

## **Empirical Linkages Between Democracy and Economic Growth**

JOHN F. HELLIWELL \*

Using cross-sectional and pooled data for up to 125 countries over the period from 1960 to 1985, this article evaluates the two-way linkages between democracy and economic growth. The effects of income on democracy are found to be robust and positive. The effects of several measures of democracy and personal freedoms on growth are assessed in a comparative growth framework in which growth of GDP per adult depends negatively on initial income levels, as implied by the convergence hypothesis, and positively on rates of investment in physical and human capital. Adjusting for the simultaneous determination of income and democracy makes the estimated partial effect of democracy on subsequent economic growth negative but insignificant. This nonsignificant negative effect is in any case counterbalanced by the positive indirect effect that democracy exerts on growth via education and investment. The general result of the growth analysis is that it is still not possible to identify any systematic net effects of democracy on subsequent economic growth.

There is a longstanding presumption that democracy takes root and survives where levels of economic development and education are high.<sup>1</sup> There is more recent literature dealing with the question of whether democracy is a luxury that must be paid for in terms of subsequently slower increases in living standards.<sup>2</sup> Where linkages between democracy and economic growth have been established, they more often than not support the notion that democracy does pose a cost in terms of subsequent reductions in growth rates. As a third wave of democracy has spread in the 1980s, particularly in eastern Europe, a systematic assessment of available global evidence seems well worth while. Is it better that economic development and reform take precedence over the

\* Department of Economics, University of British Columbia, Harvard University, and National Bureau of Economic Research. I am grateful for inspiration, advice and helpful comments from Alberto Alesina, André Blais, Michael Bruno, Dick Cooper, Marc Gaudry, Sam Huntington, Andy Moravcsik, Bob Putnam, David Sanders, Jim Stock, Hugh Ward and anonymous referees. I am also grateful for the research support of the Social Sciences and Humanities Research Council of Canada, and of the Harvard Center for International Affairs.

<sup>1</sup> The earlier evidence is surveyed in Seymour Martin Lipset, 'Some Social Requisites of Democracy: Economic Development and Political Legitimacy', *American Political Science Review*, 53 (1959), 69–105.

<sup>2</sup> Many empirical studies of the effects of democracy on economic growth are reviewed in L. Sirowy and A. Inkeles, 'The Effects of Democracy on Economic Growth and Inequality: A Review', *Studies in Comparative International Development*, 25 (1990), 126–57. The extent to which the results depend on country-specific factors is emphasized in S. Haggard, *Pathways from the Periphery: The Politics of Growth in the Newly Industrializing Countries* (Ithaca, NY: Cornell University Press, 1990), chap. 10.

spread of democracy (as in China) or that democracy should precede economic reforms (as in most of Central and Eastern Europe), or are the two types of change independent? There will always be limitations on the applicability of previous experience to current problems, but the issues raised are of sufficient importance, and the range of previous experience broad enough, to encourage an attempt to review the current state of the global evidence.

This article takes advantage of the increasing availability of comparable data for economic growth and income levels in most of the world's national economies, and combines it with some of the available data categorizing political rights and civil liberties in an equally large number of economies. In order to examine the possible effect of the level of economic development on political democracy, a sample of 125 countries is used. This sample represents the largest number of countries for which it is possible to obtain comparable measures of per capita real incomes<sup>3</sup> and regular assessments of the extent of political and civil rights. These initial results are then confirmed using other measures of democracy and more complex estimation techniques for a smaller sample of countries. In order to assess the effects of democracy on subsequent economic growth, the sample is reduced to ninety-eight countries and a model of comparative growth is estimated for the period 1960 to 1985. The sample is reduced for other tests which make use of earlier estimates of the relative status of political democracy among about ninety countries in 1960 and 1965. The fact that the results using different sample sizes are very similar suggests that the use of smaller numbers of countries, where necessary, does not pose major estimation problems.

The empirical analysis is divided into two sections. To study the effects of income levels on the character of the political system, annual indices of political and civil liberties for the years 1976–85 are regressed on logarithmic levels of real GDP per capita. Supplementary tests for the importance of schooling levels are also carried out, since education is frequently considered to play an important role in enabling the choice of a democratic form of government. These results are shown in Tables 1 and 2, and are described in Section I. The main analytical tool used to assess the effects of democracy on economic growth is an empirical framework which examines comparative growth performance over the 1960–85 period in a way that allows simultaneously for (a) convergence in the rates of growth of per capita GDP, (b) possible returns to scale, and (c) international differences in investment rates in human and physical capital. By adding measures of democracy and political freedoms, it is then possible to assess the extent to which the political system has any systematic

<sup>3</sup> The income measure used is real gross domestic product (GDP) per capita, converted at purchasing power parity exchange rates, using data compiled by national statistical agencies, with the collaboration of the United Nations and the OECD. The features of the Mark V release of the data used in Tables 1 and 2 are described in R. Summers and A. Heston, 'The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950 to 1988', *Quarterly Journal of Economics*, 106 (1991), 327–68.

influence on current and subsequent growth performance. This is undertaken in Section II, and in Tables 3 and 4.

I. ARE THERE ECONOMIC PREREQUISITES TO DEMOCRACY?

Introducing his seminal cross-national study, Seymour Lipset observed 'perhaps the most widespread generalization linking political systems to other aspects of society has been that democracy is related to the state of economic development.'<sup>4</sup> For a sample of forty-eight countries, Lipset examined the cross-sectional correlations between regime type and mid-century measures of economic development. He attempted to avoid the complications of mixing political cultures by dividing his sample into two main groups: twenty-eight European and English-speaking countries and twenty Latin American countries. Within the first group, he found that the average per capita income was more than twice as high in the thirteen stable democracies than in the fifteen unstable democracies and dictatorships. Among the Latin American countries, all had average incomes less than any of the countries in the first sample, but the seven democracies or unstable dictatorships had average incomes about 40 per cent higher than the thirteen stable dictatorships (with substantial income overlap in these two categories). Qualitatively similar results were obtained using measures of industrialization, education and urbanization as alternative measures of economic development. There were two key problems with Lipset's analysis, however. First, because his measures of economic development derived from the period *after* that used to classify political regimes, Lipset's correlations were unable to establish whether it was economic development which led to democracy or *vice versa*. Secondly, the Second World War, while no doubt to some extent a consequence of the lack of democracy in many of the European countries, also led to destruction of their economic capacities, hence providing a correlation between low postwar incomes and low prewar levels of democracy that could not be used directly to support the conclusion that low levels of income lead to low levels of democracy.

Another thirty years of history, better measures of comparative real incomes, more regular and systematic measures of democracy, and a much larger sample of countries available for analysis suggest that it is now appropriate to revisit these issues. The analysis conducted here is based on measures of economic development and democracy covering 125 countries for each year from 1976 through 1985 – a total of 1,250 observations. Economic development is measured by average per capita real income. The measure of democracy is obtained by transforming measures of political rights and civil liberties published annually by Gastil.<sup>5</sup> The index takes the value of zero for a country with no political

<sup>4</sup> Lipset, 'Some Social Requisites of Democracy', p. 75.

<sup>5</sup> The data are described in R. D. Gastil, 'The Comparative Survey of Freedom: Experiences and Suggestions', *Studies in Comparative International Development*, 25 (1990), 25–50. Gastil's separate indices for political rights and civil liberties are each on a scale from 1 to 7, with 1 representing

and civil rights, and the value 1.0 for a country with full measures of both types of rights. The two components of the democracy index, political rights and civil liberties, are highly correlated with one another ( $r = 0.93$ ), and give indistinguishable results if used separately in the regressions reported below, so at this stage it will be sufficient to use the combined index.

