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EMPIRICAL LINKAGES BETWEEN DEMOCRACY AND ECONOMIC GROWTH

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ABSTRACT

Using cross-sectional and pooled data for up to 125 countries over the period from 1960 to 1985, this paper 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 on growth are assessed in a comparative growth framework in which growth of per capita GDP 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 direct effect of democracy on subsequent economic growth negative but insignificant. Allowing for the possible positive indirect effect of democracy on income, flowing through the positive effect of democracy on education and investment, tends to offset the negative direct effect of democracy on economic growth. 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.

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1. Introduction

There is a longstanding presumption that democracy takes root and survives where levels of economic development and education are high.[1] There is a 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.[2] 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, and is spreading throughout Eastern Europe in the early 1990s, often in countries where living standards are low and sometimes sinking further, it seems well worthwhile to assess the global evidence in a systematic way. Is it better that economic development and reform take precedence over the spread of democracy, as in China, that democracy should precede economic reforms, as in Eastern Europe, or are the two types of change independent? There will always be limitations on the applicability of previous experience to current issues, but the issues 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 paper takes advantage of the increasing availability of comparable data for economic growth and income levels in most of the world's

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[1] Lipset (1959) surveys much of the earlier literature.

[2] Many empirical studies of the effects of democracy on economic growth are reviewed by Sirowy and Inkeles (1990). The extent to which the results depend on country-specific factors is emphasized by Haggard (1990, chapter 10).

national economies, and combines it with some of the available data categorizing political rights and civil liberties in an equally large number of economies. For establishing the linkages between the level of economic development and political democracy, a sample of 125 countries will be used for which it is possible to obtain comparable measures of per capita real incomes[3] and regular assessments of the extent of political and civil rights. For assessment of the reverse linkages from democracy to subsequent economic growth, the sample will be reduced to 98 countries for which a model of comparative growth has been estimated covering the years 1960 to 1985. The sample is reduced still further for some experiments, to make use of earlier estimates of the relative status of political democracy among about 90 countries in 1960 and 1965. Where overlap is possible, experiments show that the results from the samples of different sizes are very similar, so the need to use smaller numbers of countries in some cases does not appear to pose great problems.

While this paper does deal with two large questions, relating to the influence of living standards to the choice of a democratic form of government, and the impact of democratic government on subsequent economic growth, it does so in a very preliminary way, and leaves untouched many important issues. For example there is no detailed consideration of the factors determining the nature and timing of movements to and from democracy. Likewise, there is no consideration of the complex linkages between the inequality of distribution and the form of government and the rate of economic growth.

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[3] Real GDP per capita converted at purchasing power parity exchange rates, using the 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 this paper are described in Summers and Heston (1991).

To study the effects of income levels on the choice of political system, the main tool used will be regressions of annual indexes of political and civil liberties for the years 1975 through 1985 on levels of real GDP per capita, with supplementary tests for the importance of other factors, such as schooling levels, that are often held to have an independent effect on the choice of a democratic form of government. These results are reported in Section 2.

The main analytical tool used to assess the effects of democracy on economic growth is an empirical framework explaining comparative growth performance over the 1960-85 period in a way that allows simultaneously for convergence in per capita GDP, for possible returns to scale, and for international differences in investment rates in human and physical capital. By adding measures of democracy and political freedoms, it should then be possible to assess whether the political system has any systematic influence on current and subsequent growth performance. This is done in Section 3.

2. Are There Economic Prerequisites to Democracy?

"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." Thus does Seymour Lipset (1959, p. 75) introduce his path-breaking empirical analysis of cross-sectional correlations between the status of political regimes and mid-century measures of economic development, for a sample of 48 countries, mainly in Europe and the Americas. He attempts to avoid the complications of mixing political cultures by dividing his sample into two main groups: 28 European and English-speaking countries and 21 Latin American countries. Within the first group, he finds that the average per capita income is more than twice as high in the

13 stable democracies as in the 15 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 7 democracies or unstable dictatorships had average incomes about 40% higher than the 13 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. Since these measures of economic development were all taken subsequent to the twenty-five year period of political history used to classify political regimes, there arises the question of whether the development was a prerequisite or a consequence of the level of democracy. In addition, World War II, 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 should 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 suggest that it is appropriate to revisit these issues. The analysis in this paper is based on measures of average per capita real incomes and a measure of political democracy for each of 125 countries for each year from 1976 through 1985. The measure of democracy is obtained by transforming a sum of the measures of political rights and civil rights published annually following procedures described by Gastil (1990). The index takes the value of zero for a country with no political and civil rights, and the

value 1.0 for a country with full measures of both types of rights[4]. The two components of the democracy index, political rights and civil rights, are highly correlated with one another (r=.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 GDPs 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 1250 observations. Equation 1 shows the simplest form of the regression, which shows that about 42% 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% increase in per capita income raises the predicted value of the democracy index by 2 points on a 100-point scale. Tests to see whether this effect varied by size of income or region showed that there was no systematic non-linearity[5] or threshold that

