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How democracy affects growth

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Abstract

This paper introduces a new methodology to examine the empirical relationship between democracy and economic growth. Democratic institutions are assumed to affect growth through a series of channels. We specify and estimate a full system of equations determining growth and the channel variables. Results suggest that democracy fosters growth by improving the accumulation of human capital and, less robustly, by lowering income inequality. On the other hand, democracy hinders growth by reducing the rate of physical capital accumulation and, less robustly, by raising the ratio of government consumption to GDP. Once all of these indirect effects are accounted for, the overall effect of democracy on economic growth is moderately negative. Our results indicate that democratic institutions are responsive to the demands of the poor by expanding access to education and lowering income inequality, but do so at the expense of physical capital accumulation.

JEL classification: O40; C30; E60

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1. Introduction

Democracy is valued independently of its effects on material well-being. Equal participation in elections and in the evaluation of government officials is

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universally perceived as a precondition for social justice. Studying the effects of democracy on economic growth, because it focuses on its material consequences, is often deemed a futile endeavor. We believe, instead, that this issue deserves close examination. Whether the development of political rights is a determinant or a consequence of material progress is a key policy question. This is particularly important in the wake of Latin American, Eastern European and African democratizations. As political liberalization becomes a frequent precondition for providing financial support to the developing world, determining its costs and benefits is essential to define policies that further both economic development and democracy.

As shown in Table 2, the simple correlation between an index of democracy and economic growth is positive but weak over the period 1970–1989. Thus, it comes as no surprise that the empirical literature on this topic is largely inconclusive. Borner et al. (1995) report that out of sixteen empirical studies, three uncover a positive association between democracy and growth, three find a negative association and the remaining ten are inconclusive. Recent research focusing explicitly on the role of democracy, such as Helliwell (1994) and Barro (1996a), find a non-significant negative effect of democracy on growth once several growth-determining variables are held constant. However, finding that democracy has a weak negative partial effect on economic growth may hide the fact that it entails both costs and benefits. Specifying explicitly the channels of influence from democracy to economic growth will allow a better understanding of the economic costs and benefits of democracy.

We start by defining democracy in purely *procedural* terms, that is, as a body of rules and procedures that regulates the transfer of political power and the free expression of disagreement at all levels of public life. In particular, democracy must be distinguished from its outcomes. Huntington (1991) makes this point elegantly: 'Democracy is one public virtue, not the only one, and the relation of democracy to other public virtues and vices can only be understood if democracy is clearly distinguished from other characteristics of political systems'. The Freedom House indicator of political rights used in this paper is based precisely on this procedural definition of democracy. However, the full implications of this fact have thus far not been exploited in previous research.[1]

Indeed, all previous studies focus on the *direct* effect of democracy on growth, conditional on other growth-determining factors. This procedure should be questioned: In theory, if a comprehensive institution such as democracy matters, it should matter *indirectly* through its effect on variables that in turn determine

[1] See Freedom House (1972–1995) for the methodology underlying the democracy index used in this paper.

economic growth.[2] Existing theoretical arguments point to links between democracy and a number of societal characteristics that influence growth. However, none of those arguments suggest that democracy has a direct impact on growth.

In this paper, we proceed by selecting, from the political science and the economics literatures, variables that both determine growth and are affected by democracy. For instance, it has been argued that democratization influences government consumption. A larger government may in turn lower economic growth when the cost of financing its activities through distortionary taxation outweighs the economic benefits of public goods. Hence, there are reasons to believe a priori that democracy affects growth through government consumption. In this paper, we formally test this and other possible linkages. In particular, we formulate and estimate a full system for the joint determination of growth and democracy in which we endogenize the relevant channels.

Our methodology allows us to decompose the total effect of democracy on growth into its different components. We are able to pinpoint whether and how democracy affects growth through each of the possible channels of influence. Using a system of simultaneous equations, we assess the sign and magnitude of a specific channel of influence, taking into account other competing channels. We find that democracy fosters growth by improving the accumulation of human capital and, less robustly, by lowering income inequality. On the other hand, it hinders growth by reducing the rate of physical capital accumulation and, less robustly, by increasing government consumption. These partial effects sum up to an overall effect which is in line with previous studies: A moderate negative impact of democracy on growth.

The paper is organized as follows: Section 2 discusses the theoretical arguments for each channel of causation. Section 3 describes the econometric method and the specification search underlying our estimation strategy. Section 4 contains the empirical results, analyzes their robustness and presents extensions of the paper's methodology. Section 5 concludes.

2. Democracy and growth: The channels

The democracy-growth channels involve many of the 'usual suspects' studied in the empirical growth literature. These are variables directly or indirectly

[2] Barro (1996a) concludes that: 'With respect to the determination of growth, the cross-country analysis brings out favorable effects from maintenance of the rule of law, free markets, small government consumption, and high human capital. Once these kinds of variables and the initial level of GDP are held constant, the overall effect of democracy on growth is weakly negative'. A sensible account of the channels linking democracy and growth must emphasize precisely the aforementioned variables. Helliwell (1994) mentions that: '(…) some aspects of democratic systems are more helpful to subsequent growth than others', providing further motivation for our approach.

associated with the exercise of governmental power. It will become clear that we view democracy as a political system characterized by two main features:

(1) It adds the voice of the great number of poor to that of the few rich, changing the composition of the citizenry effectively influencing the political process.
(2) It decreases the discretionary nature of power, in the sense that political decisions become more responsive to constraints beyond the control of politicians.

2.1. Political instability

The *stability of governance* is an important characteristic of political systems. Political instability leads to uncertainty about future policies and creates an incentive for rulers to adopt predatory behavior vis-à-vis the private resources of the economy. One of the important characteristics of democracy is the provision of transparent rules for the alternation of political forces in power. Furthermore, by encouraging an open debate over the choice of policies and policy-makers, it discourages extremism and the take-over of power by illegitimate means. Thus, democracies may exhibit peaceful and predictable transfers of political power where autocracies experience violent and erratic changes.[3] The lower degree of uncertainty that results from reduced political instability is likely to foster investment and growth. On the empirical side, Alesina et al. (1996) showed that political instability has a negative effect on growth.

2.2. Distortions

Democracy may also influence the *quality of governance*: Rulers with discretionary power tend to set up distortionary policies that benefit a small set of insiders at the expense of the general population. Democracies make it easier to keep these abuses in check and control the quality of policy-making, by submitting politicians to regular public scrutiny and promoting viable alternatives in the form of opposition parties. In other words, the exercise of power is potentially more arbitrary in autocratic regimes that lack public scrutiny of policy-makers. As a measure of government-induced distortions we use the black market premium of the exchange rate (BMP), i.e., the difference between the local currency's official and black market exchange rates divided by its

[3] On the other hand, democracies may just substitute constitutional for non-constitutional transfers of power (i.e., elections for coups) and the number of transfers of power may actually increase. In other words, there may be a trade-off between type and quantity of political changes as a country becomes more democratic.

official value.[4] We expect a higher black market premium to lead to lower rates of capital accumulation and lower growth in per capita GDP.[5]

2.3. Government size

Several theoretical arguments point to a causal link between the nature of political institutions and the size of government, as measured by the ratio of *public consumption* to GDP. Meltzer and Richard (1981) have elegantly shown how a government that delivers uniform benefits financed by proportional taxes creates the stimulus for its own expansion. This model summarizes the incentives at work in democratic states, as far as government intervention is concerned: Taxes discourage economic activity and the increased number of poor vote for more government intervention financed by higher taxes. In addition, Mancur Olson (1982), among others, has argued that policy-making in democracies tends to be captured by interest groups whose demands increase the size and scope of government. On the other hand, abuses by the few can be better kept in check in a political system that gives voice to the many, i.e., in democracies. Along this line, Pommerehne and Schneider (1982) investigated a cross-section of Swiss municipalities and found strong evidence that representative government spend more than direct governments.[6]

Moreover, autocrats have incentives to increase the sphere of governmental activity to maximize their leverage over the economy. This can be seen as a generalization of the view expressed in Niskanen (1971), stressing that the main motivation of bureaucrats is to increase the size of their bureau, since their

[4] More direct measures of bureaucratic performance, such as the independence and the effectiveness of the judiciary, the level of corruption and the amount of red tape, have been shown by Mauro (1995) to have an adverse effect on economic growth. These variables are only available for the 1980s and so their use would considerably limit the time span and the number of countries in our study. We resorted to the use of the black market premium as a proxy for the quality of governance: Distortions on the foreign exchange market are strongly associated with other inefficient policies, as argued in Barro (1991).

[5] To some extent, the black market premium also captures macroeconomic instability. In what follows we will examine whether the macroeconomic instability channel might operate by using the inflation rate as an additional channel. The results are discussed in Section 3.

[6] Pommerehne and Schneider (1982) estimate the demand for government services from 48 Swiss municipalities which operate under direct democracy. They then use the resulting parameter estimates to compute demand for public service in the 62 Swiss municipalities that have a representative form of government. They find that *all* the individual spending categories are underestimated: Representative democracies spend 28% more than direct democracies. Furthermore, government spending is smaller in municipalities with representative governments when citizens have a right to call a referendum and reverse government decisions. We interpret these results as suggesting that a decrease in the discretionary power of politicians is likely to be associated with a reduction in government size. Similar effects may come into play when contrasting autocracies with democracies, since what matters for the argument is how closely the citizenry is associated with the control of public officials.

power derives directly from the pool of resources under their control.[7] On the other hand, minority rule can be advantageous if the characteristics of the few wielding power encourage them to act in the interest of society at large. If autocrats own a disproportionately high share of the economy's capital they have an incentive to select the growth-maximizing size of government. Giving more say to the poor in policy-making can in this case lead to more distortions and lower growth. Summarizing, it is theoretically unclear whether democracies spend less or more than autocracies, so the issue requires empirical examination.