Table 1 shows the results of several regressions explaining variations in political freedoms, among countries and over time, by real per capita GDP converted at purchasing power parity exchange rates. Initially, separate regressions were run for each year, but since the coefficients were insignificantly different from year to year, it was possible to increase the efficiency of the estimates by stacking the observations to form a single sample of 1,250 observations. Equation 1 shows the simplest form of the regression, in which about 42 per cent of the variance among countries in the freedom index is explained by variations in per capita incomes. The coefficient of 0.2 on the logarithm of per capita GDP suggests that a 10 per cent increase in per capita income raises the predicted value of the democracy index by 2 points on a 100-point scale. The notion that different cultures may give rise to sharply different degrees of democracy, even at equivalent levels of income, is tested in Equation 2, using a series of 'regional' dummy variables. The Equation 2 results show that, even after adjusting for the effects of different levels of per capita income, the degree of democracy is sharply higher in OECD countries, sharply lower in six oil-dependent countries of the Middle East,<sup>6</sup> slightly lower in Africa and slightly higher in Latin America, with the base of comparison being the remaining countries, mainly in Eastern Europe and Asia. These geographic/cultural differences raise to 63 per cent the fraction of variation explained by the equation. The estimated effect of income drops from 0.20 to 0.12 when the regional variables are added, reflecting the strong correlation between regions and average incomes, with the OECD countries in particular being both richer and more democratic. However, since the income effect remains very significant, the equation still shows that the strong correlation between democracy and income is not simply due to the fact that the OECD countries are richer and more democratic than most other countries.

Tests were also conducted to see if the effect of income on democracy varied by region or by level of income in some way more complex than that captured by Equations 1 and 2. These tests involved testing for slope coefficients that differed by income or region, and testing the log-linear model against quadratic and cubic functions of income. Only in the case of the OECD region did the

*(Footnote continued)*

the highest levels of rights, and 7 the lowest. Summing the two indices, as Gastil does in his more recent work, gives a measure that takes the value 2 for the most democratic and 14 for the least democratic systems. This is linearly transformed to make an index for the probability of freedom (PFR), ranging from 0 for no freedoms to 1.0 for fully democratic systems. If FR is the 2 to 14 index, then  $PFR = (14 - FR)/12$ .

<sup>6</sup> These are Bahrain, the United Arab Emirates, Iran, Iraq, Kuwait and Saudi Arabia.

TABLE 1 *Effects of Income and Education on Democracy, 1976-85*

	Equations					
	(1)	(2)	(3)	(4)	(5)	(6)
No. of observations	1,250	1,250	980	980	10 × 125	10 × 98
Estimation method	OLS stacked	OLS stacked	OLS stacked	OLS stacked	Iterative Zellner	Iterative Zellner
Constant	-1.132 (20.46)	-0.508 (6.46)	-1.11 (13.46)	-0.344 (4.05)	-0.323 (2.30)	-0.808 (5.30)
<i>Coefficients</i>						
lnGDP	0.205 (28.08)	0.122 (12.47)	0.194 (14.87)	0.097 (7.93)	0.098 (5.55)	0.145 (6.29)
OECD		0.334 (16.22)		0.314 (13.07)	0.366 (6.94)	
MEOIL		-0.370 (14.86)			-0.356 (4.47)	
Africa		-0.100 (4.91)		-0.114 (5.39)	-0.134 (3.11)	
Latin America		0.079 (3.46)		0.055 (2.54)	0.123 (2.53)	
Secondary school		1.857 (4.46)	0.884 (2.52)		3.08 (3.82)	
$\bar{R}^2$	0.419	0.634	0.579	0.660	0.57-0.68	0.52-0.61
D.W.	0.21	0.29	0.26	0.29	1.66-2.18	1.6-2.0
S.E.E.	0.256	0.203	0.221	0.196	0.19-0.21	0.21-0.23

*Notes:* Absolute values of *t* statistics are in parentheses. For Equations 1 to 4, these are estimated using H. White's heteroscedasticity-consistent estimator. The six Middle East oil exporters are not in the 98-country sample, and hence MEOIL does not appear in Equations 3, 4 and 6. The ranges for statistics below Equations 5 and 6 reflect variations among the ten cross-sectional equations. Equations 5 and 6 are estimated using Zellner's SUK method, and all estimation uses K. White's SHAZAM programme. See H. White, 'A Heteroscedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity', *Econometrica*, 48 (1980), 149-70; A. Zellner, 'An Efficient Method for Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias', *Econometrica*, 30 (1960), 54-78; and K. J. White, *SHAZAM User's Reference Manual 7.0* (Toronto and London: McGraw Hill, 1993).

data suggest that a separate slope coefficient should be included in the model rather than the separate intercept shown in Equation 2 – but the difference was not significant.<sup>7</sup> The tests for non-linearity did not reveal anything preferable to the log-linear form, thus casting some doubt on the notion of there being a threshold level of income above which there is a sharp increase in the probability of a country being democratic.<sup>8</sup>

Equations 3 and 4 show the effect of adding the secondary school enrolment rate, measured as a fraction of the adult population, to Equations 1 and 2 (because of missing data the number of cases is reduced to 98). Dahl and others have hypothesized that the apparent link between economic development and democracy may be partly explained by the fact that literacy, education and communication all increase the effective demand for democracy.<sup>9</sup> The significant additional effect of schooling in Equations 3 and 4 shows that education and economic development are distinct enough that their separate contributions to the attainment of democracy can be estimated. In Equation 3, the coefficient on the education variable suggests that an increase of 1 per cent in the percentage of the working age population that is in secondary school raises the democracy index by 1.85 points (if the index is measured on a scale of 100). The effect drops to 0.88 when the regional effects are allowed for in Equation 4, reflecting the large differences among the regions in their rates of schooling, with the less democratic continents also having lower average schooling.

Although the stacking of the 1,250 observations in principle provides a much larger sample, and hence more powerful estimates of the effects, the year-to-year changes in the democracy index and in relative incomes are small compared to the differences among countries. Thus there is a strong year-to-year correlation of the error terms for each country, which shows up as a

<sup>7</sup> The  $R^2$  rises from 0.634 to 0.635 if the OECD has a separate slope rather than intercept in Equation 2. The coefficient on  $\ln\text{GDP}$  falls from 0.122 to 0.120, with an additional income effect of 0.037 for the OECD countries.

<sup>8</sup> If the level and the square of per capita GDPs are used as explanatory variables, both are strongly significant, in a 125-country cross-sectional equation for the 1985 Gastil index, with the coefficients being positive for the level and negative for the quadratic term. However, if an artificial encompassing model is set up, containing these two variables and the logarithm of real per capita GDP (the variable that is used in the equations reported in Table 1), statistical tests show that there is no significant difference in explanatory power between the quadratic and the logarithmic models, with the data preferring the logarithmic model to the quadratic model. The  $P$ -value of the Wald chi-square test for excluding the two variables of the quadratic model is 0.25, while it is 0.21 for excluding the logarithmic variable, with the tests in both cases being of restricted versions of the encompassing equation. If the equation is augmented by adding the separate intercept for the Middle East oil producers, the preference for the logarithmic over the quadratic form is much stronger, with a  $P$ -value for the Wald test of excluding the quadratic variables being 0.43, compared to 0.03 for excluding the logarithmic variable. Since the peak of the quadratic is very near the top of the range of GDP per capita, at the levels of Sweden and Australia, the exponential and quadratic forms give very similar predicted values for most countries.

