Appendix on Sources and Methods

"Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse"

March 19, 2010

Table of Contents: Page

SECTION ONE: GENERAL CONSIDERATIONS AND RULES

A salient concern when taking a time series approach to data is measurement error. One common source of measurement error occurs when different sources are used in the creation of a data series, because the various sources may employ different definitions or methods of calculation. This may produce discontinuous jumps or drops in a data series that are the result of the source change. One technique that some researchers employ when taking pooled or random effects approaches (e.g., Humphreys 2005) is to average the values of a country year observation using all of the available sources. Because sources vary in their longitudinal coverage, however, this approach produces jumps or drops in series as the number of sources changes. Moreover, when taking this approach, researchers may unwittingly be weighting particular sources more heavily than others, because some of the commonly used data sources in the resource curse literature (e.g., *The British Petroleum Statistical Review of World Energy*) do not develop their own estimates, but instead reprint data that was published earlier in other publicly available sources. Complicating matters still further, these commonly used sources often combine the data from a number of other sources—but do not provide a discussion of how those sources were combined. The result, therefore, of averaging all observations from all sources is that researchers may be taking a weighted mean of all observations, without either knowing the weights or whether the weighting system is constant or shifting.

We therefore follow four rules in constructing our data series. First, we give primacy to primary sources, because they tend to provide much more fine-grained data and tend to be more transparent in terms of the methods of measurement than secondary sources. Second, when we employ secondary sources, we give primacy to those sources that provide detailed discussions of the methods and sources employed. Third, we minimize the number of sources used to construct any data series, ideally employing only one source per series, on the reasonable assumption that the methods used to measure the variable in question are likely to be constant over time within a single source. Fourth, when we have to use more than one source for any country series, we make certain that the values in the two data series sync for the overlapping years, so that we can be reasonably certain that they are employing similar methods or are drawing on the same primary source.

We follow standard practice in constructing data sets by using the most updated data available from each source. That is, most sources publish several years of data in each volume and typically provide a preliminary estimate for the most recent year of data, plus updates of the data for years previously published. We therefore employ the updated data, rather than the preliminary estimates.

SECTION TWO: CONSTRUCTING ESTIMATES OF THE DEPENDENT VARIABLES

In order to be certain that our results are robust to alternative measures of resource reliance we estimate our regressions using four different measures: Fiscal Reliance on Oil, Gas, and Minerals; Total Oil Income Per Capita; Total Fuel Income Per Capita; and Total Natural Resource Income Per Capita.

1. Estimating Fiscal Reliance

The causal mechanism that links oil and minerals to regime types is assumed in the extant literature to be the rents captured by governments from oil, gas, and mineral production, thereby allowing them to finance themselves without taxing citizens. We therefore follow Hussein Mahdavy, "The Patterns and Problems of Economic Development in Rentier States: The Case of Iran" in M.A. Cook ed., *Studies in the Economic History of the Middle East* (London, England: Oxford University Press, 1970—hereafter Madhavy 1970) and Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." Comparative Politics 37: 297-317 (hereafter Herb 2005) by constructing a measure of Fiscal Reliance on Resource Revenues, the percentage of government revenues from oil, gas, or minerals. Fiscal Reliance includes taxes and royalties paid by either privately-owned or state-owned oil and mining firms, as well as dividend payments or direct transfers paid to the government by state-owned firms. We depart from the literature to date, however, by coding this variable from a country's first year of independence (or 1800) to 2006, allowing us to observe countries before and after they became major oil or mineral producers.

The retrieval and standardization of idiosyncratically organized fiscal data from the annual reports of central banks, treasury ministries, and statistical offices extending back to countries' independence is not an enterprise characterized by economies of scale. We therefore truncate our coverage of Fiscal Reliance with respect to the number of countries. We do so by applying four criteria: 1) a country had oil or mineral revenues equal to at least five percent of total government revenues between 1972 and 1999, based on Herb (2005); 2) we are able to obtain volumes of the serial publications that contain countries' fiscal data; 3) those records allow for the identification of oil and mineral revenue streams; and 4) the country demonstrates variance in the Polity2 Combined measure of regime type (discussed below). Eighteen major resource exporters meet these criteria: sixteen oil producers and two of the world's major copper producers. The oil producers are Mexico, Venezuela, Ecuador, Trinidad and Tobago, Nigeria, Angola, Indonesia, Iran, Algeria, Bahrain, Equatorial Guinea, Gabon, Yemen, Oman, Kuwait, and Norway. The copper producers are Chile and Zambia.

We compute fiscal reliance by keying in the data from treasury ministry annual reports, statistical agency yearbooks, the reports of monetary authorities, and, where feasible, government owned petroleum companies. We do not always have this last source, but when we do it permits us to capture off-budget government expenditures that are not included in the annual expenditures reported by the ministry of the treasury. When we are unable to obtain the data from these primary sources we use data from International Monetary Fund Country Reports or World Bank Country Studies, which are based on the review of government accounts by teams from these multilateral organizations. We also draw on data from the Economist Intelligence Unit. When no other data are available we draw on the secondary literature. Our data series on Fiscal Reliance covers 18 major oil, gas, or mineral producers.

We provide a country-by-country discussion of the sources below. We follow the following convention in listing sources. We start with the sources to which we gave primacy: those published by the central banks, monetary authorities, treasury ministries, and national government statistical agencies. We next list the sources published by international agencies, such as the World Bank or the International Monetary fund, because we drew on these when a native source was not available. Finally, we list secondary works, which we drew on only when we were missing data from a native source or international agency.

Algeria:

Our estimates draw on the following sources.

Annuaire Statistique de l'Algerie neuvieme volume 1956-1957, p. 212.
Annuaire Statistique de l'Algerie dixieme volume 1958 , p. 204.
Annuaire Statistique de l'Algerie treizieme volume 1961, pp. 193, 203, 208.
Annuaire Statistique de l'Algerie premier volume 1963-1964, p. 216.
Annuaire Statistique de l'Algerie 1966-1967, p. 212.
Annuaire Statistique de l'Algerie edition 1972, pp. 244-245.
Annuaire Statistique de L'Algerie edition 1975, pp. 328-329.
Annuaire Statistique de L'Algerie edition 1979, p. 399.
Annuaire Statistique de L'Algerie edition 1985, pp. 300-303
Statistical Yearbook of Algeria edition 1987, p. 272
Statistical Yearbook of Algeria edition 1991, pp. 328, 329, 330, 332.
Statistical Yearbook of Algeria edition 1994, pp. 393-396.
Statistical Yearbook of Algeria Edition 1996, p. 378.
Algerian Central Bank Website, http://www.bank-of-algeria.dz/indicateur.htm
Ali Aissaoui, *Algeria: The Political Economy of Oil and Gas* (Oxford University Press, 2001), p. 225.

Angola:

Our estimates draw on the following sources:

Orcamento Geral Para o ano economico de 1969.
Orcamento Geral Para o ano economico de 1971.
Orcamento Geral Para o ano economico de 1972.
Orcamento Geral Para o ano economico de 1974.
Republica Popular de Angola, Comissao Nacional Do Plano, Direccao Nacional De Estatistica, *Anuario Estatistico 1974,* p. 323.
World Bank, *A World Bank Country Study: Angola, An Introductory Economic Review* (1991), pp. 45-46.
International Monetary Fund, *IMF Staff Country Staff Report, 95/122, Angola, Recent Economic Developments*, p. 68, table 14.
International Monetary Fund, *IMF Country Staff Report No. 97/112, Angola Recent Economic Developments*, page 34, table 14.

International Monetary Fund, *IMF Staff Country Report No. 99/25, April 1999, Angola Statistical Appendix*, p. 18, table 16.
International Monetary Fund, *IMF Country Report No. 03/292 September 2003; Angola: Selected Issues and Statistical Appendix,* p. 106.
International Monetary Fund, *IMF Country Report No. 05/125 April 2005; Angola: Selected Issues and Statistical Appendix,* p. 67.
International Monetary Fund, *IMF Country Report No. 07/355 October 2007 Angola: Selected Issues and Statistical Appendix,* p. 62.
The Economist Intelligence Unit, *Angola, Sao Tome and Principe Country Profile, 1990-91*, p. 31.
Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).

Bahrain:
Our estimates draw on the following sources:
Kingdom of Bahrain Monetary Agency, *Annual Report* 2001.
Kingdom of Bahrain Monetary Agency, *Annual Report* 2003.
Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).
Alik Khalifa Al-Kuwari, *Oil Revenues in the Gulf Emirates, Patterns of Allocation and Economic Development* (Bowker 1978), p. 88.

Chile:
Our estimates draw on the following sources:
Central Bank of Chile website: http://si2.bcentral.cl/Basededatoseconomicos/951_portada.asp?idioma=I
Chile, Departamento de Estudios Fiscales, *Cuentas Fiscales de Chile, 1925-1957.*
Díaz, J.; Lüders, R. y Wagner, "Economía Chilena 1810-1995: Cuentas Fiscales" http://www.cuadernosdeeconomia.cl/Pdf/DT_188.pdf
Díaz, J.; Lüders, R. y Wagner, "Economía chilena 1810-2000. Producto total y sectorial. Una nueva mirada." Documento de Trabajo 315, Instituto de Economía de la Pontificia Universidad Católica de Chile.
Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).
Manuel Lasaga, *The Copper Industry in the Chilean Economy: An Econometric Analysis* (Lexington Books, 1981), p. 13.
Markos Mamalakis, *Historical Statistics of Chile: Government Services and Public Sector and Theory of Services, Vol 6*, p. 506.

Ecuador:
Our estimates draw on the following sources:
Ecuador, Ministerio de Finanzas website (http://mef.gov.ec)

Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).

Equatorial Guinea:

Our estimates draw on the following sources:

International Monetary Fund, *IMF Equatorial Guinea Background Appendices,* 1995.
International Monetary Fund, *IMF Country Report: Republic of Equatorial Guinea Statistical Appendix*, 2003.
International Monetary Fund, *IMF Country Report: Republic of Equatorial Guinea: Statistical Appendix*, 2005.
International Monetary Fund, *IMF Country Report: Republic of Equatorial Guinea: Statistical Appendix*, 2008.

Gabon:

Our estimates draw on the following sources:

International Monetary Fund, *Gabon - Background Paper, IMF Staff Country Report No. 95/129*, pp. 5, 7, 11.
International Monetary Fund, *Gabon: Selected Issues and Statistical Appendix, May 2002, IMF Country Report No. 02/94*, p. 103.
International Monetary Fund, *Gabon - Second Review…January 2005, IMF Country Report No. 05/5*, p. 25.

Indonesia:

Our estimates draw on the following sources:

Statistik Indonesia, *Statistical Pocketbook of Indonesia 1950.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1960.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1963.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1968.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1969.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1972-73.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1974-75.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1976.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1977.*
Statistik Indonesia, *Statistical Pocketbook of Indonesia 1979.* 5, 1976, 1977, 1979.
Statistik Indonesia, *Statistical Yearbook of Indonesia 2006,* p.405.
Statistik Indonesia, *Statistical Yearbook of Indonesia 2007*, p.421
Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics January 1986,* p.96
Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics January-May 1990*, p.108
Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics January 1991*, p.108
Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics January 1993,* p.114
Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics January 1996*, pp. 95-96.

Statistik Ekonomi - Keuangan Indonesia, *Indonesian Financial Statistics March 2004,* p.97.
United States Embassy, Indonesia, *Petroleum Report Indonesia, 2005-06.*
J.S. Uppal, *Taxation in Indonesia* (Gadjah Mada University Press, 1986).