The effects of governmental activity on growth involves a trade-off between the costs of distortionary taxation required to finance it and the benefits it provides. Barro and Sala-i-Martin (1992) show that, in a simple endogenous growth model where government spending is productive, there exists a growth-maximizing rate of taxation. Alesina and Rodrik (1994) study an economy with unequal distribution of capital and labor where individuals vote over taxation: The lower the capital income to labor income ratio of the median voter, the larger the tax rate and thus the lower growth. The growth-maximizing tax-rate would only be chosen in an economy where the median voter owns only capital. Taken together, these theories point to a negative effect of government size on growth. Indeed, Barro (1991) has documented a negative relationship between government consumption and growth.

2.4. Human capital

Differences in political regimes may also impact economic growth by leading to different social choices. Consider *human capital*: A substantial part of education spending is publicly financed and thus contains a strong redistributive element; if democracies are more responsive to the basic needs of the population than dictatorships, they will choose policies that promote human capital accumulation.[8] As far as human capital is concerned, a serious problem of endogeneity needs to be considered: A higher level of human capital is likely to be a determinant of democracy as well as one of its outcomes. The link between democracy and development may originate in the fact that education increases the demand for democracy.[9] In what follows, we address the issue of reverse causality by instrumenting for democracy in the human capital channel.

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[7] Even if one expects the objective functions of dictators and bureaucrats to be substantially different, they can express themselves in the same manner.

[8] Recent empirical evidence that democracy is positively associated with various measures of human capital can be found in Engerman et al. (1999) and Wacziarg (1999).

[9] Such an argument is pervasive throughout de Tocqueville's 1839 treatise on democracy in America, in which he associates the diffusion of democracy with the spread of the 'Spirit of the Enlightenment' ('l'Esprit des Lumières') de Tocqueville (1990).

Saint-Paul and Verdier (1993) present an endogenous growth model where redistribution, in the form of public education, is determined by political equilibrium. They show that, since human capital enhances productivity, the higher education spending delivered by the political process leads to higher growth. Previously, Mankiw et al. (1992) had shown empirically that human capital impacts growth positively. In conclusion, human capital is a potentially important channel of causation from democracy to growth.

2.5. Income inequality

The degree of *income inequality* also results from societal choices that are affected by the political regime. A move from dictatorship to democracy is expected to give a greater weight to the preferences of the poor in collective decision-making. The enfranchised poor may use the political process to their benefit and influence government to carry out inequality-reducing income redistribution.[10] The effect of income inequality on growth, the other link in the chain, has been widely studied. Alesina and Rodrik (1994) model an economy where higher income inequality leads to the adoption of a suboptimally high rate of taxation and thus to lower growth. Alesina and Perotti (1996) document a negative empirical linkage between inequality and growth.

2.6. Trade openness

The degree of *trade openness* can also be influenced by the extent of political freedom. Protectionist policies tend to be imposed because they benefit a few producers at the expense of a great mass of consumers. Democracies may weigh the preferences of the latter group more heavily than autocracies and result in less protectionism. But political economy models of endogenous protection with voting and lobbying can easily generate a high level of protection in democracies.[11] Hence, in democracies as well as in autocracies, groups that benefit from protections face incentives to voice their concerns (via political contributions or media campaigns) and tend to prevail over the greater numbers who stand to gain from free trade but are harder to mobilize. The effect of democracy on the trade regime remains an open empirical question.[12]

Numerous studies document a robust positive effect of trade openness on economic growth.[13] International trade allows countries to reap the full benefits

[10] This is the case in Saint-Paul and Verdier (1993), and more recently in Acemoglu and Robinson (1996)

[11] See, for instance, Grossman and Helpman (1992).

[12] Tavares (1998) argues, on the basis of factor proportions trade theory, that democratization should lead to increased trade openness in poor, labor abundant countries and not in rich, capital abundant countries.

[13] See for instance, Sachs and Warner (1995) and Wacziarg (1998), among many others.

of comparative advantage, thus raising both the steady-state level of per capita income and the transitional growth rate. Trade also increases the internal degree of product market competition, spurs technological transmissions, allows access to larger markets and may provide incentives for greater policy discipline through regional or global economic arrangements.

2.7. Physical capital accumulation

Lastly, we investigate the possibility that the degree of democratization may affect the rate of *physical capital accumulation*. In theory, there are several ways in which institutions may affect the rate of return to physical investment, independent of the channels already examined above. The political process may lead to a distribution of national income between capital and labor that is favorable to the latter, by giving a greater voice to unions and labor interests. Ceteris paribus, higher wages decrease the return to capital in democracies and thus lower the incentives for private investment. Rodrik (1999) provides support for this hypothesis by showing empirically that democracies pay higher wages. On the other hand, by better securing property rights and facilitating contract enforcement, democracies may raise the returns to investment.[14] They may do so also by reducing the extent of political, social and economic uncertainty.[15] Although part of this effect may be captured by the political instability channel, democracy may also affect other types of uncertainty that determine investment. These opposing effects suggest the issue deserves empirical examination. Furthermore, the rate of physical capital investment has been shown by Levine and Renelt (1992) to be one of the most robust determinants of economic growth.

3. Econometric methodology

Our analysis of the channels through which democracy affects growth involves an estimation procedure based on the features of panel data models and features of simultaneous equations models. The basic econometric specification consists of a series of eight structural relationships describing the behavior of the endogenous variables. The model consists of a cross-country growth equation and seven channel equations, one for each of the channel variables discussed in Section 2. In addition to the growth and channel variables, we account for the possibility that the level of democracy itself may be endogenous and instrument for it with the full set of exogenous variables in the system. We use a panel of countries across

[14] Clague et al. (1996) propose such an argument. They find that long-lasting democracies are better able to secure property rights and to guarantee the enforcement of contracts than autocracies.

[15] Rodrik (1998a,b) presents empirical evidence supportive of the hypothesis that democracies produce greater stability in economic performance.

time, so each of the $M = 8$ relationships can be formulated for each of $T = 4$ time periods, with parameters constrained to be equal across time-periods.

As far as the channel relationships are concerned, our parameters of interest are the coefficients that describe the effect of a marginal change in the democracy index on the dependent variable. The product of the coefficient on democracy in the channel equation by the coefficient of the channel variable in the growth equation indicates whether and how democracy affects growth through this particular channel. In addition to an index of democratization, each channel equation contains other control variables, some of which are endogenous in our system. This highlights the importance of using an instrumental variables estimator.

3.1. Structural form

Our model contains M theoretical relationships ($m = 1, \ldots, M$) (and endogenous variables) and K exogenous variables ($k = 1, \ldots, K$) for T time periods ($t = 1, \ldots, T$). The data consists of N countries ($i = 1, \ldots, N$). The most unrestricted version of the structural model is a set of TM equations of the form (superscripts index equations while subscripts index variables):

$$\gamma_{11}^{tm} y_{i11} + \cdots + \gamma_{T1}^{tm} y_{iT1} + \cdots + \gamma_{1M}^{tm} y_{i1M} + \cdots + \gamma_{TM}^{tm} y_{iTM} + \delta_{11}^{tm} x_{i11} + \cdots + \delta_{T1}^{tm} x_{iT1} + \cdots + \delta_{1K}^{tm} x_{i1K} + \cdots + \delta_{TK}^{tm} x_{iTK} = \varepsilon_i^{tm}. \quad (1)$$

Of course, this formulation is far too general. In particular, without further restrictions, the structural parameters will not be identified. We start by imposing the following restrictions:

(1) For all m relationships, we constrain non-contemporary coefficients to zero, i.e., $\gamma_{sm}^{tm} = 0$ and $\delta_{sk}^{tm} = 0$, for all s different from t. This ensures that the model will not be dynamic.
(2) Coefficients for a specific variable and equation relationship are constrained to be equal across time, i.e., $\gamma_{tm}^{tm} = \gamma_{tm}^{sm}$ and $\delta_{tk}^{tm} = \delta_{tk}^{sm}$ for all s.[16]
(3) We impose a normalization whereby, in each equation of the structural model, the coefficient on the endogenous variable which is designated as dependent variable for this equation, is set equal to one: $\gamma_m^m = 1$. This identifies the mth endogenous variable as the dependent variable for the mth equation.

So each set of T equations corresponding to one of the $m = 1, \ldots, M$ relationships can be written as follows:[17]

$$y_{im} = \varepsilon_i^m - \gamma_1^m y_{i1} - \cdots - \gamma_M^m y_{iM} - \delta_1^m x_{i1} - \cdots - \delta_K^m x_{iK} \quad (2)$$

[16] For some of our reported estimates, we will relax this assumption for the intercepts of each equation to allow for time-specific effects.