<sup>9</sup> R. A. Dahl, *Polyarchy: Participation and Opposition* (New Haven, Conn.: Yale University Press, 1971), pp. 74–5.

very low Durbin–Watson statistic, if the sample is stacked with the ten observations for each country grouped together, as is the case for Equations 1 to 4. The result of this is that the sample is not really as big as it appears to be, and the significance of the coefficients is overstated. This can be rectified by re-estimating the equations with the sample of 1,250 split into ten equations of 125 observations each, with coefficients constrained to be the same in each equation, and estimated by an interactive procedure that takes into account the loss of information implied by the errors being very similar in each of the ten annual equations. Equations 2 and 3, the equations for the large sample with regional effects and for the smaller sample with GDP and schooling, are estimated by this method and shown as Equations 5 and 6. The *t*-statistics are substantially reduced. The GDP and regional effects remain highly significant in Equation 5, as do the GDP and schooling effects in Equation 6. Equations 5 and 6 show that the regional factors together contribute more than schooling, but that schooling goes some distance in explaining the variations in democracy not captured by differences in GDP per capita.<sup>10</sup> In addition, as will be shown below, education plays an important role in explaining long-term GDP growth, and hence the levels of GDP per capita, thus providing a second channel whereby education affects democracy.

The analysis so far has made use of Gastil's index of political freedom, since it is available on a consistent basis for many years and many countries. Bollen has prepared alternative measures for a smaller sample of countries, and has surveyed some of the issues involved in developing quantitative measures of democracy.<sup>11</sup> Bollen's index, which he has published for 1960 and 1965, is an equally weighted sum of six component indexes, three relating to popular sovereignty (fairness of elections, election of chief executive and election of the legislature) and three to political freedoms (press freedom, freedom of

<sup>10</sup> This conclusion needs to be treated with some caution, as inclusion of the OECD variable in Equation 6 removes the significance of the education variable, evidence of the fairly high correlation between the two variables. Thus to some extent education and the complex of factors that define members of the OECD are competing for explanatory power; with the OECD variable adding to the equation by slightly more than the schooling variable.

<sup>11</sup> In surveying the issues, Bollen concludes that it is important not to confound political liberties and political rights with political stability. He argues that the former two comprise an appropriate measure of political democracy, while the latter is not. The Gastil measures accord with Bollen's preferences, by focusing on political rights and freedoms rather than political stability, and in providing measures whose changes might themselves provide an index of stability. Bollen's views and Gastil's measures both seem to embody key features of Dahl's *Polyarchy* dimensions of open competition and widespread participation, with individuals protected in their rights to express their political opinions, and free to form parties and to compete in binding elections by unintimidated voters. Both of Gastil's component indices seem relevant, since civil rights and political freedoms are in many respects mutually supportive. There is no evidence that either component has more influence than the other, as Gastil's two component indices give indistinguishable results when used separately. See K. A. Bollen, 'Issues in the Comparative Measurement of Political Democracy', *American Sociological Review*, 45 (1980), 370–90; and K. A. Bollen, 'Political Democracy: Conceptual and Measurement Traps', *Studies in Comparative International Development*, 25 (1990), 7–24.

group opposition, and lack of government sanctions against political opposition). Since the Gastil index of political freedoms has been linearly converted into a scale with zero representing lack of political freedoms and 1.0 full freedoms, it should be directly comparable with the Bollen measures.<sup>12</sup>

Comparing the Bollen index for 1960 with the Gastil indices for 1976 and 1985, several differences are readily apparent. The Bollen index is unimodal, with nineteen countries at 0.95 or above, two-thirds of the countries above 0.50, only six countries below 0.25, and none below 0.10. The Gastil index is bimodal, with modes at both ends: sixteen countries are rated at 1.0, and nineteen countries are below 0.10. As shown in the data appendix, the mean of the Bollen index is 0.68, compared to 0.46 and 0.52 for the Gastil 1976 and 1985 measures. The simple correlation between the 1960 Bollen index and the 1976 Gastil index is 0.59, and the Spearman rank correlation is 0.62. The Bollen index also appears to be more volatile over time than the Gastil index, as the correlation between the 1960 and 1965 values, for countries that appear in both, is lower than between any pair of the Gastil indices. Without overlapping observations, it is not possible to analyse the differences further, and even general conclusions are hard to reach, since the 1960s may well have been a more volatile period than that from the mid-1970s to the late 1980s.<sup>13</sup> In any event, it is clear that the Bollen and Gastil indices are quite independent attempts to measure fairly similar concepts of political democracy, so that any attempts to use the Bollen data to confirm the results from the Gastil data are likely to be useful.<sup>14</sup>

Equations 1 and 2 of Table 2 show the results of using the ninety observations for the 1960 Bollen index as the dependent variable for the re-estimation of Equations 1 and 6 of Table 1. The coefficient of income, in Equation 1, is

<sup>12</sup> The biggest factor limiting the comparison is that the Gastil indices do not start before the mid-1970s, with the result that there is no overlap in the time periods covered by the Gastil and Bollen indices. In addition, the Bollen index for 1965 is only available for ninety of the ninety-eight countries for which full data are available from 1960 through 1985, and the 1960 index has several fewer observations. To provide as full as possible a sample of the state of democracy for the beginning of the growth period, 1965 values were used to fill out the 1960 sample to ninety countries.

<sup>13</sup> Huntington reports that the number of democratic states fell from thirty-six in 1962 to thirty in 1973 and has since risen again, to fifty-eight in 1990. Measured as percentages of the total number of states, Huntington calculates that democracies fell from 32.4 per cent in 1962 to 24.6 per cent in 1973 and rose to 45 per cent in 1990. See S. Huntington, *The Third Wave: Democratization in the Late Twentieth Century* (Norman: University of Oklahoma Press, 1991).

<sup>14</sup> There are also statistical grounds for being glad to have the unimodal Bollen index available to check the results that use the bi-modal Gastil index as a dependent variable. The Gastil index, like many of the dichotomous measures of democracy, is not normally distributed about its mean. In addition, both indices are bound in the range between zero and 1.0. To avoid the risks of biased standard errors that might arise from the implied non-normality, all OLS equations estimated with either of the democracy indices as the dependent variable makes use of H. White's procedure for estimating standard errors consistently in the presence of heteroskedastic residuals. See H. White, 'A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity', *Econometrica*, 48 (1980), 149–70.

slightly lower than using the Gastil index, and the equation explains 30 per cent of the cross-sectional variance of the Bollen index. This is strongly supportive of the results based on the Gastil index. Adding the schooling variable for 1960 (Equation 2) lowers the income coefficient and gives a strong coefficient ( $t = 4.2$ ) on the schooling variable. These results are also close to those of Equation 6 in Table 1, which implies that the Gastil and Bollen results are consistent with one another, bearing in mind the different scaling of the two education variables.<sup>15</sup>

The results so far seem to indicate a fairly strong influence from GDP per capita to the level of political rights and freedoms. But the data may be revealing correlation rather than causation. Are there ways of checking against the possibility that something else might be determining democracy, and then democracy is facilitating the attainment of high levels of income? Some direct tests of the influence of democracy on economic growth are reported in the next section. If we find there are no positive effects of democracy on economic growth, then the effects we find here of income on democracy are not likely to be the result of reverse causation. But it is possible to do some preliminary tests to guard against those possibilities, using the 98-country sample for which determinants of the rate of economic growth are available. One simple check is to estimate the 1985 equation splitting the 1985 income variable into two parts, the 1960 level of real GDP per adult and the change between 1960 and 1985, and then to re-estimate the equation using instrumental variables for the determinants (other than the level of democracy) of post-1960 growth. If the positive effect we have found flowing from income to democracy is being inflated because something else is determining democracy, and democracy is then helping economic growth, then the application of estimation techniques designed to remove simultaneous equation bias in the coefficient on post-1960 growth will lead to a reduction in the estimated effect of post-1960 income growth on democracy. If, on the other hand, there is a negative feedback from democracy to growth, then re-estimation should be expected to lead to an increase in the estimated effect of post-1960 income growth on the level of democracy. Table 2 shows the results of these tests.

