

# Globalization and Democracy, 1870-2000

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## Abstract

We study whether international trade fosters democracy. The likely endogeneity between democracy and trade is addressed via the gravity model of trade, allowing us to obtain a measure of natural openness. This serves as our instrumental variable for actual trade openness *à la* Frankel and Romer (1999). We use this powerful instrument to obtain estimates of the causal impact of openness on democratization. A positive impact of openness on democracy is apparent from about 1895 onwards. Late nineteenth century globalization may have helped generate the “first wave” of democratization. Between 1920 and 1938 countries more exposed to international trade were less likely to become authoritarian. Finally, our post-World War II results suggest that a one standard deviation increase in trade with other countries could bring countries like Indonesia, Russia or Venezuela to be as democratic as the US, Great Britain or France. We also see some variation in the impact of openness by region and note that commodity exporters and petroleum producers do not seem to become more democratic by exporting more of such items.

## 1 Introduction

Does democracy go hand in hand with globalization? Or, on the contrary, does globalization stem incipient democracy? The questions go beyond mere academic interest. There is increasing evidence that democracy leads to positive economic outcomes and welfare gains. To the extent that trade fosters democracy, if at all, the implications are crucial for global trade talks and for the negotiation of regional integration arrangements such as the Free Trade Area of the Americas, to take but one example. Promoting world and hemispheric commerce might help achieve economic development in less-developed countries, and it may also strengthen their efforts toward building better institutions. From a long-run perspective, there may be a case

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that today's most economically advanced democracies achieved such status partially because of their engagement with international trade.

To investigate the link between international commerce and democracy, we first marshal a number of theoretical and anecdotal explanations. Many of these argue trade could bring about greater political participation and competition, but there is little agreement on the exact mechanisms. Moreover, some argue that globalization could hinder democracy.

What of the systematic statistical evidence? There is no consensus here either and relatively little research on this to date. Figures 1, 2, and 3 show the evolution of the global average value of "openness" to trade and the average of one measure of democracy for three separate historical periods. Over the long run, there seems to be a positive relationship between trade and democracy. But, Bussman (2001) explores the issue using simultaneous equation techniques and instrumental variables (*different from those we propose*) and finds that there was little evidence that trade openness was associated with democracy. On the other hand, Li and Reuveny (2002) report a negative relationship between trade openness and democracy. Mansfield, Milner and Rosendorff (2000) look at whether political regimes influence trade but not the reverse.

We contribute to this empirical question by refining the methodological approach to the problem. In particular we propose a new, powerful instrumental variable to better sort out the causal impact of globalization on democracy. Our instrument uses exogenous geographic information to predict trade flows similar to Frankel and Romer (1996). We use this in two-stage least squares regressions for data from the period 1870 to 2000. Contrary to the empirical work we are familiar with, we find some evidence of a substantive and statistically significant positive impact of openness on the level of democracy. Unfortunately, most of our evidence relies on cross-sectional variation in the data to identify the relationship of interest. Our conclusion that there is a positive relationship hinges crucially on this. We believe our instrument, which measures proximity to other nations in a complex way, gives us a good impression of the reduced form association between openness and democracy. But there is some evidence that other time-invariant national characteristics which are correlated with proximity are creating more democracy. However, since it is not immediately apparent which factors these are and our

instrument seems to incorporate truly exogenous information that is unfortunately rather time invariant, we conclude that there is more evidence for a positive relationship than otherwise.

We begin by reviewing the theoretical, anecdotal and empirical evidence to date. Section 3 outlines our research design. We present our econometric results in Section 4 and conclude by putting these in greater context while also suggesting further lines of investigation.

## **2 Trade and Democracy: Theoretical and Anecdotal Evidence**

Could “globalization” be responsible for the growing preponderance of democracy? The July 2000 election of Mexican opposition candidate Vicente Fox, after 71 years of one-party rule, led some observers to establish a link between the country’s membership in the North American Free Trade Agreement (NAFTA) and its democratic transition. For example, Thomas Carothers, vice president for studies at the Carnegie Endowment for International Peace, recently wrote that “[b]ringing Mexico into the North American Free Trade Agreement created a broader context of integration that reinforced pressure on the Mexican political elite to move ahead with liberalization”.<sup>1</sup> A related view is implicit in official documents as well. Take for example the following statement from a US Trade Representative’s report on NAFTA [USTR (1999, chapter VII)]:

“In the decade since the end of the Cold War, the United States has continued to lead in development of the world’s trade agenda, and to lead in advancing the democratic values embodied in free markets, consumer choice, respect for basic rights of workers and the environment, and transparency of process. The NAFTA exemplifies this leadership.”

Similarly, following political turmoil in Paraguay in the mid 1990s, which threatened to de-rail the latter’s incipient democracy, the Mercosur members—Argentina, Brazil, Paraguay, and Uruguay—adopted a clause making political democracy a prerequisite for membership in the South American customs union. Lastly, the transition to democracy in Southern Europe—Greece, Portugal, and Spain—occurred almost simultaneously with an expansion of the European Economic Community.

There is also a perception among certain quarters that globalization in general, and not just the expansion of international trade, is good for democracy. For example, some people have argued that the presence of transnational corporations in developing countries at present-times instills democratic values in the population of the host countries. Consider the following passage taken from *Civilization*, the magazine of the U.S. Library of Congress:

“In developing countries, most of them with strong authoritarian traditions and rigid hierarchical structures, American companies often provide workers, at least those who are reasonably educated and somewhat skilled, their first experience of civil society—their first chance to cultivate the skills needed to make most of democracy, free markets, and the rule of law. Companies do so not because they can help it. They build the skills of civil society because of the way they work.”<sup>2</sup>

From Lin and Nugent (1995, p. 2336):

“...a dictatorship or authoritarian regime may not be compatible with long-run economic growth. The more successful is such a state in achieving economic development, the more likely it is that the state will face a legitimacy crisis. This is because both a financially independent middle class and the integration of the domestic economy with the world economy are at the same time both necessary conditions for and natural effects of economic success in the modern world. As a result, democratic ideology of DCs [developed countries] may penetrate the middle class and undermine the legitimacy of the regime. These pressures may also force the state to cut its own power of intervention in order to make credible its commitment to such reforms. Thus, authoritarian states may gradually be transformed into democratic states, as seems to be happening in Korea, Taiwan, and Chile.”

Political economy arguments can be seen in the work of Acemoglu and Robinson (2003). They argue globalization narrows income inequality in LDCs due to Stolper-Samuelson effects. This in turn causes elites to be more willing to extend the franchise to a population that is now less likely to vote for redistributive policies because of their improved incomes.

Alternatively, more proximate nations are often more democratic. A conventional argument goes that as nations come into more frequent contact (e.g., through transactions) a diversity of views is embraced and emboldened culminating in a transition to a democratic political system that allows free expression of such ideas.

Li and Reuveny (2002) provide an extensive survey of many similar approaches that argue for a positive relationship. But they also survey the literature that argues there could be a negative relationship between trade and democracy. We leave this theoretical debate for further research. Our approach focuses on the cross-country experience of many nations since 1870.

Indeed, from an historical viewpoint, there have been many ups and downs in both the level of international integration and also the amount of democracy. For instance, the years between 1870 and 1913 witnessed rapid integration in the world economy stimulated in part by liberal trade policies, falling shipping costs, economic growth, improved communication infrastructure and decreasing transaction costs of international trade associated with the spread of the gold standard (see for example López Córdova and Meissner (2003), Estevadeordal, Frantz, and Taylor(2003) and O'Rourke and Williamson (1999) ). It is natural to wonder whether these factors had anything to do with the fact that at roughly the same time many western countries extended the franchise to larger segments of society.

Also, the interwar years saw attempts to re-build the international order of the late nineteenth century and a burst of interest in democratization associated with the creation of new countries after the War. Eventually the momentum fizzled and even reversed. The global trading system and capital markets imploded. Fascists and Bolsheviks stormed to power. Liberal democracy lost ground. Because of this, the period is an excellent testing ground for our econometric model. One might ask if the countries with the most extensive commercial links with other countries avoided or delayed the downward spiral into authoritarianism beginning in the mid-1920s. While theory and observation suggests there should be a link between democracy and integration, our statistical techniques complement these approaches and work to find the reduced form association.

### 3 Empirical strategy

The challenge for an empirical test of the above hypotheses is that there is, in all likelihood, a two-way causal relationship present. Mansfield, Milner and Rosendorff (2000) argue that democracies are more likely to enact free trade policies. The net effect of democracy on openness would be ambiguous *a priori*. In the other direction, international trade, as argued above, may lead to greater political freedoms. Also, in a democracy, interest groups may also be better able to obtain protection from foreign competition and voters may even agree to impose import restrictions in order to help less-privileged social groups.

If there is in fact a simultaneous determination of political and trade outcomes, one possible approach in the absence of a plausible structural model is to find variables that determine trade flows but are not correlated with any other factors influencing the level of democracy. These could then be used as instrumental variables to isolate the impact of greater international trade flows (or globalization at large) on political outcomes. Such a technique avoids the simultaneity bias which would plague any regression analysis that attempts to explain democracy in terms of trade flows.

As appropriate instruments, we take an approach inspired by the Frankel and Romer (1999) study of the impact of trade openness on output per capita. This is a problem similarly affected by endogeneity. The methodology has been subsequently used by a number of papers including Frankel and Rose (2002) who study how currency unions, through their impact on trade, affect growth and Wei (2000) who examines the impact of openness on corruption and the quality of governance.

Frankel and Romer used geographic variables—distance from other nations, land area, and information on waterway access—to estimate a country’s “natural openness” through the *gravity* equation of trade. That is, these variables are used as regressors in an OLS regression where the dependent variable to be explained is exports and imports (relative to GDP) between any two countries. The predicted level of openness then serves as an instrument for the actual level of openness. The authors then estimated an instrumental variables regression with income per capita as the dependent variable and openness as an endogenous regressor.

In a similar fashion, we use a gravity equation, augmented with other variables not used by Frankel and Romer, to create an instrument for trade openness. Then we regress a country’s democracy measure on trade openness using our predicted openness measure as an instrumental variable. Of course, other variables besides openness may influence a country’s political status. Nevertheless, pinpointing the correct set of those other variables poses an important challenge in itself, and many would themselves be subject to endogeneity problems.<sup>3</sup> As Rodrik (2000) has noted, democracy is a “meta-institution” which likely defines the effectiveness of other institutions—e.g., the rule of law—that shape economic outcomes. While this is an important line of research, as long as the geographic information we use to predict openness is not correlated with these omitted variables the relationship we estimate will not be biased because of these exclusions.

### 3.1 Econometric Model

Given the above, democracy in country  $i$  during period  $t$  might be a function of the following variables: the level of exports plus imports divided by GDP during the period ( $\text{Openness}_{it}$ ); a  $(1 \times K_1)$  vector,  $x$ , consisting of time-varying country-specific characteristics; and a  $(1 \times K_2)$  vector,  $z$ , containing time-invariant country-specific characteristics.

Possibilities for time-invariant (or very slowly changing) characteristics that do not suffer from an endogeneity problem are colonial legacy, land area, ethnic or linguistic diversity or simple country indicator variables to control for unobservable characteristics such as culture. Time varying variables might include lagged values of the democracy measure and population.<sup>4</sup> We also posit a possibly heteroscedastic and autocorrelated error term  $u_{it}$  and a possibly heteroscedastic, country specific, time-invariant error term  $\varepsilon_i$ . The following equation summarizes the basic econometric model of interest:

$$(1) \quad \text{Democracy}_{it} = \beta_0 + \delta \text{Openness}_{it} + x_{it}\gamma + z_i\Gamma + \varepsilon_i + u_{it}$$

where  $\beta_0, \delta, \gamma$ , and  $\Gamma$  are vectors of parameters to be estimated. Model (1) may be subject to endogeneity problems, as discussed before. As such, openness could be correlated with the

error term  $u_{it}$ . TO circumvent this, an appropriate instrumental variable for openness that is not correlated with any other possible omitted determinants of democracy not included in equation (1) but which is strongly correlated with trade openness. We use a two-step procedure to obtain such instruments.

First we estimate a gravity equation. The gravity equation is a powerful reduced form model of bilateral trade flows with a long theoretical and empirical history. An early example of a theoretical derivation of the equation we estimate is in Anderson (1979). Modern practical and theoretical applications and variations can be found in Anderson and van Wincoop (2003), Frankel (1998) and Frankel and Rose (2002). The augmented gravity equation we use has the following form

$$\begin{aligned}
 (2) \quad \ln \left( \frac{\text{Exports}_{ijt} + \text{Imports}_{ijt}}{\text{GDP}_{it}} \right) &= G_{it} \lambda_t + \omega_{it} = \lambda_0 + \lambda_{1t} (\ln(\text{population}_{it})) + \lambda_{2t} (\ln(\text{population}_{jt})) \\
 &+ \lambda_{3t} \ln(\text{area}_{it}) + \lambda_{4t} \ln(\text{area}_{jt}) + \lambda_{5t} (\ln(\text{distance}_{ijt})) \\
 &+ \lambda_{6t} (\text{border}_{ij}) + \lambda_{7t} (\text{landlocked}_{ij}) \\
 &+ \lambda_{8t} (\text{island}_{ij}) + \lambda_{9t} (\text{language}_{ij}) + \omega_{ijt}
 \end{aligned}$$

where  $G_{it}$  is a  $(1 \times 9)$  vector of explanatory variables, distance is the great-circle distance between two countries' geographic centers measured in kilometers,  $\text{border}_{ij}$  equals one if country  $i$  and country  $j$  share a border,  $\text{landlocked}$  takes on the values 0, 1 or 2 depending on whether neither, one or both countries are on a major body of water,  $\text{island}$  (defined similar to the  $\text{landlocked}$  variable) indicates whether the countries are islands,  $\text{language}$  is 1 if there is a dominant or official language shared by both countries and 0 otherwise, the other variables are naturally interpreted and  $\omega_{it}$  is a homoscedastic white noise error term.<sup>5</sup>

We estimate the vector of coefficients,  $\lambda_t$ , separately for each year. We then predict the logarithm of bilateral openness for each country pair at each date for which we have all explanatory variables. For each country we then arrive at the level of predicted trade openness by taking the exponential of the predictions and adding up over all other trading partners. Our instrument for actual openness is predicted or "natural" openness,  $\widehat{T}_{it}$ , such that



$$(3) \quad \text{predicted openness} = \hat{T}_{it} = \sum_{j \neq i} \exp \left[ G' \hat{\lambda}_t \right]$$

where  $\hat{\lambda}_t$  is the OLS estimate of the vector of coefficients in equation (2). Note that we can actually predict trade even for countries for which we have geographical data but not trade data. As usual  $\hat{T}_{it}$  is uncorrelated with the residuals from the regression and hence incorporates only the geographic determinants of trade.<sup>6</sup> These combinations of variables would seem to be uncorrelated with other possible determinants of democracy.