[17] From now on we drop the time subscript on the parameters since we have already imposed cross-time parameter equality restrictions.

where y_{ij}, x_{ik} and ε_i^m are the $(T \times 1)$ vectors that stack each endogenous variable $j = 1, \ldots, M$, each exogenous variable $k = 1, \ldots, K$ and each disturbance $m = 1, \ldots, M$, over the T time periods. Eq. (2) shows that our original model, with each relationship formulated for each time period, is equivalent to a panel data model where the data for each individual country have been stacked over time. Additional identifying restrictions will be discussed below.[18]

If we stack the ε_i^m errors into a vector ε_i, we are able to formulate the usual assumptions on the error vector, namely: $E(\varepsilon_i) = 0$ and $E(\varepsilon_i \varepsilon_i') = \Sigma$. The off-diagonal elements of Σ are the error covariances across time and across structural relationships, which are unconstrained.[19] Stacking the error terms over all observations $i = 1, \ldots, N$ leads to a block diagonal covariance matrix, with the blocks corresponding to the individual covariance matrix Σ. The assumption that the reduced form error terms can covary across time for a single relationship is tantamount to allowing the error term to contain a country specific effect that is independent from the right-hand side variables, an approach equivalent to the random effects model. Given the above, important additional restrictions imposed on the covariance matrix of the full $(MTN \times 1)$ disturbance vector stem from the assumption that Σ does not depend on the country subscript i. This rules out heteroskedasticity and spatial autocorrelation.[20]

3.2. Estimation of the structural parameters

Several estimation procedures have been proposed for the type of system we are analyzing.[21] The most obvious one is indirect least squares or indirect feasible generalized least squares: First estimate the reduced-form coefficients using least squares or the SUR technique on the full set of reduced-form equations; second, retrieve the structural parameters and the corresponding

[18] The formal conditions for identification are the familiar rank and order conditions (Greene, 1993). Basically, we need to exclude as many exogenous variables from each equation as we include endogenous variables. A previous version of this paper, available upon request, formally derives these conditions for the econometric framework that we are considering.

[19] In other words, we allow the error term for the education relationship in a particular period to be correlated with the error term for the education relationship in any other period and, say, government consumption in any period.

[20] However, we report standard errors that are robust to heteroskedasticity (White-robust).

[21] The first estimation method that can be considered is equation-by-equation instrumental variables (or 2SLS) estimation on the structural form model. This yields consistent estimates, but efficiency is not attained because cross-equation disturbance correlations are neglected. In order to impose cross-period parameter equality restrictions and to exploit efficiency gains from the correlation of error terms for each structural relationship across time, one could use a variant of single-equation IV whereby each structural relationship is estimated for all time periods jointly using three-stage least squares, as in Barro (1996a). This method takes into account cross-period correlations, but does not exploit the information inherent in the fact that error terms may not be independent across structural relationships.

standard errors using minimum distance estimation (Delta method). This, however, is computationally demanding and yields no gain in efficiency or consistency compared to the systems method of estimation to which we now turn.

We estimate the full set of $(T \times M)$ equations *jointly* using three-stage least squares. This is an IV-GLS estimator which achieves consistency through instrumentation and efficiency through appropriate weighting. The 3SLS estimator can be obtained as follows:

(1) Estimate the reduced-form coefficient matrix via OLS and retrieve the fitted values for the endogenous variables for each equation of the structural model.
(2) Estimate the structural system equation-by-equation via 2SLS and retrieve the estimated covariance matrix of the residuals from this procedure.
(3) Finally, use the estimated covariance matrix from stage 2 and the fitted values of the endogenous variable from stage 1 in an IV-GLS procedure applied to the stacked structural model.

In order to examine the impact of instrumenting for the endogenous variables on our results, we report Seemingly Unrelated Regression (SUR) estimates of the model's parameters. These exploit the efficiency gains derived from our assumed error structure, without using instrumental variables. We also report simultaneous equations fixed-effects estimates, in order to isolate the within-country relationships and to provide a further check on the robustness of the channel estimates.

3.3. Specification and exclusions

In order to determine the exclusions needed for the identification of our system, we follow two different strategies. First, we estimate a system based on a priori theoretical exclusions, which constitutes our benchmark model. Second, we submit the estimates of this benchmark model to a sensitivity test based on an empirical specification search, in which we let the data determine which variables should appear in each equation. Throughout, we include democracy in every channel equation but exclude it from the growth regression.

3.3.1. Choice of exogenous variables

The estimation framework presented above implies that we need a relatively wide set of exogenous variables, labeled $x_{i1}, \ldots, x_{iK}$. These variables are exogenous in the sense that they do not appear on the left-hand side of any of our structural relationships, i.e., they are not determined within the system.[22] By

[22] For a similar empirical strategy, relying on a set of exogenous cultural and religious variables to explain the quality of government, see LaPorta et al. (1998).

choosing a sufficiently wide set of variables, we will limit the scope for omitted variables bias. The variables used as exogenous instruments in the estimation fall into the following categories:[23]

- cultural variables (religion dummies and ethnolinguistic fractionalization),
- demographic variables (log of population, share of the population over 65 and under 15),
- gravity variables (country land area, distance from major trading partners, landlocked country dummy, island dummy, oil exporter dummy, terms of trade shocks),
- historical variables (post-war independence dummy, dummy if ever a colony, number of war casualties),
- the log of income per capita and its squared value ((the log of initial income will appear in every relationship of our base specification, so that it will never be operative as an instrument, only as a control, in other words, it will not provide identifying information)).

3.3.2. Benchmark specification

We determine the set of endogenous and exogenous variables appearing on the right-hand side of each equation based on existing specifications for growth and the various channel equations. We also excluded all lags and leads from every equation. The set of exclusions and inclusions for the base specification can be inferred from Appendix C (Table 12). In every equation, the number of exclusions is sufficient for the order condition for identification to be satisfied. The rank condition can safely be assumed to hold in a model of this size.

For the growth equation, we choose a specification commonly accepted in the cross-country growth literature (see, for instance, Barro, 1991,1996a). It is derived from an augmented Solow model, with initial income and the set of channel variables as regressors.[24] In the neoclassical growth framework these variables can affect the long-run steady-state of the economy and, consequently, its growth rate during the transition to the steady-state. In augmented versions of this model, and in endogenous growth models, these variables may also affect long-run growth rates. This common specification of the growth regression allows comparability of our results with the previous literature.

Turning to the channel equations, we relied, when possible, on existing empirical work. The specification of the human capital equation involved, among others, the inclusion of cultural variables (religion and ethnolinguistic

[23] See Appendix A for a complete description.

[24] This specification assumes that the exogenous variables affect growth only through the channel variables. When we turn to our empirical specification, we will allow some of the exogenous variables to appear in the growth regression. Results are not sensitive to this assumption.

fractionalization), income inequality and government size. For the inequality channel, we started from an 'augmented' Kuznets curve: The specification contains the log of initial income and its square, as well as several cultural variables and measures of country size. The openness equation involves mostly gravity variables, such as country size, the distance from major trading partners, and the country's area. The specification of the government size equation is based on Rodrik (1998a,b), which attempted to explain the determinants of the size of government. The equation for physical investment is close to that estimated by Barro and Sala-i-Martin (1995). For instability and distortions, we relied on reasonable priors for the inclusion of both endogenous and exogenous variables. The validity of these theoretical choices was consistent with an empirical specification search, to which we now turn.

3.3.3. Empirical specification search

In the growth and channel equations, the estimated coefficient on the democracy index may be sensitive to the chosen specification, and in particular to the exclusion of particular endogenous or exogenous variables. The sets of included and excluded variables also determine the extent of over-identification for each equation.

To obtain an empirical specification, we used the identifying information inherent in the exclusion of all leads and lags of the exogenous variables. The exclusion of leads and lags of exogenous variables ensures that the number of excluded instruments exceeds the number of included endogenous regressors. This is true even when all contemporary exogenous and endogenous regressors are included in every channel equation.[25] We used this identifying information in the first stage of our systematic specification search: The full system, with all contemporaneous variables on the right-hand side, was estimated using 3SLS. At this stage, the number of over-identifying restrictions is limited and the operative instruments are weak, so there is much to be gained in terms of standard errors, from simplifying the specifications. We removed all the variables with coefficients that were insignificantly different from zero at the 95% confidence level.[26] A total of 97 variables were thus removed from our 8 structural relationships. We were left with a subset of the original variables, which included both endogenous and exogenous regressors.

The criteria for excluding variables from the various equations is based on tests for the individual significance of each coefficient. To check whether the

[25] As a variant of this procedure, we also report results based on excluding all of the channel variables for every channel equation. The procedure then amounted to choosing the set of excluded *exogenous* variables for each equation. As shown in Table 4 this modification had little impact on the estimates of the channel effects.

[26] With the exception, of course, of democracy in the channel equations and of the channel variables in the growth equation.

exclusion of these variables as a group is valid, we can compute a joint test of the exclusion restrictions of the whole system. This *quasi-likelihood ratio* tests is based on the difference between the value of the minimum distance criterion in the null or restricted model and in the initial model.[27] The QLR statistic is asymptotically chi-squared with degrees of freedom equal to the number of excluded variables. Testing the validity of all the exclusions jointly, we find that the QLR statistic is equal to 72.75. The 95% critical value for the chi-squared distribution with 97 degrees of freedom is equal to 120.99, so we fail to reject the null hypothesis that the excluded variables are jointly insignificant at a very high level of significance, and conclude that their exclusion was indeed justified statistically.

Interestingly, most of the determinants of the channels that survived the specification search make sense. In fact, there is a substantial overlap between the two sets of variables: 64.7% of the variables appearing in the theoretical specification also appeared as a result of the systematic specification search. Moreover, variables that are key determinants of the channel variables, such as the gravity variables in the trade openness equation, naturally survive the empirical specification search.

4. Analysis of the channel effects

4.1. Overview of the data

This section describes the nature and broad characteristics of the data.[28] The time period under study is 1970–1989 and the data refers to a diverse cross-section of 65 industrial and developing countries. Our panel consists of four time periods corresponding to five-year intervals. Most of the variables, including growth and the democracy index, enter as five-year averages, which limits the potential for measurement error and business cycle effects driving our results. The democracy index is a variable ranging from 0 (full autocracy) to 1 (country with fully developed democratic institutions). It is constructed on the basis of a yearly survey that evaluates political institutions in each country according to how it fares on 9 criteria, based on the freedom to elect representatives and the existence of a meaningful opposition (Freedom House, 1972–1995). The index is created with the aim of consistency across time and across countries, so it is appropriate to use it in a panel data context.

