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Democracy in Emerging Markets: A New Perspective on the Natural Resources Curse

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Abstract

Using annual data from 1980 to 2014, we reexamine the relationship between democracy and natural resources for a large sample of emerging market economies. Controlling for human capital (or real GDP per capita) and openness measures, dynamic panel methods address endogeneity from more democratic regimes demanding better control of rents. We find that democracy responds positively to natural resource rents in GDP (NAT) and negatively to terms of trade (TOT). The NAT positive effects mitigate the negative impact of TOT on democracy and holds well in different specifications. By building on a literature focusing on oil rents, increases in NAT (extra revenue over production costs) represent a windfall for mining companies. This leads society to require higher levels of participation in decisions to exploit these rents more transparently. We also find that diversification of rents helps democracy, especially in economies with high shares of oil rents.

Keywords: Democracy, emerging markets, natural resources, panel data methods, terms of trade.

JEL Classification: D72, Q33.

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1. Introduction

In an influential study, Haber and Menaldo (2011) contend that the negative correlation between democracy and reliance upon natural resources may be an artefact of bias from the omission of unobserved country-specific time-invariant factors. The endogeneity of nations' reliance upon natural resources may be due as well to the reverse effect of democracy upon natural resources. Haber and Menaldo (2011, p. 3) ask: "Might it be the case that the only economic sectors that yield rates of return high enough to compensate for expropriation risk in authoritarian states are oil, gas, and minerals, thereby engendering resource reliance?" We build on this insight to argue that reverse causation may also be due to less pressure upon an autocracy to pursue a diverse growth strategy across sectors.

Our analysis is based on emerging market economies (developing countries) in the period 1980-2014. This choice is justified by Andersen and Ross (2014)'s contention that there has been a pronounced resource curse post-1970s on account of the fact that "oil wealth only became a hindrance to democratic transitions after the transformative events of the 1970s, which enabled developing country governments to capture the oil rents that were previously siphoned off by foreign-owned firms" (Andersen and Ross, 2014, p. 993). Antonakakis et al. (2017) too conclude that the resource curse hypothesis is documented mainly for developing economies and (medium-high) income countries for 76 countries over 1980-2012.

Since rent appropriation by politicians and bureaucrats is likely easier in autocracies than in democracies, the magnitude of rents and their potential appropriators' incentives to undermine democracy may be positively correlated. Ades and Di Tella (1999) find that appropriable rents promote corruption. Brooks and Kurtz (2016) perform geographically weighted regressions for three cross-section periods and conclude that oil is not in itself a curse and may even be a blessing with respect to democratic development.

We focus our study on emerging markets primarily because most industrial countries have already been democratic for several decades after World War II, while emerging markets have sluggishly moved towards democracy up to the end of the Twentieth Century.[1] When implementing our approach to the data, we expand on the definition of rents to include not only oil. Most studies have focused exclusively on oil but natural resource rents include other commodity and mining activities that may be relevant to the evolution of democracy in emerging markets that are not oil producers.

The 'resource curse' hypothesis states that countries with an abundance of natural resources (e.g., petroleum, diamonds, gold) tend to have less economic growth, less democracy and lower institutional quality than countries with fewer natural resources. The resource curse hypothesis has been subject of intensive debate and discussion in this journal (Gilberthorpe and Papyrakis, 2015; Boutilier, 2017; Manzano and Gutiérrez, 2019; Ross, 2019; Moisé, 2020).[2]

Our paper is related to Brückner et al. (2012), who estimate the effects of changes in oil prices on changes in democracy and also the effects of changes in real GDP growth on changes in democracy. In contrast to their study, we focus on natural resource rents rather than oil prices. Natural resource rents have been previously used to explain economic development by, for example, Corrigan (2017). Further studies include Tsui (2011), who estimates the effects of oil discoveries (as well as oil endowment) on democracy for a panel of countries and Masi and Ricciuti (2019), who find that exogenous variation in

[1] Our dataset suggests considerable evolution towards more democratic regimes over this 35-year time span, although at varying degrees depending on region. Over this period, the Polity2 index of democracy (varying from -10 in very authoritarian regimes to 10 in very democratic) shows that Latin American economies moved on average from -0.84 to 7.58, a change of 8.42 towards more democracy in Latin America; followed by African economies from -4.81 to 3.02, a change of 7.83; and then by Asian economies from -3.07 to 2.93, a change of only 6.00.

[2] A review article by van der Ploeg (2011) explains that natural resources can be either a curse or a blessing to a country, depending on economic or institutional conditions. Ross (2001, 2012) holds that countries rich in natural resources (petroleum, in particular) tend to autocracy. Oskarsson and Ottosen (2010) revisit Ross' theory on oil and democracy for a large sample of countries and question whether the relationship holds for long periods. Ross (2015) reviews the resource curse and argues that petroleum has at least three harmful effects: to make authoritarian regimes more durable; to increase corruption; and to help trigger conflict in lower income countries. O'Connor et al. (2018) find that oil does not have robust long-run negative effects on democracy, which "… cast considerable doubt on the existence of a political resource curse" for samples of countries from 1974 to 2012.

oil endowment does not have the same effect on all countries. Theoretical models of the mechanism include the game-theoretic model by Bhattacharyya and Hodler (2010) through the corruption channel and Mehlum et al. (2006) and Robinson et al. (2006) for institutions helping facilitate the assimilation of resource booms. The overall message of these theoretical studies is that countries with strong institutions will tend to benefit from resource booms: solid institutions help keep corruption in check or ameliorate the perverse incentives of booms.

Building on Haber and Menaldo (2011), we argue that the share of natural resource rents as a percentage of GDP (NAT) could be positively or negatively related to democracy – itself an institution – depending on how societies deal with abundance or scarcity. In contrast to the exogenous nature of terms of trade, the share of natural resource rents in the economy is assumed endogenous to the political process: as societies become more democratic, there may be a movement towards transparency and the dissolution of the large monopolies whose non-competitive practices give rise to high rents from mineral resources.[3] We expect terms of trade (TOT) and NAT to negatively affect the level of democracy if some sort of "resource curse" mechanisms are in place. On the other hand, a positive coefficient would suggest the opposite: that perhaps economic windfalls supply valuable institution-building resources.

We start with very simple bivariate regressions of democracy along the lines of Acemoglu et al. (2019), who propose a bivariate relationship between real GDP per capita and democracy that allows for a lag-length that supports sufficient dynamics of GDP. We will then move to a multivariate model of democracy, in which the main independent variables of interest are terms of trade (TOT) and NAT, with either real GDP or human capital playing the role of the domestic fundamental, and with either trade openness or the share of FDI in GDP playing the role of the external control. TOT, a nation's term of trade index, is initially assumed to be exogenous.

[3] This approach is consistent with Brooks and Kurtz (2016), who have used the same strategy of treating natural resources as endogenous to Democracy in the case of oil.

The econometric model in this paper distinguishes between the effects on democracy of natural resource rents on the one hand and TOT on the other. Given the potential endogeneity of key variables in past studies, we apply panel data methods to our sample with dynamic panels to allow for reverse causation, that is, the potential effect of democracy on natural resource rents (the greater propensity of more democratic government to break up natural resource monopolies, for instance). This strategy yields the following main results. First, NAT exerts positive yet smaller effects on democracy than does TOT, whose effects are negative and sizable. Second, in fixed effects models only TOT shows negative effects on democracy. Third, the results from dynamic panels are quantitatively larger than those observed in fixed effects models and hold under different identification procedures.

The rest of the paper proceeds as follows. Section 2 describes the data, while section 3 explains the methodology. Section 4 reports the results, Section 5 runs robustness checks and Section 6 presents conclusions and policy implications.

2. The Data

We collect data from 1980 to 2014 for a large sample of 76 emerging market economies selected according to data availability.[4] The main source is the *World Development Indicators* (WDI) database from the World Bank, from which we extract most of the data except the democracy measure (Polity2 score).