### 3.2 Data

We refer the reader to the data appendix for a full description of our sources and methodology for implementing the different econometric specifications. Here we outline the basic characteristics of the data.

To estimate our gravity equation we used trade data from López Córdova and Meissner (2003) and Barbieri (1996) prior to 1913, Barbieri (1996) and Ritschl and Wolf (2004) for the interwar period, and Rose and Glick (2001) made available on line at <http://faculty.haas.berkeley.edu/arose/> for post-1960. We also supplemented the Rose and Glick trade data with the IMF's *Direction of Trade Statistics* and missing GDP and population data from the World Bank's *World Development Indicators* data base. Where possible we use PPP-adjusted output. Post-1960 the PPP adjustment factors come from the World Bank's *World Development Indicators*; the interwar period uses Maddison's PPP-adjusted GDP. Trade is expressed in US dollars as in the original sources and converted to real values for our two latter samples. Prior to 1910 we divide real trade values by real GDP.

To measure democracy, we use the *polity* score from the Polity IV data set (described by Marshall and Jaggers (2000)). This measures five attributes of a country's political system. These categories measure how competitive and open political participation is, how open and competitive "executive" recruitment is and how much constraint on the executive there is. A weighted sum of the component variables is taken, and two new variables, one measuring democracy and the other autocracy, are created. The democracy variables take the values 0, 1,

2,...,10. The autocracy variables take the values -10, -9, -8,...,0. The Polity IV score is the sum of the eleven point measure of democracy and the eleven point measure of autocracy. Countries are only included in the Polity IV data set if they achieved independence by 1998 and had a population of 500,000 or more in 1998. Dependencies at any point in time are not included.

We use the Polity IV measure because it appears to be the best available data set that measures deep political and institutional change over a long time and for a large number of nations. As a check we carry out a similar analysis using the binary measure democracy created by Alvarez, Cheibub, Limongi and Przeworski (2000). Other measures such as Polyarchy measure only participation rates in elections, while Freedom House measures information relevant to economic and political liberties at the personal level and is only available from 1973. Nevertheless we are aware that any attempt to measure the level of democracy is fraught with conceptual and mechanical problems or inaccuracies.<sup>7</sup>

## 4 Results

Below we show that there is ample, but not incontrovertible, evidence for a sizeable positive relationship between openness and democracy. For the interwar and post-1960 period, our econometric evidence suggests that switching from complete economic autarchy to the median level of (PPP-adjusted) openness could, in the long run, raise a country's polity score by as much as three or four points. In other words, in the year 2000, such opening up to trade could have transformed Russia, Venezuela or Indonesia into a full-fledged democracy with a polity score equivalent to that in the US, France or Great Britain.<sup>8</sup> The relationship is also statistically significant and positive but less precisely estimated prior to 1913. Still, the point estimates suggest that a change in openness seems to have a similar impact over all three historical periods.

Though our results are fairly robust, some specifications suggest that we have found a spurious correlation. We use various panel techniques and also year-by-year cross-sectional regressions to identify the coefficient on openness. Our regressions are forced to rely on cross-sectional variance for identification and hence the data reveal more about the long-run equilibrium rela-

tionship of interest than the dynamic impact of opening up on democratization.

In a panel setup that allows for general country fixed factors or country fixed factors and persistence in regime choice, the relationship disappears in statistical and substantive terms. We believe this is because our variables of interest, including our instrument, do not sufficiently vary over time within countries. This impedes us from disentangling the impact of opening up to trade from the influence of unknown fixed factors or country specific unobservables. We do however make an attempt to control for certain identifiable fixed factors and still find a positive relationship.

### **Some Preliminaries**

As described above, we use the estimated gravity model separately for each year of our sample to predict dyadic trade relative to output as in equation (3). The results from this “first stage” regression are reported in Tables 1 and 2. The gravity model itself fits the data very well, the signs and sizes of the coefficients make economic sense and are mostly comparable to other studies. One difference between the earlier periods and the latter periods is that land areas are either positively correlated or unassociated with trade.

As instruments, the predicted values of openness seem extremely powerful. Indeed Tables 3 and 4 show that predicted openness is always extremely highly statistically significant in a regression of actual openness on this variable. In fact, the t-statistic on predicted openness is always larger than 2.7. In the year-by-year regressions it is usually much larger than this in the later years. It is often on the order of six or larger in the 1960-2000 period, and in the pooled data it is never smaller than 16 and as large as 42. The predictive power and the correlation between our instrument and openness is relatively weaker but still quite strong when including controls for country size as column (3) from Table 3 shows.

We have chosen to present estimates of the panel models and then to present regressions for single selected years for comparison. For the post-1960 period and from 1870 to 1913 we provide results every five years. For the interwar period, more data was available for certain years, and so we present results from those years.<sup>9</sup>

Our key results use various panel data techniques which provide different ways to look at

the data. Our main results use three common specifications: country “random effects”, country “fixed effects” and a partial adjustment model which allows for a lagged dependent variable. We also ran GMM and instrumental variables regressions on the first differenced data to control for fixed effects and to allow for the lagged dependent variable. A word about each type of model and our justification for using it is in the econometric appendix.

### **Pooled Data Results**

With these considerations in mind, we estimate equation (1) both controlling and not controlling for endogeneity. Table 5 lists various specifications. First observe that a univariate OLS regression of polity on openness shows a statistically significant and positive relationship in all three time periods.<sup>10</sup> Comparing instrumental variables estimates from column (2) to OLS estimates in column (1) for all three sub-tables suggests the OLS coefficient is biased slightly downward. This could happen for example if openness had measurement error and only roughly proxied democracy-enhancing interactions. Alternatively it could simply be sampling error as Frankel and Romer suggested.

To check the robustness of the univariate results, we included two measures of a nation’s size. Column (3) shows that including controls for size increases the two stage least squares point estimates. In the 1960-2000 period and the interwar period, our coefficient is positive and highly statistically significant. In the pre-World War I period, the coefficient is significant at the 93 percent level. Using the coefficients from column (3), the magnitudes of the partial effects given a one standard deviation change in openness in the pre-World War I period, the Interwar period and the post-World War II period are four, five and three polity points respectively. This long-run comparability is interesting in its own right and could be suggestive of a structural relationship between the two variables.<sup>11</sup>

In contrast to these results, columns (4) through (6) which control for fixed country effects provide no evidence for any link between openness and democracy.<sup>12</sup> The coefficient on openness is positive but much smaller than in the random effects specifications and is not statistically significant at any conventional level. For skeptics of a positive relationship, the interpretation of columns (4) through (6) is that correlation between openness or natural openness and un-

observable variables or factors not included in say column (3) are responsible for generating the already discussed positive coefficient. However, one should not immediately accept the idea that the positive relationship found in the random effects models is spurious.

The obvious reason that the fixed effects specification does not work is that for many countries our instrument for openness does not vary too much over time. Dickey-Fuller tests for predicted openness showed that for the vast majority of the countries we could not reject the notion that the levels were stationary. Most of the variation appears to be across countries rather than within countries. In this case it would not be wise to expect good identification from a fixed effects regression. In other words, the instrument seems highly collinear with the included fixed factors. It is itself based on factors which are time-invariant or are slowly changing. Moreover, it is a prediction of actual openness which also changes fairly slowly over time. At the same time, it does not seem sensible to say that our measure of proximity and geography are correlated in any substantive way to other unobserved or omitted factors. So a plausible conclusion is that there is a mechanical problem here.

Nevertheless in columns (1) and (2) of Table 6 we drop the country dummies and include a number of time-invariant controls that the fixed effects could be capturing. These include the absolute difference between a country's latitude and zero, a measure of ethnolinguistic fractionalization (from Roeder 2001) as measured in the year 1985, indicators for petroleum and commodity exporting countries and regional indicators. We focus on the 1960-2000 period as such data is only readily available for these years. In column (1) we see that the coefficient on openness is much smaller than in Column (3) of Table 5, but it is still positive and highly significant.<sup>13</sup> However, when we control for country size, the coefficient on openness diminishes in size and statistical significance so that it is statistically indistinguishable from zero. This is likely to be for the same reasons that plague the fixed effects regressions of Table 5. Moreover we would expect proximity to be negatively correlated if at all correlated with size. But instead the coefficient appears to be upward biased when omitting size controls.

Other notable results on these new control variables suggest that countries further from the equator are more democratic while exporters of commodities and possibly petroleum may

be less democratic after controlling for other factors. Also the data confirm that, conditional on a number of variables, the Middle East and Sub-Saharan regions are the least democratic in the world compared to the US and Canada while the Latin American/Caribbean countries, East Asia and Western Europe are somewhat less so relative to these two North American countries. Because it is not obvious why our instrument would be correlated with these fixed factors, except for the fact that these are slowly moving over time, and because these factors explain almost 60 percent of the variation in our instrument, Table 6 makes us more comfortable with the idea that trade openness has a role in determining political outcomes rather than unobservable factors or other obvious underlying fixed characteristics of countries.<sup>14</sup>

We also present two other types of dynamic specifications in Table 5. The “partial adjustment” model of columns (7) through (9) shows that the long-run impact of a change in openness is roughly approximated by the simple non-dynamic specification. For instance column (9) shows for the post-1960 period that the long-run coefficient is comparable to the estimate of column (3). It is calculated as  $0.1 (= \frac{0.004}{1-0.96})$ . For the interwar period, the long-run marginal impact appears larger than what column (3) would imply. Prior to World War I, the magnitude of the coefficient on openness varies between -0.002 and 0.006 and does not appear significant. For the latter two periods however, these specifications suggest that there is a dynamic process underway and that adjustment of the polity level to changes in openness is cumulative rather than immediate as one might expect.

The Arellano-Bond/GMM and Anderson-Hsiao/IV estimates are in columns (10) and (11) of Table 5. We find very mixed results when we eliminate fixed factors in this way. Most of the time the coefficient is statistically indistinguishable from zero which echoes the results from the other fixed effects specifications. In the GMM specification, we could not reject the null hypothesis of no second order autocorrelation in the transformed error terms, and so we rule out the possibility that this problem has caused our estimator to be inconsistent. The reason we find a coefficient statistically indistinguishable from zero is again unclear. It is known that the Arellano-Bond procedure can produce weak estimates in a panel context with high persistence in the dependent variable. The problems of invariance in the instrument cited above also creep

in here, so it is unclear how worthwhile these specifications are given the data structure.

In columns (3) through (6) of Table 6 we also control for the possibility of heterogeneous coefficients by region during the 1960-2000 period. It is possible that cross-regional differences in the relationship could seriously bias our aggregated estimates. We include separate slope coefficients on openness for a number of geographical regions. This is under the assumption that certain unobserved cultural or geographical variables could influence the connection between openness to trade and democracy in a similar way throughout the region. Our regions, as seen in Table 6, are South East and East Asia, Eastern Europe and Central Asian states, Middle East and Northern Africa, South Asia, Western Europe, Sub-Saharan Africa, Latin America and the Caribbean, and North America (consisting only of the United States and Canada).<sup>15</sup>

There appears to be a particularly significant positive relationship in Western Europe, North America, Latin America, South Asia and post-1989 Eastern Europe.<sup>16</sup> The same cannot be said for the Middle East/North Africa nor for Sub-Saharan Africa. In both regions, the estimated coefficient is usually negative and statistically different from zero. If we include lagged values of the polity score, the coefficient signs stay the same, but we can only reject the null hypothesis of no relationship for Latin America, Western Europe and the US and Canada.<sup>17</sup>

Besides showing some regional differences in the relation, another lesson from Table 6 is that primary commodity and petroleum exporters do not benefit from the pressures to democratize arising from international trade.<sup>18</sup> It would therefore tend to suggest that each dollar of international commerce is not equally beneficial for the process of democratization. This evidence would be compatible with the idea that increased competition in goods markets or Stolper-Samuelson effects in a two-factor model could force more competition in the political sphere.

#### **4.1 Robustness: Year By Year Results**

##### **Results: 1960-2000**

We present simple specifications similar to those above for various years so that the reader can see if the panel results are masking underlying changes in the relationship over time.<sup>19</sup> For various baseline years, Table 7 shows that there is a positive relationship between openness

and democracy which is statistically significant at conventional levels between 1960 and 1975. Simple OLS suggests the coefficient decreases over time from 0.23 in 1960 to a low of about 0.05 in 1995.<sup>20</sup>

Table 8 reports our year by year instrumental variables regressions. The relationship between international trade and democracy is positive but the coefficient tends to become less statistically significant over time. Up to 1980 it is significant at greater than the 90 percent level. The coefficient also changes magnitude somewhat from year to year and shows a tendency to be trending downwards (as in the OLS results) over time.

In all years, the relationship is fairly substantive. In 1960, when the estimated coefficient is at its maximum of 0.28. This seems substantive. A one standard deviation increase in openness, or a move from autarchy to the median level of openness of 12 percent, would imply an increase in the polity score of three and a half points. This is equal to almost one half of the polity score's standard deviation. According to the polity rankings in 1960, this would have been equivalent to seeing the likes of Brazil or Turkey become as democratic as the US, the UK or the Netherlands.

In the year 2000, when the coefficient is at its estimated low, the marginal effect of opening up from autarchy to the median level of openness (i.e., 18 percentage points) would have been to increase the polity score by a much smaller but still substantive 0.72 points. This implies a beta coefficient of about 0.13. In that year this would have been similar to moving from a polity score of 8, as in Mexico or Senegal, to one with a polity score of 9 as in France, South Africa or India.<sup>21</sup>

### **Robustness**

We included size variables in Table 9. The difference between the results here and the previous table is largest in 1960 and 1965. Controlling for country size also increases the statistical significance of the coefficient on openness in most years. Besides eliminating the already discussed bias, it appears to alleviate the excessive influence Singapore exerts on the results.

Ordered probit specifications for selected years appear in Tables 11 and ???. As mentioned



above, this specification of the dependent variable is technically more correct, but whether the parameterization makes a difference in practice to the substantive results is the question. We follow techniques adapted from Rivers and Vuong (1988) to control for endogeneity. Our results are qualitatively similar to the two-stage least squares results. The coefficient is larger in earlier years and openness is associated with more democracy. In contrast to the linear regressions, the coefficient is also statistically significant at greater than the 95 percent level in all years except 1970.<sup>22</sup>

Finally, our regressions use “generated instruments” as instruments rather than the geographic information itself. As in Wooldridge (2002 p. 117) the usual two-stage least squares standard errors are asymptotically correct under the assumption the parameters from the gravity equation are consistent and the correlation between the geographic information and the error term is zero. Nevertheless, we simulated the change in the standard error of the openness coefficient for small changes in the underlying geographic data.<sup>23</sup> This allows us to gauge how much sampling error could be affecting the standard errors. To save on computation time, we chose to carry out such a simulation for 1960 and 1995. Doing so barely altered the standard errors on the coefficient on openness. For example, our simulations yielded an increase of 0.001 in the standard error of the openness coefficient in both years.

