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Income and democracy: Revisiting the evidence☆

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ABSTRACT

In an influential paper, Acemoglu et al. (2008) find that the positive correlation between income per capita and the level of democracy across countries vanishes once country-specific effects are accounted for. In this paper, we find evidence of a non-linear effect from income to democracy even after controlling for country-specific effects. In particular, our findings point to the existence of a positive effect only in low-income countries.

1. Introduction

It is well-known in the literature that income per capita is strongly correlated with the level of democracy across countries. This strong empirical regularity is often known as "modernization theory" or Lipset hypothesis (see Lipset, 1959). After controlling for country-specific effects, focusing on within-country variation, Acemoglu et al. (2008) find that this positive association vanishes. They interpret this result as evidence in favor of the idea that societies embarked on divergent political-economic development paths at certain critical junctures in the distant past.

The finding in Acemoglu et al. (2008) has been recently challenged by Benhabib et al. (2011) and Treisman (2011) based on Tobit-type approaches given the censored nature of the democracy index; Gundlach and Paldam (2009) also recover a positive effect from income to democracy by considering a different instrumentation strategy based on prehistoric conditions; lastly, Heid et al. (2012) find evidence in favor of the "modernization theory" by resorting to an alternative estimation strategy.

In this paper, we allow for more flexible – non-linear – specifications for the effect of income on democracy. Based on the same identifying assumptions, estimation methods, and data as Acemoglu et al. (2008), we obtain evidence in favor of an heterogeneous effect of income on democracy (heterogeneous across levels of income). More concretely, we find that the poorest countries in the world might be benefited in terms of higher democracy standards from an increase in income. This finding is robust to different samples, functional form specifications, measures of democracy, and instrumentation strategies.

2. Data and motivating evidence

We consider two unbalanced panels from Acemoglu et al. (2008) covering the post-war period 1960–2000. One is based on five-year intervals and the other one is based on ten-year intervals. Both panels include two democracy indicators, namely, the Polity IV (PIV) index and the Freedom House (FH) index. The PIV indicator takes 20 different values, allowing for a richer classification of countries (in terms of democracy levels) than the FH index, which can take 7 values. Also, PIV is more focused on democracy measurement than FH, which also includes other components such as socio-economic rights. In contrast, FH has a

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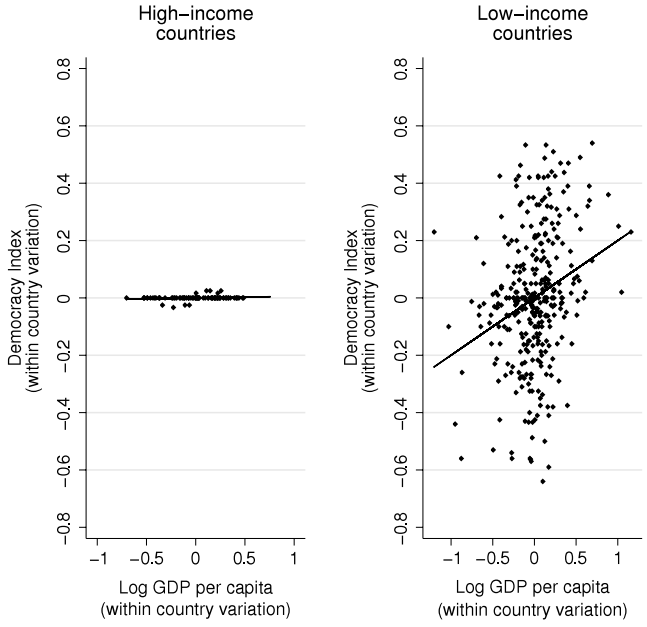

Fig. 1. This figure plots within-country variation of log GDP per capita and the contemporaneous Polity IV index of democracy over the period 1960–2000 for high- and low-income countries. In order to consider country-specific heterogeneity we plot the variables in deviations from its country-specific time mean. We split the sample into ten-year periods and each country-period pair is labeled as high-income (low-income) if its associated GDP per capita is above (below) the 80 percentile of the empirical cross-sectional density of this variable in a given period. The regression represented by the fitted line in the left panel (high-income countries) yields a coefficient of 0.005 (standard error = 0.005), and the regression for low-income countries in the right panel yields a coefficient of 0.203 (standard error = 0.049).

broader coverage of countries than the PIV index.[1] Acemoglu et al. (2008) provide more details about the dataset.

Fig. 1 plots within-country variation of democracy against log GDP per capita for high- and low-income countries separately.[2] Within-country correlation between income and democracy in high-income countries is surprisingly weak. In contrast, there is a strong positive within-country association between both indicators in low-income countries.