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[4] Gastil's separate indices for political rights and civil liberties are each on a scale from 1 to 7, with 1 representing the highest levels of rights, and 7 the lowest. Summing the two indices, as Gastil does in his more recent work, and which seems to be supported by our results, 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 the PFR index, ranging from 0 for no freedoms to 1.0 for fully democratic systems. If FR is the 2 to 14 index, PFR=(14-FR)/12.

[5] 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

could be determined, but that within the OECD there was some evidence of a slightly higher proportionate effect of income on the democracy index. This perhaps supports to some extent the idea of Max Weber, as quoted by Lipset (1959, p.73) that modern democracy may only occur in its purest form in the conditions of capitalist industrialization, conditions which broadly speaking are the criteria for membership in the OECD. The notion that different cultures may give rise to sharply different degrees of democracy, even at equivalent levels of income, is tested more broadly in equation 2, which shows the degree of democracy, even after adjusting for the effects of different levels of per capita income, to be sharply higher in OECD countries, sharply lower in six oil-dependent countries of the middle east[6], 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 % the fraction of variation explained by the equation. The estimated effect of income drops from .20 to .12 when the regional variables are added, reflecting the strong correlation between regions and average incomes, with especially the OECD countries being at once richer and more democratic. However the equation still shows, since the income effect remains very significant, that the strong correlation between

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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 marginally preferring the logarithmic model to the quadratic model. The P-value for excluding the two variables of the quadratic model is .25, while it is .21 for excluding the logarithmic variable, with the tests in both cases being of restricted versions of the encompassing equation. 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.

[6] These are Bahrain, the United Arab Emirates, Iran, Iraq, Kuwait and Saudi Arabia,

democracy and income is not simply due to the fact that the OECD countries are richer and more democratic than most other countries.

Equations 3 and 4 show what happens to equations 1 and 2 if the secondary school enrollment rate, measured as a fraction of the adult population, is added to equations 1 and 2. The number of countries is reduced to the 98 used for our comparative growth analysis, and the education variable used is simply the unlogged form of the variable used in the growth model to measure the rate of investment in human capital. In equation 3, the coefficient on the education variable suggests that an increase of 1% 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 .88 when the regional effects are allowed for in equation 4, reflecting that there are 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 1250 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 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, in terms of its explanatory power, as it appears to be, and the significance of the coefficients is overstated. This can be rectified by re-estimating the equations with, for example, the sample of 1250 split into ten equations of 125 observations each, with coefficients constrained to be the same in each equation, and estimated by an iterative 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, which are now estimated without bias, are reduced. The GDP and regional effects remain highly significant in equation 5, as do the GDP and schooling effects in equation 6. However, if equation 4, which combines regional and schooling effects, is re-estimated, the schooling effect, and the Latin American regional effect, are no longer significant. This shows that the regional and schooling effects are correlated. 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.[7] 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 (1980, 1990) has surveyed the issues involved in obtaining measures of democracy. He 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. He also rejects the use of voter turnout statistics. The Gastil measures accord with Bollen's preferences, by focussing on political rights and freedoms rather than political stability, and in providing measures whose changes might themselves provide an index of stability. Bollen's own index,

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[7] 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.

which he has published for 1960 and 1965, is an equally weighted sum of six component indexes, three relating to popular sovereignty (press freedom, election of chief executive and election of the legislature) and three to political freedoms (press freedom, freedom of 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. The biggest factor limiting the comparison is that the Gastil indexes do not start before the mid-1970s, so that there is no overlap. In addition, the Bollen index for 1965 is only available for 90 of the 98 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 90 countries.