Iran:

Our estimates draw on the following sources:

Bulletin de la Banque (Millié Iran) National de Perse (Siege social: Teheran) No. 3 Juin 1934.
*Bulletin de la Banque Millié Ir*an (Siege social: Teheran) No. 3 Aout 1936
Bulletin de la Banque Mellie Iran (Siege social: Teheran) No. 12 Juin 1937
Bulletin de la Banque Mellié Iran (Publication Mensuelle) No. 34 Avril 1939
Bulletin de la Banque Mellié Iran No. 59 - Juin - Juilliet 1942
Bank Melli Iran Bulletin, June-July 1947, pp. 96-101.
Bank Melli Iran Bulletin, February - March 1949, pp. 241-247
Bank Melli Iran Bulletin, September 1953, pp. 232-234.
Bank Melli Bulletin, July 1956, pp. 285-286.
Bank Melli Bulletin, May-June 1957, pp.171-173.
Bank Melli Iran Bulletin, June 1958, pp. 150-154.
Bank Melli Iran Bulletin, May-June 1959, pp. 587-589.
Bank Melli Iran Bulletin, July-August 1960, pp. 220-223.
Bank Merkazi, *Balance Sheet*, March 20, 1964
Bank Merkazi, Annual Report and Balance Sheet, March 20, 1964
Bank Markazi, Annual Report and Balance Sheet, March 20, 1968
Bank Markazi, Central Bank of Iran Annual Report and Balance Sheet 1349, pp. 36, 126 - 134
Bank Markazi, Central Bank of Iran Annual Report and Balance Sheet 1353, pp. 144, 38.
Bank Markazi, Central Bank of Iran Annual Report and Balance Sheet 2534, pp. 10, 51, 52.
Bank Markazi, Central Bank of Iran Annual Report and Balance Sheet 1356(2536), pp. 138. 140.
Bank Markazi, Central Bank of Iran Annual Report and Balance Sheet 1357, pp. 76, 78, 79.
Bank Markazi, Central Bank of Iran Economic Report and Balance Sheet 1359, pp. 140, 142, 143.
Bank Markazi, Central Bank of Iran Bulletin Spring & Summer 1983, Numbers 107 - 108, pp. 44, 46, 47.
Bank Markazi, Central Bank of Iran Bulletin Spring & Summer 1984 ,Numbers 111-112, pgs. 62, 64, 65.
Bank Markazi, Central Bank of Iran Bulletin Spring and Summer 1987, Numbers 123-124, pp. 40, 41, 43.
Bank Markazi, Central Bank of Iran Annual Review 1369, pp. 42, 44, 45.
Bank Markazi, Central Bank of Iran Annual Review 1370(1992-1993).
Bank Markazi, Central Bank of Iran Annual Review 1372(1993-1994).
Bank Markazi, Central Bank of Iran Annual Review 1373(1994-1995).
Bank Markazi Central Bank of Iran Annual Review 1374(1995-1996).
Bank Markazi Central Bank of Iran Annual Review 1375(1996-1997).
Bank Markazi Central Bank of Iran Annual Review 1376(1997-98).
Bank Markazi Central Bank of Iran Economic Report and Balance Sheet 1378.

Bank Markazi Central Bank of Iran Annual Review 1379 (2000/2001) pp. 58, 59
Bank Markazi Central Bank of Iran Annual Review 1380 (2001/02), pp. 58,59
Bank Markazi Central Bank of Iran Annual Review 1381 (2002/03), pp. 57-60.
Bank Markazi Central Bank of Iran Annual Review 1382 (2003/04), pp. 58-60.
Bank Markazi Central Bank of Iran Annual Review 1385 (2006/07), pp. 61 – 63.

Kuwait:

Our estimates draw on the following sources:

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin* October-December *1974*, Volume 1 No. 4, p.19

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1975,* Volume 2 No. 4, p.13

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin January-March 1979,* Volume 6 No. 1, p.13

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1979,* Volume 6 No. 4, p.13

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1981,* Volume 8 No. 4, p.15

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1983,* Volume 10 No. 4, p.20

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1985,* Volume 12 - No. 4, p.20

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1992* Volume 18 - No. 4, p.21

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1993,* Volume 19 - No. 4, p.44

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1994,* Volume 20 - No. 4, p.52

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin July-September 1995,* Volume - 21 - No. 3, p.58

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin January-March 1997* Volume 23 - No. 1 p.60

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1997,* Volume - 23 - No. 4

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin October-December 1998,*Volume - 24 - No. 4, p.60

Central Bank of Kuwait, Economic Research Department, *Central Bank of Kuwait Quarterly Statistical Bulletin* April-June 2001,Volume - 27 - No. 2, p.58,

Central Bank of Kuwait Website (http://www.cbk.gov.kw/WWW/index.html)

Hossein Askari, John Thomas Cummings, and Michael Glover, *Taxation and Tax Policies in the Middle East* (London: Butterworth Scientific), 1982.

Alik Khalifa Al-Kuwari, *Oil Revenues in the Gulf Emirates: Patterns of Allocation and Impact on Economic Development* (Bowker 1978), pp. 110-111.

Mexico:

Our estimates draw on the following sources:

Mexico, Secretaría de Hacienda, "Situación Financiera del Gobierno Federal," available at: http://www.apartados.hacienda.gob.mx/estadisticas_oportunas/esp/index.html

Mexico, Instituto Nacional de Estadística Geografia e Informática, Estadísticas Históricas de México, available at: http://dgcnesyp.inegi.org.mx/cgi-win/ehm.exe/CI150030

Mexico, Nacional Financiera, *La Economia Mexicana en Cifras, 1990*, page 582.

Mexico, Nacional Financiera, *La Economia Mexicana en Cifras, 1995*, page 243.

Mexico, Petroleos Mexicanos, *Anuario Estadístico* 1986.

Esperanza Duran, "Pemex: The Trajectory of a National Oil Policy," in John Wirth ed., *Latin American Oil Companies and the Politics of Energy* (University of Nebraska Press, 1985), p. 155.

Stephen Haber, Armando Razo, and Noel Maurer, *The Politics of Property Rights: Political Instability, Credible Commitments, and Economic Growth in Mexico, 1876-1929* (Cambridge University Press, 2003), p. 222.

Nigeria:

Our estimates draw on the following sources:

Central Bank of Nigeria *Annual Report and Statement of Accounts for the Year Ended December 31, 1966*, page 68

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1967*, page 48

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1968*, page 56

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1969*, page 60

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1970*, page 68

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1971*, page 64

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1972*, page 61

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1973*, page 75

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1974*, page 67

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1975*, page 82

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1976*, page 60

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1977*, page 62

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1978*, page 60

Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended*

December 31, 1979, page 60
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31, 1980*, page 74
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1981*, page 68
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1982*, page 70
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 198*3, page 74
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1984*, page 73
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1985*, page 83
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1986*, page 86
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1987*, page 82
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1988*, page 84
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1989*, page 86
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 1992*, page 62
Central Bank of Nigeria *Annual Report and Statement of Accounts for the Year Ended December 31 1998*, page 64
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 2000*, page 39
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 2005*, page 164
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 2006*, page 218
Central Bank of Nigeria, *Annual Report and Statement of Accounts for the Year Ended December 31 2007*, page 198.
Tunde Adeoye, *Fiscal Policy and Growth of the Nigerian Economy: An Empirical Perspective* (Nigerian Institute of Social and Economic Research, 2006), p. 13
Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).
Scott D. Pearson, *Petroleum and the Nigerian Economy* (Stanford University Press 1970), p. 73

Norway:
Our estimates draw on the following sources:

Data on the value of oil revenues accruing to the government from:
Norwegian Petroleum Directorate. *PetroFacts 2008*. Accessed at:

http://www.npd.no/English/Produkter+og+tjenester/Publikasjoner/Faktaheftet/Faktaheftet+2008/fakta2008.htm

Data on total government revenues from:
International Monetary Fund, *Government Finance Statistics*, various years.

Oman:
Our estimates draw on the following sources:
Central Bank of Oman, *Central Bank of Oman, Annual Report 1999*.
Central Bank of Oman, *Central Bank of Oman, Annual Report 2000.*
Central Bank of Oman, *Central Bank of Oman, Annual Report 2001*.
Central Bank of Oman, *Central Bank of Oman, Annual Report 2004*
Central Bank of Oman*, Central Bank of Oman Annual Report 2007*
Hossein Askari, John Thomas Cummings, and Michael Glover, *Taxation and Tax Policies in the Middle East* (London: Butterworth Scientific), 1982, pp. 124, 125, 209.
Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).

Trinidad and Tobago:
Our estimates draw on the following sources:
Trinidad and Tobago Central Statistical Digest, *Annual Statistical Digest 1966*, p.118.
Trinidad and Tobago Central Statistical Digest, *Annual Statistical Digest 1969*, p.126.
Central Bank of Trinidad and Tobago, *Annual Report 1974*, p. 19.
Central Bank of Trinidad and Tobago, *Annual Report 1975*, p. 23.
Central Bank of Trinidad and Tobago, *Annual Report 1979*, p. 65.
Central Bank of Trinidad and Tobago, *Annual Report 1981*, p. 72.
Central Bank of Trinidad and Tobago, *Annual Report 1983*, p. 69.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1984*, p 81.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1985*, p 81.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1986*, p 80.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1987*, p 91.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1988*, p 89.
Central Bank of Trinidad and Tobago*, Annual Economic Survey 1989*, p 92.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1991*.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1994*, p. 49.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1996*, p. 42.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1997*, p. 42.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 1998*, pg 54.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 2000*, p. 49.
Central Bank of Trinidad and Tobago, Annual Economic Survey 2001.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 2002*, p. 42.
Central Bank of Trinidad and Tobago, *Annual Economic Survey 2006*, p. 104.

Venezuela:
Our estimates draw on the following sources:

Venezuela, Departamento de Hacienda, *Cuenta General del Departmento de Hacienda* (Caracas: Imprenta Nacional), for the years 1878-1999, inclusive.

Venezuela, Gobierno Central Presupustario, "Ingresos Fiscales en Efectivo Recaudados por la Oficina Nacional del Tesoro." Available at: http://www.mf.gov.ve/inicio/info/estadisticas-de-las-finanzas-publicas/gobierno-central-presupuestario

Venezuela, Ministerio de Poder Popular para la Energia y Petroleo, *Petroleo y Otros Datos Estadísticos –PODE—2004*.

Venezuela, Ministerio de Poder Popular para la Energia y Petroleo, *Petroleo y Otros Datos Estadísticos –PODE—2005*.

Jorge Salazar Carillo, *Oil and Development in Venezuela During the 20th Century* (Westport, CT: Praeger, 1994), Tables 4.2, 5.3, 6.2, 7.2, 8.2, 8.8, 9.2, 9.10, 10.3, 11.3.

Yemen:
Our estimates draw on the following sources:

Yemen, Central Bank, *Annual Report 2005*, chapter 3.

International Monetary Fund, *IMF Country Report No 07/337: Republic of Yemen* (2007).

Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* 37: 297-317 (2005).

Zambia:
Our estimates draw on the following sources:

Zambia, *Republic of Zambia Report of the Auditor General: On the Public Accounts For the Financial Year Ended 30th June 1966*, p. 87

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1968*.

Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure For the year 1st January, 1969 to 31st December, 1969*, pp. 8-9

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1970*.

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1971*, pp. 9-13.

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1972*, pp. 9-12

Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure For the year 1st January, 1973 to 31st December, 1973*, pp. ix - xi

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1974*, pp. 7-12.

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1975*, pp. 9-14.

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1977*, pp. 9-14.

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1977*, pp. 10-15

Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1978*, pp. 10-16.
Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1979*', pp. 10-17.
Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1981*, pp. 10-16
Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1982*, pp. 10-15
Zambia, *Republic of Zambia Financial Report for the Year Ended 31st December 1983*, pp. 10-15.
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure for the Year 1st January, 1986 to 31st December, 1986*, pp. xii - xviii
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditures for the year 1st January 1987 to 31st December 1987*, pp. xi - xvii
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure…for the year 1st January, 1988 to 31st December, 1988*, pp. xi - xviii
Republic of Zambia, *Recurrent and Capital Estimates For the Year 1st January, 1989 to 31st December, 1989*.
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure for the Year 1st January, 1989 to 31st December, 1989, pp.* xiv - xviii
Zambia, *Government of the Republic of Zambia, Estimates of Revenue and Expenditure 1992*, pp. xv - xxi
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure 1993*, pp. xxxiv - xlii
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure 1993*, pp. xxxiv - xlii
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure 1993, Vol. I*, pp. xvi - xliii
Zambia, *Government of the Republic of Zambia: Estimates of Revenue and Expenditure for the year 1st January, 1994 to 31st December, 1994*, pp. xx - xxi
Zambia, *Republic of Zambia: Estimates of Revenue and Expenditure for the year 1st January 1999 to 31st December 1999*, pp. xxx - xxxvii
Zambia, *Republic of Zambia: Estimates of Revenue and Expenditure for the year 1st January, 2000 to 31st December, 2000*, pp. xxxiii - xliii
Zambia, *Republic of Zambia: Estimates of Revenue and Expenditure for the year 1st January 1999 to 31st December 2003*, pp. xxxvii - xlii
Zambia, *Republic of Zambia: Estimates of Revenue and Expenditure 2004*, pp. xxxviii - xliv
Zambia, Repub*lic of Zambia Estimates of Revenue and Expenditure For the year 1st January, 2005 to 31st December, 2005*, pp. xiix - lv
Zambia, *Republic of Zambia: Estimates of Revenue and Expenditure 2007*, pp. xxxvi - xliv

2. Estimating Total Oil Income Per Capita

Total Oil Income Per Capita is a less theoretically satisfactory measure than Fiscal Reliance, but because it is easier to estimate it has emerged as the standard measure employed in the recent literature on the resource curse. Examples include: Thad Dunning, *Crude Democracy: Natural Resource Wealth and Political Regimes* (New York: Cambridge University Press, 2008); Michael Ross, "Oil and Democracy Revisited" (Mimeo, UCLA, 2009); Silje Askalen, "Oil and Democracy—More than a Cross-Country Correlation?" Working Paper, University of Oslo, 2009); and Kristopher Ramsey, "Natural Disasters, the Price of Oil, and Democracy," (Mimeo: Princeton University, 2009). These works estimate Total Oil Income Per Capita for periods roughly coinciding with 1960 to 2004 (the exact coverage varies slightly from one study to another). Some of these works (e.g., Ramsey) look only at the largest producers, because they are based on downloadable datasets that truncate coverage to as few as 49 countries (of the 103 petroleum producing countries in the world).