[27] See Gallant and Jorgenson (1979).

[28] A complete description of the data, including sources and definitions, is provided in Appendix A. Appendix B lists the countries present in the study. The sample is smaller than is usually the case in cross-country growth studies because the estimation procedure required a large set of variables, many of which are available for a restricted set of countries only. The main constraint on the number of countries covered was the availability of the income inequality data.

In the period under study countries became on average more democratic, with the mean level of democracy changing from 0.566 in 1970–1974, to 0.696 in 1985–1989. Furthermore, democracy is highly persistent over time: the first-order autocorrelation of its five-year average is always greater than 0.88. In contrast, growth has fluctuated between 3.624 (1970–1974) and 0.255 (1980–1984) percentage points and the first-order autocorrelation of its five-year average is never greater than 0.423. The correlation between democracy and growth is always quite low and varies from − 0.055 in the 1970–1974 period to 0.340 in the 1985–1989 period. Based on these unconditional correlations, it is not surprising that past studies uncovered no systematic relationship between the two variables.

Table 1 contains summary statistics for the main variables in this study, which may help in the interpretation of the coefficient estimates by providing the scale of the relevant variables. The first column of Table 2 correlates growth with all the endogenous variables. The signs of these correlations are consistent with our priors. Public consumption and the black market premium show particularly strong negative correlations with growth. The second column contains the correlations between democracy and the various channel variables, which are all relatively high. The signs of the correlations are as expected, with the possible exception of public consumption, which is negatively correlated with the democracy index. We interpret these high simple correlations between democracy and the channel variables as validating both our choice of channels and our simultaneous equations approach. Looking at the democracy – channel and channel – growth correlations together (columns 1 and 2), we obtain some insight into the direction of the channel effects. For instance, democracy is associated with higher levels of educational attainment and education correlates positively with growth, implying that democracy correlates positively with growth positively

Table 1
Summary statistics for the main variables (1970–1989 averages)[a]

	Mean	Std. Dev.	Minimum	Maximum
Growth	1.908	1.940	− 1.477	7.513
Democracy	0.624	0.314	0.000	1.000
Log initial income	8.084	0.967	6.154	9.586
Investment rate (% GDP)	18.998	7.421	1.320	36.135
Human capital	1.420	1.138	0.063	5.348
Gini coefficient	42.035	9.644	25.100	63.150
Political instability	0.153	0.241	0.000	1.100
Black market premium	32.059	58.531	− 0.471	364.704
Trade share (% GDP)	61.477	42.719	13.686	325.607
Government consumption (% GDP)	16.192	6.451	7.831	33.962

[a]Number of observations: 65.

Table 2
Correlation matrix for the main variables (1970–1989 averages)[a]

	Growth	Democracy	Log income	Investment	Human capital	Gini coefficient	Political instability	BMP	Openness
Democracy	0.207	1							
Log income	0.295	0.810	1						
Investment	0.572	0.541	0.720	1					
Human capital	0.259	0.673	0.775	0.532	1				
Gini coefficient	− 0.343	− 0.492	− 0.504	− 0.382	− 0.514	1			
Political instability	− 0.186	− 0.295	− 0.352	− 0.343	− 0.261	0.125	1		
BMP	− 0.381	− 0.364	− 0.468	− 0.449	− 0.369	0.257	0.315	1	
Openness	0.292	0.002	0.109	0.278	0.045	− 0.049	− 0.235	− 0.128	1
Government consumption	− 0.436	− 0.487	− 0.510	− 0.416	− 0.327	0.258	0.114	0.474	0.041

[a]Number of observations: 65.

through human capital. In fact, taken at face value, the simple correlations suggest that democracy fosters growth through *every single channel*. It is, of course, necessary to control for other determinants of the endogenous variables. Indeed, the picture that emerges is different when we turn to conditional statements and control for potential endogeneity bias.

4.2. How democracy affects growth

In Appendix C (Table 12), we present 3SLS estimates for the whole system, from which our benchmark theoretical specification can be inferred. Table 3 summarizes our results for the channel effects of democracy on growth, as well as test statistics corresponding to the relevant non-linear functions of estimated parameters. For example, the product of the coefficient of democracy in the political instability equation and the coefficient of political instability in the growth equation provides the effect of democracy on growth via political instability. Because we use a simultaneous equation approach, we are able to quantify precisely the magnitude of all the partial effects and test their statistical significance.[29]

The second column of Table 3 contains the coefficients for democracy taken from the seven different channel equations in the system. These estimates provide statistically significant evidence that a higher level of democracy leads to higher educational attainment, higher government consumption, lower investment rates, a smaller degree of openness to trade and lower income inequality. There appears to be no effect on the extent of distortions and political instability.

The third column presents the estimates for the coefficients of the channel variables in the growth equation. The results are in the spirit of past findings of the cross-country growth literature (see, for instance, Barro, 1991). Growth is positively affected by educational attainment and the investment rate, while it is negatively affected by government consumption, income inequality, distortions and political instability. Trade shares, while positively related to growth, enter with a coefficient which is significant only at the 78% confidence level.[30] Overall, the results for the growth equation are consistent with previous empirical work, which makes us confident the system as a whole will deliver sensible results.

The numbers in the fourth result from the multiplication of the coefficient of democracy in each channel (column 2) by the coefficient of the respective channel in the growth equation (column 3). The combined effects suggests that democracy significantly fosters growth by improving educational opportunities

[29] The standard errors on the products of coefficients are calculated by a linear approximation around the estimated parameter values, using the formula for the variance of linear function of random variables to calculate the corresponding standard errors.

[30] This result is consistent with Levine and Renelt (1992). They could not reject the hypothesis that trade openness affects growth only through its effect on rates of physical capital accumulation.

Table 3
How democracy affects growth: Base specification

Channel	Effect of democracy on the channel	Effect of the channel on growth	Effect of democracy on growth
Human capital	0.4363	0.5669	0.2474
	(3.88)	(3.60)	(2.61)
Income inequality	− 9.3768	− 0.0321	0.3014
	(− 6.52)	(− 2.59)	(2.39)
Political instability	− 0.0288	− 0.8232	0.0237
	(− 0.46)	(− 1.95)	(0.44)
Distortions	− 5.1895	− 0.0033	0.0172
	(− 0.41)	(− 3.78)	(0.40)
Trade openness	− 39.3947	0.0030	− 0.1194
	(− 7.36)	(1.22)	(− 1.26)
Government consumption	3.2659	− 0.1536	− 0.5015
	(3.98)	(− 7.66)	(− 3.48)
Investment rate	− 4.1454	0.2653	− 1.0997
	(− 3.41)	(14.54)	(− 3.36)
Total effect			− 1.1310
			(− 2.97)
Wald test (*p*-value)			8.821
			(0.000)
Number of observations			65

Note: The second column presents the coefficient of democracy on the several channel equations, the third column refers to the coefficient of the channel variable in the growth equation, and the last column presents the product of the two coefficients. In parentheses, *t*-statistics based on heteroskedastic-consistent (White-robust) standard errors.

and decreasing income inequality. On the other hand, democracy entails costs to growth by lowering rates of physical capital investment and by raising government consumption. The largest effect by far is through this investment channel: The estimates suggest that a change from 0 to 1 in the democracy index is associated with a 1.099 reduction in the yearly growth rate of per capita GDP *through investment alone*.[31] Political instability, trade openness and distortions do not appear to be important channels. In the case of political instability and distortions, this is not because these variables do not impact growth, but rather because they are not significantly affected by democracy.[32] As to the overall effect, a one-standard deviation change in the democracy index (0.314),

[31] Helliwell (1994) also estimated the effect of democracy on physical capital accumulation, but found instead a positive and significant coefficient. Helliwell only controlled for initial income in his investment equation, whereas we control for a much wider set of variables.

[32] This is consistent with Perotti (1996). In his study of income inequality and growth, he found that democracy does not significantly affect political instability.

according to our estimate, would bring about a 0.355 percentage point decline in annual growth of per capita income. This estimate is significantly different from zero at the 99% confidence level.[33] In accordance with past studies, the overall effect of democracy is negative and economically moderate. The added value of these estimates is an *empirical explanation* of where this overall effect comes from.

4.3. Sensitivity analysis

Our benchmark model may be sensitive to several specification, sample and estimation choices. In this subsection we examine the sensitivity of our results to several modifications of the model. Firstly, we examine the sensitivity of the channel estimates to alternative specifications of the various equations in the system. Secondly, we examine whether the estimates are sensitive to the geographic coverage and the time period covered by the benchmark estimates discussed above. For easier comparison, the tables that follow always report the benchmark results from column 4 of Table 3.

4.3.1. Sensitivity to the specification of system equations

4.3.1.1. Empirical specification search. The method for our empirical specification search was described in Section 3.3.3. Columns 3 and 4 of Table 4 present estimates at each stage of the search: In the first iteration, all of the contemporaneous exogenous and endogenous variables appear on the right-hand side of each equation, and the only identifying restrictions are provided by the exclusions of leads and lags of the exogenous variables (all of which appear as part of the instrument list). As a consequence, the number of parameters to be estimated is very large, and we do not take advantage of much potential identifying information. In spite of this, the signs of the important channel effects, namely human capital, government consumption and investment, are robust.