Comparing the Bollen index for 1960 with the Gastil indexes for 1976 and 1985, several differences are readily apparent. The Bollen index is unimodal, with 19 countries at .95 or above, two-thirds of the countries above .50, only six countries below .25, and none below .10. The Gastil index is bimodal, with modes at both ends: 16 countries are rated at 1.0, and 19 countries are below .10. The mean of the Bollen index is .68, compared to .46 and .52 for the Gastil 1976 and 1985 measures. The simple correlation between the 1960 Bollen index and the 1976 Gastil index is .59, and the Spearman rank correlation is .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 indexes. Without overlapping observations, it is not possible to analyze 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. In any event, it is clear that the Bollen

and Gastil indexes 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. Table 2 shows the results of using the 90 observations for the 1960 Bollen index as the dependent variable for re-estimation of equations 1 and 6 of Table 1. The coefficient of income, in equation 1, is slightly lower than using the Gastil index, and the equation explains 32% 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 lowers the income coefficient and gives a coefficient of 2.0 (t=1.9) on the schooling variable. These results are also very close to those of equation 6 in Table 1. Interestingly, the regional variables are not significant in the Bollen equation.

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 are 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 will be reported in the next section. If we find there are no direct 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 the growth model has been tested. 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. 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 we would expect to find a positive coefficient on the post-1960 growth that is higher than for the 1960 income level. If there

is no feedback from democracy to growth, then the two coefficients will not be significantly different. If the coefficient is higher for the 1960 level than for the subsequent change, then that would suggest that a possible negative effect from democratization to growth. 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 3 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 difference to be statistically significant, with the probability of the result being due to chance estimated at less than 2%. 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 variables estimation is used to re-estimate equation 4, the two coefficients move closer together, and the difference between them becomes insignificant. 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 experiments suggest that the results showing a positive effect flowing from income to democracy are not due to a positive effect flowing from democracy to growth. Indeed, whatever feedback there is seems to be negative, so that when its possibility is taken into account in the estimation of the democracy equations, the estimated effects become larger. It is now time to turn to consider more directly a larger body of earlier studies and new evidence on the impact of democracy on growth.

3. Democracy and Economic Growth

Previous studies on the effects of democracy on economic growth have been surveyed by Sirowy and Inkeles (1990). 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 arguing 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 skeptical perspective doubting any systematic linkage between democracy and growth. Of the thirteen studies they survey, three find an unqualified negative effect of democracy on growth, four find a negative effect in some circumstances and regime types, and six find no relationship.[8] 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 the 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.

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[8] Three studies outside the range of their survey report some evidence of positive effects of democracy on growth; Pourgerami (1988), Kormendi and Meguire (1985) and Grier and Tullock (1989). However, since the 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.

Our empirical analysis of the effects of democracy on economic growth starts with an extended form of the Solow (1956, 1957) growth model, as augmented by Mankiw, Romer and Weil (1990) to include human capital accumulation, with real output determined as a Cobb-Douglas function of physical capital, human capital and efficiency units of labour:

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

where H is the stock of human capital, L the stock of labour (growing at rate n), K the stock of physical capital and A 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, s_h the fraction invested in human capital and δ the rate of depreciation of the physical capital stock, then in the steady state the log of output per capita is:

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

This framework is extended to include the possibility of what Mankiw *et al.* call "conditional convergence", that if each country starts at some level of output that differs from its steady state value, there will be convergence towards the steady state growth path for that country. This need not imply that all countries have the same equilibrium level of income per capita (they argue that the level of A can 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[9]. 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 λ, where

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

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

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

Applied by Mankiw *et al.* to a cross-sectional sample of the growth experience of 98 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 for the whole sample of countries, as well as for the more restricted sample of industrial countries[10]. Their results also

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[9] The technology index A is nonetheless 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 indexes, 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 indexes strongly favour the latter, as reported by Helliwell and Chung (1991).

[10] Convergence of growth rates among the current industrial countries has also been shown by Abramovitz (1979, 1990), Maddison (1973), Dowrick and Nguyen (1989) and Baumol (1986), among others. The Baumol results were queried by De Long (1988) because of the possibility that the tests were likely to be biased by focussing only the countries that ended up rich. This difficulty is largely avoided by the use of nearly complete samples of countries in

showed that allowing for the 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 created the likelihood of increasing returns to scale at the national level.[11]

Equation 1 of Table 3 shows the results of estimating equation (4), augmented by a size variable to test for the possibility of increasing returns to scale, using the sample of 90 countries for which the growth data and the Bollen index are both available, and the same 1960 to 1985 growth period analyzed by Mankiw *et al.*[12] The results show a strong conditional convergence effect, the expected effects of the investment rates in physical and human capital and from population growth, and also evidence of slight

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subsequent studies, including Mankiw *et al* and in this paper.