### **Results: 1920-1938**

For the 1920s and 1930s, our regressions support the idea that naturally open countries or places where trade was more important were less likely to fall to authoritarianism. Table 7 shows that during the interwar period there is a highly statistically significant and positive relationship between openness and democracy when not controlling for endogeneity. The results here show that the coefficient on openness is much larger than that in the pre- and post-War eras. In many years the coefficient is between 0.3 and 0.5. The marginal effect of a one standard deviation change in openness is measured as roughly four which is similar to that in the early post-1960 period.

Table 8 reports the instrumental variables regressions. The relationship between international trade and democracy is positive, highly statistically significant and larger than nearly all

the year by year estimates after 1960. The estimated coefficient of 0.53 in 1928 implies a move from the median level of PPP-adjusted openness of 21 percent to 10 percent (a one standard deviation decrease) would imply a decrease in the polity score of roughly six points. In Finland for example openness fell from 31 percent in 1928 to 19 percent in 1931. The polity score fell from ten to four between these years. Of course other countries experienced falls in measured openness during the worldwide depression, but the econometrics suggest the countries with the largest falls in trade would be expected to succumb to increasing authoritarianism.

For this sub-period we also tried other specifications of these baseline regressions. We included controls for size in Table 9 and obtained larger more statistically significant coefficients on openness than those in Table 8. Here there is almost a one-for-one relationship between openness and the polity score. Ordered probit results produce positive coefficients (and increases in the polity score for increases in openness) that are also highly statistically significant in all years of the interwar period.

### **Results: 1870-1913**

For the relatively limited nineteenth century sample, Table 7 shows that in many of our benchmark years there is a statistically significant and positive relationship between openness and democracy.<sup>24</sup> Simple OLS suggests the coefficient on openness equals roughly 0.1.<sup>25</sup> Statistical significance is higher in the latter years of this period suggesting that this first wave of globalization (which dates from at least the mid-nineteenth century) took time to provoke the initial stimulus to democracy's first major advance.

Table 8 reports instrumental variables regressions. The relationship between international trade and democracy is positive and statistically significant at better than the 90 percent level in four out of the nine years presented. In most years, the OLS coefficient seems to be biased downward compared to the instrumental variables regressions. Since data were only available for these benchmark years, we are unable to tell if the coefficient is becoming increasingly significant over time or whether these results are sample-based.

The estimated coefficient of 0.1 implies that a move from autarchy to the median level of openness of 38 percent would yield an increase in the polity score of roughly four points.

According to the polity rankings in 1910, this would have been equivalent to seeing countries like Spain, Portugal or Denmark gain a polity score equal to the US or Canada.

We tried other specifications of these baseline regressions to test their sensitivity. Ordered probit results in Table ?? find some evidence that there is a positive relationship between democracy and openness. While the coefficient is positive and the marginal effects are too, in many years these are only statistically significant at about the 85 or 90 percent confidence level. One might attribute these imprecise results to the fact that the number of degrees of freedom are so small. Indeed, given the theoretical arguments and the other empirical evidence, we feel cautiously inclined to trust the point estimates and to downplay the large standard errors here.

## 5 Conclusions

In this study we attempt to gauge the causal impact of trade openness on the level of democracy. To do so we construct a measure of “natural” openness and use it to see if countries that are more naturally open are more democratic. Indeed we find that open countries have consistently been more strongly democratic between 1895 and 2000.

Our methods suggest that an autonomous move from autarchy to the average level of openness, perhaps through the ending of inward looking trade policies or the signing of trade agreements to lower tariffs, could raise a country’s democracy measure by somewhere between three and five points over the long-run. This is a substantial increase. To put this in perspective, this would have been comparable to seeing countries like Argentina, South Korea, Brazil or Romania (all with polity scores of 8) achieve a polity score similar to the US, the UK or France in the year 2000.

Interestingly there is evidence that the strength of the relationship is fairly constant over time, and changes in openness also seem to have a long-run impact on the level of the polity score rather than an immediate short-run effect. Further evidence has shown that there may be variation by region in the impact. Unfortunately, we cannot totally rule out that a set of as yet un-identified fixed or slowly changing country-level variables is responsible for the move to democratization.

Since our definition of democracy is based on the Polity IV data set it may not capture all aspects of a democratic system. For the cautious reader, our results might be interpreted as saying that openness raises competition in the recruitment of the executive, more open participation in choosing the executive and more checks and balances against an executive. It would be interesting to find out through which channels openness is affecting the polity score.

Given the components that the polity score measures, this study may shed light on the kind of theoretical model one would need to explain this process. The results may be in line with a story that argues that openness and more fierce competition in goods markets creates similar pressures in the political system. This is something we intend to look at in future research from a theoretical and historical perspective.

Overall, the long-run patterns suggest a similar story for the period between 1870 and 1913, again between 1920 and 1939 and finally between 1960 and 2000. We believe there is adequate information available to argue that international trade or, at the very least, fundamental factors that drive openness to trade can help increase the process of building and consolidating democracy. Nevertheless, more research needs to be done to analyze the relative strength of this channel versus other factors.

## References

- Acemoglu, Daron and James Robinson**, “Political Origins of Dictatorship and Democracy,” 2003. Mimeo, University of California, Berkeley.
- Alvarez, Mike, José Antonio Cheibub, Fernando Limongi, and Adam Przeworski**, *Democracy and Development: Political Institutions and Material Well-Being in the World, 1950-1990*, Cambridge: Cambridge University Press, 2000.
- Anderson, James E.**, “A Theoretical Foundation for the Gravity Equation,” *American Economic Review*, 1979, 69 (1), 106–116.
- **and Eric van Wincoop**, “Gravity with Gravitas: A Solution to the Border Puzzle,” *American Economic Review*, March 2003, 93 (1), 170–192.
- Anderson, T.W. and Cheng Hsiao**, “Formulation and Estimation of Dynamic Models Using Panel Data,” *Journal of Econometrics*, 1982, 18 (1), 47–82.
- Barbieri, Katherine**, “Economic Interdependence and Militarized Interstate Conflict, 1870-1985.” PhD dissertation, Binghamton University, Binghamton, NY 1996.
- Brock, William A. and Steven N. Durlauf**, “Multinomial Choice with Social Interactions,” Working Paper t0288, National Bureau of Economic Research June 2003.
- Bussman, Margit**, “Examining Causality Among Conflict, Democracy, Openness, and Economic Growth,” 2001. Mimeo, University of Alabama.
- Eichengreen, Barry and Douglas Irwin**, “Trade blocs, currency blocs and the reorientation of world trade in the 1930s,” *Journal of International Economics*, 1995, 38, 1–24.
- Estevadeordal, Antoni, Brian Frantz, and Alan M. Taylor**, “The Rise and Fall of World Trade, 1870-1939,” *Quarterly Journal of Economics*, 2003, 118, 359–407.
- Frankel, Jeffrey A. and Andrew K. Rose**, “An Estimate of the Effect of Currency Unions on Trade and Growth,” *Quarterly Journal of Economics*, May 2002, 117 (2), 437–466.
- **and David Romer**, “Does trade Cause Growth?,” *American Economic Review*, June 1999, 89 (3), 379–399.
- **, ed.**, *The Regionalization of the World Economy*, Chicago: Chicago University Press, 1998.
- Griliches, Zvi**, “Estimating the Returns to Schooling: Some Econometric Problems,” *Econometrica*, 1977, 45 (1), 1–22.
- Heston, Robert Summers Alan and Bettina Aten**, *Penn World Table Version 6.1* Center for International Comparisons at the University of Pennsylvania (CICUP) October 2002.
- House, Freedom**, *Freedom House Country Ratings* 2003.
- Li, Quan and Rafael Reuveny**, “Economic Globalization and Democracy: An Empirical Analysis,” 2003. Mimeo, Pennsylvania State University.
- Lin, Justin Yifu and Jeffrey B. Nugent**, “Institutions and Economic Development,” in Jere Behrman and T.N. Srinivasan, eds., *Handbook of Development Economics*, Vol. IIIA, Amsterdam: Elsevier Science B.V., 1995, chapter 38, pp. 2301–2370.
- López-Córdova, J. Ernesto and Christopher Meissner**, “Exchange Rate Regimes and International Trade: Evidence from the Classical Gold Standard Era,” *American Economic Review*, 2003, 93 (1), 344–353.
- Maddison, Angus**, *The World Economy: A Millennial Perspective*, Paris: Development Centre of the Organisation for Economic Co-operation and Development, 2001.
- Mansfield, Edward D., Helen V. Milner, and B. Peter Rosendorff**, “Free to Trade: Democracies, Autocracies, and International Trade,” *American Political Science Review*, 2000, 94 (2), 305–321.
- Marshall, Monty G. and Keith Jagers**, *Polity IV Project: Political Regime Characteristics and Transitions, 1800-1999* Integrated Network for Societal Conflict Research (INSCR) Program, Center for International Development and Conflict Management (CIDCM) December 2000.
- Mitchell, Brian R.**, *International Historical Statistics. Europe 1750-1988*, New York: Stockton Press, 1992.
- *International Historical Statistics. The Americas 1750-1988*, New York: Stockton Press, 1993.
- *International Historical Statistics. Africa, Asia & Oceania 1750-1988*, New York: Stockton Press, 1995.

- Obstfeld, Maurice and Alan M. Taylor**, "Sovereign Risk, Credibility and the Gold Standard: 1870-1913 versus 1925-31," April 2003, *113*, 1-35.
- O'Rourke, Kevin H. and Jeffrey G. Williamson**, *Globalization and History: The Evolution of a Nineteenth-Century Atlantic Economy*, Cambridge, Massachusetts and London: The MIT Press, 1999.
- Ritschl, Albrecht and Nikolaus Wolf**, "Endogeneity of Currency Areas and Trade Blocs: Evidence from the Inter-war Period," Working Paper 4112, CEPR November 2003.
- Rodrik, Dani**, "Institutions for High-Quality Growth: What They Are and How to Acquire Them," Working Paper 7540, National Bureau of Economic Research February 2000.
- Roeder, Philip G.**, "Ethnolinguistic Fractionalization (ELF) Indices, 1961 and 1985," Technical Report 2001. Downloaded from <http://weber.ucsd.edu/~proeder.htm> on 22 November, 2003.
- Rose, Andrew K.**, "Do We Really Know that the WTO increases Trade?," *American Economic Review*, 2003. (forthcoming).
- **and Reuven Glick**, "Does a Currency Union affect Trade? The Time-Series Evidence," *European Economic Review*, June 2002, *46* (6), 1125-1151.
- Tir, Philip Schafer Paul F. Diehl Charles Gochman Douglas M. Stinnet Jaroslav**, "The Correlates of War Project Direct Contiguity Data, Version 3," *Conflict Management and Peace Science*, 2002, *19* (2), 58-66.
- Treier, Shawn and Simon Jackman**, "Democracy as a Latent Variable," 2003. Mimeo, Stanford University.
- USTR**, "NAFTA Works for America," Electronic document: <http://www.ustr.gov/naftareport/home.htm> July 1999.
- Vanhanen, Tatu**, *The Polyarchy Dataset: Vanhanen's Index of Democracy* 2000.
- Vuong, Douglas Rivers Quang H.**, "Limited Information Estimators and Exogeneity Tests for Simultaneous Probit Models," *Journal of Econometrics*, November 1988, *39* (3), 347-366.
- Wei, Shang Jin**, "Natural Openness and Good Government," Working Paper 7765, National Bureau of Economic Research June 2000.
- Wooldridge, Jeffrey M.**, *Econometric Analysis of Cross Section and Panel Data*, London: MIT Press, 2002.

## Notes

<sup>1</sup>*The Washington Post* (29 January 2001).

<sup>2</sup>Bernard Avishai, "America's invisible export," *Civilization*, April-May 2000, p. 84.

<sup>3</sup>For example, it is compelling to think that the level of democracy is positively related to schooling levels. However, schooling itself is likely to be influenced by the political regime.

<sup>4</sup>An important point that Frankel and Romer made is that controls for size were necessary. Smaller countries are naturally more proximate to other countries and also engage in more international and less intra-national trade. If trade and exchange in general (i.e., the overall size of the economy), rather than international trade affected the amount of democracy, our instrument could be negatively correlated with the error term and therefore possibly biased downward. Therefore, key controls may be population and land area.

<sup>5</sup>We make land area and distance a time-varying variable. In principle, if the area of a country changes, then the geographic center of a country may also change. It turns out that we do not have too many observations with full data that change bilateral distance or area within our samples.

<sup>6</sup>We assume a heteroscedastic error process for equation (2). If we do not then  $\hat{T}_{it}$  will be multiplied by a pair-specific residual, and this would affect our regressions of interest. Assuming homoscedasticity makes it so that a constant pre-multiplies all of the instruments and hence will not affect our instrumental variables regressions.

<sup>7</sup>Treir and Jackman (2003) provide a recent analysis of some important issues and provide measures of the latent value of democracy. These variables could be of interest as a dependent variable in further study.

<sup>8</sup>We are aware that this comparative static is only an approximation. One problem with this is that categorical coding of the dependent variable makes it generally technically incorrect to suppose that incremental changes are uniform across the interval. Ordered probit analysis we undertake below helps us to be more precise about this.

<sup>9</sup>We have in fact carried out these specifications every five years between 1870 and 1910 (the only years for which we have data) and for all years between 1920 and 1939 and 1960 and 2000. Reporting only benchmark years does not change the qualitative results reported below.

<sup>10</sup>Our results differ from Bussman (2001) because she uses different instrumental variables than we do. Her results appear to rely mainly on population growth rates to instrument for openness. Contrary to Li and Reuveny (2003) we find a positive coefficient. This is possibly because of their use of fixed effects with a lagged dependent variable which is a mis-specification given the structure of the data. They also include other variables likely to be endogenous but do not correct for this problem either.

<sup>11</sup>Singapore is an extreme outlier for the 1960-2000 sample. In each year it massively influences the results compared to its relative importance on the global scene. Taking Singapore out

changes our results drastically: in the specification of column (3) the coefficient is estimated at 0.21 and has a standard error of 0.01 while the other coefficients are qualitatively similar.

<sup>12</sup>We do not run a panel “fixed effects” regression with the lagged value of polity as in Li and Reuveny (2003). The presence in equation (1) of fixed effects indicators coupled with a lagged dependent variable would present an econometric problem even if there were no autocorrelation in the error term. To see why, one uses the notion that the fixed effects panel estimator can be written as a model where all the regressors are in terms of deviations from individual mean values. One immediately sees that the error term in this specification is a function of all periods’ error terms, and because of this, the lagged dependent variable is correlated with this error term.