[4] The 76 emerging market countries are: Algeria; Angola; Argentina; Bangladesh; Benin; Bolivia; Botswana; Brazil; Burkina Faso; Burundi; Cabo Verde; Cameroon; Central African Republic; Chad; Chile; China; Colombia; Comoros; Congo, Dem. Rep.; Congo, Rep.; Costa Rica; Dominican Republic; Ecuador; Egypt; El Salvador; Equatorial Guinea; Ethiopia; Gabon; Gambia; Ghana; Guatemala; Guinea; Guinea-Bissau; Haiti; Honduras; India; Indonesia; Ivory Coast; Jordan; Kenya; Lesotho; Madagascar; Malawi; Malaysia; Mali; Mauritania; Mauritius; Mexico; Morocco; Mozambique; Myanmar; Namibia; Nicaragua; Niger; Nigeria; Pakistan; Panama; Paraguay; Peru; Philippines; Rwanda; Senegal; Singapore; South Africa; South Korea; Sri Lanka; Tanzania; Thailand; Togo; Tunisia; Turkey; Uganda; Uruguay; Venezuela; Zambia; and Zimbabwe.

The description of the data is as follows. Polity2 ranges from -10 in very authoritarian regimes to +10 in very democratic regimes and is retrieved from the Polity IV version of the Polity data series, a widely used database that contains yearly data on the level of democracy. TOT is the net barter terms of trade index calculated by the World Bank as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. We then calculate terms-of-trade volatility (TOTVOL) as the deviation from the mean of the log differences in TOT. Natural resources (NAT) is the share of natural resource rents as a percentage of GDP (NY.GDP.TOTL.RT.ZS) and represents rents different from those used in the System of National Accounts, in which rents are a form of property income. The estimates of natural resources rents are calculated as the difference between the price of a commodity and the average cost of producing it. This is done by estimating the world price of units of specific commodities and subtracting estimates of average unit costs of extraction or harvesting costs (including a normal return on capital). These unit rents are then multiplied by the physical quantities countries extract or harvest to determine the rents for each commodity as a share of gross domestic product (GDP). Some of this measure's assumptions could be seen as limited; however, as previously argued, NAT represents an expansion on the definition of rents to include not only oil, but other activities such as mining that may be relevant to the evolution of democracy in emerging markets. Estimates based on sources and methods are described in The World Bank (2011).

Human Capital is measured in two ways. First, HC_PUBS is the number of scientific and technical journal articles of each country in each year. Second, we employ HC_PWT (Penn World Table) from Feenstra et al. (2015).[5] These choices follow from the observation that the most commonly used

[5] There are two main reasons why we do not initially adopt years of schooling as the human capital measure. First, journal publications form a better measure of human capital in explaining democracy since they measure innovation of a country and is not restricted to elementary years of education. Second, Acemoglu et al. (2005) find evidence that high levels of schooling precede democracy but conclude that their evidence is not robust. However, we also run robustness checks using

measure of human capital (years of schooling) refers to basic education and is thus less related to the level of participation in civil liberties. Real GDP per capita (GDPCAP) is the per capita gross domestic product in constant 2010 U.S. dollars. A variety of series is used as controls. Aid is the net official development assistance (ODA) received as a percentage of gross national income (GNI). Life expectancy (LIFEXP) is life expectancy at birth measured in years for both male and female. The dependency ratio (DEP) is the ratio of dependents (people younger than 15 or older than 64) to the working-age population, shown as a proportion of dependents per 100 working-age population. The urbanization ratio (URBAN) is the percentage of the total population living in urban areas. Trade openness (TO) is defined by exports plus imports over gross domestic product. For financial openness, we adopt foreign direct investment (FDI) as a percentage of GDP. All variables in the study are in log terms to address the normality bias, especially right skewness, except for the Polity2 score and TOTVOL, which assume positive and negative values, and HC_PWT, which is a normalized index, has low mean and does not present skewness.

Figure 1 reports scatterplots of democracy versus the three fundamental variables of the empirical model below: terms of trade, natural resources and human capital. These graphs are plotted using the mean value of each measure per country. The charts in the figure show that democracy is negatively related to terms of trade and natural resources but has a positive relationship with human capital. In the two graphs where democracy is plotted against terms of trade and human capital, China is the outlier with low terms of trade, high human capital and low democracy levels. Fitted line plots have a 95% confidence level.[6]

In the democracy vs. natural resource rents graph, the negative slope indicates that societies with higher percentages of natural resource rents correspond to the least democratic ones. Since the pace of

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the HC index based on Feenstra et al. (2015), who consider both the average years of schooling from Barro and Lee (2013) and an assumed rate of return to education based on Mincer equation estimates around the world (Psacharopoulos, 1994).

[6] The slope of the fitted lines in both graphs change only very slightly when the fit does not consider the above-mentioned outliers. These graphs are available upon request.

the democratization process in the past few decades has been a sluggish one, this scatterplot may not be telling the entire story about the recent dynamics between democracy and natural resource rents. In the last 35 years, some emerging countries have decided, for example, to privatize part of their public companies (electricity, telecommunications, mining, etc.) to make them more efficient and profitable. The empirical models below will investigate possible bidirectional causation between these variables as described in the methodology section.

Table 1 provides some descriptive statistics for the 76 emerging markets in the sample (selected years to save space). Democracy (Polity2) grows from -3.39 in 1980 to +4.14 in 2014, an increase of 7.53 that means a large improvement in emerging markets' democracy along the 35-year period. The region with highest increase in the Polity2 score is Latin America (8.42), followed by Africa (7.83) and Asia (6.00).

TOT falls after reaching its highest value (130.53) in 1985, in line with the 1986 oil price collapse which largely affected commodity prices. It declines until 2001 and then begins to rise consistently with the 2000s commodity boom when the competitiveness of emerging markets rose due to a larger demand for commodities that resulted in higher prices, as reviewed by Erten and Ocampo (2013). From 1980 to 2014, however, there is a decrease of 7.25 points, from 127.70 to 120.45 points, with Asia as the region with the largest drop (-66.07 points), followed by Latin America (-24.61) and Africa displays a decrease of only 2.08 points. Terms-of-trade volatility (TOTVOL) also has more positive values during the 2000s and is smaller, in absolute terms, in the last observations in the sample. Africa has the largest reduction in volatility (-0.103), followed by Latin America (-0.018), while Asia has in 2014 nearly the same level of volatility (0.022) it had in 1980 (0.023). Human capital (HC_PUBS) grows from 1,600 in 1981 to 9,985 in 2013, showing a very large growth in the publication of academic and technical journal articles and registration of patents, especially for Asia and then Latin

America.[7] Human capital index (HC_PWT) by Feenstra et al. (2015) grows from 1.50 to 2.20, showing a much more modest growth in human capital of 46.7% over the entire period.

Among the controls, trade openness grows from 70.76 percent in 1980 to 81.23 percent in 2008, showing some ups and downs until scoring 75.52 percent in 2014. Latin America has the largest (16.77%) growth in TO, followed by Asia (8.63%), while Africa observed a decrease in trade openness of 3.45%. Foreign direct investment (FDI) has increased since 1980. Its growth is stronger in Africa (3.75%) and Latin America (3.17%). Asia starts at the largest FDI-GDP ratio (1.94%) in 1980 but only grows 1.65% until 2014.

Table 2 reports the correlation matrix. Democracy (Polity2) is negatively correlated with terms of trade (-0.16), natural resources (-0.33), aid (-0.30) and the dependency ratio (-0.37). There is a very small correlation between Polity2 and terms-of-trade volatility (0.02). Polity2 has a positive correlation with per capita income (0.35), life expectancy (0.44), urbanization (0.36), human capital (0.17 with HC_PUBS and 0.49 with HC_PWT), foreign direct investment (0.15), and very small correlation with trade openness (0.05).

TOT and TOTVOL show weak correlation coefficients with natural resources share of GDP. Correlation coefficient between TOT and NAT is 0.25; between TOT and TOTVOL is 0.21; and between NAT and TOTVOL is 0.06. Correlation between TOT (and TOTVOL) with control variables is very weak in all cases, while NAT is mildly correlated to some domestic variables in some cases. Some of the control variables will not be used in the regressions below when showing medium to high correlations among themselves.