To provide a starting point, Equation 3 shows the results of regressing the 1985 Gastil index on 1985 real GDP per adult for the 98-country sample. Equation 4 shows the result of splitting the income variable into 1960 income and subsequent growth. The coefficient on 1960 income is almost twice that on the variable for post-1960 growth, and the tests below the equation reveal the

<sup>15</sup> Although the estimated coefficient for schooling is much smaller for the Bollen equation, it is necessary to bear mind that the 1960 schooling variable is measured as a fraction of population of school age, while the education variable from the growth equation is measured as a fraction of the adult population. When this scale adjustment is made, the coefficients are insignificantly different from one another. If regional variables are added to Equations 1 and 2 of Table 2, they are not significant.

TABLE 2 *Effects of Income and Education on Democracy for 1960 and 1985*

	Equations					
	(1)	(2)	(3)	(4)	(5)	(6)
No. of observations	90	90	98	98	98	98
Estimation method	OLS	OLS	OLS	OLS	IV	IV
Dependent variable	Bollen 1960	Bollen 1960	Gastil 1985	Gastil 1985	Gastil 1985	Gastil 1985
Constant	-0.524 (3.29)	0.144 (0.62)	-1.545 (12.31)	-1.751 (13.78)	-1.750 (9.95)	-1.70 (8.59)
<i>Coefficients</i>						
lnGDPa60	0.158 (7.97)	0.055 (1.69)		0.289 (17.04)		0.271 (10.02)
Sch60 as prop of age group		0.492 (4.18)				
lnGDPa85-lnGDPa60				0.148 (2.84)		0.345 (3.80)
lnGDPa85			0.256 (16.16)		0.282 (12.98)	
<i>t</i> -value of coefficient differences				2.38		0.72
Probability of equality (Wald)	0.298	0.359	0.620	0.017	0.613	0.412
$\bar{R}^2$	0.220	0.210	0.216	0.211	0.218	0.576
S.E.E.						0.228

*Notes:* Absolute values of *t* statistics, in parentheses, are for Equations 1 to 4 adjusted for heteroscedasticity. Durbin-Watson statistics are not reported as they have no use in cross-sectional regressions unless the observations have been organized in groups to be tested for homogeneity. Equations 5 and 6 are estimated by instrumental variables, using 1960 values for GDP, investment, schooling, and sample average scale and population growth as instruments. The income variable used is the logarithm of real GDP per adult. The probability tests for Equations 4 and 6 are the probabilities of the coefficients on 1960 income and post-1960 growth being equal, using Wald's chi-square statistic.

difference to be statistically significant, with the probability of the result being due to chance estimated at less than 2 per cent. If this difference between the coefficients is due to there being a negative feedback from democracy to subsequent growth, then re-estimation by appropriate simultaneous equation methods should move the two income coefficients closer together. Equation 6 shows that this indeed happens. When instrumental variable estimation is used to re-estimate Equation 4, the two coefficients switch relative sizes, and the difference between them becomes insignificant.<sup>16</sup> We would also expect, if there is a negative feedback from democracy to subsequent growth, that the re-estimation of Equation 3 by instrumental variables would raise the estimated effect of income on democracy. This turns out to be the case, as shown by Equation 5, although the increase is not large enough to be statistically significant.

The above tests suggest that the results reported in Tables 1 and 2, which show a positive effect flowing from income to democracy are not due to a positive effect that flows from democracy to growth. Since re-estimation to avoid simultaneous equation bias raises rather than lowers the estimated effect of income on democracy, we can be sure that the positive effect of income on democracy is not due to positive feedbacks from democracy to economic growth. On the contrary, since the attempts to purge the bias have led to an increase in the estimated positive effect of income on democracy, the results suggest that the feedback from democracy to growth may be negative, with democracy possibly having a negative partial effect on subsequent economic growth. The next section assesses this possibility more directly.

## II. DEMOCRACY AND ECONOMIC GROWTH

Previous studies on the effects of democracy on economic growth have been surveyed by Sirowy and Inkeles.<sup>17</sup> They distinguish three perspectives on the topic: a *conflict perspective*, in which economic growth is seen to require an authoritarian regime to implement the kinds of policies needed to facilitate rapid growth; a *compatibility perspective*, which argues that democracies are as capable as authoritarian regimes of combining redistribution and growth in such a way as to broaden markets and achieve economic expansion; and a *sceptical perspective*, which doubts any systematic linkage between democracy and growth. Of the thirteen studies they survey, three find an unqualified

<sup>16</sup> Instrumental variables regression is a single-equation procedure for removing simultaneous equations bias by employing instruments for each of the right-hand-side endogenous variables in the equation. Eligible instruments should be free of any correlation with the error terms in the equation being estimated, yet be closely correlated with the variable for which they are acting as an instrument. The instruments used in this study mainly comprised 1960 observations of a closely related variable. Thus Bollen 1960 was used as an instrument for Gastil 1976, 1960 schooling rates were used as an instrument for average 1960–85 schooling rates, and 1960 investment rates were used as instruments for average 1960–85 investment.

<sup>17</sup> See Sirowy and Inkeles, 'The Effects of Democracy on Economic Growth and Inequality'.

negative effect of democracy on growth, four find a negative effect in some circumstances and regime types, and six find no relationship.<sup>18</sup> Sirowy and Inkeles attribute the discrepancies among the results to differences in time period, country coverage, and uneven matching of political and economic measures. They are especially critical of the lack of a clearly specified growth model in which the effects of democracy can be assessed and the general failure to account for other key factors, many of which might be presumed to be correlated with democracy, that influence economic growth. In view of the mixed nature of the evidence, and the availability of longer samples of comparable growth experience, it seems appropriate to try to make a systematic attempt to test the relationship anew.

The empirical analysis of the effects of democracy on economic growth which is developed here starts with an extended form of the Solow growth model.<sup>19</sup> This has been augmented by Mankiw, Romer and Weil to include human capital accumulation, with real output determined as a Cobb – Douglas function of physical capital, human capital and efficiency units of labour:<sup>20</sup>

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta} \quad (1)$$

where  $Y$  is the level of real output,  $H$  is the stock of human capital,  $L$  is the stock of labour (growing at rate  $n$ ),  $K$  is the stock of physical capital (depreciating at rate  $\delta$ ) and  $A$  is the level of technology, growing at the constant rate  $g$ . The coefficients imply constant returns to all factors taken together, and hence diminishing returns to any combination of physical and human capital. If  $s_k$  is the fraction of output invested in physical capital, and  $s_h$  is the fraction invested in human capital, then in the steady state the log of output per capita is:

$$\begin{aligned} \ln[Y(t)/L(t)] = & \ln A(0) + gt - ((\alpha + \beta)/(1 - \alpha - \beta))\ln(n + g + \delta) \\ & + (\alpha/(1 - \alpha - \beta))\ln(s_k) + (\beta/(1 - \alpha - \beta))\ln(s_h) \end{aligned} \quad (2)$$

This framework is extended to include the possibility of what Mankiw *et al.* call ‘conditional convergence’, whereby if each country starts at some level of output that differs from its steady state value, there will be convergence to-

<sup>18</sup> Three studies outside the range of their survey report some evidence of positive effects of democracy on growth; Pourgerami, Kormendi and Meguire, and Grier and Tullock. However, since their measures of democracy were taken late in the growth period under survey, these studies are open to the risk of reverse causation. Attempts to make appropriate adjustments will be reported later in this section and in Table 3. See A. Pourgerami, ‘The Political Economy of Development: A Cross-national Causality Test of the Development-democracy-growth Hypothesis’, *Public Choice*, 58 (1988), 123–41; R. C. Kormendi and P. G. Meguire, ‘Macroeconomic Determinants of Growth’, *Journal of Monetary Economics*, 16 (1985), 141–63; and K. B. Grier and G. Tullock, ‘An Empirical Analysis of Cross-National Economic Growth, 1951–1980’, *Journal of Monetary Economics*, 24 (1989), 259–76.