[11] For examples, see Romer (1986, 1990) and Lucas (1988, 1990). Alternative endogenous growth models by Grossman and Helpman (1991) assume economies of scale and knowledge spillovers mainly at the industry level, which need not imply returns to scale at the national level. See Helpman (1991) for a helpful survey.

[12] 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 in Mankiw *et al* (1990) and in Helliwell and Chung (1992). The income data are from Summers and Heston (1988).

economies of scale.[13] 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 we are studying starts in 1960. Since we have already established a positive effect from income levels to democracy, using 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. We deal with this difficulty in two ways. First, it is possible to use the of the Bollen index of political democracy for 1960, which is clearly free of the risk of positive feedback from post-1960 economic growth. Second, 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 90 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 x to that of y, as they were assessed by Bollen in 1960, would have reduced 1985 GDP per adult by 5%. The 95% confidence bands for the estimate of the change in 1985 GDP cover from about +1% to -11%, so not too much should be made of the specific estimate.

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[13] Subsidiary tests show that the result for economies of scale is based entirely on the experience of the OECD countries, and depend 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. Further tests for economies of scale are reported by Backus, Kehoe and Kehoe (1991).

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 average value of the Gastil index over the 1976-1985 period. The coefficient is positive, small, and weakly determined: the 95% range covers from -.20 to +.34. When the equation is re-estimated using instrumental variables, as shown in equation 4, the effect turns fairly large and negative, but is still not significantly different from zero, and the equation as a whole becomes weaker. 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 (1988) 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 positively and significantly related to cross-sectional variations in per capita GNP growth from 1965 to 1984. Since the democracy measure relates to the end of the growth period, the study is open to Sirowy and Inkeles' (1990, p. 137) criticism of mismatched timing, and is susceptible to reverse causation. To check for this possibility, the Pourgerami democracy index was used in the Table 3 growth equation for the 76 countries for which both sets of data are available. The results, which are shown as equations (5) and (6) in Table 3, show an insignificant positive effect under OLS estimation which turns insignificantly negative when instrumental variables estimation is used to reduce the risks of simultaneous equations bias.

Studies by Kormendi and Meguire (1985) and Grier and Tullock (1989) both use dichotomous transformations of Gastil's 1978 index of civil liberties in equations for GDP growth. Kormendi and Meguire find a weak positive effect, on 1950-1977 GDP growth, of a dichotomous variable equal

to 1.0 for the 19 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 27 countries, 21 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=.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.[14] However, once again the apparent contrast seems to be due primarily to the risk of reverse causation, as both studies use an index of civil rights at the end of the growth period under review, and hence likely to have been influenced by the already-established positive linkage from income levels to the establishment of political and civil rights. To assess these possibilities, the Grier and Tullock variable, using the 1976 Gastil civil liberties index, which should be better than the 1978 index, was tested the table 3 growth equations for 1960-1985 growth for 90 countries. The effect is negative (i.e. countries with low civil liberties had slightly lower growth), as found by Grier and Tullock, although the t-value is only 1.0. However, when the equation is re-estimated by instrumental variables, using as an instrument a dichotomous version of the Bollen index for 1960, with the

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[14] There is, nonetheless, a possibility that civil liberties and political rights have different effects on economic growth, with the former being more associated with the movements and 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 by Dornbusch and Edwards (1991). To check against this possibility, the difference between the 1976 civil liberties and political rights indexes was included in the 98-country growth equation of Table 3. The coefficient was weakly negative (t=1.2), suggesting that the Grier and Tullock results are not due to the use of the civil liberties index rather than the combined index used more generally in this paper.

cutoff chosen to give the same number of countries with low values of civil liberties, the coefficient turns positive and remains insignificant. The essential reason for this seems to be that 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 in 1978, being replaced by other countries that had ranked relatively high in 1960. Among those which had back-slid after 1960 were two countries (Chile and Ghana) in Huntington's (1991, p. 14) group of second-wave democracies that had been subject to reversals in the 15 years after 1960, and others that had never been classified as democracies in 1960, but which became even less democratic after 1960. The simple correlation between the Bollen 1960 and the Gastil 1976 dichotomous indexes is only .33, showing partly the differences there can be between different assessments, but revealing even more the great volatility in political and civil liberties in many countries in the 1960s and 1970s. Thus the dichotomous index, when purged of the effects of post-1960 changes, seems to support results shown in table 3, that higher initial levels of the democracy measures seem to have, if anything, a weak negative effect on subsequent growth. It would be more appropriate to say that the aggregate evidence does not support any significant linkage between the level of democracy and subsequent economic growth.[15] To go further will probably require making distinctions among various types and features of democratic regimes.