[7] Up to 1985, there are observations for only 13 countries and after that there are at least 75 country-year observations. Therefore, the average number of publications decreases while countries are starting to report their number of scientific and technical articles. The mean in 1986 is 351 and it consistently increases until the last available year.

3. Empirical Methodologies

The empirical model below is adapted from Acemoglu et al. (2005, 2008) for the closed economy and from Kangoye (2011), who originally captures terms of trade and foreign aid effects on democracy. Our modified panel data model is as follows:

$$Dem_{it} = \alpha_{it} + \mu Dem_{it-1} + \beta TERMS_{it-1} + \sigma NAT_{it-1} + \gamma DOM_{it-1} + \omega X_{it-1} + \upsilon_{it} \quad (1),$$

where Dem_{it} is an index of democracy (Polity2, varying from -10 in very authoritarian regimes to 10 in very democratic); α_{it} is the country-year fixed effects term; Dem_{it-1} *is* lagged democracy to capture the persistence of the democratization process; $TERMS_{it-1}$ is the lagged terms of trade variable exogenous to countries and important for emerging markets due to its dependence on foreign markets. This variable can be represented by TOT, which is the terms-of-trade measure in levels that corresponds to the natural log of the price of exports divided by the price of imports, or by TOTVOL which is a volatility measure calculated as the deviation from the mean of log differences in TOT. There is a vast literature on the time series properties of the declining trends of prices of commodities over manufactured goods, which usually cover a span of 50 years of data at monthly frequency: examples include Mollick et al. (2008) for the years 1947-1998 and Enders and Holt (2012) for the years 1960-2010. The expected sign for TERMS is negative ($\beta < 0$). In Economics, Tornell and Lane (1999) model the dynamic interactions of groups by a fiscal process that allows access to the aggregate capital stock. In equilibrium, they show that this leads to slow economic growth and a "voracity effect", by which negative terms of trade shock perversely generates an increase in fiscal redistribution and reduces

growth. They compute the effect of a change in the terms of trade on the equilibrium growth rate.[8] In Political Science, Ross (2001) examines 113 states between 1971 and 1997 and shows that oil exports are strongly associated with authoritarian rule and that this is not limited to the Middle East region. Kangoye (2011) finds negative β-coefficients for 71 developing countries over 1980-2003: A negative β-coefficient suggests the society responds to an increase in TERMS instability with preference for a less democratic regime.[9]

Natural resource rents (NAT), on the other hand, could be positively or negatively related to democracy depending on how countries deal with the abundance or scarcity and its effects on the political process. Natural resources could be considered a "blessing", for example, having a positive effect on democracy. It is clear from the construction of NAT that it refers to an abnormal compensation: excess over cost. If NAT is flat or close to zero mining firms are producing according to costs of production. If there is an increase in NAT there is some extra revenue, which may be taken as a windfall for mining companies, and for society eventually. For it to help democracy, society would have to require a higher level of participation in decisions to be able to exploit the use of these extra rents more transparently. A negative coefficient from NAT would conversely be consistent with a more authoritarian government to exploit the intensity of natural resources in the economy. While we are not aware of any empirical work employing NAT, Haber and Menaldo (2011) report in a study focusing on explaining democracy in the long-run with panel error-correction models positive long-run multiplier effects using Polity as dependent variable and oil income on the right-hand side.

DOM_{it-1} is a domestic economic fundamental and corresponds to either human capital (measured by HC_PUBS or HC_PWT) or real per capita gross domestic product (GDPCAP). We alternate these

[8] Tornell and Lane (1999, p. 39) look at the economies of Nigeria, Venezuela and Mexico in the 1970s and 1980s and show that "government spending rose sharply in response to the improvement in the terms of trade and peaked at the crest of the oil boom in 1980–1982. A startling example is Nigeria…"

[9] Kangoye (2011) regresses terms-of-trade on its one-period lag and on the time trend to calculate an instability index. Kangoye (2011)'s main emphasis, however, is that more foreign aid leads to more democracy. Jones and Tarp (2016) employ dynamic panels and find small positive effects of aid on political institutions.

measures due to their moderate correlation coefficient in our sample of countries (0.42 with HC_PUBS and 0.70 with HC_PWT). Either one of them in (1) captures a very stable component of the domestic economy.[10] This is to gauge the effects of output and education on the evolution of democracy in societies; in general, the wealthier and more educated, the more democratic the society should be. Concerning the education-democracy link, Evans and Rose (2012) use a survey of 18 sub-Saharan African countries to provide evidence that educational level has the largest positive effect on democracy.

X_{it-1} is a vector of lagged controls including per capita GDP, openness (trade or FDI), urbanization, dependency, foreign aid, and life expectancy. These control variables have obvious expected signs and are included to reduce "omitted variables" problems in (1). For example, a society with a higher per capita income should have a more democratic regime with individuals having access to better living conditions and quality of life; an increase in trade and financial integration should lead to more democracy since the flow of goods and transactions from abroad will require a more open society; more urban societies will have population interacting frequently to each other and the exchange of ideas should lead to more democracy; and so on.[11]

Underlying (1), democracy in a country will follow the normal evolution of domestic income or human capital. However, terms of trade shocks may affect the adoption of democracy if society cannot avoid a more authoritarian government presumably more able to handle the volatility of foreign trade or due to the voracity effect. And higher share of natural resource rents may require more democracy. We will estimate (1) first by fixed effects models (FEM) for the whole panel of countries. We lag all

[10] We also perform other fixed-effect panel data regressions with income, globalization and urbanization as the fundamental variable (instead of human capital). However, these models show instability in their specifications and we focus on human capital.

[11] Trade openness, by fostering market competition, may lower monopoly rents. Besides, 'increased trade and economic integration promote civil and political freedoms directly by opening a society to new technology, communications, and democratic ideas' (Griswold, 2004, p. 1). There is the possibility, for the reasons discussed by Li and Reuveny (2003) that trade openness shall weaken democracy or exert no effect upon it.

regressors by one year to minimize endogeneity problems. A better treatment requires the model below to be estimated by System Generalized Method of Moments (SGMM) in dynamic panels:

$$Dem_{it} = \lambda Dem_{it-k} + \delta \text{TERMS}_{it-1} + \tau \text{NAT}_{it-1} + \rho \text{DOM}_{it-1} + \theta X_{it-1} + \nu_{it} \quad (2),$$

where Dem_{it-k} is the lagged term of democracy, with k small but chosen to satisfy the absence of second-order serial correlation in dynamic panels. We will define the number of lags of democracy (k) by checking the best specification in the Arellano-Bond test of autocorrelation, i.e., the one that fails to reject the null hypothesis of no autocorrelation. We explore in this paper the potential endogeneity of NAT, and later combine it with other possible variables such as TO and GDPCAP. We assume TERMS (measured by TOT or TOTVOL) as exogenous variables in our SGMM model.[12]

In addition, we employ interaction terms for the SGMM dynamic panels in models (3) and (4):

$$Dem_{it} = \lambda Dem_{it-k} + \delta \text{TERMS}_{it-1} + \Omega \text{NAT}_{it-1} * \mu \text{OIL\_DUM}_{i} + \rho \text{DOM}_{it-1} + \theta X_{it-1} + \nu_{it} \quad (3),$$

where OIL_DUM_{i} is a dummy variable equal to 1 if the country's oil rents correspond to more than 5% of the GDP, as well as:

[12] It is possible to assume empirically that TOT is endogenous. In theory, building on Dornsbusch (1980), Swift (2004, p. 743) shows that "If the exchange rate change is the result of a shock common to many small countries, as in the usual commodity currency case, the exchange rate change must be passed through to world market prices, with a subsequent endogenous change in terms of trade." This is of course very different from TOT being endogenous to democracy. We keep the exogenous TOT assumption of small open economies and relax this in the empirical models below.

$$Dem_{it} = \lambda Dem_{it-k} + \delta \text{TERMS}_{it-1} + \Omega \text{NAT}_{it-1} * \pi \text{TOT}_{it-1} + \rho \text{DOM}_{it-1} + \theta X_{it-1} + \nu_{it} \quad (4),$$

where the interaction between NAT and TOT should help assess whether the quantity-effects variable (NAT) boosts or mitigates the influence of the price-effects variable TOT.