<sup>13</sup>In a regression of our instrument on the fixed factors included in Table 6 column (2) and year indicators, the R-Squared is roughly 0.6. This is another way to say that the instrument is fairly fixed over time and the root of our multicollinearity problems.

<sup>14</sup>We also included the average polity score of each country’s Politically Relevant International Environment (PRIE) and output per capita. We instrumented the latter with distance from the equator. We define the PRIE as the US, the UK, France, and the USSR (or Russia after 1990). We include China if the country is in Asia. In the PRIE score we also include the polity score of all countries that are less than 601 miles from the home country. In the year-by-year specifications with this variable we ran, we found that openness is positively related and statistically significant at better than the 90 percent level up to 1980. Output per capita is always positive and significant as is the PRIE polity score. In a panel specification openness is negative and significant or negative and insignificant depending on the particular specification. Still, the lack of convincing instruments for output per person and the econometric identification problem associated with neighborhood effects as outlined in Brock and Durlauf (2003) persuaded us not to report these specifications. While we are aware that the non-linear ordered probit model may identify the regional effects, we are cautious because of the remaining “selection” issues and because the instrument for openness does not seem related to the regional average choices.

<sup>15</sup>Prior to 1990 the countries for which we have data in the Eastern Europe region are Poland, Hungary, Romania and Turkey.

<sup>16</sup>If we leave out Singapore, East Asia also has a large, statistically significant and positive relationship.

<sup>17</sup>We also allowed for different slopes by region both for openness and lagged polity. The results are qualitatively similar to those of Table 6 where we allow for regional variation in the coefficient on openness.

<sup>18</sup>When we control for whether a country is a primary commodity exporter or a petroleum exporter by interacting these variables with openness in the baseline two-stage least squares regression, results show that these types of countries have significantly lower polity scores.

<sup>19</sup>Below we present ordered probit results for selected years. This type of model, strictly speaking, may be more appropriate for the structure of our dependent variable. We are also comfortable using continuous dependent variable techniques because, as the number of categories becomes large, ordered probit and linear models produce very similar results and because the predictions we get from our model are very nearly within the bounds of the actual outcomes.



<sup>20</sup>Again, Singapore is an extreme outlier. In each year it overly influences the results compared to its relative importance on the global scene. Taking Singapore out changes our results slightly up to 1980 and significantly after 1980. When we take it out, the coefficient on openness is highly statistically significant up to 2000 and does not show a secular decline.

<sup>21</sup>We also ran instrumental variables regressions with a quadratic term for openness including Singapore adding the square of predicted openness to our instrument list. Results are qualitatively very similar to (un-reported) results which left Singapore out. The total partial effect (evaluated at the mean of openness) ranges from a high of 0.50 in 1970 to a low of 0.14 in 2000. Nevertheless, the sum of the coefficients in the polynomial are statistically significant only from 1970 onwards which suggests a more linear relationship prior to the 1970s when global trade had yet to fully take off.

<sup>22</sup>As mentioned above, we used the binary data from Alvarez et. al. in an instrumental variables probit model including simply openness but also controls for country size and GDP per capita. Their data is available from 1960 to 1990. The results show a highly significant and positive relationship between democracy and openness. It would appear that the general positive correlation is not too sensitive to the way in which we code the democracy variable.

<sup>23</sup>Essentially we allow each variable in the gravity equation to increase by 0.001 and generate a new value of predicted trade. We then redo the instrumental variables regression to see how the standard error of our coefficient changes. See Frankel and Romer (1999) for a precise explanation.

<sup>24</sup>The countries in our 1910 sample are Great Britain, France, USA, Belgium, Switzerland, Italy, Germany, Denmark, Norway, Sweden, Austria, Russia, Spain, Portugal, Greece, Australia, Canada, Japan, Brazil, Mexico, Chile, Argentina and New Zealand.

<sup>25</sup>There are also a few outliers in this period with openness greater than 110 percent. Excluding the Netherlands from 1880, Switzerland in 1880 and Chile from 1880 to 1890 changes the simple linear model results drastically. The coefficients on openness are larger and more significant after 1890. However, including a quadratic for openness yields OLS results very similar to those found excluding these outliers.

## Econometrics Appendix

Our random effects models assume that one part of the error term is idiosyncratic to the country, and, most importantly, that the country error is uncorrelated with the instrument, and other included or excluded regressors. Our fixed effects specifications allow us to relax this strong assumption and model any unobserved heterogeneity with a country specific intercept. The other benefit of this type of model is that it uses the variance over time in the data *within* a country to estimate the average relation between changes in openness to changes in democracy. The drawback is that if the regressors are uncorrelated with the country specific error component the estimates are inefficient and would tend to over-reject the null hypothesis of no correlation.

The partial adjustment model pools the data but allows for the influence of past outcomes by including the lagged value of the polity score. One natural interpretation of the partial adjustment model is that a country has a conditional target or optimal level of democracy, but that it is costly or difficult to adjust towards this level. The model hence allows for estimation of a short run-impact and a long-run impact on the level of democracy.<sup>26</sup> For all of these specifications we make sure to use heteroscedasticity and autocorrelation robust standard errors.

We also present a generalized method of moments (GMM) estimation technique for dynamic panels with fixed effects made operational by Arellano and Bond (1991). This type of technique is precisely for panel data models that have the structure of equation (1) but which might include lagged values of democracy to control for the importance of historical regime choice. Note that if previous levels of democracy matter, a fixed effects panel regression is not valid in this case because of the correlation between the error term and the lagged values induced by the within transformation.

To obtain unbiased estimates of the coefficients, one first writes equation (1) in first differences as follows

$$(4) \quad \Delta Democracy_{it} = Democracy_{it} - Democracy_{it-1} = \tilde{\beta}_0 + \tilde{\delta}(\Delta Openness_{it}) + \sum_{k=1}^T \tilde{\gamma}_k (\Delta Democracy_{it-k}) + \Delta u_{it}$$

where the “ $\Delta$ ” is the difference operator, and we use the “ $\tilde{\cdot}$ ” to distinguish the coefficients estimated in this model from those of equation (1). Notice that the variables that are constant over time (e.g., the country fixed effects) fall out of the equation, and so we control for these factors by taking the first differences. The lagged dependent variable terms are correlated with the new error term since the lagged error term appears in the differenced error term. To get around this, one uses plausible instruments for the lagged values of the dependent variable. Assuming we restrict the lag structure to include only the first-lagged difference of the democracy measure, then any previous lag from period  $t - 2$  and before would be viable. These values are highly correlated with lagged democracy but are uncorrelated with the error term.<sup>27</sup>

The GMM estimates gain efficiency by using a large number of “moment” restrictions and solve for the parameters on the basis of those restrictions. In particular the moment restrictions here are that the expectations of the cross products of the lagged values used as instruments and the error terms are zero. We use up to the fifth lag of the dependent variable as an instrument, the level and first difference of predicted openness and the second lag of actual openness in the instrument set. Our justification for including the second lag of actual openness is that this variable can be considered predetermined and hence not correlated with the error term.<sup>28</sup> We use *Stata* and also reproduced our results in *Ox*. The details on estimation methods are given in the *Stata User's Manual*.

Anderson and Hsiao (1982) performed a similar regression using only the second lag as an instrument for the lagged difference. Arellano and Bond (1991) pointed out that using many more lags as instruments could increase the efficiency of the estimation. We present Anderson Hsiao type estimates for comparison.

# Data Appendix

## **Democracy**

1870-2000: We use the polity measure from the Polity IV data set. We classify this variable as missing if there is an interruption, interregnum, or transition. See the discussion in the text and the Polity IV manual for insight into how this variable is constructed.

## **Openness**

1870-1913: Exports and imports were taken from Barbieri (1996), López Córdova and Meissner (2003) and Mitchell (1992, 1993 and 1995). GDP come from the data set underlying López Córdova and Meissner (2003). Some additional nominal GDP and total trade values were taken from the data set used in Obstfeld and Taylor (2003). Nominal imports and exports were divided by the nominal value of GDP to arrive at an openness measure.

1917-1940: Exports and imports in dollars were taken from Barbieri (1996) and Mitchell (op. cit.). Nominal GDP data come from Eichengreen and Irwin (1995), Mitchell (op. cit.), Obstfeld and Taylor (2003), and Ritschl and Wolf (2003). Real PPP-adjusted GDP is available from Maddison (2001). For real-PPP adjusted openness we inflated current values of exports and imports to 1990 values using the US CPI from [www.freelunch.com](http://www.freelunch.com). We then divided these values by Maddison's GDP values.

1960-2000: Total trade in dollars comes from Rose (2003) supplemented by data from the IMF *International Financial Statistics* and the World Bank's *World Development Indicators*. We reflat trade using a US CPI available from [www.freelunch.com](http://www.freelunch.com). We divided these real values of trade by GDP values from the *Penn World Tables* supplemented by the *World Development Indicators*. To make the PPP adjustment, we used the GDP price level factor from the *World Development Indicators* to account for local deviations of the price levels.

## **Gravity Regression Components**

### **Bilateral Trade**

1870-1913: Bilateral trade comes from López Córdova and Meissner (2003). We divided current dollar value bilateral trade by nominal current dollar values of GDP. Using PPP-adjustments made the regressions of interest infeasible.

1917-1940: Bilateral trade comes from Barbieri (1996) supplemented by Ritschl and Wolf (2003). We converted trade to real 1990 values using a CPI for the US and divided these values by Maddison's PPP-adjusted GDP.

1960-2000: Bilateral trade comes from Rose (2003) supplemented by the IMF's *Direction of Trade Statistics*. We use the average of exports and imports as reported by both countries in a country pair rather than the average of all four possible values as in Rose (2003). We converted trade to real values as described above and divided by PPP-Adjusted GDP.

### **GDP**

See previous notes on openness.

### **Population**

1870-1913: Data come from López Córdova and Meissner (2003).

1917-1940: Populations come from Mitchell (op. cit.) supplemented by data from Eichengreen and Irwin (1995).

1960-2000: Population comes from the World Bank's *World Development Indicators*.

**Land Area** This is measured as the logarithm of square kilometers.

1870-1913: López Córdova and Meissner (2003)

1917-1940: Stinnett, Tir, Schafer, Diehl, and Gochman (2002)

1960-2000: Rose (2003)

### **Bilateral Distance**

1870-1913: López Córdova and Meissner (2003)

1917-1940: Eichengreen and Irwin (1995)

1960-2000: Rose (2003)

### **Shared Border Indicators**

1870-1913: López Córdova and Meissner (2003)

1917-1940: Eichengreen and Irwin (1995)

1960-2000: Rose (2003)

**Landlocked Indicators**

1870-1913: López Córdova and Meissner (2003).

1917-1940: Eichengreen and Irwin (1995)

1960-2000: Rose (2003)

**Island Indicator**

All years come from Rose (2003)

**Common Language**

1870-1913 and 1917-1940: López Córdova and Meissner (2003)

1960-2000: Rose (2003)

Table 1: Gravity Equation Results, 1870-2000

| <i>Regressors</i>         | <i>Year</i>     |                 |                  |                 |                 |                 |                  |                  |                 |  |
|---------------------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|--|
|                           | 1960            | 1965            | 1970             | 1975            | 1980            | 1985            | 1990             | 1995             | 2000            |  |
| distance                  | -0.65<br>(0.03) | -0.72<br>(0.03) | -0.94<br>(0.03)  | -1.10<br>(0.03) | -1.14<br>(0.03) | -1.24<br>(0.04) | -1.30<br>(0.04)  | -1.17<br>(0.03)  | -1.27<br>(0.03) |  |
| ln (area) country i       | -0.10<br>(0.02) | -0.07<br>(0.01) | -0.17<br>(0.02)  | -0.11<br>(0.02) | -0.14<br>(0.02) | -0.15<br>(0.02) | -0.13<br>(0.02)  | -0.14<br>(0.02)  | -0.07<br>(0.02) |  |
| ln (area) country j       | -0.12<br>(0.02) | -0.12<br>(0.02) | -0.19<br>(0.02)  | -0.12<br>(0.02) | -0.14<br>(0.02) | -0.21<br>(0.02) | -0.23<br>(0.02)  | -0.25<br>(0.02)  | -0.12<br>(0.02) |  |
| ln (population) country i | -0.34<br>(0.02) | -0.35<br>(0.02) | -0.08<br>(0.02)  | -0.11<br>(0.02) | -0.08<br>(0.02) | -0.05<br>(0.02) | 0.00<br>(0.02)   | 0.01<br>(0.02)   | -0.14<br>(0.02) |  |
| ln (population) country j | 0.74<br>(0.02)  | 0.75<br>(0.02)  | 0.92<br>(0.02)   | 0.83<br>(0.02)  | 0.88<br>(0.02)  | 1.00<br>(0.02)  | 1.08<br>(0.02)   | 1.10<br>(0.02)   | 0.95<br>(0.02)  |  |
| landlocked                | -0.19<br>(0.06) | -0.19<br>(0.05) | -0.43<br>(0.06)  | -0.50<br>(0.06) | -0.65<br>(0.06) | -0.74<br>(0.06) | -0.94<br>(0.06)  | -1.13<br>(0.05)  | -0.91<br>(0.04) |  |
| island                    | 0.38<br>(0.05)  | 0.42<br>(0.05)  | 0.27<br>(0.06)   | 0.19<br>(0.06)  | 0.10<br>(0.05)  | 0.29<br>(0.06)  | 0.14<br>(0.06)   | 0.20<br>(0.05)   | 0.46<br>(0.05)  |  |
| border                    | 0.15<br>(0.13)  | 0.14<br>(0.12)  | 0.42<br>(0.13)   | -0.04<br>(0.14) | 0.16<br>(0.14)  | 0.12<br>(0.14)  | 0.28<br>(0.14)   | 0.79<br>(0.13)   | 0.80<br>(0.11)  |  |
| common language           | 0.41<br>(0.06)  | 0.45<br>(0.05)  | 0.45<br>(0.06)   | 0.44<br>(0.06)  | 0.33<br>(0.06)  | 0.34<br>(0.07)  | 0.30<br>(0.07)   | 0.52<br>(0.06)   | 0.55<br>(0.05)  |  |
| constant                  | -6.33<br>(0.46) | -6.25<br>(0.42) | -10.11<br>(0.44) | -8.22<br>(0.43) | -8.25<br>(0.40) | -9.70<br>(0.45) | -11.34<br>(0.47) | -12.52<br>(0.39) | -9.27<br>(0.32) |  |
| Number of obs             | 4477            | 5699            | 8040             | 8817            | 9657            | 10051           | 10842            | 13005            | 11942           |  |
| R-squared                 | 0.44            | 0.43            | 0.35             | 0.33            | 0.34            | 0.31            | 0.33             | 0.36             | 0.46            |  |

Notes: Dependent variable in the "Gravity Equation" is the log of total bilateral trade divided by GDP. See the text for precise definitions.