We depart from the extant literature by estimating Total Oil Income Per Capita for every oil producing country in the world from the 1800 to 2006. This means that we observe countries before and after they became petroleum producers, because commercial production did not begin (in Romania and the United States, in 1857 and 1859, respectively), until technological advances allowed it to be refined into commercially valuable products—most notably, kerosene.

In order to estimate Total Oil Income Per Capita three values must be known: the volume of crude oil production in each country-year; the value of crude oil in each year; and the population in each country-year. The formula is simply Crude Oil Production times the Price of Crude Oil in 2007 dollars, divided by Population.

2A. Estimating the Volume of Crude Oil Output:

Following our general coding rules, we give primacy to a single source in estimating the volume of crude oil production, *The Oil and Gas Journal* (hereafter OGJ), which has been the petroleum industry's leading trade journal since its inception in 1902. It also provides the broadest country coverage of any single source. Initially, OGJ relied on estimates made by the U.S. Bureau of Mines, which obtained its data from individual countries, but since at least the early 1980s the OGJ produces its annual estimates of crude oil output from measurements made at the level of the oil field (reproduced in another OGJ publication discussed below) on a monthly basis. Additionally, the OGJ includes in its estimates of crude oil production the crude oil equivalents of Natural Gas Liquids (NGL, products such as propane, which are liquid at atmospheric pressure).

In order to produce our OGJ series we relied on three OGJ sources: hardcopies of the OGJ; the Oil and Gas Journal Database (hereafter, OGJD); and the *Oil and Gas Journal Databook* (hereafter OGJB). We started with OGJD, which we purchased from Pennwell's, which owns the database, covering the years 1990 to 2006. We retrieved the OGJ database for 1970 to 1991 from the Stanford Earth Sciences Library, which has it on floppy disks. When the OGJD provided monthly output data, we summed the values for each month in order to obtain yearly estimates. We note that OGJD does not include some minor producers. It also excludes some mid-sized producers for some country-years on the basis of low levels of output in those years. Fortunately, the data for those countries is provided in the OGJB, which provides coverage from 1983 to 2006. We therefore keyed in the missing data from the OGJB by hand. When there were missing country-year observations from the OGJD before 1983, we found the data in hardcopies of the OGJ. Typically, the OGJ published its annual country estimates of crude petroleum output for the prior two years in its February 15 issue, although there is some variance in the exact date of publication from year to year.

Prior to 1970 (when the OGJD begins coverage), all OGJ data has to be keyed in by hand working from OGJ hardcopies. Coding the data from the OGJ hardcopies is an intensely time consuming process, but we soon noted that the OGJ data series synced with a data set published by the American Petroleum Institute in its *Petroleum Facts and Figures, 1971* volume (hereafter API) which covers all producing countries from 1857 (the year that the world's first commercial oil wells were sunk) to 1967 in a single table. The footnotes to API indicate that it drew its data from the OJG, as well as from the U.S. Bureau of Mines. We verified that the API and OGJ data series synced by keying sets of overlapping country-years for both sources, and having verified the close fit of the data series we switched to API for country-years from 1857 to 1966. (API's last year of coverage 1967, but its 1967 data are the preliminary estimates produced by OGJ in 1968, which were subsequently updated by OGJ in 1969). We therefore employ OJG for the 1967 observations

There are a few country-years (particularly former Soviet Bloc countries in the late 1950s and 1960s) that are missing in both OGJ and API. We therefore turned to the petroleum industry's other major trade journal, World Oil, which produces estimates for these country years. These entries were keyed in by hand. We verified that the data in World Oil synced with the data series in OGJ and API by keying in the data for years in which the sources overlapped.

We noted that the OGJ did not begin to provide coverage of the newly independent countries that emerged out of the Soviet Union until 1996, even though they became independent at the end of 1991. We therefore turned to the website of the U.S. Energy Information Administration (hereafter USEIA); its Country Report pages provide a breakdown of energy production by type from 1980 to 2006. Following our rule of source minimization, we code all the years for these countries (1992 to 2006) from USEIA—though we note that the estimates made by OGJ for the overlapping years are quite close.

We next verified that our reliance on the OGJ did not miss very minor producers, some of which have only begun to come on line in recent years, such as Belize, Mongolia, Sudan, Senegal, and Sweden. We therefore turned again to USEIA to identify and code the data for any of these producers not covered by OGJ. Because USEIA does not begin coverage until 1980 we made certain that the data series for these very minor producers are not left censored by employing pre-1982 volumes of the following publications: *World Oil*, the International Energy Agency's *Oil Information*, the International Energy Agency's *Energy Statistics of Non-OECD Countries,* and the International Energy Agency's *Energy Statistics and Balances of Non-OECD Countries* (various issues). In those few cases in which we found that the

USEIA data is left censored we rely on these alternative sources, and again, following the rule of single sources we constructed the entire country series from that single source. For data from International Energy Agency publications, we converted petroleum measured in metric tons to barrels, using the conversion factors published in International Energy Agency, *Oil Information*.

2B. Estimating the Price of Crude Petroleum:
We follow conventions in the resource curse literature and employ the price series constructed by British Petroleum's, *Statistical Review of World Energy, 2008* (hereafter BPSR8). We note that BPSR is the only price series with extensive time series coverage: it provides estimates of both nominal and real (2007 U.S. dollars) back to 1861. Our series on Total Oil Output Per Capita thus begins in 1861, even though we have production observations for Romania beginning in 1857 and the United States beginning in 1859.

2C.Estimating Populations:
In order to mitigate measurement error that might come from source changes we follow our rule of using as few sources as possible to produce any individual country series. We therefore take the data from the World Bank's *World Bank Development Indicators* (online edition—hereafter WBDI), which begins coverage in 1960. For countries that were independent before 1960, we employ the United Nation's *World Population Prospects* (online edition—hereafter UNWPP), which provides coverage since 1950. For countries that were sovereign before 1950 we then link the WBDI or UNWPP data series to either of two sources: For countries with longer population histories we then link the UN or WBDI data to either of two sources: Angus Maddison, *The World Economy: Historical Statistics* (Paris, OECD, 2003); or Arthur Banks Cross National Time Series Data Archive website—and we choose the source depending how which provides the longer run of data for that particular country. We note that this leaves some country-years as uncoded, particularly in the late 19th and early 20th centuries. We therefore code those country years from B.R Mitchell, *International Historical Statistics 1750-2003*, fifth edition (2003). We note that this occurs very rarely.

Summary:
We construct estimates of Total Oil Income Per Capita for 168 countries from 1800 to 2006. The first positive values in the series appear in 1861. Of the 168 countries in the dataset, 103 reveal positive values.

3. Estimating Natural Gas Income Per Capita

In order to estimate Natural Gas Income Per Capita three values must be known: the volume of *marketed* natural gas production; the value of natural gas in each year; and the population in each country-year. The formula is simply Marketed Natural Gas Production times the Price of Natural Gas in 2007 dollars, divided by Population.

3A. Estimating the Volume of Marketed/Dry Natural Gas Production:
Natural gas is typically found in the same reservoirs as oil. Until quite recently, most producing countries did not attempt to sell the natural gas they produced. Instead they either

flared it off or reinjected it back into the reservoir to maintain pressure so as to extract crude oil. The reason was that marketing natural gas either requires an expensive system of pipelines that transport the gas from the point of production to the end users (homes, factories, power plants), or it requires the ability to lower the temperature of the gas to the point that it liquefies, allowing it to be shipped by tanker as Liquified Natural Gas (LNG). The former option tended to only be employed as a widespread practice in developed economies, which had households with incomes high enough to purchase appliances that run on natural gas or that have factories that could employ natural gas on a large scale. The latter option, LNG, is a very recent innovation that is employed by very few producers, because the cost of cooling the gas and transporting it in special tankers is only feasible when world energy prices are extremely high. The implication is that researchers should be careful that they are measuring marketed natural gas, not total natural gas production, much (or most) of which may produce no revenue at all. Indeed, in some African countries, less than 10 percent of the natural gas produced is actually marketed.

Natural gas includes both the gases which emerge from the wellhead in gaseous and liquid form. That is, it includes NGL (see discussion in 1A, above). Dry natural gas is natural gas from which natural gas liquids (NGL) have been removed. As a technical and definitional matter, dry natural gas does not have to be marketed: it could be reinjected back into petroleum reservoirs or flared off. As a practical matter, however, almost all series that separately report marketed and dry natural gas production show marketed natural gas as being of greater volume than dry natural gas for any country-year. The implication is that dry natural gas is a subset of marketed natural gas. Inasmuch as NGL is included in our estimates of crude oil production, our preferred measure of natural gas is dry production..

Our basic source is U.S. Energy Information Administration, *International Energy Annual*, which is available online (http://tonto.eia.doe.gov), hereafter referred to as USEIA. USEIA provides coverage for all producers in the world for three different types of natural gas production: Gross Production (from 1990 to 2008), Marketed Production (1990 to 2008); and Dry Production (1980 to 2008). We note that for overlapping years (1990 to 2008) the differences in country-year observations between Marketed and Dry Production are very small, and Marketed Production always exceeds Dry Production. The implication is that in the USEIA data Dry Production is Marketed Production from with the NGLs have been removed. We also note that USEIA provides coverage of both total and marketed production for the United States from 1900 to 2008. See: http://tonto.eia.doe.gov/dnav/pet/hist/n9010us2a.htm

For countries other than the United States, we have to sync the USEIA data series with series that have a longer time dimension. Several sources have such coverage. These include:

B.R Mitchell, *International Historical Statistics 1750-2003*, fifth edition (2003), which provides coverage from 1900 to roughly 1998, with the end date of each series varying by country. It provides broad country coverage, although it tends to exclude smaller producers. Hereafter cited as Mitchell 2003.

The British Petroleum *Statistical Review of World Energy, 2009. Hereafter cited as BPSR9.*

BPSR9 provides coverage for major producers from 1970 to 2008 and is clear that its figures are for dry natural gas.

The United States Geological Survey *Mineral Yearbook* (hereafter MYB). MYB provides coverage of Marketed Production back to the 1940s. It is, however, exceedingly difficult to use. From the 1940s to 1976 the MYB produced a separate Fuels volume that provided the data for all countries in that year in a single table. Beginning in 1977, however, the MYB stopped producing a separate volume on Fuels. This means that researchers have to go to the individual country reports for each and every year and search for the fuels data for that country—and then repeat the operation for each and every producing country for each and every year. We therefore only keyed in the MYB data from 1963 to 1976 (covering the years 1960 to 1975). When we could not create seamless series from other sources, we keyed in the rest of the data for that specific country from the MYB.

The Oil and Gas Journal Database (hereafter OGJD), which provides coverage form 1990 to 2008.

There are several fortunate characteristics of the data from these sources:

First, the data series in BPSR9 and USEIA Dry Production sync so closely in years in which they overlap that as a practical matter they are substitutes for each other. To the degree that they diverge we suspect that it is a product of the conventions that each source employed to round the data.

Second, the data series in Mitchell 2003 sync with those in BPSR9 for years in which the two series overlap. We suspect that differences in reported output are a function of differences in the basis on which the data were rounded. The implication is that Mitchell is reporting Dry Production.

Third, not surprisingly, the data series in USEIA Dry and Mitchell 2003 sync for the years in which they overlap. To the degree that they diverge we suspect that it is a product of the conventions that each source employed to round the data. The implication is that Mitchell is either reporting Dry Production or Marketed Production.

Fourth, the data series in Mitchell 2003 and MYB tend to sync. The variance between the two tends to be larger than between Mitchell 2003 and USEIA or BPSR9. We suspect that is because the overlapping years tend to be for periods (the 1950s, 1960s, 1970s) when output was quite low by current standards. Hence differences due to the conventions used to round the data are exaggerated. In addition, some differences in reported production may be a product of the fact that MYB reports marketed, not dry production. We suspect, however, that any differences due to this factor are very minor—as the differences in USEIA Dry and Marketed are quite small. In short, the data series in Mitchell 2003 and MYB are close, but not perfect, substitutes for each other.