Our main identification procedure runs from democracy to NAT. Contrary to the exogenous nature of terms of trade, the share of natural resource rents in the economy is endogenous to the political process. The reason is that more democratic societies leads to a political and social movement towards more transparency in public companies, as well as solvency of large monopolies that have been typically in charge of controlling the rents of mineral resources in emerging markets. As robustness checks, our dynamic models allow for democracy to have an impact on NAT and TO (more democratic regimes are presumably more open to foreign trade); on NAT and FDI (more democratic regimes are presumably more open to foreign capital); on NAT and HC (more democratic regimes may lead to more human capital accumulation), and on NAT and GDPCAP (more democratic regimes grow faster).

We adopt the SGMM for the dynamic specifications in this paper, implemented through the "xtabond2" package in Stata software. This estimator tends to perform better than Difference GMM (DGMM) estimators by handling quite persistent processes: trends in democracy around the world depend to a large extent on its past level of democracy. For instance, Heid et al. (2012, p. 166) run SGMM regressions of democracy on lagged democracy and lagged GDP per capita and find a statistically significant positive relation between income and democracy and suggest that prior studies using different estimators "do not take into account the high persistence of income and democracy."

When explaining democracy, high persistence holds as evidenced in the next section. Following the empirical literature on dynamic panels, we follow recommendations by Roodman (2009) to reduce the number of instruments below the number of countries in order to minimize the problems caused by proliferation of instruments. Before conducting multivariate versions of SGMM for the models above, we follow Acemoglu et al. (2019), who run bivariate regressions with GDP per capita depending on democracy allowing for a suitable lag-length to incorporate GDP dynamics. We modify their setting for SGMM of flexible lags of democracy running bivariate specifications with each of the main regressors in turns: ln(GDPCAP), ln(HC), ln(TOT), ln(NAT), and controls ln(TO) and ln(FDI). Each of these is assumed alternately endogenous to democracy as implemented by SGMM. We use a combination of 5% significance of longest lag of dependent variable and absence of serial correlation by AB (2) tests to choose the appropriate lag length of democracy.

4. Results

Table 3 reports the fixed-effects panel data regression results using (1) with TOT only. We remove controls for AID, LIFEXP, DEP and URBAN because of their high correlation with HC_PUBS, NAT and GDPCAP. The lagged democracy term (DEM_{t-1}) shows a very persistent coefficient that ranges from 0.83 to 0.88 with significance at the 1% level. This result is consistent with a sluggish democratization process in the emerging countries in the last 35 years. TOT is negative and significant in five out of eight regressions. NAT has a direct positive effect on democracy although it is not statistically significant in the FEM regressions, suggesting that the "resource curse" may come from prices (terms of trade) rather than prices and quantities (natural resource rents). In columns (3)-(5), HC_PUBS has an overall positive impact on democracy, indicating that more educated societies

mitigate the negative response of TOT on democracy: TOT loses significance when human capital is included. In columns (6)-(8), GDPCAP does not show statistically significant coefficients.

In column (7), TO controls for international markets and shows a positive coefficient of 0.386 that is statistically significant at the 10% level. The R^2 coefficients in every regression, helped by the lagged dependent variable, range from explaining from 76% to 82% of the variance in democracy in our sample. Overall, the message from Table 3 is that TOT has negative effects on democracy (coefficients around -0.35 or -0.39) and the coefficients of HC_PUBS are small but positive, ranging from 0.066 to 0.100. We do not display the fixed-effects panel data regression results using the model specification with TOTVOL (terms-of-trade volatility), which shows very little evidence of volatility on democracy.[13]

Before moving to dynamic panels, we follow Acemoglu et al. (2019) and perform bivariate SGMM regressions allowing for a data dependent lag-length to incorporate persistence in democracy (up to 8 years) in a table available upon request. These preliminary bivariate SGMM regressions suggest that democracy is indeed very persistent and that GDP per capita appears to be most significant among those independent variables accounted for in (1) or (2).[14]

Table 4 displays the SGMM regression results using model (2) with TOT assumed exogenous. Our specification tests show the need for two lags of the dependent variable DEM to avoid the serial correlation bias (Arellano-Bond test). Therefore, we use DEM_{t-2} in our regressions although the resulting coefficients do not show statistical significance. In this table, we assume reverse causation from DEM to NAT, in the sense that more democratic societies demand for a more efficient

[13] In a table available upon request, additional regressions show only one positive coefficient. NAT shows positive and highly significant coefficients in columns (2) and (4). Trade openness and the equity-related globalization measures are highly significant in columns (6) and (8), respectively, when TOTVOL is used instead.

[14] We run bivariate specifications with each of the main independent variables in turn: ln(GDPCAP), ln(HC), ln(TOT), ln(NAT), and the controls ln(TO) and ln(FDI). It is clear from that GDP per capita has positive and statistically significant effects at 1% level on democracy (coefficient of 2.057), followed by TOT with negative effects (-0.934), statistically significant at 10%. All other independent variables, including NAT and HC, are found to be not statistically significant.

exploration of natural resources by firms as explained in the methodology section. We use collapse procedures in order to reach a smaller number of instruments than the number of countries (as shown by 68 < 76 in column (1)). In the specification tests, our model passes the serial correlation and validity of instruments tests, displaying p-values greater than 0.10.

The lagged democracy coefficient (DEM_{t-1}) shows high persistence and ranges from 0.76 to 0.90 with statistical significance at the 1% level. TOT is negative and statistically significant in all SGMM regression results, showing significance at the 5% level when HC_PUBS is the domestic component of the model in regressions (1) to (3), and at the 10% level when GDPCAP is adopted in regressions (4) to (6). NAT is positive and significant in four out of six regression results, suggesting that more exploration of natural resources alleviates the negative impact from the "resource curse" which in our model is detected by TOT. However, the impact of TOT on democracy is much larger than the one from NAT. For example, in specification (1) the TOT coefficient of -0.737 multiplied by the sample mean of TOT in Table 1 (114.40) suggests that an increase of 1% in TOT (1.44) leads to a decrease of -1.061 on democracy, which is sizable. In column (4) when the domestic fundamental is GDP per capita the same exercise suggests for the negative TOT coefficient of 0.851 that an increase of 1% in TOT (1.44) leads to a decrease of -1.225 on democracy, although the significance level of TOT is now at 10% instead of the 5% level in columns (1) to (3). In column (1) the positive NAT coefficient of 0.370 times the sample mean of 8.63 suggests that an increase of 1% in NAT (0.086) leads to an increase of 0.032 on democracy. It has the opposite effect of TOT and smaller adjusted impact evaluated at sample means. In column (4), when the domestic fundamental is GDP per capita the same exercise suggests that an increase of 1% in NAT leads to an increase of 0.052 on democracy. HC_PUBS is positive and statistically significant in columns (1) to (3). The positive HC_PUBS coefficient of 0.210 in column (1) times the sample mean of 2,935 suggests that an increase of 1% in HC_PUBS (29.35) leads to an increase of 6.164 on democracy. Alternatively, when GDPCAP is

included its coefficients are estimated positive but the standard errors are large. A modification of Table 4 has TOT assumed endogenous to democracy with larger and still negative and statistically significant coefficients of TOT on democracy, with larger standard errors in all cases.[15]

Table 5 reports System-GMM regression results using the specifications from Table 4, with a modification: we interact NAT with the dummy variable OIL_DUM which is equal to 1 if the country's oil rents correspond to more than 5% of the GDP. This interaction term allows us to check whether top oil producing countries are the ones where DEM benefits the most from natural resources.[16] This is an important question, especially after we find that the simple replication of Table 4 substituting NAT with oil rents over GDP (OIL_RENTS) results in a not statistically significant coefficient for OIL_RENTS, a nonresult that is consistent with the existing literature (table available upon request). Based on the interaction of NAT and OIL_DUM we provide a novel perspective on the oil literature: results from Table 5 show that natural resources rents improve democracy in the top oil producing countries as evidenced by larger coefficients (varying from 0.8 to 1.0) than the ones in Table 4. This suggests that oil rents combine with other natural resources rents as engines of the democratization process: Diversification of the natural resource rents/exploration is good for democracy, especially in oil producing countries![17]

Table 6 corresponds to robustness checks on the SGMM model specification. By assuming different specifications for the potential endogeneity in the model, we show additional results to Table

[15] In order to implement this in SGMM, we use no exogenous variables in columns (1) and (4) when either human capital or GDP per capita is used as controls. For the other specifications we take either trade openness or FDI as exogenous. The other statistically significant coefficients, at 10% level, are positive for human capital in column (3) and positive for FDI in column (6). With TOT endogenous we find persistence of democracy increasing overall and ranging from 0.774 to 1.064.