Table 2: Gravity Equation Results, 1870-1939

| Regressors                | Year            |                 |                 |                 |                 |                 |
|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                           | 1920            | 1925            | 1928            | 1932            | 1935            | 1938            |
| distance                  | -0.61<br>(0.10) | -0.34<br>(0.07) | -0.51<br>(0.08) | -0.51<br>(0.07) | -0.42<br>(0.06) | -0.48<br>(0.06) |
| ln (area) country i       | 0.22<br>(0.05)  | 0.09<br>(0.04)  | -0.01<br>(0.04) | -0.02<br>(0.04) | -0.00<br>(0.03) | 0.02<br>(0.03)  |
| ln (area) country j       | 0.07<br>(0.06)  | -0.06<br>(0.04) | -0.04<br>(0.05) | -0.06<br>(0.04) | -0.04<br>(0.03) | -0.02<br>(0.04) |
| ln (population) country i | -0.52<br>(0.07) | -0.49<br>(0.05) | -0.35<br>(0.06) | -0.35<br>(0.05) | -0.48<br>(0.04) | -0.51<br>(0.05) |
| ln (population) country j | 0.49<br>(0.08)  | 0.54<br>(0.06)  | 0.66<br>(0.06)  | 0.65<br>(0.05)  | 0.51<br>(0.04)  | 0.52<br>(0.05)  |
| landlocked                | -0.23<br>(0.19) | -0.27<br>(0.12) | -0.22<br>(0.14) | -0.16<br>(0.12) | -0.18<br>(0.09) | -0.32<br>(0.12) |
| island                    | 0.70<br>(0.16)  | 0.41<br>(0.12)  | 0.00<br>(0.13)  | 0.04<br>(0.12)  | 0.48<br>(0.09)  | 0.50<br>(0.10)  |
| border                    | 0.37<br>(0.30)  | 0.61<br>(0.19)  | 0.10<br>(0.22)  | 0.03<br>(0.19)  | 0.21<br>(0.15)  | -0.11<br>(0.19) |
| common language           | 0.99<br>(0.25)  | 0.90<br>(0.18)  | 1.21<br>(0.22)  | 1.24<br>(0.20)  | 1.14<br>(0.16)  | 1.01<br>(0.18)  |
| constant                  | -2.18<br>(1.23) | -3.77<br>(0.88) | -4.89<br>(0.99) | -5.29<br>(0.86) | -3.00<br>(0.70) | -2.67<br>(0.80) |
| Number of obs             | 396             | 488             | 640             | 716             | 693             | 698             |
| R-squared                 | 0.38            | 0.43            | 0.36            | 0.38            | 0.48            | 0.42            |

Notes: Dependent variable in the "Gravity Equation" is the log of total bilateral trade divided by GDP. See the text for precise definitions.

| Regressors                | Year            |                 |                 |                 |                 |                 |                 |                 |                 |
|---------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                           | 1870            | 1875            | 1880            | 1885            | 1890            | 1895            | 1900            | 1905            | 1910            |
| distance                  | -0.46<br>(0.18) | -0.50<br>(0.14) | -1.04<br>(0.15) | -1.00<br>(0.16) | -1.02<br>(0.14) | -0.93<br>(0.12) | -0.78<br>(0.12) | -0.67<br>(0.12) | -0.71<br>(0.10) |
| ln (area) country i       | 0.06<br>(0.08)  | 0.01<br>(0.07)  | 0.16<br>(0.08)  | 0.14<br>(0.08)  | 0.11<br>(0.07)  | 0.09<br>(0.06)  | 0.05<br>(0.07)  | -0.09<br>(0.06) | -0.02<br>(0.05) |
| ln (area) country j       | 0.03<br>(0.09)  | 0.05<br>(0.07)  | 0.10<br>(0.08)  | 0.07<br>(0.09)  | 0.09<br>(0.08)  | 0.12<br>(0.07)  | -0.07<br>(0.07) | -0.13<br>(0.06) | -0.03<br>(0.05) |
| ln (population) country i | -0.43<br>(0.13) | -0.32<br>(0.10) | -0.24<br>(0.12) | -0.27<br>(0.12) | -0.33<br>(0.11) | -0.24<br>(0.09) | -0.21<br>(0.10) | -0.11<br>(0.08) | -0.17<br>(0.07) |
| ln (population) country j | 0.45<br>(0.10)  | 0.47<br>(0.09)  | 0.53<br>(0.11)  | 0.48<br>(0.11)  | 0.48<br>(0.09)  | 0.53<br>(0.08)  | 0.74<br>(0.08)  | 0.77<br>(0.07)  | 0.73<br>(0.06)  |
| landlocked                | -0.97<br>(0.45) | -1.33<br>(0.34) | -1.41<br>(0.43) | -1.05<br>(0.42) | -0.77<br>(0.34) | -0.66<br>(0.26) | -0.65<br>(0.25) | -0.84<br>(0.26) | -0.41<br>(0.22) |
| island                    | 1.43<br>(0.27)  | 1.25<br>(0.23)  | 0.17<br>(0.29)  | -0.21<br>(0.29) | 0.12<br>(0.25)  | 0.41<br>(0.23)  | -0.18<br>(0.24) | 0.07<br>(0.19)  | 0.40<br>(0.16)  |
| border                    | 1.29<br>(0.40)  | 1.91<br>(0.32)  | 0.73<br>(0.42)  | 0.45<br>(0.42)  | 0.48<br>(0.37)  | 0.59<br>(0.33)  | 0.68<br>(0.35)  | 0.89<br>(0.36)  | 0.53<br>(0.30)  |
| common language           | 1.36<br>(0.44)  | 0.80<br>(0.32)  | 1.19<br>(0.43)  | 0.82<br>(0.44)  | 0.76<br>(0.38)  | 0.79<br>(0.33)  | 0.53<br>(0.34)  | 0.65<br>(0.32)  | 1.01<br>(0.28)  |
| constant                  | -3.33<br>(1.13) | -3.13<br>(0.93) | -1.64<br>(1.17) | -0.87<br>(1.21) | -0.57<br>(1.07) | -1.93<br>(0.91) | -0.80<br>(0.95) | 0.36<br>(0.89)  | -1.05<br>(0.78) |
| Number of obs             | 173             | 245             | 290             | 293             | 330             | 386             | 416             | 481             | 451             |
| R-squared                 | 0.50            | 0.52            | 0.37            | 0.34            | 0.40            | 0.42            | 0.41            | 0.39            | 0.49            |

Notes: Dependent variable in the "Gravity Equation" is the log of total bilateral trade divided by GDP. See the text for precise definitions.

Table 3: First Stage Regression Results, 1870-2000

| Regressors         | Year           |                |                |                |                 |                |                |                |                |
|--------------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|
|                    | 1960           | 1965           | 1970           | 1975           | 1980            | 1985           | 1990           | 1995           | 2000           |
| Predicted Openness | 2.28<br>(0.43) | 2.35<br>(0.46) | 3.73<br>(0.76) | 4.6<br>(1.20)  | 5.06<br>(1.52)  | 3.88<br>(1.24) | 3.93<br>(1.51) | 3.49<br>(1.54) | 3.51<br>(0.79) |
| constant           | 4.56<br>(1.84) | 5.06<br>(1.94) | 3.7<br>(2.70)  | 2.18<br>(5.91) | -0.29<br>(9.19) | 3.1<br>(5.25)  | 4.3<br>(7.18)  | 6.58<br>(8.99) | 0.9<br>(5.29)  |
| Number of obs      | 76             | 90             | 97             | 103            | 104             | 105            | 105            | 117            | 115            |
| R-squared          | 0.58           | 0.48           | 0.47           | 0.4            | 0.44            | 0.42           | 0.29           | 0.26           | 0.4            |

NOTES: Dependent variable is the real value of total exports and imports divided by PPP-adjusted GDP. Predicted openness comes from the predicted values of the gravity equation presented in Table 1. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors         | Year            |                |                 |                |                |                |
|--------------------|-----------------|----------------|-----------------|----------------|----------------|----------------|
|                    | 1920            | 1925           | 1928            | 1932           | 1935           | 1938           |
| Predicted Openness | 0.83<br>(0.22)  | 1.01<br>(0.12) | 0.84<br>(0.28)  | 1.08<br>(0.25) | 1.06<br>(0.12) | 0.95<br>(0.25) |
| constant           | 15.20<br>(4.88) | 7.92<br>(2.65) | 15.06<br>(3.46) | 5.77<br>(1.92) | 5.25<br>(1.60) | 8.10<br>(2.51) |
| Number of obs      | 22              | 26             | 27              | 29             | 29             | 29             |
| R-squared          | 0.37            | 0.61           | 0.22            | 0.36           | 0.66           | 0.57           |

NOTES: Dependent variable is real value of total exports and imports divided by PPP-adjusted GDP. Predicted openness comes from the predicted values of the gravity equation presented in Table 2. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors         | Year            |                  |                 |                 |                 |                 |                 |                 |                |
|--------------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|
|                    | 1870            | 1875             | 1880            | 1885            | 1890            | 1895            | 1900            | 1905            | 1910           |
| Predicted Openness | 0.95<br>(0.39)  | 0.98<br>(0.37)   | 0.86<br>(0.23)  | 1.16<br>(0.34)  | 1.15<br>(0.30)  | 1.52<br>(0.29)  | 1.36<br>(0.29)  | 1.16<br>(0.25)  | 1.18<br>(0.28) |
| constant           | 13.40<br>(8.42) | 15.35<br>(10.12) | 20.11<br>(7.76) | 17.15<br>(7.71) | 17.41<br>(8.25) | 11.78<br>(7.01) | 12.93<br>(5.62) | 17.62<br>(5.31) | 9.77<br>(6.49) |
| Number of obs      | 18              | 19               | 17              | 19              | 19              | 21              | 21              | 22              | 23             |
| R-squared          | 0.34            | 0.32             | 0.24            | 0.20            | 0.28            | 0.35            | 0.47            | 0.48            | 0.62           |

NOTES: Dependent variable is total exports and imports divided by GDP. Predicted openness comes from the predicted values of the gravity equation presented in Table 1. Heteroscedasticity consistent errors are reported in parentheses.

Table 4: First Stage Regression Results for Pooled Data, 1870-2000

| Variable           | Random Effects  | Partial Adjustment | Random Effects<br>Omitted Variables | Fixed Effects   |
|--------------------|-----------------|--------------------|-------------------------------------|-----------------|
|                    | (1)             | (2)                | (3)                                 | (4)             |
| Predicted Openness | 3.65<br>(0.10)  | 3.53<br>(0.11)     | 3.57<br>(0.13)                      | 1.68<br>(0.13)  |
| ln(population)     | ---             | ---                | -3.68<br>(0.35)                     | ---             |
| ln (land area)     | ---             | ---                | 1.01<br>(0.36)                      | ---             |
| Polity <i>t-1</i>  | ---             | 0.34<br>(0.06)     | ---                                 | ---             |
| Constant           | -2.26<br>(3.08) | -2.29<br>(3.04)    | 43.45<br>(5.55)                     | -6.4<br>(13.28) |
| Number of obs      | 4184            | 4084               | 4184                                | 4184            |
| R-Squared          | 0.40            | 0.41               | 0.43                                | 0.83            |

Notes: Sample is 1960 to 2000. Dependent variable in all columns is real openness. Time dummies are not reported. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses.

| Variable           | Random Effects  | Partial Adjustment | Random Effects<br>Omitted Variables | Fixed Effects   |
|--------------------|-----------------|--------------------|-------------------------------------|-----------------|
|                    | (1)             | (2)                | (3)                                 | (4)             |
| Predicted Openness | 0.88<br>[0.06]  | 0.68<br>[0.06]     | 0.58<br>[0.08]                      | 0.23<br>[0.04]  |
| ln(population)     | ---             | ---                | 0.54<br>[0.30]                      | ---             |
| ln (land area)     | ---             | ---                | -3.73<br>[0.61]                     | ---             |
| Polity <i>t-1</i>  | ---             | 0.66<br>[0.07]     | ---                                 | ---             |
| Constant           | 13.97<br>[2.69] | 15.53<br>[2.41]    | 74.56<br>[13.31]                    | 14.35<br>[1.45] |
| Number of obs      | 522             | 518                | 522                                 | 522             |
| R-Squared          | 0.50            | 0.62               | 0.57                                | 0.9             |

Notes: Sample is 1920 to 1940. Dependent variable in all columns is real openness. Time dummies are not reported. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses.

| Variable           | Random Effects   | Partial Adjustment | Random Effects<br>Omitted Variables | Fixed Effects    |
|--------------------|------------------|--------------------|-------------------------------------|------------------|
|                    | (1)              | (2)                | (3)                                 | (4)              |
| Predicted Openness | 1.76<br>(0.24)   | 1.35<br>(0.36)     | 1.9<br>(0.28)                       | 0.35<br>(0.30)   |
| ln(population)     | ---              | ---                | -2.32<br>(3.23)                     | ---              |
| ln (land area)     | ---              | ---                | -6.26<br>(4.99)                     | ---              |
| Polity <i>t-1</i>  | ---              | 0.001<br>(0.56)    | ---                                 | ---              |
| Constant           | -8.91<br>(10.07) | 138.89<br>(94.63)  | -8.97<br>(12.56)                    | 32.58<br>(10.59) |
| Number of obs      | 190              | 170                | 190                                 | 190              |
| R-Squared          | 0.31             | 0.32               | 0.33                                | 0.79             |

Notes: Sample is 1870 to 1910 with country year observations every five years. Dependent variable in all columns is real openness. Time dummies are not reported. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses.