<sup>19</sup> See R. M. Solow, ‘A Contribution to the Theory of Economic Growth’, *Quarterly Journal of Economics*, 70 (1956), 65–94, and ‘Technical Change and the Aggregate Production Function’, *Review of Economics and Statistics*, 39 (1957), 312–20.

<sup>20</sup> See G. Mankiw, D. Romer and D. Weil, ‘A Contribution to the Empirics of Economic Growth’, *Quarterly Journal of Economics*, 107 (1992), 407–37.

wards the steady state growth path for that country. This need not imply that all countries have the same equilibrium level of income per capita (the level of  $A$  can clearly be different across countries, based on variations in natural resources, institutions, and other factors unrelated to the stocks of human and physical capital) or even the same growth rate, since the equilibrium growth rate for each country will depend on its population growth and investment in human and physical capital.<sup>21</sup> The Solow model augmented for human capital accumulation predicts that the rate of convergence of each country towards its steady state growth path will be at the proportional rate  $\lambda$ , where

$$\lambda = (n + g + \delta)(1 - \alpha - \beta). \quad (3)$$

The log difference between current income per effective worker and that in any given earlier period 0 is thus given by

$$\begin{aligned} \ln(y(t)) - \ln(y(0)) = & (1 - e^{-\lambda t})(\alpha/(1 - \alpha - \beta))\ln(s_k) \\ & + (1 - e^{-\lambda t})(\beta/(1 - \alpha - \beta))\ln(s_h) \\ & - (1 - e^{-\lambda t})((\alpha + \beta)/(1 - \alpha - \beta)) \\ & \ln(n + g + \delta) - (1 - e^{-\lambda t})\ln(y(0)). \end{aligned} \quad (4)$$

Applied by Mankiw *et al.* to a cross-sectional sample of the growth experience of ninety-eight countries from 1960 to 1985, this equation seemed to fit the experience of the developing as well as the industrial countries. There was evidence of conditional convergence towards the steady state growth rate for the whole sample of countries, as well as for the more restricted sample of industrial countries.<sup>22</sup> Their results also showed that allowing for the

<sup>21</sup> The technology index  $A$  is none the less assumed to have the same exogenous growth rate in each country. Alternative convergence models assume that there is also convergence in the rates of growth of the efficiency indices, thus giving international transfers of knowledge a key role to play in the convergence process. Tests of equal versus converging growth rates for the efficiency indices strongly favour the latter, as reported by J. F. Helliwell and A. Chung, 'Macroeconomic Convergence: International Transmission of Growth and Technical Progress', in P. Hooper and J. D. Richardson, eds, *International Economic Transactions: Issues in Measurement and Empirical Research* (Chicago: University of Chicago Press, 1991), pp. 388–436.

<sup>22</sup> Convergence of growth rates among the current industrial countries has also been shown by Abramovitz, Maddison, Dowrick and Nguyen, and Baumol, among others. The Baumol results were queried by De Long because of the possibility that the tests were likely to be biased by focusing only on the countries that ended up rich. This difficulty is largely avoided by the use of nearly complete samples of countries in subsequent studies, including Mankiw *et al.* and in this article. See M. Abramovitz, 'The Catch-up Factor in Postwar Economic Growth', *Economic Inquiry*, 28 (1990), 1–30; A. Maddison, *Phases of Capitalist Development* (Oxford: Oxford University Press, 1982); S. Dowrick and D.-T. Nguyen, 'OECD Comparative Economic Growth 1950–85', *American Economic Review*, 79 (1989), 1010–30; W. Baumol, 'Productivity Growth, Convergence and Welfare: What the Long-Run Data Show', *American Economic Review*, 76 (1986), 1072–85; and J. B. De Long, 'Productivity Growth, Convergence and Welfare: Comment', *American Economic Review*, 78 (1988), 1138–54.

TABLE 3 *Effects of Democracy on Economic Growth, 1960–85*

	Equations			
	(1)	(2)	(3)	(4)
No. of observations	90	90	90	90
Estimation method	IV	IV	IV(a)	IV(b)
Constant	2.631 (2.06)	2.641 (3.75)	1.784 (3.09)	1.889 (1.53)
<i>Coefficients</i>				
Scale	0.057 (2.06)	0.055 (1.99)	0.055 (1.95)	0.071 (2.03)
lnGDPa60	– 0.407 (5.39)	– 0.391 (5.24)	– 0.423 (5.21)	– 0.312 (2.12)
Invest – ( $n + g + \delta$ )	0.238 (1.58)	0.284 (1.74)	0.215 (1.34)	0.358 (1.31)
School – ( $n + g + \delta$ )	0.420 (4.52)	0.419 (4.57)	0.414 (4.44)	0.454 (4.12)
Bollen 1960		– 0.200 (1.11)		
Gastil 1976			0.109 (0.58)	– 0.624 (0.70)
$\bar{R}^2$	0.445	0.458	0.439	0.336
S.E.E.	0.329	0.301	0.331	0.360

*Notes:* Absolute values of  $t$ -statistics are in parentheses. The dependent variable in all equations is the growth in real GDP per adult from 1960 to 1985, i.e.  $\ln\text{GDPa85} - \ln\text{GDPa60}$ . Instrumental variables used in all equations include primary and secondary schooling and investment rates in 1960, 1960 GDPa, and scale, all in log form, and  $n + g + \delta$ . Equations 2 and 4 also use Bollen 1960 as an instrument, while Equation 3 uses Gastil 1976, and hence deliberately leaves in the possibility of simultaneous equations bias in the estimation of the effect of democracy on growth.

accumulation of human capital lowered the estimated coefficient on physical capital to a level that was consistent with capital's share in output, and hence with the Cobb–Douglas assumption of constant returns to scale. Mankiw *et al.* interpreted their results as a vindication of the augmented Solow model, and an implicit rejection of the increasing number of models built on the assumption that knowledge spillovers create the likelihood of increasing returns to scale at the national level.<sup>23</sup>

<sup>23</sup> Romer and Lucas, among others, have presented models assuming increasing returns at the national level. Alternative endogenous growth models by Grossman and Helpman assume economies of scale and knowledge spillovers mainly at the industry level, which need not imply returns to scale at the national level. See P. M. Romer, 'Are Non-Convexities Important for Understanding Growth?', *American Economic Review*, 80 (1990), 97–103; R. E. Lucas, 'Why Doesn't Capital Flow from Rich to Poor Countries?', *American Economic Review*, 80 (1990), 92–6; and G. M. Grossman and E. Helpman, *Innovation and Growth in the Global Economy* (Cambridge, Mass.: MIT Press, 1991).