[16] The top oil producing countries (measured by oil rents over GDP) in our sample are: Angola (38.3), Republic of Congo (37.6), Equatorial Guinea (36.6), Gabon (28.9), Nigeria (25.1), Chad (24.5), Venezuela (14.8), Algeria (12.9), Egypt (10.3), Ecuador (8.6), Cameroon (6.2), Indonesia (5.7), Mauritania (5.5), and Malaysia (5.5).

[17] For robustness, we test a slight change to the oil dummy variable, setting it equal to 1 if the country's oil rents correspond to more than 10% of the GDP (OIL_DUM10). The results are consistent with our findings: the coefficients are even larger, although less significant. We attribute the lower significance to the small number of countries comprised in OIL_DUM10 (9 countries vs 14 countries; countries and ratios are listed in the previous footnote). A Table with these results is available upon request.

4. The lagged DEM variable continues with high persistence with coefficients varying from 0.783 to 0.913. Coefficient on TOT remains negative and statistically significant in all regression specifications, ranging from -0.704 to -0.983. In (1), the negative TOT coefficient of 0.704 multiplied by the sample mean of 114.40 suggests that an increase of 1% in TOT (1.44) leads to a decrease of -1.014 on democracy, which remains sizable and similar to what is shown in Table 4 under the baseline procedure. In column (2), an increase of 1% in NAT leads to an increase of 0.061 on democracy, not very different than the effect reported in Table 4. NAT is positive and statistically significant in two out of four regressions. It shows a smaller coefficient in absolute terms than TOT, in line with our previous finding of a partial outweighing effect on democracy. When we multiply the natural resource rents sample means by the respective coefficients, the positive impact on democracy is smaller than the negative one from terms of trade. In column (2), FDI shows a positive and statistically significant coefficient of 0.330, suggesting that net foreign domestic investment helps improve democracy, all else constant, when not only NAT but also FDI is assumed to be endogenous to democracy. In other words, more democracy has an impact on natural resources rents and leads to more FDI into the country, which supports the literature between institutions and growth, e.g., Antonakakis et al. (2017).

5. Robustness checks

We run robustness tests in this section. In Tables 7 to 10, we follow the suggestion from anonymous reviewers and run complementary regressions adopting the human capital index based on Feenstra et al. (2015), who consider both the average years of schooling from Barro and Lee (2013) and an assumed rate of return to education based on Mincer equation estimates around the world (Psacharopoulos, 1994). In Table 7, we run fixed-effect regressions and find significant HC_PWT coefficients, ranging from 0.660 to 0.943 with 1% level of significance. In the SGMM regressions in

Tables 8 and 9, the HC_PWT coefficients are higher than before, ranging from 1.059 to 2.498, and are significant at the 1% and 5% levels. Interestingly, in Table 9 the interaction between NAT and OIL_DUM shows higher and statistically significant coefficients (varying from 1.051 to 2.301) than the ones from Table 5 (between 0.834 and 0.998 with less statistical significance). These results show that the positive effect of human capital on democracy holds for different measures and specifications: whether the equation is standard or modified by NAT interacted with oil dummy variable. On the controls, trade openness remains not statistically significant and FDI (as share of GDP) turns out to be negative and statistically significant. This means that, with the human capital index (HC_PWT), net inflows of FDI have negative effects on democracy, which offsets slightly the positive effect of NAT. This negative impact is not found when trade openness is used to capture openness, suggesting that not all openness measures are alike for democracy.

Table 10 reports SGMM regressions of model (4) which help analyze the interaction between NAT and TOT. Results show statistically significant HC_PWT coefficients, similarly to Table 5, while the negative TOT coefficients are larger (varying between -0.914 and -1.470) and show stronger statistical significance at 5% confidence levels. When interacting NAT with TOT, its coefficient has positive and small effects on democracy, while human capital remains positive and statistically significant (not so for real GDP per capita in columns (4) to (6)).[18]

6. Conclusions and Policy Implications

[18] Following the suggestion of an anonymous referee, we run a subsample with the same 14 oil-producing countries previously used to generate the dummy variable OIL_DUM from Table 5 (see footnote 13), in order to check robustness of the TOT x NAT interaction. The results display less statistically significant (at the 10% level or not significant) than the ones from Table 10 and suggest a smaller interaction effect from NAT to the price effects of TOT in oil-producing countries. The number of countries in the panel is, however, small at only 14.

The positive results for NAT reported in this paper suggest an alleviation to the “resource curse” and are smaller when evaluated at sample means than those for TOT more commonly seen in empirical studies. Our result is in line with Alexeev and Conrad´s (2009) suggestion that the effect of large endowment of oil and other mineral resources on long-run growth has been positive. Moreover, although not employing NAT, Haber and Menaldo (2011) report for positive effects on democracy in the long-run using Polity as dependent variable and oil income as main variable of interest. Our results support higher natural resource rents leading to more democracy and are consistent with the message that solid institutions act as devices ameliorating the perverse incentives of booms on democracy. The negative one found for TOT indicates some sort of "resource curse" applied to Political Science: more favorable TOT leads to less democracy. In fact, higher TOT will potentially imply more government expenditures, which may crowd-out domestic investment and harm economic growth as argued by Tornell and Lane (1999). This would make society respond by being less willing to avoid more authoritarian regimes to handle these windfalls.

Overall, we find that the dynamic panel results are quantitatively larger than those reported in fixed effects and hold under different identification procedures and treatment of human capital. Since the previous literature on democracy is confined to oil rents, we investigate the interaction between NAT and an oil producing dummy variable and find results supportive to the idea that diversification of rents is good for democracy, especially in economies with high share of oil rents with respect to its size.

In our multivariate estimations, human capital shows a positive and statistically significant impact on democracy with large quantitative effects: higher levels of human capital, measured by either research productivity or by PWT’s human capital index, demands a more democratic society. In line with findings by Haber and Menaldo (2011) for 18 countries, our results for a larger sample of 76 economies suggest that the natural resource reliance effect has a very clear role. Increases in NAT alleviates the negative price effects on democracy associated with long-term price trends of exports

over imports. Recent research by Arin and Braunfels (2018) for 1970-2014 explores oil rents interacted with sector shares or measures of institutions in the long-run and find positive effects of oil rents on long-term growth. The main differences are that NAT in our paper is broader by incorporating all rents with mining activities, and democracy – itself an institution – is our dependent variable.

For panels of countries, Busse and Gröning (2013) document that larger resource exports lead to more corruption. In addition to the pursuit of more transparency in natural resource rents, policy implications include the management of international trade agreements. While understanding that international prices influence emerging market economies, policymakers should not simply assume natural resource rents as a problem to democracy. Extensions of this paper include exploring more disaggregated indices of natural resource rents and their effects on the role of institutions. Our dynamic panel estimations show varying effects on democracy of trade openness or FDI inflows. This suggests that openness measures are not alike and deserve further study into the causes of their effects on democracy.