We therefore proceed as follows:

First, if we can code a single country series from USEIA Dry Production we do so. That is, if a country began production on or after 1980 we use USEIA as the sole source.

Second, if a country could not be coded solely from USIEA Dry Production because it began production before 1980, but its first year of production was between 1970 to 1979, we coded that country series from BPSR9. As a practical matter, we coded very few countries from this source because: 1). The vast majority of countries that were producing in 1980 began production before 1970; and 2). BPSR9 only includes major producers.

Third, if a country began to produce after 1970, but is not covered by BPSR9 because it is a minor producer, we employ USEIA from 1980 to 2006, and then employ MYB from 1970 to 1979.

Fourth, if a country began to produce before 1970, we employ USEIA from 1980 to 2006, and then follow our rule of source minimization in choosing between Mitchell 2003 and MYB for all pre-1980 observations. As a practical matter, this meant that if a country began production after 1962 we used MYB for all 1963-1979 observations, following the rule of privileging those sources that are closest to the primary source. If, however, production began before 1963, we employ Mitchell 2003 as the source for all pre-1980 observations. The reason is as follows: there are differences in the methods by which MYB measured the output of natural gas before and after 1963. Moreover, these differences in the methods of measurement (which have to do with adjustments made to raw country data to account for differences in temperatures and pressures of the gas) before 1963 vary across countries. It is possible to calculate a rough adjustment factor for the pre-1963 data on a country by country basis, because MYB 1966 and MYB 1967 have four overlapping years of data (1963, 1964, 1965, and 1966). But, one then has to assume that any adjustment factor calculated from the 1963-66 data holds for all pre-1963 MYB observations. Moreover, for all volumes before MYB 1959 (which covers production before 1955), the MYB appears to have reprinted the data from the UN Statistical Yearbook, rather than work from primary sources from individual countries. It is not known what adjustments, if any, were made to the data by the UN. Thus, as a practical matter, if a country began production before 1963, we draw all pre-1980 observations from Mitchell 2003.

There were very rare occasions when we had to depart from these coding rules because of unexplained inconsistencies in a particular publication's data series. For example, the data series for Japan in USEIA Dry Production indicates that output triples from 1990 to 1991 (and then stays at the 1991 level). But, no other source (Mitchell 2003, BPSR9, the MYB, or OGJD) indicates such a jump in production. We therefore follow the rule of source minimization, and employ Mitchell 2003 from the first year of production to 1954, and then use the MYB for data from 1955 to 2006. We note that the fit between Mitchell 2003 and the MYB is close for the overlapping years (the difference between the two series in 1955 is only 7 percent) which suggests that any differences between the series are the product of conventions used in rounding the data or reflect the minor differences between Dry Production and Marketed Production.

3B. Estimating the Value of Natural Gas Production:
There is not an international spot market for natural gas the way there is for crude oil. Natural gas is typically delivered in pipelines with the price set through long term contracts. Several sources provide well-head price series for a few countries, but these series typically extend back only to the 1990s. There is only one series of well-head prices that extends back to the early 20th century, which is compiled by the U.S. Energy Information Agency for 1922 to 2008. The URL is: http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3a.htm. We therefore employ that price series for all country years. We deflate the nominal prices using the same price index (2007=100) employed by BPSR8 to deflate crude petroleum prices into constant dollars. (See 1B, above).

We note that very few countries marketed natural gas before 1922. These were: the United States (back to 1900); Canada (back to 1911); Russia (back to 1913); and Romania (back to 1913). We therefore employ the average nominal price of natural gas from 1922 to 1928 as the price for the period 1900 to 1921, and then run those nominal prices through the price index. We are confident in doing so because the nominal price of natural gas from the early 1920s to the late 1950s was extraordinarily stable (e.g., the nominal prices of natural gas was the same in 1956 as in 1922), and given the small volumes of gas produced in these four countries prior to 1922 there is no reason to suspect that price stability was a new phenomenon. We note that our results would not be sensitive to choosing other sets of years to compute the average price applied to the pre-1922 observations. In the first place, the nominal price series would not be much affected by a different choice of years, because prices did not vary much from year to year. In the second place, the volume of output in these four countries was so low before 1922 that it would take tremendous adjustments in the price series to have a discernable effect on the value of total production.

3C. Estimating Population:
The methods and sources for estimating population are detailed in 2C, above.

3D. Summary:
We construct estimates of Natural Gas Income Per Capita for 168 countries from 1900 to 2006. Of these, 97 display positive values.

4. Estimating the Value of Coal Production Per Capita

In order to estimate Coal Production Per Capita three values must be known: The volume of coal produced, the price of coal adjusted for inflation, and population. Our data series provide coverage of all three of these variables back to 1890. As a practical matter this means that we observe the vast majority of countries in the world before and after they became producers of coal. The major exceptions are countries that were major iron and steel producers in the nineteenth century (Germany, Great Britain, and the United States).

4A. Estimating the Volume of Coal Produced

Several sources provide data on coal production. These are:

B.R. Mitchell, *International Historical Statistics, 1750-2005, sixth edition* (2007), hereafter Mitchell 2007. This source breaks production into three types: Hard, Brown, and Anthracite. It also often reports coal volumes in undifferentiated units. It provides data as far back as 1800 through roughly 2000-2003.

United States, Energy Information Administration, *Energy Information Annual*, available online at: http://www.eia.doe.gov/emeu/international/coalproduction.html
Hereafter referred to as USEIA. USEIA breaks down coal production into Anthracite, Lignite, and Bituminous Coal. It covers 1980 to 2006.

The British Petroleum *Statistical Review of World Energy, 2009. Hereafter cited as BPSR9.* BPSR9 provides coverage for major producers from 1970 to 2008. It does not break coal down into its sub-types

The United States Geological Survey *Mineral Yearbook* (hereafter MYB). MYB also does not break down coal into its sub-types.

Because of differences in the definition of the types of coal, it is not possible to create consistent series on coal by type. It is the case, however, that total coal production from Mitchell 2007 and USEIA are the same for overlapping years. It is also the case that the vast majority of coal produced—on the order of 70 percent—is bituminous coal. Moreover, Bituminous Coal is an intermediate grade of coal, between Lignite (the softest), Sub-Bituminous (next softest), and Anthracite (hardest). Thus, it is possible to create a single series on total coal production. We took the data from USEIA from 1980 to 2006, and the data from Mitchell 2007 for all years prior to 1980.

There were only two countries for which the USEIA data did not sync with the Mitchell 2007 data: Mexico and Belgium, neither of which are major coal producers. We therefore turned to the MYB, because it Mitchell appears to have drawn his data from this source. We found the following: in the case of Mexico, Mitchell had made a recording error; he recorded the MYB data for "washed metallurgical coal" instead of "total coal" from 1994 to 2006. We also found that for other overlapping years in MYB and Mitchell 2007 the data were nearly identical. We therefore used Mitchell 2007 for all years until 1975, and then used MYB for all years 1975 to 2006. In the case of Belgium, Mitchell 2007 and MYB were extremely close substitutes for each other. We therefore assumed that there was a recording error in USEIA. We therefore used Mitchell 2007 and MYB to build the Belgium coal data series. We note, however, that Belgium is a trivial coal producer, and that our results would not have been sensitive to using the USEIA data instead of MYB.

4B. Estimating the Price of Coal

There are two sources that provide long-run price coal price data: The US Energy Information Administration, *Annual Energy Review* (cited above, and abbreviated as USEIA), which provides data from 1949 to 2006; and the USGS *Mineral Yearbook, 1952* (hereafter referred to as MYB1952), which provides data from 1890 to 1952. USEIA breaks down coal prices into the following sub-categories: Bituminous (1949 to 2006); Sub-Bituminous (1979-2006); Lignite (1949-2006); Anthracite (1949-2006). MYB1952 breaks down coal prices into the following sub-categories: Bituminous and Lignite (1890 to 1952); and Pennsylvania Anthracite (1949-1952). Inasmuch as the vast majority of coal produced in the world is bituminous, and inasmuch as our production series does not differentiate coal by type (see 4A), and inasmuch as bituminous coal is priced between lignite and anthracite, we produce a single price series on bituminous coal from USEIA and MYB1952. We proceeded as follows.

From 1979 to 2008, the bituminous price series comes from USEIA, which differentiates bituminous from all other coal types.

For 1949 to 1978 USEIA reports a series for "Bituminous Coal." However, this series represents the combined price of both bituminous and sub-bituminous coal. In order to calculate the price for bituminous coal, we back out its price from the combined price. We assume that the combined price for 1949 to 1979 to be a weighted average of the prices of bituminous and sub-bituminous coal, specifically, [(amount of bituminous coal)*(price of bituminous coal) + (amount of sub-bituminous coal)*price of sub-bituminous coal)], divided by the sum of sub-bituminous and bituminous coal produced by volume). This means That is, we have an equation with two unknowns (price of bituminous and price of sub-bituminous). We take the average ratio of the prices of bituminous and sub-bituminous coal for 1979-2008 to get a second equation expressing sub-bituminous coal as a percentage of bituminous coal, and then substitute this into the weighted average equation. Then, we solve for the price of bituminous coal. This works for years 1969-1979. Before 1969, however, we no longer have production broken down into bituminous and sub-bituminous, so we cannot directly get the weights for the weighted average equation (we only know total production). For the series from 1949 to 1969, we use the sub-bituminous and bituminous weights from 1969. We note that there was almost no sub-bituminous coal produced before 1969, so our results are not sensitive to the choice of weights.

Before 1949 we have to rely on price data from MYB1952, which provides price and production data that combines bituminous, sub-bituminous, and lignite. This means that the MYB1952 price data is a weighted average with three elements. Specifically, the equation is: [(amount of lignite/total production)*price of lignite + (amount of bituminous/total production)*price of bituminous + (amount of sub-bituminous/total production)*price of sub-bituminous]. We use the production weights of the three types from 1969, which we obtain from USEIA. For the price weights, we find the price of sub-bituminous and lignite in terms of the price of bituminous, as approximated by taking the average of these ratios for 1949-1959. Since we now have sub-bituminous and lignite in terms of bituminous, we have an equation with one unknown, and can solve for the price of bituminous. We then get the price of sub-bituminous and lignite by simply applying the average ratio 1949-1959 to the price we get each year for bituminous.

In short, our price series is the price of bituminous coal from 1890 to 2006. We then deflate the nominal price series using the same price series we use for Crude Oil and Natural Gas, from BPSR9.

4C. Estimating Population:
The methods and sources for estimating population are detailed in 2C, above.

Summary:
We construct estimates of Total Coal Income from 1890 to 2006 for 168 countries. Eighty-one of the 168 display positive values.

5. Estimating Total Fuel Income Per Capita

One might worry that Total Oil Income Per Capita does not include income from other mineral fuels from other sources (e.g., natural gas, coal). In fact, a measure that includes these other sources of energy— the Hamilton and Clemens Fuel Depletion variable (see Kirk Hamilton and Michael Clemens, "Genuine Savings Rates in Developing Countries," *World Bank Economic Review* (1999) 13: 333-56)–has been used by resource curse researchers for some time (e.g., Dunning 2008, Aslaksen 2009).

We therefore develop a measure of Total Fuel Income Per Capita (oil, natural gas, and coal in 2007 dollars divided by population) and Total Fuel and Metals Income Per Capita (oil, natural gas, coal, precious metals, and industrial metals in 2007 dollars, divided by population. Our measures differ from Hamilton and Clemens (as well as the researchers who use their measure) in two respects. First, we estimate our measures all the way back to 1900, while the Hamilton and Clemens measure only goes back to 1971 (some researchers, such as Dunning 2008, push this measure back to 1960). Second, the Hamilton and Clemens measure subtracts out the imputed costs of production and the normal rate of return on capital. We eschew these deductions because they are based on very limited observations of actual production costs (usually one or two observations per country series) and because they impose a single normal rate of return on capital for every country-year.

In order to know Total Fuel Income Per Capita we need to know three values: Total Oil Income Per Capita, Natural Gas Income Per Capita, and Coal Income Per Capita. We take those values from sections 2, 3, and 4, above.

There are some country-years where we have Total Oil Income Per Capita but are missing Natural Gas Income Per Capita or Coal Income Per Capita. When these missing values occur in the midst of a series of positive values for either of these variables we make the reasonable assumption that the missing value is the average of the values that precede it and follow it in the series. That is, we interpolate the missing data. If we do not do this we would be implicitly treating these missing values for Natural Gas and Coal as zeroes and therefore undercounting the rents from fuel that are not from oil.