Equation 1 of Table 3 shows the results of estimating Equation (4) using the sample of ninety countries for which the growth data and the Bollen index are both available, and the same 1960 to 1985 growth period analysed by Mankiw *et al.*<sup>24</sup> To test for the possible existence of economies of scale at the national level, a measure of each economy's sample-average GDP is added to the estimation equation. Because results reported later in this article confirm that both schooling and investment are influenced by both income and democracy, all of the estimated growth equations in Table 3 are estimated by instrumental variables, using schooling and investment rates at the beginning of the 1960–85 growth period as instruments for the average income data used in the growth equations. The results show a strong conditional convergence effect,<sup>25</sup> the expected effects of the investment rates in physical and human capital and from population growth,<sup>26</sup> and also evidence of slight economies of scale.<sup>27</sup> The model therefore seems to provide an appropriate test-bed for investigating the effects of democracy on growth. The main problem is that the Gastil data are only available from the mid-1970s, while the growth period that is being studied starts in 1960. As it has already been established that income levels exert a positive influence on democracy, the use of a measure of democracy from the middle or end of the sample period runs the risk that a possible negative effect of democracy on growth would be masked by the reverse effect of income level on democracy. This difficulty can be dealt with in two ways. First, it is possible to use the Bollen index of political democracy for 1960,

<sup>24</sup> The dependent variable is the logarithm of real GDP per adult in 1985 minus the logarithm of real income per adult in 1960, following Mankiw *et al.* The independent variables are the same as in Equation 4, using the logarithm of the gross investment rate to measure the fraction of output invested in physical capital and the logarithm of the percentage of the adult population in secondary school to proxy for the share of output devoted to investment in human capital. The results reported in Table 3 impose the coefficient restrictions implied by Equation 4 in the text, that the coefficient on the population growth term should be equal to the negative of the sum of the coefficients on the investment and education variables. Tests show that the restriction is easily accepted, leads to a slightly higher explanatory power (after taking account of the degree of freedom saved) and does not change any of the results materially, as reported by Mankiw *et al.* The income data are from the Mark IV version of the Summers and Heston data set. See Mankiw *et al.*, 'A Contribution to the Empirics of Economic Growth', and R. Summers and A. Heston, 'A New Set of International Comparisons of Real Product and Prices: Estimates for 130 Countries, 1950 to 1985', *Review of Income and Wealth*, 34 (1988), 1–25.

<sup>25</sup> This is shown by the significant negative coefficients on the variable measuring initial real income per adult, which imply that countries with lower average incomes at the beginning of the growth period had faster growth rates in the subsequent twenty-five years, once account is taken of differences in the rates of investment in physical and human capital.

<sup>26</sup> The investment and education variables both have the expected positive sign, although the investment rate is not significant when instrumental variables estimation methods are used.

<sup>27</sup> This is shown by the positive coefficient on the variable measuring the average scale of each economy during the sample period. Subsidiary tests show that the result for economies of scale is based entirely on the experience of the OECD countries, and depends on the use of sample-average scale rather than initial scale in the equation. No evidence of scale economies appears when the experience of the developing countries is separately assessed.

which is clearly free of the risk of positive feedback from post-1960 economic growth. Secondly, we can make use of the Gastil measures and attempt to allow for the possible effects of simultaneous equations bias by appropriate estimation techniques.

Equation 2 of Table 3 shows the effect of adding the Bollen index to the cross-sectional growth equation for ninety countries. The coefficient suggests a negative effect of democracy on growth, although the effect is not statistically significant at the usual levels. If the coefficient were to be taken at face value it would imply that a 20-point increase in the Bollen index, for example a shift from the democracy level of Libya (31) to that of Senegal (49), as they were assessed by Bollen in 1960, would have reduced 1985 GDP per adult by 4 per cent. The 95 per cent confidence bands for the estimate of the change in 1985 GDP range from about + 4 per cent to - 12 per cent, so not too much should be made of the specific estimate. It should be noted, however, that this estimated negative effect is in addition to the slowing effect that richness *per se* has on subsequent economic growth in the convergence model being estimated here.

Turning to the Gastil index, the situation becomes even more cloudy, as there are no measures as far back as 1960, and the later measures are likely to be contaminated by reverse causation. Equation 3 shows the effects of adding the Gastil index for 1976, about halfway through the growth period. In this equation the Gastil 1976 index is treated as though it were truly exogenous, and it is included in the list of instrumental variables. The coefficient is positive, small and weakly determined: the 95 per cent bounds range from - 0.20 to + 0.34. When the equation is re-estimated using the Bollen 1960 index as an instrument for Gastil 1976, as shown in Equation 4, the effect turns fairly large and negative, but is still not significantly different from zero. The fact that the estimated effect turns negative using simultaneous equations estimation is, however, what would be expected if there were a positive effect of income on democracy and a negative reverse effect from democracy to subsequent economic growth.

A recent study by Pourgerami develops a measure of democracy based on Amnesty International reports of human rights violations, and finds that more democracy (i.e. few infringements of civil liberties) is good for growth.<sup>28</sup> Since Pourgerami's democracy measure relates to the end of his 1965-84 estimation period, the study is open to Sirowy and Inkeles' criticism of mismatched timing, and is susceptible to reverse causation.<sup>29</sup> To check for this possibility, the Pourgerami democracy index was used in the Table 3 growth equation for the seventy-six countries for which both sets of data are available. The results show a positive but insignificant effect which approaches zero when the Bollen

<sup>28</sup> See Pourgerami, 'The Political Economy of Development'.

<sup>29</sup> See Sirowy and Inkeles, 'The Effects of Democracy on Economic Growth and Inequality', p. 137.

1960 index is used as an instrumental variable for Pourgerami's democracy measure.

Studies by Kormendi and Meguire and Grier and Tullock both use dichotomous transformations of Gastil's 1978 index of civil liberties in equations for GDP growth.<sup>30</sup> Kormendi and Meguire find a weak *positive* effect, on 1950–77 GDP growth, of a dichotomous variable equal to 1.0 for the nineteen countries (almost all in the OECD) with the highest levels of civil liberties. Grier and Tullock find a stronger *negative* effect from a dichotomous variable with the value 1.0 for twenty-seven countries, twenty-one of which are in Africa, with the lowest levels of civil liberties in a pooled time-series cross-section equation covering per capita growth for 113 countries from 1950 to 1981. Since the Gastil index of civil liberties is highly correlated with the matching index of political rights ( $r = 0.91$  for the 1976 measures), and hence with the combined index of democracy, these results may seem to run counter to most of the other evidence showing, if anything, a weak negative effect of democracy on subsequent growth.<sup>31</sup> However, once again the apparent contrast seems to be due primarily to reverse causation, as both studies use an index of civil rights at the end of the growth period under review which is likely to have been influenced by the already-established positive linkage from income levels to political and civil rights.

To assess the extent to which these previous findings might have been contaminated by reverse causation, I constructed four dummy variables which took the value 1.0 for the countries which scored lowest (a) on the Gastil civil rights index for 1978, (b) on the Gastil combined index for 1978, and (c) on the two corresponding versions of the Bollen index for 1960.<sup>32</sup> These variables were then added to Equation 1 of Table 3 – the basic estimation of the growth model by instrumental variables (results not reported here). None of the dummies produced the sort of significant positive effect on growth hypothesized by Grier and Tullock or by Kormendi and Meguire. Indeed, when either of the Bollen dichotomous variables was used, either representing itself or used as an

<sup>30</sup> See Kormendi and Meguire, 'Macroeconomic Determinants of Growth', and Grier and Tullock, 'An Empirical Analysis of Cross-National Economic Growth, 1951–1980'.

<sup>31</sup> There is a possibility that civil liberties and political rights have different effects on economic growth, with the former encouraging the movements of people and ideas likely to foster growth and the latter posing greater risks of short-term policy choices leading to instability of the type emphasized in R. Dornbusch and S. Edwards, eds, *The Macroeconomics of Populism in Latin America* (Chicago: University of Chicago Press, 1991). However, when the difference between the 1976 civil liberties and political rights indices was added to the ninety-country growth equation of Table 3, it took an insignificant negative coefficient, casting doubt on the idea that civil rights are more growth-inducing than political rights.