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Figure 1.

Scatterplot of Democracy (Polity2) versus fundamentals.

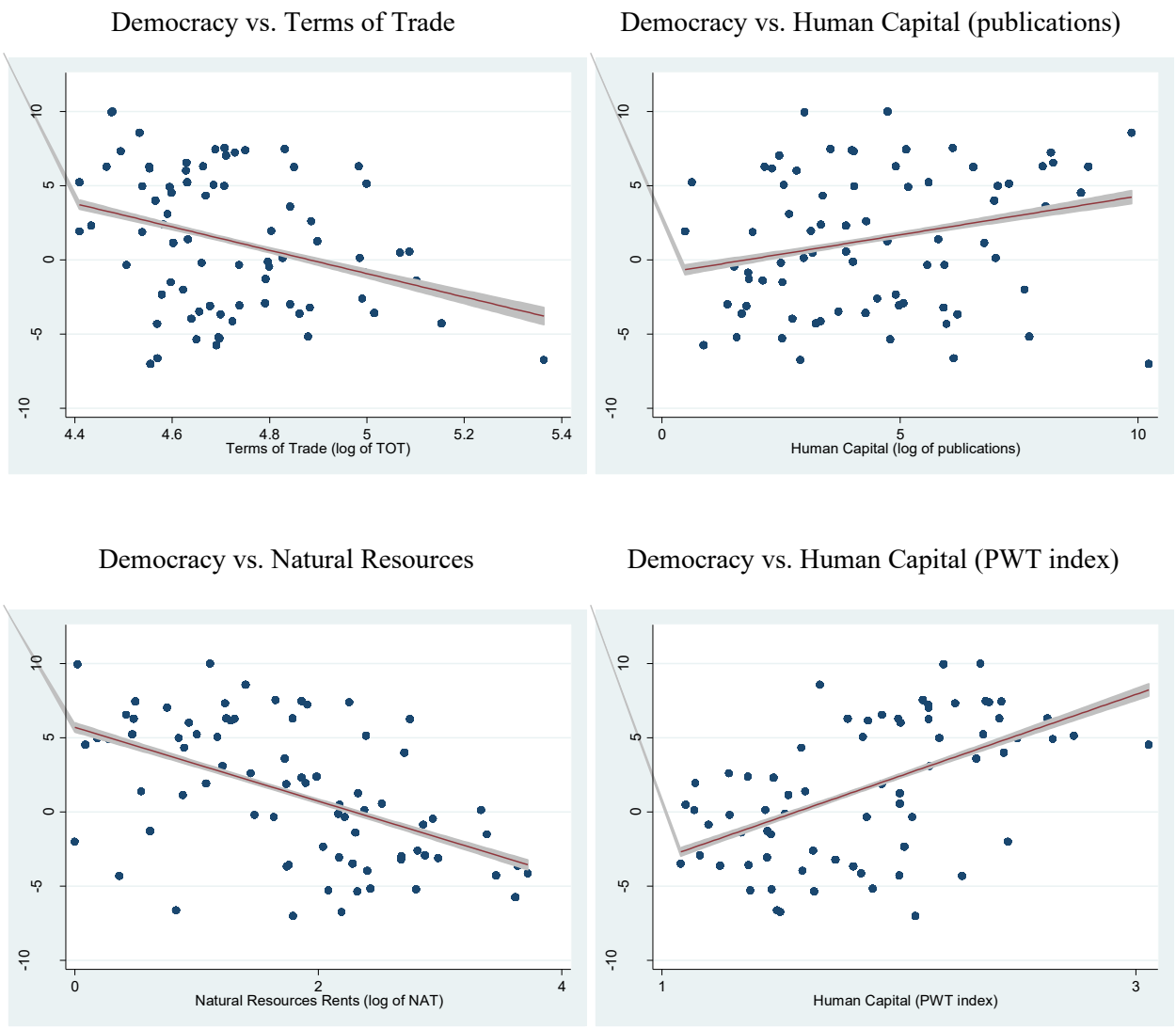

Table 1

Summary statistics.

Year	DEM	TOT	TOTVOL*	NAT	HC_PUBS*	HC_PWT	GDPCAP	AID	LIFEXP	DEP	URBAN	TO	FDI
1980	-3.39	127.70	0.058	10.49	1,600	1.50	2,582.17	7.77	55.93	87.71	35.22	70.76	1.24
Africa	*-4.81*	*137.82*	*0.095*	*10.75*	*972*	*1.29*	*1,558.02*	*11.61*	*51.22*	*93.76*	*26.26*	*78.31*	*0.91*
Asia	*-3.07*	*150.95*	*0.023*	*5.70*	*2,674*	*1.63*	*2,636.22*	*3.95*	*62.67*	*76.55*	*37.62*	*82.06*	*1.94*
L. America	*-0.84*	*136.19*	*0.006*	*5.04*	*885*	*1.80*	*4,721.42*	*1.59*	*63.47*	*81.46*	*55.97*	*49.01*	*1.07*
1985	-2.68	130.53	-0.036	6.79	1,576	1.60	2,509.78	8.01	58.01	85.82	38.08	62.26	0.90
1990	-0.63	109.68	-0.025	9.04	429	1.71	2,636.39	10.90	59.26	83.96	41.14	64.70	1.30
1995	2.45	108.07	0.045	9.41	551	1.82	2,978.21	9.71	59.94	80.51	43.59	71.90	3.34
2000	2.78	100.00	0.022	8.61	1,771	1.93	3,291.50	5.25	60.81	77.09	45.76	73.11	2.82
2005	3.54	105.74	0.031	10.33	4,124	2.02	3,866.66	6.08	62.60	73.23	48.06	77.19	3.69
2010	3.67	122.98	0.050	9.75	7,723	2.11	4,497.00	5.86	65.05	70.00	50.38	76.11	3.68
2014	4.14	120.45	-0.003	8.58	9,985	2.20	4,953.68	4.27	66.63	68.07	52.21	75.52	4.36
Africa	*3.02*	*135.74*	*-0.008*	*13.80*	*908*	*1.90*	*2,631.82*	*6.37*	*61.16*	*79.89*	*42.22*	*74.85*	*4.66*
Asia	*2.93*	*84.88*	*0.022*	*2.38*	*45,491*	*2.56*	*9,146.71*	*1.16*	*73.04*	*49.30*	*54.99*	*90.69*	*3.59*
L. America	*7.58*	*111.59*	*-0.012*	*4.71*	*4,364*	*2.54*	*7,118.82*	*1.31*	*74.28*	*55.15*	*72.77*	*65.78*	*4.23*
Mean	**1.25**	**114.40**	**0.001**	**8.63**	**2,935**	**1.85**	**3,341.45**	**7.34**	**60.87**	**78.74**	**44.18**	**70.81**	**2.76**
Africa	***-0.84***	***117.99***	***0.002***	***12.42***	***335***	***1.59***	***1,845.82***	***11.00***	***54.77***	***88.45***	***34.46***	***70.96***	***2.92***
Asia	***1.49***	***107.40***	***-0.002***	***3.32***	***12,520***	***2.13***	***5,356.78***	***1.99***	***68.07***	***61.60***	***46.56***	***87.51***	***2.66***
L. America	***5.75***	***111.52***	***0.001***	***4.25***	***1,569***	***2.17***	***5,237.45***	***2.62***	***69.35***	***69.40***	***64.42***	***58.28***	***2.46***
Difference**	**7.53**	**-7.25**	**-0.061**	**-1.90**	**8,385**	**0.70**	**2,371.52**	**-3.50**	**10.70**	**-19.64**	**16.98**	**4.76**	**3.11**
Africa	***7.83***	***-2.08***	***-0.103***	***3.05***	***-64***	***0.61***	***1,073.80***	***-5.24***	***9.95***	***-13.87***	***15.96***	***-3.45***	***3.75***
Asia	***6.00***	***-66.07***	***-0.001***	***-3.32***	***42,818***	***0.93***	***6,510.49***	***-2.78***	***10.38***	***-27.25***	***17.37***	***8.63***	***1.65***
L. America	***8.42***	***-24.61***	***-0.018***	***-0.34***	***3,479***	***0.74***	***2,397.40***	***-0.28***	***10.81***	***-26.32***	***16.80***	***16.77***	***3.17***

Notes: * We report the mean values of TOTVOL and HC_PUBS in the year 1981 instead of 1980, since there is no data for publications and due to missing observations related to the log-differencing of TOT. The last value for HC_PUBS is from 2013. ** Difference in the 1980-2014 period.