Table 5: Openness and Democracy: Panel Estimates for Three Periods

| Variable           | <i>Post World War II Sample: 1960-2000</i> |                                 |                                  |                  |                                 |                                 |                   |                                  |                                  |                                   |                                 |
|--------------------|--|---------------------------------|----------------------------------|------------------|---------------------------------|---------------------------------|-------------------|----------------------------------|----------------------------------|-----------------------------------|---------------------------------|
|                    | (1)<br>OLS                                 | (2)<br>2SLS                     | (3)<br>2SLS                      | (4)<br>OLS       | (5)<br>2SLS                     | (6)<br>2SLS                     | (7)<br>OLS        | (8)<br>2SLS                      | (9)<br>2SLS                      | (10)<br>GMM                       | (11)<br>2SLS                    |
| Openness           | 0.08<br>(0.01)                             | <b>0.13</b><br>( <b>0.01</b> )  | <b>0.13</b><br>( <b>0.01</b> )   | -0.02<br>(0.01)  | <b>0.02</b><br>( <b>0.03</b> )  | <b>0.02</b><br>( <b>0.02</b> )  | 0.0003<br>(0.001) | <b>0.004</b><br>( <b>0.002</b> ) | <b>0.004</b><br>( <b>0.003</b> ) | <b>-0.005</b><br>( <b>0.006</b> ) | <b>-0.14</b><br>( <b>0.10</b> ) |
| In(population)     | ---  | ---                             | <b>1.07</b><br>( <b>0.13</b> )   | ---              | ---                             | <b>0.24</b><br>( <b>0.86</b> )  | ---               | ---                              | <b>0.04</b><br>( <b>0.03</b> )   | ---                               | ---                             |
| In (land area)     | ---  | ---                             | <b>-0.32</b><br>( <b>0.13</b> )  | ---              | ---                             | ---                             | ---               | ---                              | <b>-0.01</b><br>( <b>0.02</b> )  | ---                               | ---                             |
| Polity <i>t</i> -1 | ---  | ---                             | ---                              | ---              | ---                             | ---                             | 0.96<br>(0.00)    | <b>0.96</b><br>( <b>0.004</b> )  | <b>0.96</b><br>( <b>0.004</b> )  | <b>0.94</b><br>( <b>0.02</b> )    | <b>0.61</b><br>( <b>0.11</b> )  |
| Constant           | -0.07<br>(1.13)                            | <b>-0.93</b><br>( <b>1.16</b> ) | <b>-13.85</b><br>( <b>2.76</b> ) | -11.46<br>(5.03) | <b>-3.38</b><br>( <b>5.01</b> ) | <b>-3.54</b><br>( <b>13.6</b> ) | -0.11<br>(0.22)   | <b>-0.03</b><br>( <b>0.20</b> )  | <b>-0.56</b><br>( <b>0.48</b> )  | <b>0.13</b><br>( <b>0.12</b> )    | <b>-0.55</b><br>( <b>0.48</b> ) |
| Time Dummies       | Yes  | Yes                             | Yes                              | Yes              | Yes                             | Yes                             | Yes               | Yes                              | Yes                              | Yes                               | Yes                             |
| Country Dummies    | No   | No                              | No                               | Yes              | Yes                             | Yes                             | No                | No                               | No                               | ---                               | ---                             |
| Number of obs      | 4184                                       | <b>4184</b>                     | <b>4184</b>                      | 4184             | <b>4184</b>                     | <b>4184</b>                     | 4084              | <b>4084</b>                      | <b>4084</b>                      | 3941                              | 3622                            |

Notes: Dependent variable in columns (1)-(9) is the Polity score. The dependent variable in columns (10) and (11) is the first difference of the Polity score. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses in columns (1)-(9). Heteroscedasticity consistent standard errors are reported in parentheses in columns (10) and (11). Time dummies are not reported.

| Variable           | <i>Interwar Sample: 1920-1940</i> |                                 |                                  |                 |                                 |                                   |                |                                 |                                 |                                 |                                |
|--------------------|-----------------------------------|---------------------------------|----------------------------------|-----------------|---------------------------------|-----------------------------------|----------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|
|                    | (1)<br>OLS                        | (2)<br>2SLS                     | (3)<br>2SLS                      | (4)<br>OLS      | (5)<br>2SLS                     | (6)<br>2SLS                       | (7)<br>OLS     | (8)<br>2SLS                     | (9)<br>2SLS                     | (10)<br>GMM                     | (11)<br>2SLS                   |
| Openness           | 0.38<br>(0.03)                    | <b>0.38</b><br>( <b>0.04</b> )  | <b>0.47</b><br>( <b>0.06</b> )   | -0.02<br>(0.04) | <b>-0.12</b><br>( <b>0.14</b> ) | <b>-0.15</b><br>( <b>0.13</b> )   | 0.02<br>(0.01) | <b>0.03</b><br>( <b>0.01</b> )  | <b>0.06</b><br>( <b>0.02</b> )  | <b>0.03</b><br>( <b>0.02</b> )  | <b>0.48</b><br>( <b>1.44</b> ) |
| In(population)     | ---                               | ---                             | <b>1.18</b><br>( <b>0.48</b> )   | ---             | ---                             | <b>-6.17</b><br>( <b>4.45</b> )   | ---            | ---                             | <b>-0.01</b><br>( <b>0.12</b> ) | ---                             | ---                            |
| In (land area)     | ---                               | ---                             | <b>-0.17</b><br>( <b>0.21</b> )  | ---             | ---                             | ---                               | ---            | ---                             | <b>0.03</b><br>( <b>0.05</b> )  | ---                             | ---                            |
| Polity <i>t</i> -1 | ---                               | ---                             | ---                              | ---             | ---                             | ---                               | 0.98<br>(0.01) | <b>0.97</b><br>( <b>0.02</b> )  | <b>0.63</b><br>( <b>0.03</b> )  | <b>0.77</b><br>( <b>0.08</b> )  | <b>0.02</b><br>( <b>1.17</b> ) |
| Constant           | -2.21<br>(1.32)                   | <b>-4.13</b><br>( <b>0.88</b> ) | <b>-23.19</b><br>( <b>8.48</b> ) | 11.43<br>(1.35) | <b>12.53</b><br>( <b>1.66</b> ) | <b>110.09</b><br>( <b>73.13</b> ) | 0.17<br>(0.46) | <b>-0.54</b><br>( <b>0.25</b> ) | <b>-1.2</b><br>( <b>2.25</b> )  | <b>-0.03</b><br>( <b>0.03</b> ) | <b>5.35</b><br>( <b>15.8</b> ) |
| Time Dummies       | Yes                               | Yes                             | Yes                              | Yes             | Yes                             | Yes                               | Yes            | Yes                             | Yes                             | Yes                             | Yes                            |
| Country Dummies    | No                                | No                              | No                               | Yes             | Yes                             | Yes                               | No             | No                              | No                              | ---                             | ---                            |
| Number of obs      | 522                               | <b>522</b>                      | <b>522</b>                       | 522             | <b>518</b>                      | <b>522</b>                        | <b>518</b>     | <b>518</b>                      | <b>518</b>                      | 481                             | <b>466</b>                     |

Notes: Dependent variable in columns (1)-(9) is the Polity score. The dependent variable in columns (10) and (11) is the first difference of the Polity score which for this sample is recorded each five years. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses in columns (1)-(9). Heteroscedasticity consistent standard errors are reported in parentheses in columns (10) and (11). Time dummies are not reported.

| Variable           | <i>Pre-World War I Sample: 1870-1910</i> |                                 |                                  |                  |                                 |                                   |                   |                                  |                                   |                                |                                |
|--------------------|--|---------------------------------|----------------------------------|------------------|---------------------------------|-----------------------------------|-------------------|----------------------------------|-----------------------------------|--------------------------------|--------------------------------|
|                    | (1)<br>OLS                               | (2)<br>2SLS                     | (3)<br>2SLS                      | (4)<br>OLS       | (5)<br>2SLS                     | (6)<br>2SLS                       | (7)<br>OLS        | (8)<br>2SLS                      | (9)<br>2SLS                       | (10)<br>GMM                    | (11)<br>2SLS                   |
| Openness           | 0.02<br>(0.01)                           | <b>0.07</b><br>( <b>0.03</b> )  | <b>0.10</b><br>( <b>0.06</b> )   | 0.0005<br>(0.01) | <b>-0.14</b><br>( <b>0.15</b> ) | <b>-0.17</b><br>( <b>0.16</b> )   | -0.002<br>(0.003) | <b>0.006</b><br>( <b>0.006</b> ) | <b>-0.0004</b><br>( <b>0.01</b> ) | <b>0.02</b><br>( <b>0.02</b> ) | <b>0.13</b><br>( <b>0.08</b> ) |
| In(population)     | ---                                      | ---                             | <b>0.48</b><br>( <b>1.25</b> )   | ---              | ---                             | <b>-4.15</b><br>( <b>6.29</b> )   | ---               | ---                              | <b>-0.05</b><br>( <b>0.24</b> )   | ---                            | ---                            |
| In (land area)     | ---                                      | ---                             | <b>0.44</b><br>( <b>0.75</b> )   | ---              | ---                             | ---                               | ---               | ---                              | <b>-0.09</b><br>( <b>0.14</b> )   | ---                            | ---                            |
| Polity <i>t</i> -5 | ---                                      | ---                             | ---                              | ---              | ---                             | ---                               | 0.96<br>(0.02)    | <b>0.95</b><br>( <b>0.02</b> )   | <b>0.95</b><br>( <b>0.02</b> )    | <b>0.66</b><br>( <b>0.06</b> ) | <b>0.62</b><br>( <b>0.4</b> )  |
| Constant           | 0.37<br>(0.89)                           | <b>-3.12</b><br>( <b>1.79</b> ) | <b>-17.95</b><br>( <b>26.1</b> ) | 3.96<br>(0.86)   | <b>9.27</b><br>( <b>5.84</b> )  | <b>81.99</b><br>( <b>106.92</b> ) | 0.67<br>(0.19)    | <b>0.29</b><br>( <b>0.30</b> )   | <b>2.64</b><br>( <b>4.93</b> )    | <b>0.2</b><br>( <b>0.1</b> )   | <b>0.29</b><br>( <b>0.26</b> ) |
| Time Dummies       | Yes                                      | Yes                             | Yes                              | Yes              | Yes                             | Yes                               | Yes               | Yes                              | Yes                               | Yes                            | Yes                            |
| Country Dummies    | No                                       | No                              | No                               | Yes              | Yes                             | Yes                               | No                | No                               | No                                | ---                            | ---                            |
| Number of Obs      | 190                                      | <b>190</b>                      | <b>190</b>                       | <b>190</b>       | <b>190</b>                      | <b>190</b>                        | 170               | <b>170</b>                       | <b>170</b>                        | 147                            | 108                            |

Notes: Dependent variable in columns (1)-(9) is the Polity score. The dependent variable in columns (10) and (11) is the first difference of the Polity score which for this sample is recorded each five years. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses in columns (1)-(9). Heteroscedasticity consistent standard errors are reported in parentheses in columns (10) and (11). Time dummies are not reported. For this Pre-World War I sample, the observations are for country years every five years beginning in 1870.

Table 6: Instrumental Variables Estimations with Omitted Variables and Regional Coefficients, 1960-2000

| Variable                         |                  |                  | Variable                            | Regional Variation in Coefficients |                 |                  |                   |
|----------------------------------|------------------|------------------|-------------------------------------|------------------------------------|-----------------|------------------|-------------------|
|                                  | (1)              | (2)              |                                     | (3)                                | (4)             | (5)              | (6)               |
| Openness                         | 0.06<br>(0.01)   | -0.01<br>(0.01)  | East Asia Pacific x Openness        | 0.04<br>(0.01)                     | 0.01<br>(0.01)  | 0.001<br>(0.002) | 0.0006<br>(0.002) |
| ln (population)                  | ---              | -0.19<br>(0.13)  | Eastern Europe/CIS x Openness       | 0.13<br>(0.03)                     | 0.07<br>(0.04)  | 0.01<br>(0.01)   | 0.01<br>(0.01)    |
| ln (land area)                   | ---              | -0.75<br>(0.12)  | Middle East/North Africa x Openness | -0.13<br>(0.02)                    | -0.17<br>(0.03) | -0.01<br>(0.01)  | -0.01<br>(0.01)   |
| Distance from Equator            | 0.15<br>(0.02)   | 0.18<br>(0.02)   | South Asia x Openness               | 0.4<br>(0.10)                      | 0.2<br>(0.11)   | -0.004<br>(0.02) | -0.01<br>(0.03)   |
| Ethnolinguistic Fragmentation    | 3.76<br>(0.58)   | 5.5<br>(0.61)    | Western Europe x Openness           | 0.19<br>(0.01)                     | 0.17<br>(0.01)  | 0.01<br>(0.002)  | 0.01<br>(0.003)   |
| Primary Commodity Exporter Dummy | -2.04<br>(0.31)  | -1.81<br>(0.32)  | Sub-Saharan Africa x Openness       | -0.12<br>(0.02)                    | -0.16<br>(0.03) | -0.01<br>(0.01)  | -0.01<br>(0.01)   |
| Petroleum Exporter Dummy         | -1.08<br>(0.50)  | 0.36<br>(0.53)   | Latin America/Caribbean x Openness  | 0.14<br>(0.02)                     | 0.09<br>(0.02)  | 0.01<br>(0.004)  | 0.01<br>(0.01)    |
| East Asia Pacific                | -3.71<br>(0.96)  | -5.21<br>(0.95)  | USA/Canada x Openness               | 0.34<br>(0.03)                     | 0.35<br>(0.03)  | 0.02<br>(0.008)  | 0.02<br>(0.01)    |
| Eastern Europe/CIS States        | -7.99<br>(0.98)  | -11.46<br>(1.06) | ln(population)                      | ---                                | 0.37<br>(0.16)  | ---              | 0.03<br>(0.04)    |
| Middle East/North Africa         | -12.43<br>(0.97) | -15.22<br>(1.02) | ln (land area)                      | ---                                | -0.52<br>(0.12) | ---              | -0.02<br>(0.03)   |
| South Asia                       | -3<br>(1.06)     | -6.25<br>(1.14)  | Polity t-1                          | ---                                | ---             | 0.94<br>(0.01)   | 0.94<br>(0.01)    |
| Western Europe                   | -2.12<br>(0.93)  | -4.13<br>(0.93)  | Constant                            | -0.23<br>(0.99)                    | 1.12<br>(3.21)  | 0.02<br>(0.21)   | -0.14<br>(0.66)   |
| Sub-Saharan Africa               | -7.75<br>(0.99)  | -11.22<br>(1.09) |                                     |                                    |                 |                  |                   |
| Latin America/Caribbean          | -2.17<br>(0.97)  | -5<br>(1.03)     |                                     |                                    |                 |                  |                   |
| Constant                         | -0.36<br>(1.46)  | 14.12<br>(3.08)  |                                     |                                    |                 |                  |                   |
| Number of obs                    | 4184             | 4184             | Number of obs                       | 4184                               | 4184            | 4084             | 4084              |

NOTES: Dependent variable is the Polity score. Estimations assume a "random effects" error term. Auto-correlation and heteroscedasticity consistent standard errors are reported in parentheses in columns. Year indicators are not reported. Omitted category in the regional dummies is "North America" which includes Canada and the US.