3. Econometric model

Acemoglu et al. (2008) propose to estimate the effect of income on democracy by considering the following model:

$$d_{it} = \gamma d_{it-1} + \beta y_{it-1} + \delta_t + \eta_i + \upsilon_{it}, \tag{1}$$

where d_{it} is the democracy score of country i ($i = 1, \ldots, N$) in period t ($t = 1, \ldots, T$), and y_{it-1} refers to the lagged value of log income per capita. Moreover, persistence and mean-reverting dynamics of democracy are captured by the coefficient of the lagged dependent variable (d_{it-1}). η_i captures country-specific fixed heterogeneity potentially correlated with the regressors, and δ_t captures time-specific shocks common to all countries.

In this linear specification, the effect of income on democracy is assumed to be the same for all countries regardless of their level of income. Given the motivating evidence discussed above, we allow the effect of income on democracy to depend on the income level. A simple specification that would capture this non-linearity is based on the inclusion of a square term of income in Eq. (1):

$$d_{it} = \gamma d_{it-1} + \beta_1 y_{it-1} + \beta_2 y_{it-1}^2 + \delta_t + \eta_i + \upsilon_{it}, \tag{2}$$

where now the effect of income on democracy is given by $\beta_1 + 2\beta_2 y_{it-1}$, which linearly depends on the level of income. Provided $\beta_2 < 0$, the model in (2) represents a quadratic function with a maximum at $y^* = -\frac{\beta_1}{2\beta_2}$. Therefore, democracy in countries with GDP per capita levels below y^* positively reacts to changes in income. However, once the income threshold y^* is passed, this positive effect vanishes and becomes negative.

We follow Acemoglu et al. (2008) and consider both strictly exogenous and endogenous regressors. For this purpose, we employ, respectively, fixed effects OLS and both first differenced GMM (Arellano and Bond, 1991), and system GMM (Arellano and Bover, 1995; see also Heid et al., 2012 for more details on the use of system GMM in this setting).

4. Results

Table 1 presents the results when estimating Eqs. (1) and (2) by fixed effects OLS (FE), Arellano and Bond (1991) first-differenced GMM (Diff-GMM), and Arellano and Bover (1995) system GMM (Sys-GMM). In particular, we use the panels of five- and ten-year data and the Polity IV democracy index. Column (1) illustrates that once we control for country-specific effects the positive correlation between the levels of income of democracy disappears (this column replicates column 2 of Table 3 in Acemoglu et al., 2008). Estimates in column (2) suggest that the quadratic specification is not sharply at odds with the data, as confirmed in the remaining columns of Table 1.

In columns (3)–(6) we allow for endogeneity of income per capita. While column (3) replicates the result in Acemoglu et al. (2008), in column (4) we include a square term of income, and we obtain a significant non-linear effect from income to democracy. We interpret this result as evidence in favor of our hypothesis of heterogeneous effects across different levels of income. Below a certain level of wealth, increases in income generate increases in democracy confirming the Lipset hypothesis. This finding gives support to the theoretical model discussed in Zak and Feng (2003) in which democratic transitions are affected by the rate of economic growth.

Furthermore, column (5) includes lagged log population, lagged education and lagged age structure as additional controls in our quadratic specification. In column (6), we consider the system GMM estimator which exploits moment conditions arising from the mean stationarity assumption of the variables.[3] In both cases we confirm our main result in column (4), the non-linear effect is statistically significant at conventional levels.

Finally, columns (7)–(11) present results where the relationship between income and democracy is analyzed at lower frequency by employing data over ten-year intervals. All the estimates are very similar to those based on five-year data in columns (1)–(6).

Regarding the appropriateness of our econometric specification, AR(2) tests on residuals indicate that there is no further serial correlation in both samples – at five or ten-year intervals – and

[1] See Munck and Verkuilen (2002) for a survey of the different indicators of democracy considered in studies of comparative politics and international economics.

[2] We consider here data in deviations from country-specific means due to its connection with the fixed effects estimators considered later in the paper (note that a simple OLS regression with the data in Fig. 1 leads to the commonly-used fixed effects estimator).

[3] In our empirical specification, system GMM is expected to alleviate finite-sample biases due to weak instruments in first differenced GMM as argued by Heid et al. (2012). However, we also acknowledge that some authors have criticized the use of mean stationarity assumptions in system GMM when analyzing cross-country data sets that started at the end of a war. In particular, Barro and Sala-i-Martin (1995) argue that initial conditions at the start of such a sample may not be representative of the steady state behavior of the variables.