Table 2

Correlation matrix.

	DEM	Ln (TOT)	TOTVOL	Ln (NAT)	Ln (HC_PUBS)	HC_PWT	Ln (GDPCAP)	Ln (AID)	Ln (LIFEXP)	Ln (DEP)	Ln (URBAN)	Ln (TO)	Ln (FDI)
DEM	1												
ln(TOT)	-0.16	1											
TOTVOL	0.02	0.21	1										
ln(NAT)	-0.33	0.25	0.06	1									
ln(HC_PUBS)	0.17	0.01	0.03	-0.18	1								
HC_PWT	0.49	-0.13	0.02	-0.33	0.50	1							
ln(GDPCAP)	0.35	-0.08	0.01	-0.29	0.42	0.70	1						
ln(AID)	-0.30	0.00	-0.02	0.23	-0.63	-0.61	-0.72	1					
ln(LIFEXP)	0.44	-0.14	0.01	-0.49	0.48	0.71	0.67	-0.63	1				
ln(DEP)	-0.37	0.11	-0.01	0.41	-0.63	-0.76	-0.64	0.68	-0.74	1			
ln(URBAN)	0.36	-0.06	0.01	-0.24	0.36	0.62	0.77	-0.56	0.67	-0.57	1		
ln(TO)	0.05	-0.09	0.02	-0.01	-0.12	0.26	0.30	0.07	0.15	-0.14	0.25	1	
ln(FDI)	0.15	-0.09	0.03	0.06	0.10	0.31	0.20	-0.08	0.21	-0.25	0.24	0.37	1

Table 3

Fixed-effect regressions of Democracy.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t
$ln(DEM)_{t-1}$	0.881***	0.879***	0.831***	0.830***	0.834***	0.880***	0.869***	0.878***
	(0.0115)	(0.0115)	(0.0161)	(0.0178)	(0.0165)	(0.0114)	(0.0129)	(0.0121)
$ln(TOT)_{t-1}$	-0.391***	-0.358**	-0.0892	-0.100	-0.0924	-0.358**	-0.390***	-0.348**
	(0.130)	(0.139)	(0.140)	(0.145)	(0.141)	(0.141)	(0.142)	(0.141)
$ln(NAT)_{t-1}$		0.128	0.0776	0.0525	0.0694	0.117	0.0718	0.112
		(0.0991)	(0.108)	(0.103)	(0.106)	(0.0984)	(0.0939)	(0.0970)
$ln(HC\_PUBS)_{t-1}$			0.0835**	0.0656*	0.0997**			
			(0.0349)	(0.0380)	(0.0404)			
$ln(GDPCAP)_{t-1}$						0.0113	0.00207	-0.00808
						(0.0761)	(0.0785)	(0.0785)
$ln(TO)_{t-1}$				0.248			0.386*	
				(0.183)			(0.216)	
$ln(FDI)_{t-1}$					-0.0383			0.0314
					(0.0701)			(0.0634)
Constant	2.197***	1.837***	0.484	-0.358	0.458	1.770**	0.509	1.852**
	(0.610)	(0.589)	(0.591)	(0.986)	(0.600)	(0.737)	(1.021)	(0.717)
Observations	2,544	2,459	2,074	2,006	1,986	2,441	2,355	2,326
R^2	82.1%	81.9%	76.0%	76.0%	76.4%	82.1%	81.6%	81.9%
Number of countries	76	76	76	75	73	76	76	73

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. Regression (4) covers 75 countries: Lesotho is dropped due to insufficient trade openness observations; regressions (5) and (8) include 73 countries: Bolivia, Democratic Republic of Congo, and Haiti are dropped due to insufficient FDI observations.

Table 4
System-GMM regressions of Democracy.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t
$ln(DEM)_{t-1}$	0.842***	0.799***	0.760***	0.847***	0.803***	0.898***
	(0.105)	(0.118)	(0.128)	(0.115)	(0.127)	(0.131)
$ln(DEM)_{t-2}$	0.0305	0.0801	0.113	0.0405	0.0762	-0.0237
	(0.106)	(0.123)	(0.121)	(0.108)	(0.120)	(0.122)
$ln(TOT)_{t-1}$	-0.737**	-1.173**	-0.764**	-0.851*	-0.820*	-0.872*
	(0.345)	(0.569)	(0.368)	(0.439)	(0.497)	(0.486)
$ln(NAT)_{t-1}$	0.370*	0.633*	0.316	0.599**	0.536	0.554*
	(0.212)	(0.359)	(0.232)	(0.261)	(0.354)	(0.294)
$ln(HC\_PUBS)_{t-1}$	0.210***	0.412**	0.381**			
	(0.0804)	(0.194)	(0.148)			
$ln(GDPCAP)_{t-1}$				1.129	1.109	1.173
				(0.763)	(0.752)	(0.815)
$ln(TO)_{t-1}$		-1.323			0.125	
		(1.142)			(0.620)	
$ln(FDI)_{t-1}$			-0.472			0.155
			(0.320)			(0.189)
Constant	2.320*	8.375	2.224	-5.084	-5.491	-5.422
	(1.320)	(5.632)	(1.416)	(5.148)	(5.393)	(5.318)
Endogenous on RHS	NAT	NAT	NAT	NAT	NAT	NAT
Number of instruments	68	68	68	68	68	68
AB(2) test p-value	0.26	0.159	0.155	0.18	0.133	0.408
Hansen test p-value	0.254	0.282	0.321	0.61	0.527	0.704
Observations	2,072	2,004	1,984	2,378	2,294	2,270
Number of countries	76	75	73	76	76	73

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. NAT is assumed endogenous to democracy and TOT is assumed exogenous. Please refer to text of Results section for modification of the TOT exogenous assumption, which imply negative and statistically significant coefficients only for TOT with larger estimated coefficients and higher standard errors.

Table 5
System-GMM regressions of Democracy on Interaction Term NAT x OIL_DUM.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t
$ln(DEM)_{t-1}$	0.825***	0.781***	0.757***	0.875***	0.836***	0.927***
	(0.109)	(0.121)	(0.132)	(0.112)	(0.125)	(0.124)
$ln(DEM)_{t-2}$	0.0653	0.108	0.133	0.0323	0.0518	-0.0299
	(0.107)	(0.119)	(0.125)	(0.106)	(0.117)	(0.118)
$ln(TOT)_{t-1}$	-0.635*	-0.827*	-0.695*	-0.638*	-0.543	-0.755*
	(0.365)	(0.450)	(0.368)	(0.346)	(0.340)	(0.398)
$ln(NAT)_{t-1}$ x OIL_DUM	0.834*	0.998*	0.713	0.796*	0.556	0.901**
	(0.480)	(0.559)	(0.478)	(0.443)	(0.471)	(0.438)
$ln(HC\_PUBS)_{t-1}$	0.166**	0.303*	0.336**			
	(0.0827)	(0.156)	(0.147)			
$ln(GDPCAP)_{t-1}$				0.398	0.458	0.332
				(0.670)	(0.646)	(0.679)
$ln(TO)_{t-1}$		-0.700			0.516	
		(0.829)			(0.464)	
$ln(FDI)_{t-1}$			-0.438			0.271
			(0.325)			(0.179)
Constant	2.207	5.234	2.186	-0.0489	-2.908	0.650
	(1.481)	(3.979)	(1.496)	(5.058)	(5.657)	(5.087)
Endogenous on RHS	NAT	NAT	NAT	NAT	NAT	NAT
Number of instruments	68	68	68	68	68	68
AB(2) test p-value	0.169	0.106	0.131	0.200	0.180	0.426
Hansen test p-value	0.263	0.271	0.378	0.567	0.386	0.485
Observations	2,072	2,004	1,984	2,378	2,294	2,270
Number of countries	76	75	73	76	76	73

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively. Regression (2) covers 75 countries: Lesotho is dropped due to insufficient trade openness observations; regressions (3) and (6) include 73 countries: Bolivia, Democratic Republic of Congo, and Haiti are dropped due to insufficient FDI observations.

