9
Women in Industry	798	15.5	8.99	0	50.2
Men in Services	810	39	14.3	5	69.3
Women in Services	813	52	25.6	9	100
Male Secondary	607	57.7	27.9	3	98.6
Female Secondary	607	58	29.9	1.3	98.5
College	1272	16.9	16.9	.1	97.7
Urban	4372	46.1	25	2.24	100
Life Expectancy	1527	62.5	11.7	31.2	79.8
Telephones	3129	106	154	.1	691
TVs	3040	151	169	0	838
Taxes	2325	50.9	18.7	0	101
Govt. Consumption	3538	15.2	6.51	.897	76.2
Government/GDP	2277	23.8	11.9	0	91.2
Military/GNP	1298	4.36	6.64	0	102
Military Personnel	1440	1.84	2.6	0	29.6
Ethnic Tensions	1739	3.791	1.633	0	6