When the insignificant variables are excluded from this specification (column 4), we revert to the major results uncovered using the theoretical specification: A positive human capital effect and negative investment and government consumption effects, leading to a moderately negative overall effect. However, the inequality effect is reversed and now insignificant statistically, casting doubts on its robustness.[34] By and large, the choice of our benchmark specification did not

[33] We also report a Wald test for the non-linear hypothesis that the sum of the individual channel effects (themselves the products of coefficients in the channel and growth equations) is insignificantly different from zero. This produces the same p-value as the t-test reported in the text.

[34] The last two columns of Table 4 repeat this exercise, but excluding all of the channel variables from the right-hand sides of the channel equations. The results are largely unaffected by the use of this alternative procedure.

Table 4
Systematic specification search

	Base model	All endogenous iteration #1	All endogenous iteration #2	No endogenous iteration #1	No endogenous iteration #2
Human capital	0.2474	0.4475	0.6858	0.7993	0.6727
	(2.61)	(2.71)	(4.45)	(4.68)	(4.46)
Income inequality	0.3014	− 0.3897	− 0.1579	− 0.3338	− 0.1430
	(2.39)	(− 1.87)	(− 1.67)	(− 2.20)	(− 1.90)
Political instability	0.0237	0.0485	− 0.0786	0.0383	− 0.0077
	(0.44)	(0.31)	(− 0.99)	(0.35)	(− 0.12)
Distortions	0.0172	− 0.0574	− 0.0231	− 0.0691	0.0013
	(0.40)	(− 0.92)	(− 0.56)	(− 1.36)	(0.04)
Trade openness	− 0.1194	0.3012	0.1402	0.4780	0.3165
	(− 1.26)	(1.71)	(1.49)	(3.55)	(3.09)
Government consumption	− 0.5015	− 0.6900	− 0.6215	− 0.8139	− 0.7253
	(− 3.48)	(− 3.34)	(− 3.92)	(− 4.16)	(− 4.43)
Investment rate	− 1.0997	− 0.3822	− 0.9730	− 1.7684	− 1.5377
	(− 3.36)	(− 0.93)	(− 2.78)	(− 5.14)	(− 4.64)
Total effect	− 1.1310	− 0.7221	− 1.0280	− 1.6695	− 1.4231
	(− 2.97)	(− 1.20)	(− 2.38)	(− 3.76)	(− 3.71)
Wald test (p-value)	8.821	1.435	5.656	14.137	13.728
	(0.000)	(0.231)	(0.017)	(0.000)	(0.000)
Number of observations	65	65	65	65	65

Note: t-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses.

seem to affect the most robust channels or the overall effect of democracy on economic growth.

4.3.1.2. Time and regions effects. Table 5 presents several other modifications of the benchmark specification. The third column presents channel effects of democracy on growth, as well as the overall effect, when the intercepts of each relationship are allowed to vary across time periods. The estimation results are very robust to this change; the only differences lie in the fact that the trade openness channel becomes more significant, and that the absolute magnitude of the other effects is reduced. As a consequence, the overall net effect of democracy on growth is smaller.

In the fourth column of Table 5, we added regional dummies to this specification. The effect of time-invariant region-specific characteristics, not accounted for by our random effects estimation approach, may be driving some of the results. If such effects are correlated with determinants of the channel variables, their omission from the benchmark regression may result in a bias in the democracy coefficient. We try to account for regional fixed effects by including regional dummy variables in every channel equation. Specifically, we included dummy variables for OECD members, Latin America, East Asia, and Sub-Saharan Africa. We expect a reduction in the estimated effect of the democracy index on the channel variables: The inclusion of regional dummies is akin to disregarding some of the between-country variation in the determinants of the channels, which may drive much of their partial covariation with democracy. Indeed, this is generally the case, as the human capital effect and inequality channels all but disappear. However, most of the signs of the estimated channel effects are preserved. The investment and government consumption effects, although dampened as well, are still negative and significant statistically.

4.3.1.3. Excluding per capita income from the channel equations. The benchmark specification includes per capita income as a control variable for every channel equation. Since the democracy index and income levels are very highly correlated, it may be difficult to interpret the effects of democracy on growth. In particular, countries with high levels of democracy and low levels of income per capita are few in the sample, so the effects of democracy on the channel variables are hard to disentangle from the effects of income levels. In column 5 of Table 5 we excluded income per capita from every channel equation (but not from the growth equation). This is done for illustrative purposes only: We expect this exclusion to lead to an increase in the overall effect of democracy on growth, as the democracy index will capture much of the effect previously attributed to income. Indeed, the overall effect of democracy becomes positive. This is due to a reversal of the government consumption channel, which now becomes positive and significant, a reduction in the magnitude of the investment channel, and an increase in the effect of democracy through human capital. All of the other signs

Table 5
Sensitivity of the base estimates to specification

	Base model	Time specific intercepts	Time and region effects	Excluding initial income	Base specification SUR estimates
Human capital	0.2474	0.2047	0.0110	0.7107	0.0772
	(2.61)	(2.20)	(0.39)	(3.26)	(1.75)
Income inequality	0.3014	0.2600	− 0.0508	0.1726	0.0923
	(2.39)	(2.14)	(− 1.00)	(2.11)	(1.86)
Political instability	0.0237	0.0293	0.2219	0.1303	0.0907
	(0.44)	(0.58)	(2.21)	(1.59)	(1.91)
Distortions	0.0172	0.0259	− 0.0058	− 0.0244	− 0.0737
	(0.40)	(0.55)	(− 0.20)	(− 0.76)	(− 1.77)
Trade openness	− 0.1194	− 0.1965	− 0.0280	− 0.0328	− 0.1165
	(− 1.26)	(− 2.11)	(− 0.94)	(− 1.23)	(− 1.86)
Government consumption	− 0.5015	− 0.3492	− 0.1619	0.0455	0.1481
	(− 3.48)	(− 2.63)	(− 2.03)	(0.36)	(1.67)
Investment rate	− 1.0997	− 0.7119	− 0.6197	− 0.4239	− 0.3675
	(− 3.36)	(− 2.34)	(− 3.51)	(− 1.40)	(− 1.79)
Total effect	− 1.1310	− 0.7377	− 0.6333	0.5779	− 0.1494
	(− 2.97)	(− 2.12)	(− 2.57)	(1.49)	(− 0.59)
Wald test ($\chi^2(1)$) (p-value)	8.821	4.508	6.593	2.208	0.345
	(0.000)	(0.034)	(0.010)	(0.137)	(0.557)
Number of observations	65	65	65	65	65

Note: t-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses.

and magnitudes are preserved, reinforcing our confidence in the benchmark estimates.

4.3.1.4. SUR estimates. In column 6 of Table 5, we examine the sensitivity of our results to the estimation method by running the model without instrumenting for the endogenous variables. Admittedly, this should lead to inconsistent estimates, but may provide a further check on the robustness of our results. In particular, the human capital effect is much reduced when using SUR. This may be due to reverse causation, which is likely to be prevalent in the human capital–democracy relationship, as argued in Section 2. All of the other effects are roughly preserved compared to the base model.

4.3.2. Sensitivity to sample coverage

4.3.2.1. Geographic coverage. Table 6 focuses on the sensitivity of our base estimates to the sample under consideration. In order to examine this issue, we sequentially restricted the estimates to sub-samples of Latin American, OECD, Southeast Asian and Sub-Saharan African countries. The loss of degrees of freedom is thus substantial and, as expected, translates into generally larger standard errors and lower significance of the coefficients. However, the channel effects are remarkably robust. In particular, the positive effect through human capital and the negative effect through investment are preserved in most cases.[35] The government consumption channel seems to be least robust to changes in the geographic coverage of the sample.

The presence of 21 industrial countries in our sample could be a driving force behind the results. Focusing on less-developed countries is of great interest from the viewpoint of policy, since these are precisely the countries where the economic effects of democratic institutions are most debated. Moreover, developing countries are the set of countries in which, given the current levels of democratization, changes in political institutions can potentially deliver the largest changes in economic growth. Excluding OECD members from our sample (column 6), we find that the human capital, income inequality and investment channels are preserved relative to the benchmark model. However, the government consumption effect is reversed.

Finally, we attempted to increase the geographic coverage of our study by excluding the income inequality channel from the system. Indeed, the availability of data on the Gini coefficient for income inequality over the four sub-periods under consideration was the main constraining factor on the size of our data set. Removing the income inequality channel may therefore allows a check on the

[35] The estimates are affected most by the exclusion of Latin America, which reduces the sample size to 46 countries.