Table 6

Robustness for SGMM regressions of Democracy.

VARIABLES	(1) DEM_t	(2) DEM_t	(3) DEM_t	(4) DEM_t
$ln(DEM)_{t-1}$	0.839***	0.913***	0.783***	0.908***
	(0.156)	(0.137)	(0.145)	(0.133)
$ln(DEM)_{t-2}$	0.0141	-0.0351	0.0764	-0.0322
	(0.145)	(0.130)	(0.141)	(0.127)
$ln(TOT)_{t-1}$	-0.704**	-0.983*	-0.925*	-0.680*
	(0.354)	(0.530)	(0.483)	(0.407)
$ln(NAT)_{t-1}$	0.338	0.712**	0.551*	0.293
	(0.232)	(0.359)	(0.340)	(0.333)
$ln(HC\_PUBS)_{t-1}$	0.181		0.135	
	(0.149)		(0.142)	
$ln(GDPCAP)_{t-1}$		1.124		0.540
		(0.890)		(0.528)
$ln(TO)_{t-1}$	-0.256		-0.642	-0.0427
	(0.858)		(1.058)	(0.577)
$ln(FDI)_{t-1}$		0.330*		
		(0.187)		
Constant	3.438	-4.989	5.889	-0.787
	(3.769)	(5.986)	(5.156)	(4.645)
Endogenous on RHS	NAT, TO	NAT, FDI	NAT, HC_PUBS	NAT, GDPCAP
Number of instruments	53	53	53	53
AB(2) test p-value	0.433	0.434	0.221	0.462
Hansen test p-value	0.194	0.197	0.236	0.433
Observations	2,004	2,270	2,004	2,294
Number of countries	75	73	75	76

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 7

Fixed-effect regressions of Democracy: Robustness check for Human Capital.

VARIABLES	(1) DEM_t	(2) DEM_t	(3) DEM_t
$ln(DEM)_{t-1}$	0.858***	0.850***	0.863***
	(0.0122)	(0.0135)	(0.0122)
$ln(TOT)_{t-1}$	-0.375**	-0.424***	-0.419**
	(0.163)	(0.159)	(0.165)
$ln(NAT)_{t-1}$	0.097	0.075	0.108
	(0.107)	(0.103)	(0.103)
HC_PWT_{t-1}	0.817***	0.660***	0.943***
	(0.229)	(0.218)	(0.225)
$ln(TO)_{t-1}$		0.304	
		(0.238)	
$ln(FDI)_{t-1}$			-0.076
			(0.077)
Constant	0.507	-0.152	0.504
	(0.750)	(1.056)	(0.782)
Observations	2,269	2,180	2,163
R^2	81.9%	81.2%	82.5%
Number of countries	70	70	67

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 8
System-GMM regressions of Democracy: Robustness check for Human Capital.

	(1)	(2)	(3)
VARIABLES	DEM_t	DEM_t	DEM_t
$ln(DEM)_{t-1}$	0.898***	0.819***	0.833***
	(0.108)	(0.117)	(0.129)
$ln(DEM)_{t-2}$	-0.0127	0.0604	0.3110
	(0.109)	(0.121)	(0.126)
$ln(TOT)_{t-1}$	-0.748*	-0.924*	-0.817*
	(0.402)	(0.516)	(0.478)
$ln(NAT)_{t-1}$	0.384	0.545	0.558*
	(0.279)	(0.418)	(0.311)
HC_PWT_{t-1}	1.059***	1.812**	2.498***
	(0.364)	(0.725)	(0.723)
$ln(TO)_{t-1}$		-1.001	
		(0.983)	
$ln(FDI)_{t-1}$			-0.733**
			(0.308)
Constant	1.269	4.503	-0.696
	(1.565)	(4.044)	(2.378)
Endogenous on RHS	NAT	NAT	NAT
Number of instruments	68	68	64
AB(2) test p-value	0.353	0.156	0.333
Hansen test p-value	0.398	0.454	0.332
Observations	2,211	2,124	2,108
Number of countries	70	70	67

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 9
System-GMM regressions of Democracy on Interaction Term NAT x OIL_DUM: Robustness check for Human Capital.

VARIABLES	(1) DEM_t	(2) DEM_t	(3) DEM_t
$ln(DEM)_{t-1}$	0.889***	0.826***	0.854***
	(0.113)	(0.121)	(0.138)
$ln(DEM)_{t-2}$	0.00459	0.0588	0.0270
	(0.112)	(0.122)	(0.132)
$ln(TOT)_{t-1}$	-0.790*	-0.754*	-0.858
	(0.420)	(0.396)	(0.556)
$ln(NAT)_{t-1}$ x OIL_DUM	1.158**	0.973*	1.416**
	(0.577)	(0.564)	(0.686)
HC_PWT_{t-1}	1.051***	1.487**	2.301***
	(0.390)	(0.618)	(0.667)
$ln(TO)_{t-1}$		-0.471	
		(0.713)	
$ln(FDI)_{t-1}$			-0.582**
			(0.293)
Constant	1.551	2.574	-0.089
	(1.720)	(2.539)	(2.772)
Endogenous on RHS	NAT	NAT	NAT
Number of instruments	68	68	64
AB(2) test p-value	0.302	0.167	0.345
Hansen test p-value	0.465	0.528	0.494
Observations	2,211	2,124	2,108
Number of countries	70	70	67

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 10
System-GMM regressions of Democracy on Interaction Term NAT x TOT.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t	DEM_t
$\ln(DEM)_{t-1}$	0.891***	0.799***	0.807***	0.834***	0.782***	0.882***
	(0.108)	(0.122)	(0.132)	(0.110)	(0.124)	(0.125)
$\ln(DEM)_{t-2}$	-0.0098	0.0724	0.0466	0.0436	0.0896	-0.0127
	(0.109)	(0.125)	(0.129)	(0.105)	(0.119)	(0.118)
$\ln(TOT)_{t-1}$	-0.914*	-1.422*	-1.463**	-1.341**	-1.470**	-1.336**
	(0.544)	(0.745)	(0.717)	(0.523)	(0.733)	(0.604)
$\ln(NAT)_{t-1}$ x $\ln(TOT)_{t-1}$	0.0002*	0.0004*	0.0004**	0.0003***	0.0004*	0.0003**
	(0.0001)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0001)
HC_PWT_{t-1}	0.870**	1.540***	2.335***			
	(0.399)	(0.156)	(0.807)			
$\ln(GDPCAP)_{t-1}$				0.452	0.540	0.623
				(0.625)	(0.636)	(0.639)
$\ln(TO)_{t-1}$		-1.124			-0.132	
		(0.944)			(0.681)	
$\ln(FDI)_{t-1}$			-0.835**			0.0943
			(0.369)			(0.196)
Constant	2.869	8.422	3.273	2.955	3.417	1.560
	(2.752)	(5.972)	(3.411)	(5.281)	(8.259)	(5.359)
Endogenous on RHS	NAT	NAT	NAT	NAT	NAT	NAT
Number of instruments	68	68	64	68	68	68
AB(2) test p-value	0.330	0.142	0.267	0.151	0.110	0.352
Hansen test p-value	0.411	0.492	0.301	0.490	0.356	0.603
Observations	2,211	2,124	2,108	2,378	2,294	2,270
Number of countries	70	70	67	76	76	73

Notes: Robust standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.