Summary:
We construct estimates of Total Fuel Income Per Capita from 1900 to 2006 for 168 countries. One hundred twenty-four (124) countries display positive values.

6. Estimating Metals Production Per Capita

In order to estimate Metals Production three values must be known: the volume of production of each mineral, the price of each metal, and population. We are able to put together series for all three variables covering the period from 1900 to 2006 for the following major industrial and precious metals: Antimony, Bauxite (from which Aluminum is produced), Chromium, Copper, Gold, Iron Ore, Lead, Manganese, Mercury Molybdenum, Nickel, Silver, Tin, Tungsten, and Zinc. We take the volume of production of each metal times its price in order to get the value of production for each metal series, then sum the values of each metal to get the value total metals production. We then deflate the series using the price index in BPSR9. Finally, we divided by population, to get the real value of production per capita.

<u>6A. Estimating the Volume of Metals Production:</u>
Metal production is typically measured in three ways: metal content of ore or concentrate (milled ores, from which non-metal minerals have been separated); primary production; secondary production. Secondary production includes metal produced by recycling or from scrap. Primary production includes ingots or slaps produced, regardless of the origin of the raw materials (which may be imported). Metal content of ore or concentrate is the estimated volume of metal by weight contained in domestically mined ores. We therefore measure all production volumes as the metal content of ore or concentrate, because this gives us the volume of domestic production for each country-year.

Four sources provide annual data on the metal content of ore or concentrates. They are:

B.R. Mitchell, *International Historical Statistics, 1750-2005, sixth edition* (2007), hereafter Mitchell 2007. It provides data as far back as the mid-19th century through roughly 2000-2003 (depending on the country and product). Mitchell covers all of the major producers of each product, but tends not to include the volume of production of minor producers.

Christopher J. Schmitz, *World Non-Ferrous Metal Production and Prices, 1700-1976* (Frank Cass 1979). It provides data as far back as 1700 through 1976. Schmitz covers both major and minor producers. Hereafter cited as Schmitz.

United States Geological Survey, *Mineral Yearbook* (hereafter MYB). The MYB covers both major and minor producers, with production estimates typically covering the period from the early 20th century (depending on the product) through 2007. It appears to have been the source for the 20th century data in Mitchell 2007 and Schmitz. MYB has one obvious disadvantage, it has to be keyed in by hand for each and every country-year observation.

United States Geological Survey, "Historical Statistics for Mineral and Material Commodities in the United States," available online at: http://minerals.usgs.gov/ds/2005/140/#data. Hereafter cited as USGS-Statistics. USGS-Statistics covers the period 1900 to 2008 for every major mineral product. It only covers the United States and total world production.

There are several salient features of the data. First, the data published in Schmitz and Mitchell tend to be identical for overlapping country-years. The major difference is that

Schmitz' series extend back further in time, but stop in 1976. Second, the data in Mitchell and Schmitz tend to be identical with the data in MYB for overlapping country-years. It appears to be the case that most of the 20th century data in these sources was, in fact, drawn from MYB. It is the case, however, that the most recent years of data in Mitchell 2007 and Schmitz tend not to reflect the most recent updates from MYB. Instead, they reflect the preliminary estimates for those country-years. Third, the data in USGS-Statistics tend to be identical with the data in Mitchell 2007 and Schmitz.

The implication is that putting together consistent production series through 2006 is an easy matter: it means syncing either Mitchell 2007 or Schmitz with MYB. In the case of the United States we sync Mitchell 2007 with USGS-Statistics.

We therefore proceed as follows:

1. When there is coverage from Mitchell 2007 and MYB we key in the data from MYB back far enough that the values in the overlapping years are the same. We then use MYB from the overlapping years through 2006, and rely on Mitchell 2007 for the preceding years.
2. When Mitchell 2007 does not provide coverage we rely on Schmitz, and key in the data from MYB back far enough that that values in the overlapping years are the same. We then rely on MYB for the overlapping years through 2006, and rely on Schmitz for the preceding years.
3. When there is coverage from Mitchell 2007, Schmitz, and MYB, and the Schmitz data is identical to the data in Mitchell for overlapping years, but extends back farther in time, we proceed as follows: We use MYB from the years that overlap with the Mitchell 2007 data forward to 2006; and then use MYB for preceding years. We then employ Schmitz for the years not covered by MYB 2007.
4. For the United States only, we take the data from USGS-Statistics, and sync it with the pre-1900 data in Mitchell 2007 or Schmitz.
5. In the case of Chromium, MYB provides a series for all countries back to 1900. We therefore follow the rule of source minimization and rely solely on MYB. We note that the MYB Chromium data is not for the metal content of the ore, but is for the gross weight. Some countries, however, provide the ratio of the metal content to the gross weight for overlapping years. We therefore apply that ratio for all years for that country. When we a country series does not provide the ratio of the metal content to the gross weight, we use the average ratio for the reporting counties—39%. We note that when we compare the MYB gross weights to data in Mitchell and Schmitz it is apparent that they employed a constant ratio as well to convert gross weights to metal content.
6. In the case of Iron Ore, Mitchell 2007 provides data on both gross weight of ore and metal content of ore—and the data on gross weight tend to extend back farther in time than the data on metal content. We therefore take the ratio of metal content to gross weight for the overlapping years, and then apply that ratio to the years for which we have gross weight only in order to convert it to metal content.
7. In the case of Tungsten, the MYB reported data both as W (Tungsten) content and as WO3 content (Tungsten Oxide) on a 60% basis. We therefore converted data reported as Tungsten Oxide into Tungsten by taking the ratio of Tungsten Oxide to Tungsten for overlapping years. We note that when we do so the Tungsten data from MYB coincide

with the data from Mitchell 2007. We therefore use MYB from the early 1960s to 2006, and Mitchell for all years prior.

6B. Estimating Prices
USGS-Statistics provides annual price data in nominal dollars from 1900 to 2007.

6C. Population
The methods and sources for estimating population are detailed in 2C, above.

Summary:
We construct estimates of Metals Production Per Capita for 168 countries from 1900 to 2006. One hundred twenty-nine (129) of the 168 display positive values.

7. Total Income from Resources Per Capita

One might worry that Total Oil Income Per Capita and Total Fuel Income Per Capita does not include income from non-fuel minerals. For some countries, these non-fuel minerals provide substantial shares of national income and government revenues (e.g., copper in Zambia and Chile; Bauxite in Jamaica).

We therefore develop a measure of Total Resource Income Per Capita (Total Fuel Income Per Capita plus Total Metals Income Per Capita, in 2007 dollars). This measure is based on a measure often used in resource curse research, the Hamilton and Clemens Mineral Depletion variable (see Kirk Hamilton and Michael Clemens, "Genuine Savings Rates in Developing Countries," *World Bank Economic Review* (1999) 13: 333-56). Our measures differ from Hamilton and Clemens (as well as the researchers who use their measure) in three respects. First, we estimate our measures all the way back to 1900, while the Hamilton and Clemens measure only goes back to 1971. Second, the Hamilton and Clemens measure includes non-metallic minerals (e.g. Gypsum), which we do not include because the rents from these minerals are quite small. Third, the Hamilton and Clemens measure subtracts out the imputed costs of production and the normal rate of return on capital. We eschew these deductions because they are based on very limited observations of actual production costs (usually one or two observations per country series) and because they impose a single normal rate of return on capital for every country-year.

Summary:
We construct estimates of Total Resources Income for 168 countries from 1900 to 2006. Of these 168 countries, 153 display positive values.

Section Three: Estimating Dependent Variables

In order to be sure that our regressions are robust to alternative measure of regime type we employ two different metrics: the Polity Score (hereafter Polity); and Regime.

Polity

We employ the Polity 2 measure created by Monty G. Marshall and Keith Jaggers ,"Polity IV Project: Political Regime Characteristics and Transitions, 1800-2006," (University of Maryland, 2008). This is Marshall and Jaggers combined measure, scaled from -10 (most autocratic) to 10 (most democratic), with politically unstable years interpolated, coded from 1800 to 2006. We normalize their index to run from 0 to 100 by adding 10 and multiplying by five. This transformation makes regression coefficients easier to interpret. Our data series on Polity covers 164 countries.

Regime

We follow Adam Przeworski, Michael Alvarez, Jose-Antonio Cheibub, and Fernando Limongi, *Democracy and Development: Political Institutions and Material Well-being in the World, 1950-1990* (New York, NY: Cambridge University Press, 2000) and code countries as 1 (autocratic) or 0 (democratic). Democracy is defined as there being more than one political party and control of the executive alternates between parties. Przeworski et. al. coded countries from 1950 to 1990. This coding system was then extended backwards and forwards in time by: Carles Boix and Sebastian Rosato, "A Complete Data Set of Political Regimes, 1800-1999" (Department of Political Science, University of Chicago, 2001); and by Jose Antonio Cheibub and Jennifer Gandhi, "Classifying Political Regimes: A Six-Fold Classification of Democracies and Dictatorships." Department of Political Science, Yale University (2004). We use the data from Boix and Rosato (2001) for the period 1800 to 1945, and the data from Cheibub and Gandhi (2004) for 1946 to 2002. We note that for overlapping country-year observations Boix and Rosato and Cheibub and Gandhi almost always generate the same values. For post-1945 country-year observations for which Cheibub and Gandhi provided no coding, we take the data from Boix and Rosato. These country years are as follows: Jamaica 1959-61; Rwanda 1961; Libya 1951; Singapore 59-64; Oman 46-50; Bhutan 46-70; Yemen 1948 to 1966; Vietnam 1954 to 1975; and Russia 1991. This results in a complete set of Regime codes for the period 1800 to 2002. Our data series on Regime covers 166 countries.

Differences in Coverage between Polity and Regime:

There are three countries that have data coverage on the Regime measure of democracy but do not have coverage on the Polity measure of democracy: Barbados, Belize, and, Suriname.

There is one country that has data coverage on the Polity measure of democracy but does not have coverage on the binary Regime measure of democracy: East Timor.

There is one country for which neither data source codes regime type: Brunei.

SECTION FOUR: CONDITIONING VARIABLES:

1. Estimating Gross Domestic Product Per Capita

We measure real gross domestic product per capita on an annual basis for each country in our dataset in International Dollars in 2000 constant prices.

Sources and Procedures:
Our goal was to create consistent time series of real gross domestic product per capita with the greatest historical coverage possible for each country in our dataset. We drew on several sources in order to construct this measure:

A. The Penn World Tables (Version 6.2), hereafter PWT.
B. Angus Maddison, *The World Economy: Historical Statistics* (March 2009 version), hereafter Maddison.
C. Robert Barro and Jose Ursua, "Macroeconomic Crises since 1870," *Brookings Papers on Economic Activity*, Spring 2008. The dataset to this paper is available at: http://www.economics.harvard.edu/faculty/barro/data_sets_barro. Hereafter cited as Barro and Ursua.
D. World Bank, World Development Indicators Online, hereafter cited as (WBDI).

The reason we pull data from multiple sources is that no one dataset was able to maximize coverage on its own. PWT, for example, has exceedingly good coverage in terms of the number of countries, but its historical coverage begins only in 1950 and ends in 2004. WBDI provides coverage beginning in 1960 through 2006. Maddison provides excellent historical coverage for certain countries, but can't match the breadth of the PWT or the WBDI for contemporary cases. In addition, Maddison's historical coverage sometimes has multi-year gaps. Barro and Ursua provide annual estimates with a very long time dimension (as far back as 1791 for the United States), but only cover 30 countries.

Following our rule of source minimization, we do not stitch together GDP series from multiple sources in order to avoid introducing systematic measurement error within a time series[1]. Together with our desire to maximize coverage both in levels and in first differences, we used the source of GDP data according to the following rule: Choose the one source of GDP per capita data that maximizes coverage in first-differences for each country. If coverage is equal the preference order is: PWT, WBDI, Barro and Ursua, and finally Maddison[2]. The source for each country is listed in Table A1 below.

Next, we had to settle on a consistent currency. Maddison uses 1990 International Geary-Khamis dollars; Barro and Ursua provide an index (2000=1), which can be pegged to levels in 2000 I$ based on the WBDI; the latest version of the WBDI is in constant 2005 I$; the PWT is in 2000 I$. We created an index of real GDP per capita (2000=1) for each series other than

[1] The one exception to this rule is that we extended the Penn World Table, which ends in 2004, using the real GDP per capita growth rates from the World Development Indicators for 2005 and 2006. The growth rates for the two series are almost identical through 2004, giving us confidence that the change in source is inconsequential.