Table 6
Sensitivity to geographic coverage

	Base model	Excluding S.E. Asia	Excluding Sub-Saharan Africa	Excluding Latin America	Excluding the OECD	No inequality equations
Human capital	0.2474	0.1522	0.0515	0.1236	0.1798	0.2756
	(2.61)	(1.85)	(1.07)	(1.86)	(3.02)	(2.11)
Income inequality	0.3014	0.2640	0.2390	0.0059	0.1271	–
	(2.39)	(2.31)	(3.05)	(0.26)	(2.02)	–
Political instability	0.0237	0.0846	0.1155	0.0456	0.0934	0.0436
	(0.44)	(1.24)	(2.01)	(0.76)	(1.43)	(0.57)
Distortions	0.0172	− 0.0186	− 0.2216	− 0.0175	− 0.1345	− 0.1606
	(0.40)	(− 0.56)	(− 2.01)	(− 1.08)	(− 4.14)	(− 1.58)
Trade openness	− 0.1194	− 0.0044	− 0.1268	− 0.1581	0.1106	− 0.2716
	(− 1.26)	(− 0.22)	(− 2.42)	(− 1.92)	(1.49)	(− 1.80)
Government consumption	− 0.5015	0.0437	− 0.1561	− 0.0886	0.2251	0.0169
	(− 3.48)	(0.42)	(− 2.60)	(− 1.36)	(2.44)	(0.20)
Investment rate	− 1.0997	− 0.6090	− 0.9904	0.1576	− 0.8705	− 1.0373
	(− 3.36)	(− 2.38)	(− 5.36)	(0.72)	(− 3.89)	(− 2.34)
Total effect	− 1.1310	− 0.0875	− 1.0888	0.0685	− 0.2689	− 1.1334
	(− 2.97)	(− 0.28)	(− 5.58)	(0.24)	(− 0.83)	(− 2.24)
Wald test *p*-value	8.821	0.0784	31.127	0.0554	0.691	4.996
	(0.000)	(0.780)	(0.000)	(0.814)	(0.406)	(0.025)
Number of observations	65	58	52	46	44	81

Note: *t*-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses.

robustness of the remaining channels with respect to an increase in the sample size. Doing so resulted in a gain of 16 countries (or 64 data point in our panel).[36] As shown in column 7 of Table 6, this did not lead to major changes in the estimates of the remaining channels – the main channels are still human capital (positively) and investment (negatively), and the magnitude of these channel effects and of the overall effect are unchanged relative to the base system results. However, the government consumption channel is affected by this extension of the sample, again casting doubt on its robustness.

4.3.2.2. Time coverage. Our base estimates focus on the 1970–1989 time period for a number of reasons. Firstly, the Freedom House data for democracy are not available before 1972. Hence, we would have to resort to data from Bollen (1980) that are not necessarily comparable to the Gastil data used here. Furthermore, using periods preceding 1970 and following 1990 would result in a substantial decrease in country coverage, as several of our variables have reduced coverage prior to 1970 or post 1990 (this is the case, in particular, for income inequality). However, incorporating additional periods has the advantage of increasing overall sample size, as we increase the number of periods to five or six.

In order to check the robustness of our basic results to time coverage, Table 7 displays estimates going back to 1965 and extending to 1994.[37] Column 3 of this table shows the effects of incorporating the 1965–1969 time period into the benchmark system. Although this reduced the sample to 55 countries, the effect of this change seems mostly to be a reduction in the magnitude of the estimated channel effects. However, the statistical significance of the most robust channels is preserved – human capital and income inequality are still significant channels through which democracy affects growth positively, while the investment rate remains a significantly negative channel. Again, the overall effect is somewhat reduced, but is estimated more precisely – perhaps as a result of incorporating an additional time period.

Column 4 of Table 7 performs the same exercise for the 1970–1994 time period, and column 5 incorporates all 6 periods (1965–1994). Again, the results seem generally robust to changes in the time coverage of the sample, although the magnitude of the estimates on the human capital channel is reduced in both columns.[38] Both the statistical significance and the magnitudes of the remaining channels and of the overall effect are in line with those of the benchmark model.

[36] We removed the income inequality channel from our system as well as the Gini coefficient whenever it would appear on the right-hand side of other equations.

[37] We attempted to include the 1960–1964 time period as well but the sample in this case was reduced to 34 countries, and the three-stage least squares estimator failed to provide estimates for several of the channels as a result of a singular matrix.

[38] This is due entirely to a reduction of the human capital coefficient in the growth equation, rather than to a reduction of the democracy coefficient in the human capital equation.

Table 7
Sensitivity to time period coverage

	Base model (1970–1989)	1965–1989 period	1970–1994 period	1965–1994 period
Human capital	0.2474	0.1609	0.0205	0.0728
	(2.61)	(3.25)	(0.47)	(2.17)
Income inequality	0.3014	0.0829	0.4019	0.1082
	(2.39)	(2.24)	(4.97)	(4.67)
Political instability	0.0237	0.0239	0.1820	− 0.0022
	(0.44)	(1.11)	(2.33)	(− 0.19)
Distortions	0.0172	0.0201	0.0773	0.0620
	(0.40)	(1.20)	(1.55)	(6.38)
Trade openness	− 0.1194	− 0.2305	− 0.1783	− 0.1805
	(− 1.26)	(− 4.64)	(− 3.36)	(− 6.42)
Government consumption	− 0.5015	− 0.0596	− 0.1524	0.2426
	(− 3.48)	(− 0.87)	(− 2.04)	(6.53)
Investment rate	− 1.0997	− 0.5972	− 0.9394	− 0.4051
	(− 3.36)	(− 9.16)	(− 6.39)	(− 15.01)
Total effect	− 1.1310	− 0.5996	− 0.5884	− 0.1021
	(− 2.97)	(− 5.38)	(− 3.11)	(− 1.57)
Wald test *p*-value	8.821	28.941	9.647	2.476
	(0.000)	(0.000)	(0.000)	(0.116)
Number of observations	65	55	59	52

Note: *t*-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses.

We conclude that our benchmark estimates, with the exception of the government size channel, were not very sensitive to the choice of 1970–1989 as the baseline time period.

4.4. Extensions of the benchmark model

In this subsection we examine several extensions of our benchmark empirical model. We consider the possibility of an additional channel, and report estimates pertaining to the determinants of democracy. Finally, we examine whether some of our results can be extended to within-country rather than cross-country statements.

4.4.1. Macroeconomic instability

A possible omission from our list of channel variables is macroeconomic instability.[39] Although the use of the black market premium may account for

[39] We are grateful to an anonymous referee for suggesting this possibility.

this channel to some extent, we examine whether the rate of inflation may constitute another channel linking democracy to growth. Indeed, several authors have documented the detrimental effects of high inflation on rates of economic growth (Barro, 1995; Bruno and Easterly, 1998). In turn, democracies may be better able to provide a check on macroeconomic policy making. This is consistent with the negative simple correlation (−0.171) between democracy and inflation rates over the 1970–1989 period.

In order to investigate this issue empirically, we formulate an additional channel equation for inflation.[40] The determinants of inflation include the log of initial income, terms of trade shocks, as well as several measures of social conflict – ethnolinguistic fractionalization, income inequality and political instability. We also present estimates based on an empirical specification search, as described above, and results with time and region effects. These estimates are displayed in Table 8.

These results suggest two observations. Firstly, inflation does not seem to be a robust channel linking democracy to economic growth. The estimates presented in Table 8 vary in magnitude and are never statistically significant at the 95% level. This is due both to a weak effect of inflation on economic growth (consistent with past results linking only high inflation to reduced growth), and a fragile (although positive) effect of democracy on inflation once variables such as the log of per capita income are held constant. Secondly, the inclusion of the inflation channel does not seem to affect the estimates of the most robust channels – namely human capital, government consumption and investment. Hence, we conclude that the omission of the inflation channel from our benchmark estimates did not affect the basic results of the paper.

4.4.2. Democracy equation

As suggested in Section 2, democracy and growth may be jointly determined. Thus, in computing the estimates presented above, we instrumented for democracy using the full set of exogenous variables. However, we did not estimate an independent democracy equation as part of this system. Doing so would be interesting for at least two reasons. Firstly, if the estimated determinants of democracy are in line with previous results (e.g., Barro, 1996b), we can have greater confidence in the other results of our simultaneous equation methodology. Secondly, estimating a democracy equation may allow us to evaluate the extent of reverse causation between democracy, growth and some of our channel variables.

[40] This resulted in a reduction of the country coverage by three countries – Taiwan, Malawi and Benin – for which comparable inflation data were not available for the entire 1970–1989 time period. This is why we did not include the inflation channel with the previous estimates.

Table 8
Inflation channel

	Base specification	Time and region effects	All endogenous iteration #1	All endogenous iteration #2
Human capital	0.2796	0.1717	0.6043	0.5312
	(2.66)	(2.32)	(3.55)	(3.99)
Income inequality	0.2652	− 0.3894	− 0.1891	− 0.1263
	(2.45)	(− 3.31)	(− 1.38)	(− 1.53)
Political instability	− 0.0053	0.0179	0.0125	0.1165
	(− 0.10)	(0.51)	(0.14)	(1.46)
Distortions	0.0133	0.0021	− 0.0382	− 0.0481
	(0.60)	(0.20)	(− 0.91)	(− 1.31)
Trade openness	− 0.0505	− 0.0543	0.1491	0.3043
	(− 0.56)	(− 1.20)	(1.25)	(2.62)
Government consumption	− 0.4172	− 0.4408	− 0.5344	− 0.4907
	(− 3.11)	(− 3.90)	(− 2.73)	(− 3.44)
Investment rate	− 1.1848	− 0.3177	− 0.9038	− 1.0258
	(− 3.94)	(− 1.56)	(− 2.39)	(− 2.99)
Inflation rate	0.0138	0.0831	0.2054	0.1018
	(0.24)	(0.96)	(1.95)	(1.51)
Total effect	− 1.0858	− 0.9274	− 0.6943	− 0.6370
	(− 3.15)	(− 2.94)	(− 1.46)	(− 1.49)
Wald test (p-value)	9.908	8.651	2.134	2.233
	(0.000)	(0.000)	(0.144)	(0.135)
Number of observations	62	62	62	62

Note: t-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses.

Table 9 presents the parameter estimates for the determinants of democracy when this relationship is added to the system. That is, the democracy equation is estimated along with the channel and growth equations, using three stage least squares. The second column of Table 9 displays results for a benchmark democracy specification, which are in line with past results. In particular, the estimates highlight the positive impact of income levels and human capital on democracy, while, as expected, income inequality and ethnolinguistic fractionalization are negatively related to it. The estimate on economic growth is statistically significant, negative, but extremely small economically (it suggests that an additional percentage point of growth would be associated with a 0.005 fall in the democracy index).