<sup>32</sup> Following Grier and Tullock, I used all countries with values equal to 6.0 or 7.0 for the Gastil index of civil rights in 1978. The analogous cutoff for the freedom index was 12.0 or more for the sum of the civil rights and political freedoms measures. In both cases, I constructed a Bollen dichotomous index covering the same number of countries. This involved a Bollen index of 0.49 or below for the twenty-two countries with the lowest values of civil rights, and 0.48 or below for the twenty-four countries with the lowest values for the combined Gastil index.

instrument for simultaneous equations estimation of the impact of one of the Gastil measures, the effect was negative – opposite to that found by Grier and Tullock and consistent with the other results reported in Table 3. The essential reason for Grier and Tullock's result, therefore, seems to be reverse causation. Democracy was very much in flux between 1960 and 1976, with almost half of the countries in the bottom civil liberties group in 1960 being out of that group by 1976, being replaced by other countries that had ranked relatively high in 1960. Among those which slid back after 1960 were two countries (Chile and Ghana) in Huntington's group of second-wave democracies that were subject to reversals in the fifteen years after 1960,<sup>33</sup> and others that had not been classified as democracies in 1960, but which became even less democratic after 1960. The simple correlation between the Bollen 1960 and the Gastil 1978 dichotomous indexes is only about 0.15, showing partly the differences there can be between different assessments, but revealing even more the great changes in political and civil liberties that occurred in many countries in the 1960s and 1970s. Thus the dichotomous indexes for civil liberties and political rights, when purged of the effects of post-1960 changes, seem to support the results shown in Table 3: higher initial levels of the democracy measures seem to have, if anything, a weak negative effect on subsequent growth. It might be more appropriate to say that the aggregate evidence does not support any significant linkage between the level of democracy and subsequent economic growth.<sup>34</sup> To go further would probably require making distinctions among various types and features of democratic and undemocratic regimes.

It has been argued by Olson that mature democracies may be likely to suffer a slowdown in growth because of a slow buildup in the powers of special interest groups whose successful claims for special treatment reduce the growth of the economy as a whole.<sup>35</sup> If this is the case, we might expect to find slower growth in the older democracies, after adjusting for initial income levels and the other factors determining economic growth, including the current level of democracy. A rough test of this hypothesis was undertaken by constructing a qualitative variable which took the value of 1.0 for each of Huntington's ten countries that have been continuously democratic since early in the twentieth century.<sup>36</sup> When added to Equation 2 of Table 3, the variable yielded a negative coefficient, as the maturation hypothesis would suggest, but the coefficient was

<sup>33</sup> See Huntington, *The Third Wave*, p. 14.

<sup>34</sup> A similar conclusion is reported by Cooper, based on cases studies of eighteen major developing countries. See R. N. Cooper, *Economic Stabilization in Developing Countries* (New Haven, Conn.: Yale University Press, 1991), pp. 74–5.

<sup>35</sup> See Mancur Olson jr, *The Rise and Decline of Nations: Economic Growth, Stagflation and Rigidities* (New Haven, Conn.: Yale University Press, 1982).

<sup>36</sup> The countries are Australia, Canada, Finland, Iceland, Ireland, New Zealand, Sweden, Switzerland, United Kingdom and the United States (see Huntington, *The Third Wave*, p. 14).

so insignificant that there was a drop in the overall explanatory power of the equation.<sup>37</sup>

It is probably reasonable to regard these estimates of the effects of democracy on economic growth as being consistent with the broad pattern of earlier results surveyed by Sirowy and Inkeles. In essence, the effects identified are generally negative – though they are neither uniform nor very strong. However, the results reported thus far all assess the partial effect of democracy on subsequent economic growth, taking the rates of schooling and investment as given. What of the possibility that democracy, once acquired, helps to establish conditions that encourage higher levels of schooling and investment, and thereby increases economic growth via these indirect channels? The first step in assessing this possibility is to estimate the effects of democracy on subsequent rates of schooling and investment. The appropriate tests are performed in Table 4, using the Bollen 1960 index to reduce the dangers of reverse causation. The equations are estimated both with and without the inclusion of the 1960 levels of per capita GDP, which are likely to have a strong positive effect on the schooling rate, and possibly also on the investment rate. The democracy index is seen to have a positive effect on subsequent schooling and investment rates, with the estimated effect becoming smaller and less significant when account is taken of the effects of initial income levels. Indeed, as Equation 4 shows, when prior GDP levels are taken into account, the level of democracy appears to exert no significant influence on education levels.

What are the net effects of democracy on growth when the direct negative effects are combined with the positive indirect effects? Looking first at the direct effects of democracy on subsequent growth, the coefficient on the Bollen index in Table 3 suggests that if a completely undemocratic country in 1960 had instead been fully democratic the logarithm of 1985 GDP per adult would have been lower by 0.200, roughly equal to a 0.8 per cent reduction in the average annual growth rate from 1960 to 1985. However, the estimated indirect positive effects are slightly larger, being 0.149 for investment and 0.136 for schooling.<sup>38</sup> Combining the direct and indirect effects would suggest a weak positive effect of 0.085. All three channels are estimated with great imprecision, so that the only appropriate conclusion is that no significant net effect can be shown on the basis of these results.

<sup>37</sup> The coefficient on the dummy variable covering the ten rich democracies was  $-0.065$ , with a  $t$ -value of  $-0.4$ , and the adjusted  $R^2$  fell from 0.458 to 0.444.

<sup>38</sup> The investment effect is the product of the coefficient on investment in Equation 2 of Table 3 and the coefficient on the Bollen index in Equation 2 of Table 4. The schooling effect uses the schooling coefficient from Equation 2 of Table 3 and the Bollen coefficient from Equation 4 of Table 4.

TABLE 4 *Effects of Democracy on Investment and Education, 1960–85*

	Equations			
	(1)	(2)	(3)	(4)
Dependent variable	Investment rate	Investment rate	Schooling rate	Schooling rate
No. of observations	90	90	90	90
Estimation method	OLS	OLS	OLS	OLS
Constant	– 2.545 (19.44)	– 4.180 (11.37)	– 4.338 (18.24)	– 8.730 (15.62)
<i>Coefficients</i>				
lnGDPa60		0.258 (4.69)		0.695 (8.30)
Bollen 1960	1.023 (5.72)	0.524 (2.71)	1.672 (5.14)	0.326 (1.11)
$\bar{R}^2$	0.263	0.405	0.222	0.561
S.E.E.	0.443	0.398	0.805	0.605

*Notes:* The dependent variables are the logarithms of the investment and schooling rates described in the data appendix. They are averages over the 1960–85 period used for the growth equations. The independent variables are the 1960 Bollen democracy index and the logarithm of 1960 real GDP per adult.

### III. CONCLUSIONS AND ISSUES FOR FURTHER RESEARCH

The data surveyed here support strongly the notion that countries at higher income levels are more likely to have democratic forms of government. It has been shown that this positive effect does not appear to be the result of reverse causation: estimates of the reverse effect of democracy on subsequent growth indicate that this feedback is more likely to be negative than positive. This conclusion is reinforced by the fact that models which allow for the simultaneous determination of democracy and growth show positive effects of income on democracy that are larger than those estimated by more simple methods. These results tie in with the evidence that countries starting with lower levels of per capita income have higher initial growth rates which subsequently tend to slow down as income levels converge with those of richer countries. One possible component of this slowdown is that countries adopt democratic forms of government during the development process. It is still unclear whether the adoption of a democratic government contributes to growth rate convergence by reducing the subsequent growth of the democratizing countries.

It is relatively uncontroversial to suggest that increasing levels of education and income are likely to increase citizen demands for many things, including the range of political and civil freedoms that characterize democratic systems.

It is less clear, however, how or why certain features of democratic government might help or affect subsequent growth. It is almost certainly the case that some aspects of democratic systems are more helpful to subsequent growth than others.<sup>39</sup> Alesina and Rodrik, for example, argue that democracies with initially unequal distributions of income will have lower growth than democracies with more even distributions:<sup>40</sup> the large group of the enfranchised poor in the first case will vote for high taxes on capital, which will then lead to lower investment and hence lower growth rates of GDP.<sup>41</sup> It is also clear, from the evidence of several waves and reverse waves of democratization, analysed most recently by Huntington, that there are many reasons why countries have adopted democratic systems, and then in many cases lost them and sometimes tried again.<sup>42</sup> Analysis of the dynamics of these waves and reversals might well help to illuminate the subsequent effects of democracy as well the strong link from income to democracy. The numbers of countries involved, and the range of experiences they illustrate, offer at least some hope for enriching understanding of the links between political systems and economic performance.