It is probably reasonable to regard these results on the effects of democracy on economic growth as being consistent with the broad pattern of the earlier results surveyed by Sirowy and Inkeles, that the effects identified are generally negative, although being neither uniform nor very strong. However, the results reported thus far all assess the partial effect of

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[15] A similar conclusion is reported by Cooper (1991, pp. 74-5) based on cases studies of 18 major developing countries.

democracy on subsequent economic growth taking as given the rates of schooling and investment. What of the possibility that democracy, once acquired, helps to establish conditions that make possible higher levels of schooling and investment, and thereby increasing 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. This is done 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 also 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.

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 .247, roughly equal to a 1% reduction in the average annual growth rate from 1960 to 1985. However, the estimated indirect positive effects are slightly larger, being .264 for investment and .067 for schooling[16]. Combining the direct and indirect effects would suggest a weak positive effect of .084. 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.

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[16] 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.

4. 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. This positive effect does not appear to be the result of reverse causation, as attempts to estimate the reverse effect from democracy to subsequent growth show that this feedback is more likely to be negative than positive. Hence attempts to allow for simultaneous determination of democracy and growth show effects of income on democracy that are positive and larger than those estimated by more simple methods.

These results tie in with, and may provide some confirmation of the reasons for, the evidence that countries starting with lower levels of per capita income and productivity have rates of growth that are initially higher but then tend to slow down as the income levels converge. One possible component of this slowdown is that countries adopt democratic forms of government at some stage during their convergence, a form of government characterized by almost all of the richer countries. It is still unclear whether the adoption of a democratic government contributes to convergence by reducing the subsequent growth of the democratizing countries.

But the results thus far raise more questions than they answer. It is relatively easy to understand 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. But what are the channels whereby democratic forms of government might help or affect subsequent growth? It is almost surely the case that some aspects of

democratic systems are more helpful to subsequent growth than are others[17]. One whole strand of literature that has not been dealt with here considers whether inequality of income distribution helps or hinders economic growth. Another group of papers has considered the links between democracy and the inequality of income distribution. These two branches of research, when juxtaposed, may help to show some positive and negative effects from democracy to growth. For example, Alesina and Rodrick (1991) argue that democracies with initially unequal distributions of income will have lower growth than democracies with more even distribution; this is because 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[18]. Among non-democracies, whether low or high growth will depend, they argue, on whether the leadership is 'technocratic' or 'populist',

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[17] Studies have found a negative linkage between economic growth and the instability of government (Alesina et al 1991) and the frequency of assassinations and coups (Barro 1991), although Londregan and Poole (1990) 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 (1991) 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.

[18] 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 polices that lead to higher tax rates and otherwise discourage savings, labour supply, and capital accumulation, e.g. Bauer (1981), Huntington and Nelson (1976) and Weede (1983)

with the latter[19] imposing policies that lower income and growth. Persson and Tabellini (1991) propose and test a similar model in which income equality favours growth in a democracy, because it will be more likely that there will be a voting majority in favour of laws protecting contractual and others rights encouraging savings and capital formation. They find this effect significant among the democratic countries, but not among non-democratic countries. Like Alesina and Rodrik, Persson and Tabellini argue that the effect of income inequality in a non-democracy could go either way, depending on the nature of the regime. These models thus give ambiguous results about the general effects of democracy on growth, although they would predict that a move towards democracy would be less likely to slow down growth in a country with a more equal distribution of income.

There is another potentially important link between democracy and growth flowing through the choice of macroeconomic policies. Fischer (1991), Glyfason (1990) and others have emphasized the likely negative effects on growth of high inflation rates and unstable exchange rates; what is less studied is the link between democracy and the nature of macroeconomic policy choices.

It is also clear, from the evidence of several waves and reverse waves of democratization, analyzed most recently by Huntington (1991) that there is a great variety of reasons why countries have adopted democratic systems, and in many cases lost them and sometimes tried again. Analysis of the dynamics of these waves and reversals might well help to illuminate the subsequent effects of democracy as well as to augment the over-simplistic link from income to democracy. The numbers of countries involved, and the range of experiences they illustrate, offer at least some hope for enriching

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[19] The destabilizing effects of populist regimes are most widely studied in Latin America, as reported, e.g. in Dornbusch and Edwards eds. (1991).

understanding of the links between political systems and economic performance.