The other columns of Table 9 perform some sensitivity checks on this basic specification. The results are not sensitive to including all of the channel variables as determinants of democracy (column 4), including time and region effects (column 5) or estimating the system using a Seemingly Unrelated Regression estimator (column 6). Hence, the results for the democracy equation appear robust and in line with past findings. The significant estimates on many of the channel variables and growth, furthermore, justifies the use of an instrumental variables procedure to estimate our system.

Table 9
Democracy equation (joint system estimates)

	Base model	All endogenous	Time/region effects	SUR estimates
Intercept	0.0981	− 0.4752	0.2824	− 0.2727
	(0.38)	(− 1.55)	(1.51)	(− 1.07)
Log initial income	0.1010	0.1760	0.0759	0.1407
	(3.87)	(5.57)	(3.04)	(5.93)
Human capital	0.1011	0.0773	0.0695	0.0678
	(6.85)	(5.16)	(4.23)	(5.59)
Gini coefficient	− 0.0079	− 0.0087	− 0.0073	− 0.0060
	(− 6.12)	(− 7.41)	(− 6.05)	(− 5.63)
Political instability	0.0007	− 0.0205	− 0.0302	− 0.0644
	(0.06)	(− 1.85)	(− 2.17)	(− 4.49)
Black market premium	–	− 0.0002	–	–
		(− 4.85)		
Openness	–	− 0.0016	–	–
		(− 4.57)		
Government consumption (%GDP)	–	0.0066	–	–
		(2.96)		
Investment share (%GDP)	–	− 0.0053	–	–
		(− 5.53)		
Growth	− 0.0055	− 0.0007	− 0.0064	− 0.0048
	(− 4.60)	(− 0.52)	(− 4.46)	(− 3.57)
Muslim dummy	− 0.0270	0.0440	0.0323	− 0.0100
	(− 0.33)	(0.50)	(0.31)	(− 0.09)
Confucian dummy	− 0.1542	0.0299	0.0417	− 0.1164
	(− 1.59)	(0.30)	(0.42)	(− 0.92)
Catholic dummy	0.0304	0.1308	0.1315	0.0430
	(0.40)	(1.71)	(1.35)	(0.41)
Other christian dummy	− 0.0297	0.0626	0.1224	− 0.0151
	(− 0.38)	(0.83)	(1.29)	(− 0.14)
Ethnolinguistic fractionalization	− 0.0027	− 0.0030	0.0000	− 0.0021
	(− 4.16)	(− 4.21)	(0.04)	(− 3.54)
Postwar independence dummy	0.0537	0.1046	0.0793	0.0456
	(1.45)	(2.86)	(1.98)	(1.15)
Ever a colony dummy	0.0260	0.0515	− 0.0235	0.0184
	(0.58)	(1.09)	(− 0.35)	(0.46)
R-squared	0.624 0.591	0.574 0.563	0.642 0.614	0.647 0.619
	0.549 0.610	0.516 0.596	0.582 0.673	0.575 0.614
Number of observations	65	65	65	65

Note: *t*-Statistics based on heteroskedastic-consistent (White-robust) standard errors, in parentheses. Output for the time and region specific dummies suppressed and available upon request.

4.4.3. Within-country estimates

Our methodology relies in great part on the cross-national variation in the data to identify the channels linking democracy and growth.[41] This may prevent us from making statements about the effects of democracy in any

[41] Our four-period panel does include within-country variation as well, but it is used jointly with cross-sectional variation in the estimates reported above – as the estimator used is a random effects / IV estimator.

given country.[42] In this section, we turn to within-country evidence on the linkages between democracy and growth. The aim is twofold: Firstly, isolating the within-country variation in the data will allow us to evaluate the relative impacts of within and between country variations in the results presented above. Secondly, it will provide a further robustness check on these results and provide us with evidence concerning the effects of democratization within countries.

There are several drawbacks from employing fixed-effects estimation in our context. Firstly, many of the exogenous variables used in our previous estimation are not time varying, and therefore cannot be used either as instruments or as control variables in a fixed-effects procedure. As a result, we are left with a small set of weak instruments, so we do not instrument for the channel variables or democracy. Secondly, fixed-effects estimates are sensitive to measurement error.[43] Hence, using fixed-effects in the cross-country context has led to imprecise estimates of the traditional determinants of growth, and is likely to do so here as well. Lastly, in order to minimize fluctuation effects and measurement error we use averages of the data over five-year period, resulting in only four time periods. This may lead to imprecise estimates of the country-specific effects. Hence, one can reasonably expect that many of our results would vanish when using a fixed-effects estimator applied to our system.

Table 10, which reports results from jointly estimating the equations of our system using fixed effects, shows that this is not entirely the case. Concerning the effect of democracy on the channel variable (column 2), all of the signs of the estimated parameters are preserved relative to the estimates presented in Table 3, with the exception of distortions (which was and remains insignificant statistically). In particular, democracy appears to have a significantly positive impact on human capital, and a significantly negative impact on income inequality, in line with our previous results. On the other hand, while the sign and magnitude of the coefficient on the investment rate is preserved, it is no longer statistically significant at conventional levels of confidence. Concerning the impact of the channel variables on growth (column 3), their signs, magnitude and statistical significance are preserved in all cases, except for income inequality. As a result, the estimated signs of all but the inequality channel effects (column 4) are identical – and human capital remains a statistically significant channel. While the statistical significance of the other important channels (such as investment and government consumption) is affected, their estimated signs and magnitudes give us some amount of confidence in the

[42] We are grateful to an anonymous referee for suggesting this point.

[43] Indeed, under classical (white-noise) measurement error, regressing variables in differences from group means leads to raising the error-to-truth ratio when the variables are highly autocorrelated (this is the case for most of our channel variables as well as democracy). When differencing these variables, the variance of the noise part of the data is increased, while the variance of the true signal is diluted due to differencing.

Table 10
Fixed effects estimates of the base specification (joint system fixed effects, balanced panel)

Channel	Effect of democracy on the channel	Effect of the channel on growth	Effect of democracy on growth
Human capital	0.5041	1.1221	0.5657
	(3.34)	(3.11)	(2.28)
Income inequality	− 3.0447	0.1240	− 0.3775
	(− 2.20)	(3.40)	(− 1.86)
Political instability	− 0.2845	− 1.1197	0.3186
	(− 2.88)	(− 2.10)	(1.70)
Distortions	19.9308	− 0.0086	− 0.1714
	(0.77)	(− 4.17)	(− 0.76)
Trade openness	− 3.0292	0.0149	− 0.0451
	(− 0.68)	(1.22)	(− 0.60)
Government consumption	0.9353	− 0.1095	− 0.1024
	(0.97)	(− 1.92)	(− 0.87)
Investment rate	− 0.8896	0.2369	− 0.2107
	(− 0.63)	(6.43)	(− 0.62)
Total effect			− 0.0230
			(− 0.04)
Wald test (p-value)			0.000
			(0.97)
Number of observations			65

Note: t-Statistics in parentheses.

cross-sectional results, despite the aforementioned drawbacks of using fixed-effects here.[44]

5. Conclusion

This paper employs a new empirical methodology to investigate the impact of democracy on economic growth. By estimating a joint system of equations in which democracy is allowed to influence a number of growth determining variables, we are able to perform precise inference concerning the channels of influence from democracy to growth. There are three benefits from this approach. Firstly, as argued above, indirect links between democracy and growth follow clearly from the literature, whereas a direct effect of democracy on growth is not theoretically well grounded. Secondly, if a particular causation channel is dismissed as irrelevant, we can determine precisely which link in the channel breaks down. Lastly, we quantify the magnitude of the various effects to uncover which characteristics of democracy are most important for growth. This may

[44] The topic of the effects of democratization on our channel variables within countries through time is vast and, while it is not the focus of this paper, should lead to interesting future research.

help design democratic institutions that maximize the benefits of democracy while minimizing its costs.

We find that the overall effect of democracy on growth is negative and moderate, confirming results from previous studies. However, our methodology allows us to go beyond previous research and describe what drives this overall result: We found evidence that democracy increases human capital accumulation and decreases physical investment rates. These effects are robust to most changes in specification, estimation method and sample coverage. We also uncover evidence of less robust effects of democracy on growth working through income inequality (more democracy/less inequality/higher growth) and through government consumption (more democracy/more government consumption/lower growth). Finally, we uncovered no strong evidence that democracy impacts growth through government-induced distortions, political instability, trade openness or macroeconomic instability.

Our interpretation of the results is that democratic institutions are responsive to the demands of the poorer fractions of society by increasing access to education and lowering income inequality, but do so at the expense of physical capital accumulation. When summing up the effects of democracy on growth, the negative effect through physical investment dominates. However, the higher level of human capital and a more equitable society in democracies are valued in themselves, beyond their impact on income levels. The resulting view is that democratic institutions entail a trade-off between measurable economic costs and social benefits which are harder to evaluate.

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Appendix A: Data description

Growth: Growth rate of Purchasing Power Parity (PPP) adjusted Real Gross Domestic Product per capita. *Source*: Summers and Heston (1991). *Unit*: Percent points.

Democracy: Index measuring the extent of democracy in a particular country. *Source*: Bollen (1980,1990) for 1965; Freedom House (1972–1990) for 1972–1989. *Unit*: 0 (autocracy) to 1 (democracy). See the Freedom House publications for a detailed description of the index (also known as the Gastil Index).

Log income per capita: Real Gross Domestic Product per capita, PPP adjusted. *Source*: Summers and Heston (1991). *Unit*: Log of per capita GDP in 1985 dollars.