Although the analysis in this article has treated all countries equally, differing only in their values for the variables under investigation, there may be many country-specific or culture-specific factors that influence the linkages between democracy and economic growth, and which may be obscured in a study based on large samples of countries. To provide just one example, recent research on the Asian economies, for which the convergence model of growth

<sup>39</sup> Studies have found a negative linkage between economic growth and the instability of government (Alesina *et al.*) and the frequency of assassinations and coups (Barro), although Londregan and Poole have found that the significance of the negative effect of coups on subsequent growth becomes slight when the two-way linkages between coups and economic growth are jointly estimated. The results of Alesina *et al.* suggest that the two-way linkages between political instability and economic growth are unaffected by the level of democracy as measured by a three-valued index of democracy. Using the 1960 values for their index in the Table 3 equation gives similar results to those using the 1960 Bollen index, although the negative effect is less significant using the Alesina *et al.* index. See A. Alesina, S. Ozler, N. Roubini and P. Swagel, 'Political Instability and Economic Growth', *NBER Working Paper*, No. 4173 (Cambridge: National Bureau of Economic Research, 1992); R. J. Barro, 'Economic Growth in a Cross-Section of Countries', *Quarterly Journal of Economics*, 106 (1991), 407–44; J. Londregan and K. Poole, 'Poverty, the Coup Trap, and the Seizure of Executive Power', *World Politics*, 42 (1990), 151–83.

<sup>40</sup> See A. Alesina and D. Rodrik, 'Distributive Politics and Economic Growth', *CEPR Discussion Paper*, No. 565 (London: Centre for Economic Policy Research, 1991).

<sup>41</sup> Presumably it is important to make the distinction between pre-tax and post-tax distributions of income. One of the influential strands of thinking arguing that democracy will be bad for growth adopts the position that democratic governments will be more likely to undertake redistributive policies that lead to higher tax rates and otherwise discourage savings, labour supply and capital accumulation. For examples, see P. T. Bauer, *Equality, the Third World, and Economic Delusion* (London: Weidenfeld & Nicholson, 1981), S. Huntington and J. Nelson, *No Easy Choice: Political Participation in Developing Countries* (Cambridge, Mass.: Harvard University Press, 1976) and E. Weede, 'The Impact of Democracy on Economic Growth: Some Evidence from Cross-National Analysis', *Kyklos*, 36 (1983), 21–39.

<sup>42</sup> See Huntington, *The Third Wave*.

fits poorly, reveals a significant negative partial effect of democracy on subsequent growth.<sup>43</sup> In general, there is a considerable amount of unexplained international variation in both economic growth and political institutions and practices to allow for the analysis of more specific factors.

What does the evidence presented in this article offer by way of answer to the questions posed at the outset: are there economic prerequisites to democracy? Does democracy help or hinder subsequent economic growth? Is the Chinese sequencing better than the Russian one?

The results in the first section of this article confirm a robust positive relation between the level of per capita income and the adoption of democracy. There appear to be no clearly defined thresholds or prerequisites – just a strong tendency for democracy to become the chosen and maintained form of government as countries get richer and as education levels increase. These results suggest that democracy has an intrinsic value that is increasingly sought after as populations become better off and better educated. With respect to the impact of democracy on subsequent economic growth, the evidence in this article pours cold water on the notion that introducing democracy is likely to accelerate subsequent growth. The statistical fine-tuning undertaken to account for reverse causation increased the estimated likelihood of a negative direct effect of democracy on subsequent economic growth. This said, this negative effect was statistically non-significant and appeared to be offset by indirect positive influences flowing through investment and education. An optimistic interpretation of the overall results would thus be that democracy, which is generally considered to offer considerable non-economic benefits, is available at little cost in terms of subsequent lower growth. Even more optimistic is the further result that the economic cost of democracy drops, and may even be eliminated, when account is taken of the positive effects that democracy appears to have on subsequent education and investment, both of which tend to increase economic growth.

On the sequencing question, the evidence does not indicate any magical or ‘most favourable’ time for democratization, beyond the basic result that the probability of a country being democratic rises steadily with its level of income. Thus democracy delayed is not likely to be democracy lost, as long as the alternative interim system of government is able to deliver continuing increases in living standards.

<sup>43</sup> This partial negative effect only appears if allowance is made for the positive effects of investment and openness, both of which may in turn be positively influenced by the level of democracy. Differences in education levels do not appear to help explain variations in growth rates among the Asian economies. See J. F. Helliwell, ‘International Growth Linkages: Evidence From Asia and the OECD’, in T. Ito and A. Kreuger, eds, *Macroeconomic Linkage: Saving, Exchange Rates and Capital Flows* (Chicago: University of Chicago Press, 1993).

DATA APPENDIX

This appendix shows the means, standard deviations and some correlations for three measures of democracy and the variables used in the growth regressions, for the ninety-country sample defined by the availability of the Bollen data and employed for most of the equations presented in Tables 2 to 4. The three democracy indices are the Bollen index (from Bollen 1980) for 1960 and the Gastil indices for 1976 and 1985. The Gastil indices combine data for political rights and civil liberties to form an index bounded by 0 and 1.0, with zero meaning least democratic, just as is the case for the Bollen index. The income per capita figures are measured in thousands of 1980 international dollars per adult, with GDPa60 being the antilog of the variable used in the equation estimates reported in Tables 2 to 4. Similarly, the other variables are the antilogs of the variables used in the estimation, with country scale converted to billion dollars at 1980 rates, average growth reported in the dimensions of annual average percentage growth in real income per adult, schooling as secondary school enrolment as a fraction of the adult population, investment as a fraction of total GDP, and

TABLE A *Some Statistical Values*

	Mean	Standard deviation			
GDPa60	3130.0	2941.0			
GDPa85	5466.0	5362.0			
Bollen60	0.683	0.262			
Gastil76	0.460	0.346			
Growth	1.73%	1.77			
Scale	80.9	245.0			
Investment	0.178	0.081			
School	0.055	0.035			
$n + g + \delta$	0.072	0.0087			
Correlations					
	GDPa60	GDPa85	Bollen60	Gastil76	
GDPa85	0.889				
Bollen60	0.572	0.579			
Gastil76	0.783	0.804	0.595		
Gastil85	0.739	0.754	0.569	0.877	
	Growth	Scale	GDPa60	Investment	School
Scale	0.151				
GDPa60	0.124	0.449			
Investment	0.577	0.215	0.529		
School	0.480	0.323	0.673	0.653	
$n + g + \delta$	- 0.222	- 0.233	- 0.479	- 0.366	- 0.340

$n + g + \delta$  (the unlogged form of  $n + g + \delta$ , average annual population growth, as a proportion, plus a constant to represent depreciation and average technical progress). The growth equation data are the same as those used and published by Mankiw *et al.*, being drawn from the Summers and Heston 1988 publication, with the addition of World Bank data for schooling and demography.<sup>44</sup> The 1960 instruments for schooling are based on World Bank data, while those for 1960 investment are from the Summers and Heston Mark 5 data set used for the 125-country sample analysed in Table 1.<sup>45</sup> The right-skewness apparent from the means and standard deviations of the raw data disappears with the logarithmic transformation used prior to estimation.

<sup>44</sup> See Mankiw, Romer and Weil, 'A Contribution to the Empirics of Economic Growth'; Summers and Heston, 'A New Set of International Comparisons of Real Product and Prices'.

<sup>45</sup> See R. Summers and A. Heston, 'The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1988', *Quarterly Journal of Economics*, 106 (1991), 327–68.