[2] The only country for which we used the WBDI is East Timor, which is not featured in any of the other datasets.

the PWT and then converted back to levels based on the PWT chained measure of GDP per capita in 2000. That is, the underlying real growth rate of per capita GDP comes from each of the sources as listed in Table A1, with the level pegged to the PWT in the year 2000 and expressed in 2000 I$. We note that our estimates of per capita GDP are not sensitive to the choice of source: as the levels of GDP per capita for any particular country-year do not vary widely across sources. We code 166 countries (out of the 168 in our dataset) from the following sources:

Table 1: Data Sources for real per capita GDP

Country	Code	Source
Afghanistan	AFG	Maddison (2009)
Albania	ALB	Maddison (2009)
Algeria	DZA	Penn World Table 6.2
Angola	AGO	Maddison (2009)
Argentina	ARG	Barro and Ursua (2008)
Armenia	ARM	Maddison (2009)
Australia	AUS	Barro and Ursua (2008)
Austria	AUT	Maddison (2009)
Azerbaijan	AZE	Maddison (2009)
Bahrain	BHR	Maddison (2009)
Bangladesh	BGD	Penn World Table 6.2
Barbados	BRB	Penn World Table 6.2
Belarus	BLR	Maddison (2009)
Belgium	BEL	Barro and Ursua (2008)
Belize	BLZ	Penn World Table 6.2
Benin	BEN	Penn World Table 6.2
Bhutan	BTN	Penn World Table 6.2
Bolivia	BOL	Maddison (2009)
Bosnia and Herzegovina	BIH	Penn World Table 6.2
Botswana	BWA	Maddison (2009)
Brazil	BRA	Barro and Ursua (2008)
Bulgaria	BGR	Maddison (2009)
Burkina Faso	BFA	Penn World Table 6.2
Burundi	BDI	Penn World Table 6.2
Cambodia	KHM	Maddison (2009)
Cameroon	CMR	Penn World Table 6.2
Canada	CAN	Barro and Ursua (2008)
Central African Republic	CAF	Maddison (2009)
Chad	TCD	Penn World Table 6.2
Chile	CHL	Maddison (2009)
China	CHN	Maddison (2009)
Colombia	COL	Maddison (2009)
Comoros	COM	Penn World Table 6.2
Congo	COG	Penn World Table 6.2

Congo, Democratic Republic	ZAR	Maddison (2009)
Costa Rica	CRI	Maddison (2009)
Cote d'Ivoire	CIV	Penn World Table 6.2
Croatia	HRV	Penn World Table 6.2
Cuba	CUB	Maddison (2009)
Cyprus	CYP	Penn World Table 6.2
Czech Republic	CZE	Penn World Table 6.2
Czechoslovakia	CSK	Maddison (2009)
Denmark	DNK	Barro and Ursua (2008)
Djibouti	DJI	Maddison (2009)
Dominican Republic	DOM	Maddison (2009)
Ecuador	ECU	Maddison (2009)
Egypt	EGY	Barro and Ursua (2008)
El Salvador	SLV	Maddison (2009)
Equatorial Guinea	GNQ	Penn World Table 6.2
Eritrea	ERI	Penn World Table 6.2
Estonia	EST	Penn World Table 6.2
Ethiopia	ETH	Maddison (2009)
Fiji	FJI	Penn World Table 6.2
Finland	FIN	Barro and Ursua (2008)
France	FRA	Barro and Ursua (2008)
Gabon	GAB	Maddison (2009)
Gambia	GMB	Penn World Table 6.2
Georgia	GEO	Maddison (2009)
Germany	DEU	Maddison (2009)
Ghana	GHA	Penn World Table 6.2
Greece	GRC	Barro and Ursua (2008)
Guatemala	GTM	Maddison (2009)
Guinea	GIN	Maddison (2009)
Guinea-Bissau	GNB	Penn World Table 6.2
Guyana	GUY	Penn World Table 6.2
Haiti	HTI	Maddison (2009)
Honduras	HND	Maddison (2009)
Hungary	HUN	Maddison (2009)
India	IND	Barro and Ursua (2008)
Indonesia	IDN	Barro and Ursua (2008)
Iran	IRN	Maddison (2009)
Iraq	IRQ	Maddison (2009)
Ireland	IRL	Maddison (2009)
Israel	ISR	Penn World Table 6.2
Italy	ITA	Barro and Ursua (2008)
Jamaica	JAM	Penn World Table 6.2
Japan	JPN	Maddison (2009)
Jordan	JOR	Maddison (2009)

Kazakhstan	KAZ	Maddison (2009)
Kenya	KEN	Penn World Table 6.2
Korea, North	PRK	Maddison (2009)
Korea, South	KOR	Maddison (2009)
Kuwait	KWT	Maddison (2009)
Kyrgyzstan	KGZ	Maddison (2009)
Laos	LAO	Maddison (2009)
Latvia	LVA	Maddison (2009)
Lebanon	LBN	Maddison (2009)
Lesotho	LSO	Penn World Table 6.2
Liberia	LBR	Maddison (2009)
Libya	LBY	Maddison (2009)
Lithuania	LTU	Maddison (2009)
Macedonia	MKD	Penn World Table 6.2
Madagascar	MDG	Penn World Table 6.2
Malawi	MWI	Penn World Table 6.2
Malaysia	MYS	Penn World Table 6.2
Mali	MLI	Penn World Table 6.2
Mauritania	MRT	Maddison (2009)
Mauritius	MUS	Penn World Table 6.2
Mexico	MEX	Barro and Ursua (2008)
Moldova	MDA	Maddison (2009)
Mongolia	MNG	Maddison (2009)
Morocco	MAR	Maddison (2009)
Mozambique	MOZ	Penn World Table 6.2
Myanmar	MMR	Maddison (2009)
Namibia	NAM	Penn World Table 6.2
Nepal	NPL	Maddison (2009)
Netherlands	NLD	Barro and Ursua (2008)
New Zealand	NZL	Maddison (2009)
Nicaragua	NIC	Maddison (2009)
Niger	NER	Penn World Table 6.2
Nigeria	NGA	Penn World Table 6.2
Norway	NOR	Maddison (2009)
Oman	OMN	Maddison (2009)
Pakistan (-1971)	PAK	Penn World Table 6.2
Panama	PAN	Maddison (2009)
Papua New Guinea	PNG	Penn World Table 6.2
Paraguay	PRY	Maddison (2009)
Peru	PER	Barro and Ursua (2008)
Philippines	PHL	Maddison (2009)
Poland	POL	Maddison (2009)
Portugal	PRT	Maddison (2009)
Qatar	QAT	Maddison (2009)
Romania	ROM	Maddison (2009)

Russia	RUS	Maddison (2009)
Rwanda	RWA	Penn World Table 6.2
Saudi Arabia	SAU	Maddison (2009)
Senegal	SEN	Penn World Table 6.2
Serbia RB	ZZZ	Penn World Table 6.2
Sierra Leone	SLE	Maddison (2009)
Singapore	SGP	Barro and Ursua (2008)
Slovakia	SVK	Penn World Table 6.2
Slovenia	SVN	Penn World Table 6.2
Solomon Islands	SLB	Penn World Table 6.2
Somalia	SOM	Maddison (2009)
South Africa	ZAF	Penn World Table 6.2
Spain	ESP	Maddison (2009)
Sri Lanka	LKA	Barro and Ursua (2008)
Sudan	SDN	Maddison (2009)
Suriname	SUR	Penn World Table 6.2
Swaziland	SWZ	Maddison (2009)
Sweden	SWE	Barro and Ursua (2008)
Switzerland	CHE	Maddison (2009)
Syria	SYR	Maddison (2009)
Taiwan	TWN	Penn World Table 6.2
Tajikistan	TJK	Maddison (2009)
Tanzania	TZA	Penn World Table 6.2
Thailand	THA	Maddison (2009)
Timor-Leste	TMP	WBDI
Togo	TGO	Penn World Table 6.2
Trinidad and Tobago	TTO	Penn World Table 6.2
Tunisia	TUN	Maddison (2009)
Turkey	TUR	Maddison (2009)
Turkmenistan	TKM	Maddison (2009)
Uganda	UGA	Penn World Table 6.2
Ukraine	UKR	Maddison (2009)
United Arab Emirates	ARE	Maddison (2009)
United Kingdom	GBR	Maddison (2009)
United States	USA	Barro and Ursua (2008)
Uruguay	URY	Barro and Ursua (2008)
Uzbekistan	UZB	Penn World Table 6.2
Venezuela	VEN	Barro and Ursua (2008)
Vietnam	VNM	Maddison (2009)
Yemen	YEM	Maddison (2009)
Yugoslavia	YUG	Maddison (2009)
Zambia	ZMB	Penn World Table 6.2
Zimbabwe	ZWE	Maddison (2009)

2. Estimating the Percent of Democracies in the World and Region

2A. Dividing the World into Regions

As a first step we divide the world into regions. We follow Hadenius & Teorell (2005), "Assessing Alternative Indices of Democracy, C&M Working Papers 6, IPSA" (available at: http://www.concepts-methods.org/working_papers/20050812_16_PC%206%20Hadenius%20&%20Teorell.pdf) and divide the world into ten politico-geographic regions. It is based on both geographical proximity and demarcation by area specialists who have contributed to a regional understanding of democratization. The ten regions are: 1) Eastern Europe and post Soviet Union (including Central Asia); 2) Latin America (including Cuba, Haiti & Dominican Republic); 3) North Africa & Middle East (including Israel, Turkey and Cyprus); 4) Sub-saharan Africa; 5) Western Europe & North America (including Australia & New Zealand); 6) East Asia (Including Japan & Mongolia); 7) Southeast Asia; 8) South Asia; 9; The Pacific (excluding Australia & New Zealand); 10) The Caribbean.

We make some minor adjustments to the Hadenius and Teorell classications, as follows. We allocate Haiti and Suriname to the Caribbean. We do so on the following basis: neither is Spanish speaking. Moreover, Guyana is in this category, so it makes little sense that neighboring Suriname is not. We also allocate Mongolia to Eastern Europe and the Post Soviet Union because it was in the Soviet Union's sphere of influence during the Cold War. Historically it also has more in common with Central Asia (which is in Hadenius and Teorell's category for Eastern Europe and the Post-Soviet Union) than it does with the Pacific or Southeast Asia. We allocate Cyprus and Israel to Western Europe, because the populations of both are of European origin and their political institutions have been clearly shaped by their orientation toward Europe.

2B. Identifying Country-Years as Democratic

As a second step, we identify those country-years that are democratic. We follow Kristian Gleditsch and Michael D. Ward (2006), "Diffusion and the International Context of Democratization," *International Organization* 60 (4): 911-933, who code coherent democracies as those that have a combined Polity Score of 7 (85 on our normalized scale, see above).

2C. Calculating the Percentage of Democracies by Region

As a third step, for each year we calculate the percentage of countries in each region that are democratic. We do not include countries in the denominator that were not assigned a Polity Score. This means that we exclude Suriname and Barbados from Region 10.

2D. Calculating the Percentage of Democracies in the World

As a final step, for each year we calculate the percentage of countries in the world that are democratic. We do not include countries in the denominator that were never assigned a code for Polity. This means that we exclude Suriname and Barbados.

3. Identifying Civil Wars

3A. Coding and Definition:

We code the incidence of civil war for each country-year as a dichotomous indicator variable that takes on the value 1 if a country is observed as having at least one intra-state conflict with at least 1,000 battle deaths in a given year and 0 otherwise.

3B. Sources and Procedures:

Our goal was to code the incidence of civil war with the greatest coverage possible both in terms of countries and years. Historical time-series coverage was particularly important given the empirical strategy of the paper. We initially considered using data from the Correlates of War (COW) project (http://www.correlatesofwar.org/), which codes intra-state wars 1816-1997. Unfortunately, COW uses a highly restrictive definition of sovereignty, which severely truncates the historical coverage of their dataset. For example, despite the fact that Canada is usually considered an independent state starting in 1876, COW does not observe Canada until 1920. See Kristian Skrede Gleditsch and Michael D. Ward, "A Revised List of Independent States since 1816", International Interactions 25-4 (1999), pp. 393-413 (hereafter cited as Gleditsch and Ward 1999) for a thorough critique of the standard for inclusion in the COW dataset.