Human capital: Average years of secondary and higher education in the population over age 25. *Source*: Barro and Lee (1993). *Unit*: Years.

Income inequality: Gini coefficient. *Source*: Deninger and Squire (1995). *Unit*: Percent points.

Trade openness: Share of imports plus exports to GDP. *Source*: Summers and Heston (1991). *Unit*: Percent points.

Political instability: Number of revolutions and coups per year. *Source*: Barro and Lee (1993). *Unit*: Number of revolutions and coups.

Black market premium: Difference between black market exchange rate and official exchange rate, divided by the official rate. *Source*: World Currency Yearbook. *Unit*: Percent points.

Public consumption: Share of government consumption of goods and services in GDP, excluding transfers and public investment. *Source*: Summers and Heston (1991). *Units*: Percent points.

Investment rate: Rate of physical capital investment. *Source*: Summers and Heston (1991). *Unit*: Percent points.

Inflation rate: Rate of change of the CPI, December to December. Source: Bruno and Easterly, 1998. Unit: Percent points.

Muslim: Takes value 1 if majoritarian religion is Muslim. *Source*: Encyclopedia Britannica. *Unit*: Dummy variables taking the values 0 or 1.

Catholic: Takes value 1 where majoritarian religion is Catholicism. *Source*: Encyclopedia Britannica. *Unit*: Dummy variable.

Other christian: Takes value 1 where majoritarian religion is Christian, but not Catholicism. *Source*: Encyclopedia Britannica. *Unit*: Dummy variables taking the values 0 or 1.

Confucian: Takes value 1 where majoritarian religion is Buddhism, Xintoism, Confucianism, etc. (excludes Hindu). *Source*: Encyclopedia Britannica. *Unit*: Dummy variables taking the values 0 or 1.

War casualties: War casualties per capita. *Source*: Barro and Lee (1993). *Unit*: Ratio.

Ever a colony: Takes value 1 if the country was ever a colony since 1776. *Source*: Barro and Lee (1993). *Unit*: Dummy Variable.

Postwar independence: Takes value 1 if country gained independence after the Second World War. *Source*: Barro and Lee (1993). *Unit*: Dummy variable.

Terms of trade shocks: Growth rate of export prices minus growth rate of import prices. *Source*: World Bank IEC data. *Unit*: Percent points.

Oil exporter: Takes value 1 if country is oil exporter. *Source*: Barro and Lee (1993). *Unit*: Dummy variable.

Log area: Area. *Source*: Barro and Lee (1993). *Unit*: Logarithm of area in square kilometers.

Log distance: Average distance to the capitals to the world's 20 major exporters, weighted by the volume of bilateral imports. *Source*: Barro and Lee (1993). *Unit*: Thousands of kilometers.

Landlock: Takes value 1 if country has no coastline. *Source*: Central Intelligence Agency World Fact Book (1996). *Unit*: Dummy variable.

Population under 15: Percent of population 15 and under. *Source*: Barro and Lee (1993). *Unit*: Percentage points.

Population over 65: Percent of population 65 and over. *Source*: Barro and Lee (1993). *Unit*: Percentage points.

Ethnolinguistic fractionalization: Probability that two randomly selected persons from a given country will not belong to the same ethnolinguistic group. *Source*: Mauro (1995). *Unit*: Probability.

Appendix B

We provide the list of countries for the basic specifications in Table 11.

Table 11
List of countries for the base specification

Asia	Africa	Latin America	Industrial countries
India	Benin	Argentina	Australia
Indonesia	Kenya	Barbados	Austria
Israel	Liberia	Bolivia	Belgium
Korea	Malawi	Brazil	Canada
Malaysia	Niger	Chile	Denmark
Pakistan	Senegal	Colombia	Finland
Philippines	Sierra Leone	Costa Rica	France
Singapore	South Africa	Dominican Republic	Germany, West
Sri Lanka	Sudan	Ecuador	Greece
Taiwan	Tanzania	El Salvador	Ireland
Thailand	Tunisia	Guyana	Italy
Turkey	Uganda	Honduras	Japan
	Zambia	Jamaica	Netherlands
	Zimbabwe	Mexico	New Zealand
		Panama	Norway
		Peru	Portugal
		Trinidad and Tobago	Spain
		Uruguay	Sweden
		Venezuela	U.S.A
			United Kingdom

Note: 65 observations.

Appendix C

Estimates for the base specification are given in Table 12.

Table 12
System estimates for the base specification

	Growth	Human capital	Inequality	Instability	Distortions	Openness	Government size	Investment
Intercept	18.0095	− 6.1611	− 99.2584	0.7655	− 133.3480	19.9259	52.1675	− 18.6500
	(7.85)	(− 7.83)	(− 2.39)	(2.34)	(− 2.49)	(0.54)	(6.11)	(− 1.99)
Democracy	–	0.4363	− 9.3768	− 0.0288	− 5.1895	− 39.3947	3.2659	− 4.1454
		(3.88)	(− 6.52)	(− 0.46)	(− 0.41)	(− 7.36)	(3.98)	(− 3.41)
Log initial income	− 2.2259	0.9029	25.4611	− 0.0746	5.9777	17.9172	− 3.5397	4.2851
	(− 8.83)	(9.96)	(2.58)	(− 2.62)	(1.07)	(4.54)	(− 4.92)	(6.92)
Log initial income sq.	–	–	− 1.3732	–	–	–	–	–
			(− 2.25)					
Human capital	0.5669	–	− 1.1158	–	− 5.3737	–	–	− 0.3209
	(3.60)		(− 1.72)		(− 1.28)			(− 0.85)
Gini coefficient	− 0.0321	− 0.0250	–	0.0012	–	–	0.2143	–
	(− 2.59)	(− 6.53)		(0.54)			(7.63)	
Political instability	− 0.8232	–	–	–	46.4440	–	− 1.4212	− 1.3218
	(− 1.95)				(3.62)		(− 2.40)	(− 2.33)
BMP	− 0.0033	–	–	–	–	–	0.0102	− 0.0085
	(− 3.78)						(7.88)	(− 6.96)
Openness	0.0030	− 0.0024	− 0.0274	–	− 0.3295	–	− 0.0209	0.0327
	(1.22)	(− 2.02)	(− 1.90)		(− 4.05)		(− 2.64)	(4.16)
Government consumption	− 0.1536	0.0206	0.7357	− 0.0054	3.7594	0.0048	–	0.0173
	(− 7.66)	(3.44)	(10.94)	(− 1.54)	(6.07)	(0.02)		(0.41)
Investment rate (% GDP)	0.2653	–	–	–	–	–	–	–
	(14.54)							
Etholinguistic fractionaliz.	–	0.0045	− 0.0810	0.0009	− 0.1515	–	0.0624	− 0.0482
		(1.60)	(− 3.29)	(1.07)	(− 1.40)		(4.53)	(− 3.96)
Log area	–	–	–	–	–	− 9.8837	–	–
						(− 4.03)		
Log distance	–	–	–	–	–	− 2.3906	–	–
						(− 0.38)		

Table 12 (Continued)

	Growth	Human capital	Inequality	Instability	Distortions	Openness	Government size	Investment
Terms of trade shocks	–	–	8.6198	–	–	15.4644	− 7.3613	− 5.7904
			(2.40)			(1.87)	(− 3.44)	(− 2.03)
Log population	–	–	0.9173	0.0057	–	− 3.2599	− 1.5122	1.0434
			(1.58)	(0.43)		(− 1.54)	(− 5.57)	(3.32)
Share of pop. over 65	–	–	− 40.4051	–	–	–	7.5195	− 2.9172
			(− 1.08)				(0.44)	(− 0.15)
Share of pop. under 15	–	–	29.1109	–	–	–	− 13.3789	− 11.3800
			(2.67)				(− 2.03)	(− 1.31)
War casualties	–	–	− 337.9560	32.8797	–	–	–	–
			(− 5.92)	(6.56)				
Ever a colony dummy	–	0.5536	5.1720	− 0.0695	18.3453	–	− 3.2820	–
		(3.20)	(1.78)	(− 1.72)	(2.47)		(− 3.19)	
Postwar independence	–	–	–	− 0.0588	38.7806	15.5520	2.1200	–
				(− 1.01)	(4.35)	(2.43)	(2.24)	
Oil producer dummy	–	–	–	–	–	2.9371	–	–
						(0.41)		
Island dummy	–	–	–	0.0383	–	9.6688	–	–
				(0.85)		(1.49)		
Landlocked dummy	–	–	–	0.0503	–	2.9762	–	–
				(0.60)		(0.53)		
Muslim dummy	–	0.1125	1.3261	–	16.1056	–	–	–
		(0.80)	(0.51)		(1.27)			
Confucian dummy	–	0.8373	4.1293	–	61.4186	–	–	5.3008
		(4.05)	(1.29)		(4.01)			(3.65)
Catholic dummy	–	0.2117	9.6290	–	75.8600	-	–	–
		(1.69)	(5.42)		(5.40)			
Other Christian dummy	–	0.4766	7.6911	–	64.8831	–	–	–
		(3.01)	(4.54)		(5.09)			
R-squared	0.33 0.27	0.61 0.67	0.42 0.52	0.10 0.11	0.36 0.20	0.54 0.52	0.27 0.33	0.50 0.60
	0.39 0.37	0.69 0.73	0.58 0.64	0.36 0.33	0.39 0.26	0.53 0.53	0.43 0.52	0.64 0.66

Note: Number of observations: 65 (*t*-Statistics based on heteroscedastic-consistent (White-robust) standard errors, in parentheses).

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