Finally, there appear to be important but relatively unstudied indirect linkages between democracy and economic growth flowing through education. More comprehensive data on these linkages may help to define more clearly the conditions under which democracy helps or hinders subsequent economic growth.

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Table 1
Explaining Democracy by Income, 1976-1985

Equation	(1)	(2)	(3)	(4)	(5)	(6)
No. of Observations	1250	1250	980	980	10x125	10x98
Estimation Method	OLS Stacked	OLS Stacked	OLS Stacked	OLS Stacked	Iterative Zellner	Iterative Zellner
Constant	-1.132 (20.95)	-.508 (7.24)	-1.10 (16.79)	-.344 (4.05)	-.323 (2.30)	-.808 (5.30)
Coefficients:						
lnGDP	.205 (30.05)	.122 (13.77)	.194 (16.80)	.097 (7.93)	.098 (5.55)	.145 (6.29)
OECD		.334 (15.55)		.314 (13.07)	.366 (6.94)	
MEOIL		-.370 (11.72)			-.356 (4.47)	
Africa		-.100 (5.83)		-.114 (5.39)	-.134 (3.11)	
Latin America		.079 (4.29)		.055 (2.54)	.123 (2.53)	
Secondary School			1.85 (5.27)	.884 (2.52)		3.08 (3.82)
$\bar{R}^2$	.419	.634	.579	.660	.57-.68	.52-.61
D.W.	.21	.29	.26	.29	1.66-2.18	1.6-2.0
S.E.E.	.256	.203	.221	.196	.19-.21	.21-.23

Notes: Absolute values of t statistics are in parentheses. 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 differences among the 10 cross-sectional equations.

Table 2
Supplementary Tests for 1960 and 1985

Equation	(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	Gsl 85
Constant	-.524 (6.23)	-.508 (7.24)	-1.545 (9.38)	-1.750 (9.62)	-1.66 (9.67)	1.73 (9.43)
Coefficients:						
lnGDPa60	.157 (6.22)	.099 (2.50)		.289 (11.98)		.284 (11.44)
Schooling		2.00 (1.94)				
lnGDPa85-lnGDPa60				.148 (3.04)		.210 (3.04)
lnGDPa85			.256 (12.61)		.271 (12.76)	
t-value of coefficient differences				2.41		0.92
Probability of equality				.017		.360
$\bar{R}^2$	.298	.319	.620	.638	.617	.632
S.E.E.	.220	.216	.216	.211	.216	.212

Notes: Absolute values of t statistics are in parentheses. 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 the independent variables from the growth model as instruments. The income variable used is the logarithm of real GDP per adult.

Table 3
Effects of Democracy on Economic Growth

Equation	(1)	(2)	(3)	(4)	(5)	(6)
No. of Observations	90	90	90	90	76	76
Estimation method	OLS	OLS	OLS	IV	OLS	IV
Constant	1.981	1.579	1.675	0.417	1.219	1.049
	(2.32)	(2.98)	(2.86)	(0.41)	(0.62)	(0.73)
Coefficients:						
scale	.073	.071	.071	.102	.075	.070
	(2.95)	(2.87)	(2.76)	(2.88)	(2.75)	(2.33)
1960GDPa	-.343	-.319	-.354	-.200	-.308	-.269
	(5.71)	(5.23)	(5.31)	(1.63)	(4.18)	(2.37)
invest-(n+g+d)	.466	.503	.462	.519	.421	.479
	(5.71)	(5.99)	(5.58)	(5.09)	(4.42)	(3.02)
school-(n+g+d)	.203	.207	.198	.265	.145	.127
	(3.37)	(3.46)	(3.20)	(3.20)	(2.03)	(1.51)
Bollen 1960		-.247				
		(1.61)				
Gastil average			.069	-.857		
			(0.40)	(1.41)		
Pourgerami 1984-6					.131	-.093
					(1.06)	(0.19)
$\bar{R}^2$	.530	.535	.525	.365	.438	.412
S.E.E.	.303	.301	.304	.352	.308	.315

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. lnGDPa85-lnGDPa60. Equations 4 and 6 are estimated by instrumental variables using all of the growth model's independent variables (unconstrained) and the Bollen 1960 index as instruments.

Table 4
Effects of Democracy on Investment and Education

Equation	(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)
Coefficients:				
1960GDPa		.258 (4.69)		.695 (8.30)
Bollen 1960	1.023 (5.72)	.524 (2.71)	1.672 (5.14)	.326 (1.11)
$\bar{R}^2$	.263	.405	.222	.561
S.E.E.	.443	.398	.805	.605