Table 7: Democracy and Openness, OLS Regressions, 1870-2000

| Regressors    | Year           |                 |                 |                 |                 |                 |                |                |                |
|---------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|
|               | 1960           | 1965            | 1970            | 1975            | 1980            | 1985            | 1990           | 1995           | 2000           |
| Openness      | 0.23<br>(0.06) | 0.21<br>(0.05)  | 0.17<br>(0.08)  | 0.08<br>(0.04)  | 0.05<br>(0.04)  | 0.08<br>(0.06)  | 0.07<br>(0.05) | 0.04<br>(0.03) | 0.05<br>(0.03) |
| constant      | -2.5<br>(1.28) | -3.56<br>(1.21) | -3.49<br>(1.45) | -2.99<br>(1.21) | -2.13<br>(1.35) | -1.56<br>(1.31) | 0.4<br>(1.31)  | 3.2<br>(1.08)  | 3.37<br>(1.00) |
| Number of obs | 76             | 90              | 97              | 103             | 104             | 105             | 105            | 117            | 115            |
| R-squared     | 0.15           | 0.13            | 0.11            | 0.05            | 0.05            | 0.05            | 0.06           | 0.04           | 0.08           |

NOTES: Dependent variable is the Polity score as described in text. GDP in the openness variable is adjusted for purchasing power parity. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors    | Year           |                 |                 |                 |                 |                 |
|---------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|               | 1920           | 1925            | 1928            | 1932            | 1935            | 1938            |
| Openness      | 0.14<br>(0.04) | 0.36<br>(0.08)  | 0.39<br>(0.08)  | 0.58<br>(0.16)  | 0.51<br>(0.11)  | 0.46<br>(0.09)  |
| constant      | 2.24<br>(1.81) | -4.37<br>(2.52) | -5.41<br>(2.58) | -3.88<br>(2.77) | -6.89<br>(2.89) | -6.28<br>(2.67) |
| Number of obs | 22             | 26              | 27              | 29              | 29              | 29              |
| R-squared     | 0.37           | 0.5             | 0.51            | 0.31            | 0.35            | 0.39            |

NOTES: Dependent variable is the Polity score as described in text. GDP in the openness variable is adjusted for purchasing power parity. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors    | Year            |                 |                 |                 |                 |                 |                 |                 |                 |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|               | 1870            | 1875            | 1880            | 1885            | 1890            | 1895            | 1900            | 1905            | 1910            |
| Openness      | 0.11<br>(0.06)  | 0.07<br>(0.07)  | 0.08<br>(0.07)  | 0.09<br>(0.05)  | 0.08<br>(0.05)  | 0.12<br>(0.06)  | 0.15<br>(0.06)  | 0.12<br>(0.05)  | 0.10<br>(0.06)  |
| constant      | -5.11<br>(2.75) | -3.03<br>(3.11) | -2.77<br>(3.28) | -2.59<br>(2.81) | -1.77<br>(2.74) | -3.36<br>(2.96) | -3.82<br>(3.10) | -1.74<br>(2.90) | -0.06<br>(2.84) |
| Number of obs | 18              | 19              | 17              | 19              | 19              | 21              | 21              | 22              | 23              |
| R-squared     | 0.19            | 0.08            | 0.07            | 0.13            | 0.12            | 0.17            | 0.23            | 0.16            | 0.16            |

NOTES: Dependent variable is the Polity score as described in text. GDP in the openness variable is adjusted for purchasing power parity. Heteroscedasticity consistent errors are reported in parentheses.

Table 8: Democracy and Openness, Instrumental Variables Regressions, 1870-2000

| Regressors    | Year   |        |        |        |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|               | 1960   | 1965   | 1970   | 1975   | 1980   | 1985   | 1990   | 1995   | 2000   |
| Openness      | 0.28   | 0.24   | 0.25   | 0.18   | 0.11   | 0.15   | 0.13   | 0.06   | 0.04   |
|               | (0.08) | (0.08) | (0.14) | (0.09) | (0.06) | (0.10) | (0.08) | (0.06) | (0.03) |
| constant      | -3.25  | -3.97  | -4.87  | -5.9   | -4.05  | -3.01  | -1.44  | 2.45   | 3.61   |
|               | (1.39) | (1.55) | (2.49) | (2.32) | (1.99) | (2.17) | (2.22) | (1.68) | (1.03) |
| Number of obs | 76     | 90     | 97     | 103    | 104    | 105    | 105    | 117    | 115    |
| R-squared     | 0.14   | 0.13   | 0.09   |        | 0      | 0.02   |        | 0.02   | 0.08   |

NOTES: Dependent variable is the polity score as described in text. Instrumental variable for openness is the value of predicted openness as described in the text. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors    | Year   |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|--------|
|               | 1920   | 1925   | 1928   | 1932   | 1935   | 1938   |
| Openness      | 0.23   | 0.36   | 0.53   | 0.79   | 0.51   | 0.43   |
|               | (0.07) | (0.11) | (0.17) | (0.23) | (0.14) | (0.10) |
| constant      | -0.54  | -4.21  | -8.99  | -6.61  | -6.85  | -5.85  |
|               | (2.71) | (3.13) | (4.72) | (3.99) | (3.30) | (2.84) |
| Number of obs | 22     | 26     | 27     | 29     | 29     | 29     |
| R-squared     | 0.23   | 0.50   | 0.45   | 0.27   | 0.35   | 0.39   |

NOTES: Dependent variable is the polity score as described in text. Instrumental variable for openness is the value of predicted openness as described in the text. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors    | Year   |        |        |        |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|               | 1870   | 1875   | 1880   | 1885   | 1890   | 1895   | 1900   | 1905   | 1910   |
| Openness      | 0.22   | 0.15   | 0.17   | 0.12   | 0.12   | 0.18   | 0.16   | 0.11   | 0.14   |
|               | (0.11) | (0.13) | (0.13) | (0.12) | (0.10) | (0.10) | (0.09) | (0.07) | (0.07) |
| constant      | -9.7   | -6.2   | -5.93  | -3.9   | -3.07  | -5.81  | -4.19  | -1.67  | -1.39  |
|               | (4.52) | (5.56) | (5.97) | (5.64) | (4.83) | (4.58) | (4.26) | (3.71) | (3.23) |
| Number of obs | 18     | 19     | 17     | 19     | 19     | 21     | 21     | 22     | 23     |
| R-squared     | ---    | ---    | ---    | 0.11   | 0.11   | 0.12   | 0.23   | 0.16   | 0.14   |

NOTES: Dependent variable is the polity score as described in text. Instrumental variable for openness is the value of predicted openness as described in the text. Heteroscedasticity consistent errors are reported in parentheses.

Table 9: Democracy and Openness, Instrumental Variables Regressions Controlling for Country Size, 1870-2000

| Variable        | Year              |                   |                   |                   |                  |                  |                  |                 |                 |
|-----------------|-------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|-----------------|-----------------|
|                 | 1960              | 1965              | 1970              | 1975              | 1980             | 1985             | 1990             | 1995            | 2000            |
| Openness        | 0.52<br>(0.11)    | 0.43<br>(0.11)    | 0.23<br>(0.16)    | 0.23<br>(0.10)    | 0.12<br>(0.05)   | 0.15<br>(0.09)   | 0.09<br>(0.06)   | 0.07<br>(0.05)  | 0.06<br>(0.03)  |
| Ln (population) | 2.16<br>(0.70)    | 2.91<br>(0.68)    | 1.4<br>(0.84)     | 1.51<br>(0.91)    | 1.08<br>(0.77)   | 0.9<br>(0.76)    | 1.15<br>(0.70)   | 0.2<br>(0.60)   | 0.3<br>(0.60)   |
| ln (land area)  | 0.54<br>(0.82)    | -0.91<br>(0.49)   | -0.64<br>(0.61)   | 0.01<br>(0.85)    | -0.21<br>(0.79)  | -0.16<br>(0.70)  | -0.64<br>(0.73)  | 0.08<br>(0.54)  | 0.1<br>(0.54)   |
| Constant        | -48.07<br>(13.13) | -41.94<br>(11.84) | -18.96<br>(14.35) | -31.51<br>(13.46) | -19.07<br>(9.51) | -15.71<br>(9.89) | -11.06<br>(8.91) | -1.82<br>(7.90) | -2.98<br>(7.31) |
| Number of obs   | 76                | 90                | 97                | 103               | 104              | 105              | 105              | 117             | 115             |
| R-squared       | 0.18              | 0.21              | 0.15              | ---               | 0.02             | 0.04             | 0.08             | 0.02            | 0.09            |

NOTES: Dependent variable is the Polity score as described in text. Instrument for Openness is the value of predicted openness as described in the text. Heteroscedasticity consistent standard errors are in parentheses.

| Regressors      | Year                |                   |                     |                   |                   |                   |
|-----------------|---------------------|-------------------|---------------------|-------------------|-------------------|-------------------|
|                 | 1920                | 1925              | 1928                | 1932              | 1935              | 1938              |
| Openness        | 0.69<br>(0.52)      | 0.63<br>(0.19)    | 1.3<br>(0.87)       | 0.91<br>(0.33)    | 0.81<br>(0.28)    | 0.87<br>(0.20)    |
| Ln (population) | 5.72<br>(6.28)      | 2.85<br>(1.71)    | 7.74<br>(7.38)      | 1.18<br>(2.05)    | 2.71<br>(2.74)    | 3.52<br>(2.50)    |
| ln (land area)  | -0.62<br>(0.94)     | -0.41<br>(0.58)   | -1.08<br>(1.15)     | -0.27<br>(0.83)   | -0.14<br>(0.72)   | 0.78<br>(0.68)    |
| constant        | -101.15<br>(112.41) | -52.52<br>(31.83) | -14.145<br>(135.05) | -24.24<br>(37.97) | -54.97<br>(49.06) | -80.78<br>(42.62) |
| Number of obs   | 22                  | 26                | 27                  | 29                | 29                | 29                |
| R-squared       | ---                 | 0.46              | ---                 | 0.23              | 0.35              | 0.4               |

NOTES: Dependent variable is the polity score as described in text. Instrumental variable for openness is the value of predicted openness as described in the text. Heteroscedasticity consistent errors are reported in parentheses.

| Regressors      | Year               |                     |                   |                  |                   |                   |                 |                  |                 |
|-----------------|--------------------|---------------------|-------------------|------------------|-------------------|-------------------|-----------------|------------------|-----------------|
|                 | 1870               | 1875                | 1880              | 1885             | 1890              | 1895              | 1900            | 1905             | 1910            |
| Openness        | 0.48<br>(0.26)     | 0.44<br>(0.51)      | 0.16<br>(0.35)    | -0.01<br>(0.18)  | 0.07<br>(0.18)    | 0.17<br>(0.17)    | 0.05<br>(0.09)  | 0.01<br>(0.06)   | 0.07<br>(0.07)  |
| Ln (population) | 2.95<br>(2.92)     | 3.06<br>(3.83)      | 2.37<br>(6.07)    | -0.68<br>(4.34)  | 0.32<br>(3.57)    | 1.85<br>(2.80)    | -0.2<br>(2.64)  | -1.52<br>(2.38)  | -0.91<br>(2.18) |
| ln (land area)  | 2.82<br>(2.03)     | 2.72<br>(3.97)      | 0.22<br>(2.45)    | -0.67<br>(1.63)  | 0.39<br>(2.30)    | 1.08<br>(2.35)    | -0.28<br>(1.84) | -0.12<br>(1.49)  | 0.78<br>(1.49)  |
| constant        | -104.57<br>(73.72) | -103.49<br>(127.39) | -49.7<br>(139.81) | 21.17<br>(92.17) | -12.23<br>(88.15) | -51.56<br>(69.04) | 6.78<br>(59.64) | 29.22<br>(48.80) | 5.49<br>(47.31) |
| Number of obs   | 18                 | 19                  | 20                | 21               | 21                | 22                | 22              | 23               | 24              |
| R-squared       | ---                | ---                 | 0.02              | ---              | ---               | ---               | 0.04            | ---              | ---             |

NOTES: Dependent variable is the polity score as described in text. Instrumental variable for openness is the value of predicted openness as described in the text. Heteroscedasticity consistent errors are reported in parentheses.

Table 10: Ordered Probit "Instrumental Variables" Regressions with Additional Controls, 1960-2000, 1920-1938

| Variable           | Post World War II Sample: 1960-2000 |        |        |        |        |        |        |        |        |
|--------------------|-------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                    | 1960                                | 1965   | 1970   | 1975   | 1980   | 1985   | 1990   | 1995   | 2000   |
| Openness           | 0.06                                | 0.05   | 0.04   | 0.04   | 0.03   | 0.03   | 0.02   | 0.02   | 0.02   |
|                    | (0.02)                              | (0.01) | (0.03) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| Openness Residuals | -0.03                               | -0.02  | -0.02  | -0.04  | -0.02  | -0.03  | -0.01  | -0.01  | -0.004 |
|                    | (0.02)                              | (0.02) | (0.02) | (0.02) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) |
| In (Population)    | 0.34                                | 0.41   | 0.2    | 0.15   | 0.12   | 0.12   | 0.1    | -0.03  | 0.002  |
|                    | (0.11)                              | (0.11) | (0.12) | (0.09) | (0.09) | (0.09) | (0.11) | (0.12) | (0.13) |
| In (land area)     | 0.05                                | -0.15  | -0.06  | 0.04   | 0.01   | 0.02   | -0.02  | 0.06   | 0.08   |
|                    | (0.11)                              | (0.08) | (0.10) | (0.11) | (0.11) | (0.11) | (0.11) | (0.09) | (0.11) |
| Cutpoint 1         | 5.04                                | 3.13   | 0.61   | 1.86   | 0.41   | 1.44   | -0.11  | -1.63  | -0.35  |
| Cutpoint 2         | 5.84                                | 4.53   | 1.99   | 2.68   | 1.59   | 1.83   | 0.30   | -0.86  | 0.00   |
| Cutpoint 3         | 6.08                                | 4.61   | 2.15   | 2.94   | 1.87   | 2.60   | 1.25   | -0.48  | 0.12   |
| Cutpoint 4         | 6.50                                | 5.15   | 2.86   | 3.70   | 2.48   | 2.73   | 1.41   | -0.34  | 0.37   |
| Cutpoint 5         | 6.63                                | 5.25   | 2.89   | 3.80   | 2.61   | 2.78   | 1.49   | -0.14  | 0.53   |
| Cutpoint 6         | 6.75                                | 5.39   | 2.95   | 3.83   | 2.69   | 2.81   | 1.52   | -0.01  | 0.70   |
| Cutpoint 7         | 6.79                                | 5.42   | 2.98   | 3.89   | 2.74   | 2.83   | 1.55   | 0.11   | 0.81   |
| Cutpoint 8         | 6.87                                | 5.45   | 3.01   | 3.97   | 2.77   | 2.88   | 1.60   | 0.21   | 0.84   |
| Cutpoint 9         | 7.03                                | 5.59   | 3.06   | 4.00   | 2.87   | 2.96   | 1.63   | 0.29   | 0.87   |
| Cutpoint 10        | 7.08                                | 5.69   | 3.12   | 4.05   | 2.92   | 2.98   | 1.68   | 0.31   | 0.93   |
| Cutpoint 11        | 7.16                                | 5.76   | 3.20   | 4.08   | 2.95   | 3.01   | 1.70   | 0.38   | 0.98   |
| Cutpoint 12        | 7.37                                | 5.80   | 3.32   | 4.13   | 2.98   | 3.03   | 1.75   | 0.41   | 1.06   |
| Cutpoint 13        | 7.51                                | 5.90   | 3.38   | 4.22   | 3.00   | 3.08   | 1.80   | 0.57   | 1.15   |
| Cutpoint 14        | 7.60                                | 6.01   | 3.44   | 4.25   | 3.06   | 3.13   | 1.95   | 0.79   | 1.37   |
| Cutpoint 15        | 7.78                                | 6.12   | 3.50   | 4.28   | 3.08   | 3.18   | 2.08   | 0.99   | 1.69   |
| Cutpoint 16        | 7.96                                | 6.27   | 3.53   | 4.50   | 3.17   | 3.29   | 2.13   | 1.23   | 2.00   |
| Cutpoint 17        | 8.01                                | 6.44   | 3.59   | 4.68   | 3.23   | 3.46   | 2.38   | 1.56   | 2.29   |
| Cutpoint 18        | ---                                 | 6.48   | 3.80   | ---    | 3.41   | 3.66   | 2.59   | ---    | ---    |
| Cutpoint 19        | ---                                 | ---    | 4.00   | ---    | 3.65   | ---    | ---    | ---    | ---    |
| Number of obs      | 76                                  | 90     | 97     | 103    | 104    | 105    | 105    | 117    | 115    |
| Pseudo R-squared   | 0.05                                | 0.05   | 0.03   | 0.02   | 0.02   | 0.02   | 0.03   | 0.02   | 0.04   |