Gleditsch and Ward (1999) also provide a revised list of independent states since 1816. We therefore used Version 4 of their data to generate the set of country-years with *potential* for civil war, 1816-2006 (http://privatewww.essex.ac.uk/~ksg/data/iisystem.dat).
Kristian Skrede Gleditsch, "A Revised List of Wars within and between States", *International Interactions* 30-3 (2004), pp. 231-262 (hereafter Gleditsch 2004) expands and revises the list of intra-state wars from COW for the expanded set of country-years 1816-1997 and extends it through 2005 using the UCDP/PRIO Armed Conflict Dataset (see Nils Petter Gleditsch, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg, and Håvard Strand, "Armed Conflict 1946–2001: A New Dataset", *Journal of Peace Research* 39-5 (2002): 615–637—hereafter cited as Gleditsch et al. 2002). We therefore used Version 1.52 of the Gleditsch (2004) data to generate the set of country-years experiencing civil war, 1816-2005 (http://privatewww.essex.ac.uk/~ksg/eacd.html) and extended it through 2006 using Version 4-2008 of the UCDP/PRIO Armed Conflict Dataset (see Gleditsch et. al. 2002). We transformed the original datasets from a list of civil wars, participants, starting dates, and ending dates to a country-year panel by coding the participant undergoing intra-state war (intside == 0) as the country experiencing civil war for each year between the starting date and ending date.

SECTION FIVE: SPLITTING THE SAMPLE

We employ split sample techniques to estimate some regressions. These include the Error Correction Mechanism models for Total Oil Income, and the Difference-in-Differences models for Total Oil Income, Total Fuel Income, and Total Resource Income.

1. Splitting the Sample by Geographic Region

When we split the sample by geographic region we use the regions defined in Section 4.2A (Conditioning Variables / Estimating the Percent of Democracies in the World and Region / Dividing the World into Regions).

2. Splitting the Sample by GDP Per Capita at Time of Oil Discovery

2A. General Rules:

We want to know whether poor countries respond to natural resource shocks the same as rich countries. We therefore split the sample on the basis of GDP Per Capita at the time of first oil production. (If we took average GDP the results would be contaminated by the fact that oil production drives up GDP, and thus we could not identify very poor countries, poor countries, and rich countries).

When we split the sample by GDP Per Capita at time of Oil Discovery we take the Log of the GDP Per Capita estimate from Section 4.1 (Conditioning Variables / Estimating Gross Domestic Product Per Capita) for the year in which our series on Total Oil Production (Section 2.2A) begins. In some cases, we did not have GDPC in the year of first production. In those cases we took the GDP in the closest year to the year of first production—provided that the GDP observation had not been contaminated by oil production. We deemed a GDP estimate to be contaminated by oil production if it occurred in any year other than the first year of oil production for that year and if the ratio of total oil output per capita exceeded GDP per capita by five percent or more. As a practical matter, this meant that we excluded Saudi Arabia, Kuwait, and Bahrain, because by the time we have GDP estimates for those three countries they were already major oil producers. Inasmuch as none of these countries demonstrates much variance on Polity their exclusion does not affect our regressions.

2B. Determining the Mean Per Capita GDP for Each Year

We do not want to contaminate the annual means of per capita GDP with data from oil reliant countries. We therefore take the natural log of per capita gdp for all non-resource dependent countries, where resource dependence is measured by the Combined Resource Reliance Dummy (See Section 7.2 below, for information on the construction of this variable).
Our goal is to compare countries when they first start producing oil against other countries that are like them—which is to say other countries that are also not major producers of oil.

We then split the sample into three groups, as follows.
Poor Countries. A country is included in this group if it had a Log of GDP Per Capita below

the mean of all non-resource reliant countries in the first year that it began to produce oil.

Very Poor Countries. A country is included in this group if it had a Log of GDP Per Capita at least one standard deviation below the mean of all non-resource reliant countries in the first year that it began to produce oil.

Rich Countries: A country is included in this group if it had a Log of GDP Per Capita above the mean of all the non-resource-reliant countries in the first year that it began to produce oil.

3. Splitting the Sample by the Distribution of Income

We split the sample by income distribution using two different methods by which to measure income distribution, so as to be sure that our results are robust to alternative measures. One measure—which is based on the capital share of GDP—follows the approach taken by Thad Dunning, *Crude Democracy* (Cambridge University Press, 2008—hereafter cited as Dunning 2008). A second measure—which is based on the Income Gini—follows the approach taken by James K. Galbraith and Hyunsub Kum (2004), "Estimating the Inequality of Household Incomes: A statistical Approach to the Creation of a dense and Consistent Global Data Set," UTIP Working Paper Inequality Project Working Paper 22 (hereafter Galbraith and Kum).

<u>Estimation Technique 1: The Share of GDP Earned by Capital.</u>
We follow Dunning (2008) and estimate inequality as the share of GDP that goes to capital. High inequality countries are those above the mean. Low inequality countries are those below the mean. Very high inequality countries are those at least one standard deviation above the mean.

We took the following steps:.
A. We estimate Capital Shares.
Capital shares are defined as 1 minus (wages/Value Added in GDP) . Following Dunning (2008), we estimate a measure of capital shares for non-petroleum industries by removing petroleum-related sectors at the 3-digit industry level from both the numerator and denominator of labor shares. In particular: ISIC 353 (Petroleum Refineries), ISIC 354 (Miscellaneous petroleum and coal products), and ISIC 369 (Other non-metallic mineral products). All estimates are based on the 2006 UNIDO Industrial Statistics Database at the 3-digit level of ISIC code (Rev. 2). For a complete description of UNIDO's methodology please refer to the User's Guide that accompanies the INDSTAT3 (2006) ISIC Rev. 2 CD-ROM.

We extracted country-year data on Wages and Salaries (Table 5) and Value Added (Table 20) for all countries in the database, 1963-2003. We calculated the sum of Wages and Salaries for all non-petroleum industries in each country-year for which data were available. We then calculated the sum of Value Added for all non-petroleum industries in each country-year for which data were available. In order to ensure that both measures are based on the identical set of industries within a country-year observation, we discarded the small handful of observations for which data were unavailable both for Wages and Salaries as well as for value added prior to summing. We also assign the values of Ethiopia to Eritrea

We exclude the observations for Romania from 1995 and afterwards, because there is an obvious error in the UNIDO recording of wages. They fall from Billions to hundreds, while Value Added remains in Billions. Thus, the capital shares for the affected years all equal 1, which is implausible. We also assign Eritrea the values for Ethiopia post 1993.

These procedures result in estimates of the capital share of non-oil GDP for 133 countries.

B. We obtain the mean of the capital shares for all countries.
We obtain the mean of the capital shares in GDP by first calculating the mean for each country time series. We then calculate the mean of the means (64) and the standard deviation of this mean of means (12). Note: the results are not sensitive to taking the global mean of all country years. The results are also not sensitive to taking the median. We refer to this mean of means as MEAN from here on out for simplicity's sake.

C. We obtain the mean for each country.
The country mean is simply the capital share of GDP averaged for each country over all observations for that country. We refer to this as the Country Mean.

D. We next calculate the annual difference from the mean, which is the capital share for every countries' yearly observation minus the MEAN.

E. We allocate countries to above the mean and below the mean categories. This takes several steps.

E1. If the Country Mean capital share is above the MEAN, AND if there is not evidence of a shift below the MEAN in the time series for that country then we code that country as unequal. Unequal takes a value of 1 when a country meets this condition, and zero otherwise. We explain how we decide if a country's series has shifted below.

E2. If the Country Mean capital share is below the MEAN, AND if there is not evidence that there is a shift above the Mean in the time series for that country we code that country as Equal. Equal takes a value of 0 when a country meets this condition, and 1 otherwise.

E3. A few country time series are split: they begin as equal and become unequal, or begin as unequal and become equal. We split a country's code if three criteria are met.

a. In order to code part of a country time series as being in a different "state" than the rest of the time series, there have to be four consecutive observations of that country's capital share that is above (below) the MEAN. Anything less than four consecutive observations is a temporary shift and does not produce a change in coding.

b. In order to code part of a country time series as being in a different "state" than the rest of the country time series, these four consecutive observations have to occur either at the beginning or the end of the time series. Imagine, for example, that we have a country with the following time series properties: four years above the mean, four years below the mean, then four years above the mean (with the average for the series being above the mean). We would code this country as above the mean, because there is not evidence of a "permanent" shift to a different "state." The shift is temporary, with the country series returning to its old equilibrium. But imagine, for example, that we have a country with the following time series properties. Eight years above the mean, followed by four years below the mean. In this case we would split the sample, with the first eight years being coded as Unequal and the final four years coded as Equal.

c. In order to code part of a country time series as being in a different "state" than the rest of the country time series, the observations that differ from the MEAN have to be significantly different from the MEAN. We define significantly different as follows: at least four observations in the new “state” have to be at least one standard deviation (which is 12) above or below the MEAN.

F. We forward and backward code.
If we have a series that is coded throughout as equal, we back-code all missing country years as equal (back to 1960 and forward code all country years as equal to 2006.

If a country is coded in one “state” for a period, and in another state for a later period, we back-code all earlier years based on the first state, and forward code all country years based on the second state. For example, if a country is coded as Equal from 1963 to 1990, and Unequal from 1991 to 2003, then we backcode as Equal all pre-1963 observations and forward code all post 2003 observations as Unequal.

<u>Summary:</u>
The data is split on the basis of the average capital share ratio in GDP.

Countries that have an average capital share in GDP ratio below the mean are coded as Equal.

Countries that have an average capital share in GDP ratio above the mean are coded as Unequal.

Countries that have an average capital share in GDP ratio at least one standard deviation above the mean are coded as Very Unequal.

<u>Estimation Technique 2: Income Gini</u>

We repeat the steps above using the Income Gini data in Galbraith and Kum. This dataset covers 141 countries.

The two measures—the Capital Share in GDP measure, and the Income Gini measure—do not yield identical results. Nevertheless, they are sufficiently close that when we re-run our regressions splitting the sample using Estimation Technique 2 instead of Estimation Technique 1 we obtain materially similar results.

5.5 Splitting the Sample by Threshold: level of oil income

One might imagine that increases in Total Oil Income affect a major producer, such as Venezuela, much more than they affect a minor producer, such as Belize. One might also imagine that increases in Total Oil Income only affected Venezuela's Polity Score negatively once it became a major producer in the 1940's, but had no effect before that.

In order to conduct threshold analyses we therefore use the Total Oil Income Per Capita variable to split the dataset into three groups:

A. All observations above the mean of Total Oil Income Per Capita of all countries (including those that produce zero oil). The cut-off point for this split sample is $388.
B. All observations above the mean of Total Oil Income for oil producing countries only. The cutoff point for this split sample is $971.
C. All observations that are at least one standard deviation above the mean of Total Oil Income for all countries. The cut-off point for this split sample is $2,954.

We note that we do not split the sample into all observations that are at least one standard deviation above the mean for Total Oil Income Per Capita for oil producing countries only because the number of country-year observations that meet this criteria is so small that this is virtually a null set.

SECTION SIX: INSTRUMENTAL VARIABLES

We instrument using three variables based on oil reserves.

1. Estimating Reserves

We have designed the oil reserves database with a goal of minimizing measurement error by using a single source with a uniform set of standards to measure oil reserves. We rely on the Oil and Gas Journal Database (hereafter OGJD). OGJD provides coverage from 1952 to 2008. Reserves are expressed in billions of barrels. We therefore code reserves for every country year possible from the OGJD. This single source provides the vast majority of our country-year observations.

OGJD does not provide coverage for some very minor producers (e.g. Belize, Mauritania). When that is the case, we take the data from the U.S. Energy Information Administration, *International Energy Annual*, which is available online (http://tonto.eia.doe.gov), and is hereafter referred to as USEIA. USEIA provides coverage for every country in the world from 1980 to 2008. We note that the estimates of petroleum reserves from OGJD almost exactly match the estimates from USEIA for overlapping country years. Thus, measurement error is not introduced by using this source as an adjunct.

For countries covered by OGJD or USEIA that begin their series with a long string of zeroes, we assume that the years prior to 1952 (for those covered by OGJD) or 1980 (for countries covered by USEIA) are zero as well. Thus, we backcode those country year observations as zero. For example, the series in USEIA for Belize is zero from 1980 to 2004, and then positive values in 2005 and 2006. On the basis of this string of zeros we assume that Belize had zero oil reserves before 1980. When we perform this operation we also check our dataset on oil production to make sure that the country produced no oil. If the country produced oil during those years we do not the data series.

For countries covered by OGJD that do not begin with a string of zeros, we employ three other sources to backcode the data before 1952 (when OGJD begins coverage). We note that doing so does not create measurement error. The pre-1952 observations tend to be extremely low values and there is little annual variation within country series. Thus, the data from OGJD and these sources syncs for the post-1952 period. We rely successively on the following sources:

1. American Petroleum Institute, *Petroleum Facts and Figures, 1971* (hereafter API) Petroleum Facts and Figures.
2. DeGolyer and MacNaughton, *Twentieth Century Petroleum Statistics* (hereafter 20th Century). We use the volumes for the years: 1944, 1947, 1948, 1950, 1951, 1954, 1956, 1957, 1958, 1959, 1991, and 1992.

This process still produced some occasional breaks in data series. When this occurred we proceeded in four steps.

1. Some breaks occur in the 1940s because of missing data. These breaks are typically of only one-year duration (for example, we might have data for 1944 and 1946, but not

1945). In these cases we linearly interpolate. We note that the year to year variance in the 1940s is so low that two years on either side of the missing year are usually so close to each other as to be virtually identical. We are therefore not imposing strong assumptions in performing these interpolations.

2. Some breaks occur in former Soviet bloc countries in the 1970s or 1980s. For example, the OGJD has a break in coverage for Romania from 1980 to 1990. When this occurs, we employ data on reserves from *British Petroleum, Statistical Review of World Energy 2008* (hereafter BPSR8). When we use BPSR8, however, we make sure that its data syncs with the data in OGJD and USEIA for overlapping country years.
3. When no data is available from BPSR8 for missing country years from the Soviet bloc, we use data from Macartan Humphreys, "Natural Resources, Conflict, and Conflict Resolution: Uncovering the Mechanisms." *Journal of Conflict Resolution* (2005) 49: 508-37. (Dataset available on his website—hereafter cited as Humphreys). We note that when we do so we make certain that the overlapping country-year observations between Humphreys and OGJD and USEIA sync with one another.
4. In the few cases where we cannot fill in the missing 1970s or 1980s data for former Soviet bloc countries from any of these sources we perform a linear interpolation. This is the case, for example, for the data for Russia from 1970 to 1976. These are rare occurrences.

Summary:
We construct estimates of oil reserves in billions of barrels for 168 countries from 1943 to 2006. One hundred three (103) of these countries display positive values. We note that our dataset on Total Oil Income Per Capita also includes 103 countries that display positive values.

2. Estimating Oil Reserves Per Square Kilometer

We take Reserves (in billions of barrels) from our Oil Reserves Dataset, (above).

We divide Reserves by the country area, in square kilometers, which we obtained from World Bank, *World Bank Development Indicators* (online edition—hereafter WBDI). The WBDI data on country area begins in 1960. We note that any growth or shrinkage of countries from 1960 to 2008 tends to be very minor. We therefore backcode country size for pre 1960 years from the size of the country in 1960. This allows us to estimate oil reserves per square kilometer back to the first year of positive reserve values.

We adjusted figures in the WBDI to account for secessions. For example, WBDI gives the size of the Russian Federation, and then back-codes that estimate to 1961. But, the Soviet Union was far bigger than the Russian Federation (and our oil reserves measure includes those areas that later seceded from the USSR). We therefore add back to the WBDI estimates for pre-1991 Russia those countries that became independent republics after 1991: Azerbaijan, Turkmenistan, Kyrgyzstan, Kazakhstan, Tajikistan, Ukraine, Georgia, Armenia, Belarus, Moldova. We do the same thing for South Africa before 1991 (when Namibia obtained independence), for the secession of East Timor from Indonesia, for the breakup of

Yugoslavia, for the secession of Eritrea from Ethiopia, and for the breakup of Czechoslovakia into Slovakia and the Czech Republic. That is, we add back the territory lost through these secessions to their pre-secession size estimates.

3. Oil Reserves in the Region

This is the sum of Oil Reserves (in billions of barrels) aggregated up to Regions, as defined in Section 4.2A, above.

SECTION SEVEN: CODING RULES FOR COUNTRIES

1. Harmonizing Country Definitions

The datasets created by scholars and international organizations are not based on identical definitions of countries. In order to link together datasets we created a uniform system of country definitions. We therefore code countries following the definitions in the Correlates of War dataset (http://www.correlatesofwar.org/), except for the following modifications, which we make in order to maximize time series coverage. We did so with an eye to creating continuity across time. For example, some datasets treat Pre-1922 Russia, the Soviet Union (1923 to 1991), and Post-1991 Russia as three different countries. This comes at a hindrance to time-series analysis. As a general rule, when a country is split in two, and later reunified, we treat that country as having a single country code (rather than break it up into four separate countries, as some datasets do). We assign the country code of the dominant partner at the time of reunification so as to eliminate spurious discontinuous jumps in the Polity varaible. For example, we treat Vietnam as a single country by giving North Vietnam and Vietnam the same country code. We follow similar rules when countries divide into two or more countries (e.g., Russia and the Soviet Union are treated as the same country, with former Soviet Republics being treated as new countries as of 1992). Our modifications to the Correlates of War unique country identifiers are as follows:

Czechoslovakia is observed until 1992. In 1993, two new countries are observed: The Czech Republic and Slovakia.

Ethiopia and Eritrea are unified as Ethiopia until 1993. Post 1993 Ethiopia is treated as the same country as pre-1993 Ethiopia. Eritrea is treated as a new country, beginning in 1994.

Germany is treated as a single country across its history, rather than chopping it up into a number of different countries across time, as some datasets do. For pre-1867 Germany, this means that we treat Prussia and Germany as identical. For 1945-1990 we treat West Germany (Germany Federal Republic) and Germany as identical. This means that East Germany is not observed in the dataset.

Pre-1922 Russia, the Soviet Union, and Post-1991 Russia are treated as a single country (rather than being chopped up into three different countries, as in some datasets). We denote this country as Russia. Former provinces of the Soviet Union, which become sovereign at the end of 1991 (e.g. Azerbaijan, Turkmenistan, Belarus, Ukraine) are treated as sovereign countries as of 1992.

Vietnam is treated as a single country from 1954 to 2006, rather than treat it as three separate countries, as some datasets do. We treat Vietnam and North Vietnam as identical. South Vietnam is not observed in the dataset.

Yugoslavia is treated as a single country from 1920 to 1991, when it disappears. We treat the states that emerge out of it as sovereign countries. We treat pre-1920 Serbia and Yugoslavia as two separate countries—because Serbia was only a small part of the unified state of Yugoslavia.

We do not observe the following countries during the following years: Estonia, Latvia and Lithuania before 1991. They do not have Polity scores or other statistical information (e.g., GDP) from 1945 to 1990.

3. Identifying Countries as Resource Reliant

We need to be able to segregate countries into two groups: those that are resource reliant and those that are not. We do this in order to carry out two different operations: a graphical analysis of the time series relationship between natural resource reliance and Polity (Table 1 in the paper); and the difference-in-differences regressions (Table 8 in the paper).[3]

We therefore need a metric by which we can segregate the two groups. Moreover, we want that metric to be based on the theory of the resource curse. That theory states that when governments obtain revenues from natural resources they are: 1) no longer accountable to citizens; and 2) can use those revenues to coerce or buy off the opposition. We therefore base the metric on Fiscal Reliance on Resources (the percentage of government revenues from oil, gas and minerals). The theory of the resource curse does not specify the threshold at which these revenues promote or sustain authoritarian government. We therefore set the threshold at five percent so that we do not generate false negatives. This has the added benefit that it systematically biases our results in favor of the resource curse hypothesis, because it excludes resource-rich, mature democracies (such as the United States, Canada, and Australia) from the set of countries coded as resource reliant and includes authoritarian countries that produce trivial quantities of oil, gas, and minerals in an absolute sense (e.g., Morocco, Egypt, Belarus, Kyrgyzstan) in the set of countries that are coded as resource reliant.

We therefore code as resource reliant any country that has an average level of Fiscal Reliance on Resources of greater than five percent during the period 1972-1999, as measured by Michael Herb, "No Representation without Taxation? Rents, Development, and Democracy." *Comparative Politics* (2005) 37: 297-317 (hereafter Herb 2005).

[3] Once we have identified both sets of countries we can generate a variable called Net Polity, which is the difference in Polity between oil-producing countries and a synthetic, non-resource-reliant country that is represented by the average polity score of the non-resource countries in the oil producing country's geographic/cultural region (where regions are defined in Section 4.2A, above).

There is a small number of countries not coded by Herb (2005). We therefore employ the ratio of oil, gas, and mineral exports to GDP—and again apply a standard of five percent. We note that proxying fiscal reliance by resource exports does not produce false positives: we find that, when we have both variables, the set of countries that are fiscally reliant at five percent or greater and the set of countries whose resource exports exceed five percent of GDP are nearly the same. The countries that we proxy by the ratio of oil, gas, and mineral exports to GDP tend not to be ambiguous cases, and include Russia, Iraq, Peru, Azerbaijan, Turkmenistan, Kazakhstan, Tajikistan, Kyrgyzstan, Vietnam, Belarus, Bosnia and Herzegovina, Estonia, Lithuania, Ukraine, and Mongolia. The data comes from the WBDI.

There are a few cases that have neither data on Fiscal Reliance from Herb (2005) nor data on resource exports to GDP from the WBDI. They include Czechoslovakia, Cuba, Serbia Historical, Serbia, Equatorial Guinea, and North Korea. These are not ambiguous cases, and we can easily adjudicate them based on other information in our dataset or on the basis of information from the *CIA Factbook*. We code Equatorial Guinea as being resource reliant because our own estimates of Fiscal Reliance (see Section 2, above) indicate that oil and gas revenues make up nearly all of the revenues of its government. The rest of these countries are all coded as being non-resource reliant. We code Czechoslovakia as not being resource reliant because neither the Czech Republic nor Slovakia have ratios of oil, gas, and mineral exports to GDP that exceed five percent. It is therefore unlikely that they had a higher ratio of resource exports to GDP when they were a single country. We code Serbia Historical as not being resource reliant because Yugoslavia, which Serbia Historical became part of in 1919, had a ratio of oil, gas, and mineral exports to GDP of less than five percent. We code Serbia as not being resource reliant on the basis of the fact that it produces trivial quantities of petroleum (per our dataset on Total Oil Income) and on the basis of the fact that the *CIA Factbook* indicates that it is not an important producer of minerals. We code Cuba as not being resource reliant on the basis of the fact that it produces trivial quantities of petroleum (per our dataset on Total Oil Income) and on the basis of the fact that the *CIA Factbook* indicates that: a) Cuba is not an important producer of minerals; and, b) total exports are only 7 percent of GDP, and sugar accounts for the vast majority of these earnings. We code North Korea as not being resource reliant on the basis of the fact that it produces no petroleum (per our dataset on Total Oil Income) and on the basis of the fact that the *CIA Factbook* indicates that it is not an important producer of minerals. In fact, its total ratio of exports to GDP is less than three percent, which means that its ratio of mineral exports to GDP would have to be less than that.

The countries that we code as *not* being resource reliant are:
Afghanistan
Albania
Argentina
Armenia
Australia
Austria
Bangladesh
Barbados
Belgium

Belize
Benin
Bhutan
Brazil
Bulgaria
Burkina Faso
Burundi
Cambodia
Canada
Central African Republic
Chad
China
Colombia
Comoros
Costa Rica
Cote d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Czechoslovakia
Denmark
Djibouti
Dominican Republic
El Salvador
Eritrea
Ethiopia
Fiji
Finland
France
Gambia
Georgia
Germany
Ghana
Greece
Guatemala
Guyana
Haiti
Honduras
Hungary
India
Ireland
Israel
Italy
Japan
Jordan

Kenya
Korea, North
Korea, South
Laos
Latvia
Lebanon
Lesotho
Macedonia
Madagascar
Malawi
Mali
Mauritius
Moldova
Mozambique
Myanmar
Nepal
New Zealand
Nicaragua
Pakistan
Panama
Paraguay
Philippines
Poland
Portugal
Romania
Rwanda
Senegal
Serbia Historical
Serbia
Sierra Leone
Singapore
Slovakia
Slovenia
Solomon Islands
Somalia
South Africa
Spain
Sri Lanka
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syria
Taiwan
Tanzania

Thailand
Timor L'este
Togo
Turkey
Uganda
United Kingdom
United States
Uruguay
Uzbekistan
Yugoslavia
Zimbabwe

The countries that we code as being resource reliant are:
Algeria
Angola
Azerbaijan
Bahrain
Belarus
Bolivia
Bosnia and Herzegovina
Botswana
Brunei
Cameroon
Chile
Congo
Congo, Democratic Republic
Ecuador
Egypt
Equatorial Guinea
Estonia
Gabon
Guinea
Guinea-Bissau
Indonesia
Iran
Iraq
Jamaica
Kazakhstan
Kuwait
Kyrgyzstan
Liberia
Libya
Lithuania
Malaysia
Mauritania
Mexico

Mongolia
Morocco
Namibia
Netherlands
Niger
Nigeria
Norway
Oman
Papua New Guinea
Peru
Qatar
Russia
Saudi Arabia
Tajikistan
Trinidad and Tobago
Tunisia
Turkmenistan
Ukraine
United Arab Emirates
Venezuela
Vietnam
Yemen
Zambia