NOTES: Dependent variable is the Polity score as described in text. Openness Residuals are the residuals of a regression of actual openness on predicted openness, population and land area. Heteroscedasticity consistent errors are reported in parentheses.

| Variable           | Interwar Sample: 1920-1938 |        |        |        |        |        |
|--------------------|----------------------------|--------|--------|--------|--------|--------|
|                    | 1920                       | 1925   | 1928   | 1932   | 1935   | 1938   |
| Openness           | 0.15                       | 0.43   | 0.27   | 0.42   | 0.32   | 0.12   |
|                    | (0.06)                     | (0.12) | (0.09) | (0.23) | (0.13) | (0.05) |
| Openness Residuals | -0.11                      | -0.31  | -0.16  | -0.33  | -0.23  | 0      |
|                    | (0.06)                     | (0.13) | (0.11) | (0.26) | (0.16) | (0.05) |
| In (Population)    | 0.75                       | 2.12   | 0.85   | 1.38   | 1.53   | 0.35   |
|                    | (0.46)                     | (0.87) | (0.64) | (1.22) | (0.86) | (0.49) |
| In (land area)     | -0.28                      | 0.06   | 0.2    | -0.02  | 0.13   | 0.18   |
|                    | (0.21)                     | (0.21) | (0.22) | (0.16) | (0.14) | (0.14) |
| Cutpoint 1         | 10.59                      | 43.16  | 19.53  | 26.92  | 30.48  | 7.56   |
| Cutpoint 2         | 11.43                      | 43.81  | 20.25  | 27.28  | 31.53  | 8.46   |
| Cutpoint 3         | 11.72                      | 44.02  | 20.49  | 27.52  | 31.66  | 8.63   |
| Cutpoint 4         | 11.98                      | 44.26  | 21.07  | 28.01  | 31.90  | 8.93   |
| Cutpoint 5         | 12.51                      | 44.51  | 21.26  | 28.15  | 32.14  | 9.31   |
| Cutpoint 6         | 12.81                      | 44.80  | 21.47  | 28.41  | 32.26  | 9.44   |
| Cutpoint 7         | 13.31                      | 45.06  | 21.72  | 28.55  | 32.38  | 9.58   |
| Cutpoint 8         | 13.86                      | 45.30  | 21.96  | 28.69  | 32.52  | 9.73   |
| Cutpoint 9         | ---                        | 45.58  | 22.15  | 28.83  | 32.66  | 9.87   |
| Cutpoint 10        | ---                        | 46.09  | 22.34  | 28.95  | 32.94  | 10.01  |
| Cutpoint 11        | ---                        | ---    | 22.53  | 29.21  | 33.12  | 10.16  |
| Cutpoint 12        | ---                        | ---    | 22.90  | 29.34  | ---    | 10.32  |
| Number of obs      | 22                         | 26     | 27     | 29     | 29     | 29     |
| Pseudo R-squared   | 0.22                       | 0.29   | 0.22   | 0.12   | 0.16   | 0.14   |

NOTES: Dependent variable is the Polity score as described in text. Openness Residuals are the residuals of a regression of actual openness on predicted openness, population and land area. Heteroscedasticity consistent errors are reported in parentheses.

Table 11: Ordered Probit "Instrumental Variables" Regressions with Additional Controls, 1870-1910

| Variable           | Pre World War I Sample: 1870-1910 |                 |                 |                 |                 |                 |                  |                 |                 |
|--------------------|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|
|                    | 1870                              | 1875            | 1880            | 1885            | 1890            | 1895            | 1900             | 1905            | 1910            |
| Openness           | 0.06<br>(0.02)                    | 0.04<br>(0.02)  | 0.02<br>(0.02)  | 0.001<br>(0.03) | 0.02<br>(0.03)  | 0.06<br>(0.04)  | 0.01<br>(0.03)   | 0.01<br>(0.02)  | 0.05<br>(0.02)  |
| Openness Residuals | -0.04<br>(0.01)                   | -0.02<br>(0.02) | -0.01<br>(0.02) | 0.004<br>(0.03) | -0.01<br>(0.03) | -0.06<br>(0.04) | -0.02<br>(0.03)  | -0.01<br>(0.02) | -0.05<br>(0.02) |
| ln (Population)    | 0.67<br>(0.43)                    | 0.34<br>(0.48)  | 0.14<br>(0.47)  | -0.17<br>(0.62) | 0.04<br>(0.69)  | 0.53<br>(0.63)  | -0.1<br>(0.53)   | -0.31<br>(0.43) | 0.1<br>(0.47)   |
| ln (land area)     | 0.17<br>(0.23)                    | 0.12<br>(0.33)  | -0.16<br>(0.31) | -0.21<br>(0.34) | 0.1<br>(0.42)   | 0.35<br>(0.42)  | -0.003<br>(0.38) | 0.1<br>(0.32)   | 0.52<br>(0.29)  |
| Cutpoint 1         | 14.31                             | 7.09            | -0.89           | -7.55           | 1.08            | 13.95           | -2.96            | -5.33           | 8.66            |
| Cutpoint 2         | 15.05                             | 7.51            | -0.42           | -7.08           | 2.11            | 14.33           | -2.53            | -4.97           | 9.02            |
| Cutpoint 3         | 15.30                             | 7.81            | -0.11           | -6.79           | 2.41            | 15.13           | -2.05            | -4.51           | 9.27            |
| Cutpoint 4         | 15.53                             | 8.80            | 0.81            | -6.06           | 2.66            | 15.42           | -1.60            | -4.20           | 9.46            |
| Cutpoint 5         | 16.16                             | 9.10            | 1.08            | -5.80           | 3.02            | 15.67           | -1.47            | -4.07           | 9.63            |
| Cutpoint 6         | 16.56                             | 9.24            | 1.21            | -5.68           | 3.28            | 16.02           | -1.36            | -3.94           | 9.80            |
| Cutpoint 7         | 16.74                             | 9.39            | 1.34            | -5.45           | 3.41            | 16.15           | -1.01            | -3.58           | 10.24           |
| Cutpoint 8         | 16.95                             | 9.55            | 1.62            | -5.33           | 3.72            | 16.30           | -0.89            | -3.46           | 10.38           |
| Cutpoint 9         | 17.16                             | 9.73            | 1.78            | -5.07           | 3.91            | 16.44           | -0.64            | -3.35           | 10.51           |
| Cutpoint 10        | 17.37                             | 9.92            | 2.12            | -4.92           | ---             | 16.76           | -0.51            | -3.12           | 10.77           |
| Cutpoint 11        | 17.58                             | 10.13           | ---             | -4.57           | ---             | 16.96           | -0.36            | -2.86           | 11.00           |
| Cutpoint 12        | 17.85                             | 10.36           | ---             | ---             | ---             | ---             | -0.19            | -2.71           | 11.26           |
| Cutpoint 13        | 18.46                             | ---             | ---             | ---             | ---             | ---             | ---              | ---             | 11.41           |
| Number of obs      | 18                                | 19              | 20              | 21              | 21              | 22              | 22               | 23              | 24              |
| Pseudo R-squared   | 0.1                               | 0.05            | 0.03            | 0.02            | 0.01            | 0.03            | 0.02             | 0.02            | 0.05            |

NOTES: Dependent variable is the Polity score as described in text. Openness Residuals are the residuals of a regression of actual openness on predicted openness, population and land area. Heteroscedasticity consistent errors are reported in parentheses.

Figure 1: Global Un-Weighted Averages of Democracy and Openness, 1870-1910

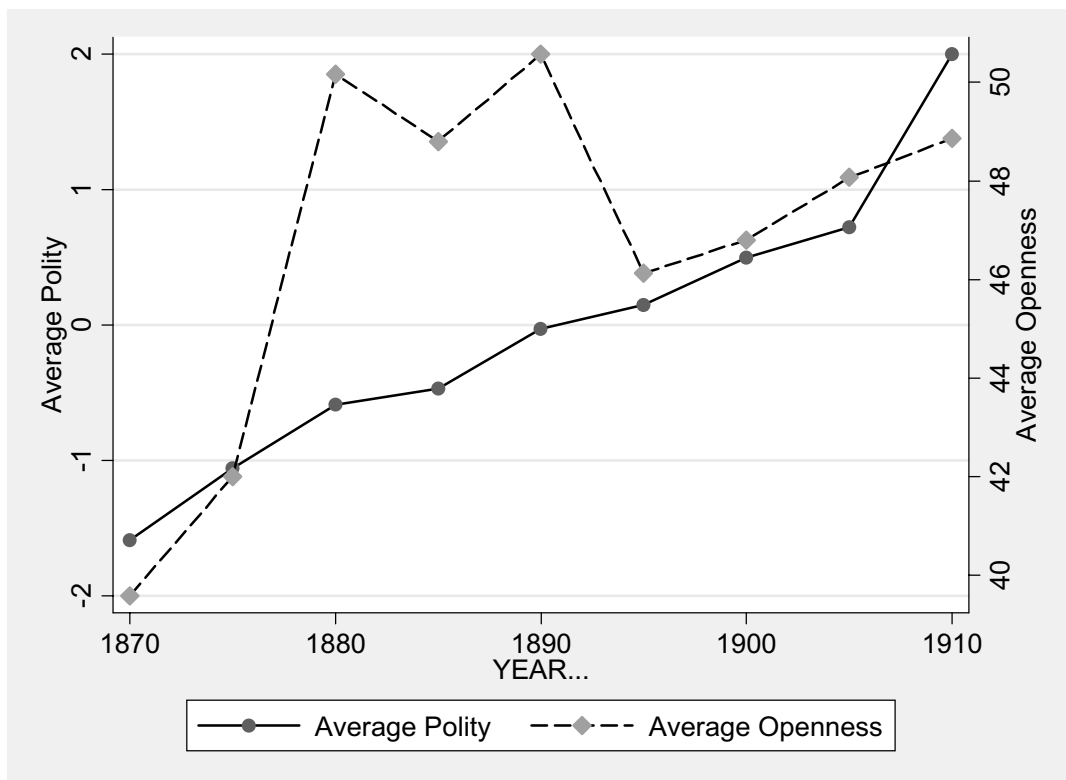




Figure 2: Global Un-Weighted Averages of Democracy and Openness, 1917-1939

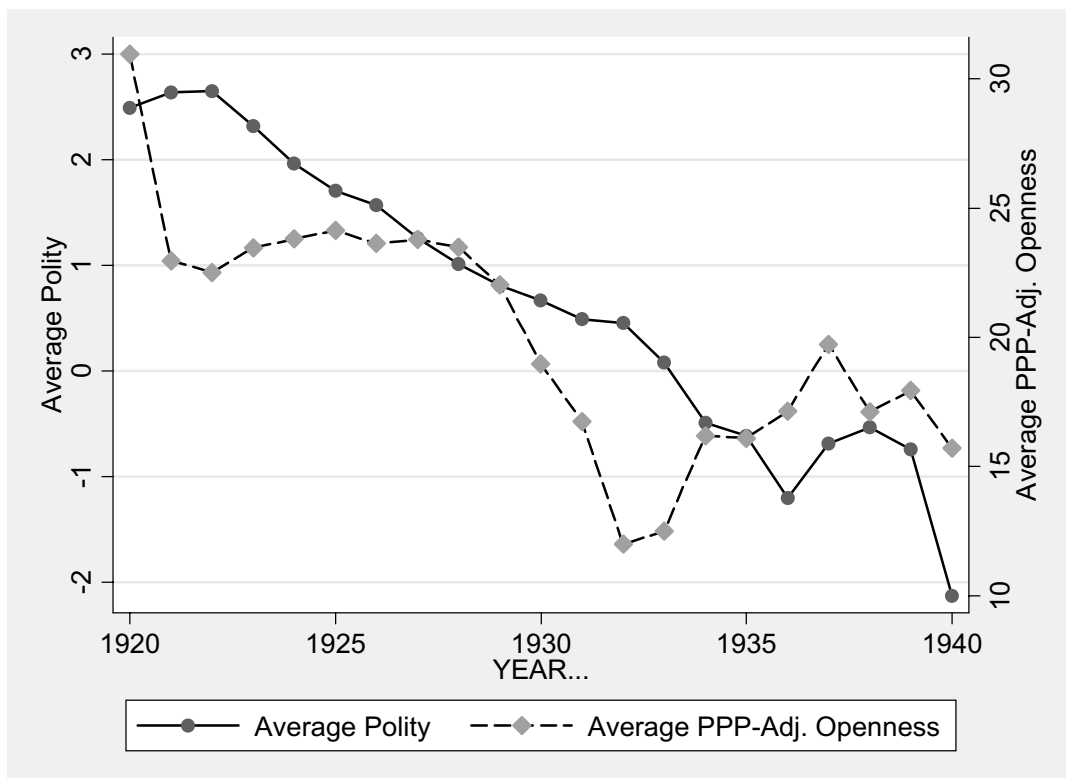


Figure 3: Global Averages of Democracy and Openness, 1960-2000

