

ENDOGENOUS DEMOCRATIZATION

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INTRODUCTION

ARE rich dictatorships more likely than poor dictatorships to collapse and be replaced by democracies? Consider, for example, Chile, which in 1985 had a per capita gross domestic product (GDP) of \$3,400 and was under dictatorship, and Benin, which in the same year had a per capita income of about one-third of Chile's, \$1,108, and was also under dictatorship. Setting aside other differences between these countries, did their relative levels of development make a transition to democracy more likely in Chile than in Benin?

Anyone who has followed recent scholarship would be likely to answer no. This is the answer that would follow from Adam Przeworski and Fernando Limongi's "Modernization: Theories and Facts," a study that hit the field of political development like a bolt of lightning and immediately changed the landscape.¹ In it they reconsider the classic proposition that economic development favors democracy, identifying an ambiguity in this proposition. Why do we observe a higher proportion of democracies among rich countries than among poor countries? Is it because development increases the likelihood that poor countries will undergo a transition to democracy? They call this an "endogenous" theory. Or is it because development makes democracies, once established, less likely to fall to dictatorships? They call this an "exogenous" theory. The conceptual distinction is brilliant, and Przeworski and Limongi offer evidence that the exogenous theory holds and the endogenous one fails.

Their conclusion has been deeply influential among social scientists and policy analysts. In a review of Przeworski and Limongi's later book (coauthored with Michael Alvarez and José Antonio Cheibub), which restates the rejection of endogenous democratization, David Brown writes: "In a convincing fashion, the authors argue that modernization

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¹ Przeworski and Limongi, "Modernization: Theories and Facts," *World Politics* 49 (January 1997).

theory (at least its endogenous variant) has no empirical basis. Put simply, the probability that any given country will become democratic does not change as its level of income rises.”² Arguing that the U.S. should continue its embargo against Cuba, Juan López dismisses the counterargument that trade will promote economic development, which in turn will help Cuba democratize. Citing Przeworski and Limongi, López writes: “Countries under dictatorial regimes are not more likely to experience a transition to democracy as they reach higher levels of economic development.”³

We challenge Przeworski and Limongi’s refutation of endogenous democratization on both theoretical and empirical grounds. First we show that to sustain the conceptual distinction between endogenous and exogenous democratization, one would need a theory in which development induces actors in democracies to sustain that system but does not induce actors in a dictatorship to change to democracy. Przeworski and Limongi fail to provide a persuasive theory linking development to democracy only under the condition of a preexisting democracy.

Having challenged Przeworski and Limongi on theoretical grounds, we then reconsider their empirical case against endogenous democratization. In their 1997 article they estimate the probability at discrete income levels that a dictatorship will collapse and become a democracy. Finding that these probabilities fail to increase monotonically as income rises, they conclude that they have refuted endogenous democratization. In the later study with Alvarez and Cheibub, they use econometric tools on observations pooled across their full data set to estimate the effect of income on the probability of transitions to and from democracy.⁴ Their analysis reveals a small but significant endogenous effect: at higher levels of income, a transition to democracy becomes more likely. Seemingly reluctant to embrace this result, however, they focus instead on the probabilities disaggregated by income levels.

We successfully replicate these results and then examine their robustness in three ways. First, we show that in the sample Przeworski and his colleagues analyze, development in poor and middle-income countries increases the probability of democracy for both endogenous and exogenous reasons: development increases both the probability of the transition to democracy and the probability that an existing de-

² Brown, “Review of Przeworski et al.’s *Democracy and Development*,” *Comparative Political Studies* 34 (June 2001), 576.

³ López, “Sanctions on Cuba Are Good, but Not Enough,” *Orbis* 44 (Summer 2000), 349.

⁴ Adam Przeworski, Michael E. Alvarez, José Antonio Cheibub, and Fernando Limongi, *Democracy and Development: Political Institutions and Well-Being in the World, 1950–1990* (New York: Cambridge University Press, 2000).

mocracy will sustain itself. The endogenous effect of development is attenuated at high levels of income. This attenuation does not argue against the endogenous model but merely reflects the small sample size and the accumulated effects of development at lower levels. Second, we correct a problem of sample selection by extending the statistical analysis to a larger sample of observations that starts in the mid-nineteenth century. This reanalysis reveals a large endogenous effect, associated with the earlier wave of democratization in Western Europe. By restricting their analysis to post-1950 cases, Przeworski, Limongi, and their associates underestimate the endogenous effect of development on transitions to democracy. Third, we estimate a model with additional theoretically appropriate controls. These controls reveal that economic development has a strong endogenous effect on democratization.

THE THEORY

Although Przeworski and Limongi's article is unabashedly empirical and conceptual, it includes a brief theoretical discussion about the relationship between democracy and development.⁵ We quote their "intuitive story" in full:

Suppose that the political forces competing over the distribution of income choose between complying with the verdicts of democratic competition, in which case each can expect to get some share of total income, or risking a fight over dictatorship, which is costly but which gives the victor all of the income. Now suppose that the marginal utility of consumption is lower at higher levels of consumption. Thus the gain from winning the struggle for dictatorship is smaller. In turn, if the production function has diminishing marginal returns in capital stock, the "catch-up" from destroying a part of it during the war for dictatorship is faster at lower levels of wealth. Hence, in poor countries the value of becoming a dictator is greater and the accumulated cost of destroying capital stock is lower. In wealthy countries, by contrast, the gain from getting all rather than a part of total income is smaller and the recuperation from destruction is slower. Hence, struggle for dictatorship is more attractive in poor countries.⁶

If we are to sustain theoretically the empirical finding that development makes already-existing democracies more stable but does not make dictatorships more likely to democratize, then the initial regime condition of our theoretical model matters a lot. At the beginning of Przeworski and Limongi's story, the regime in place appears to be a

⁵ Przeworski and Limongi (fn. 1); the version appearing in Przeworski et al. (fn. 4) drops the theoretical discussion altogether (chap. 2).

⁶ Przeworski and Limongi (fn. 1), 166. See also Adam Przeworski, "Why Democracies Survive in Affluent Countries" (Manuscript, Department of Politics, New York University, New York, 1996).

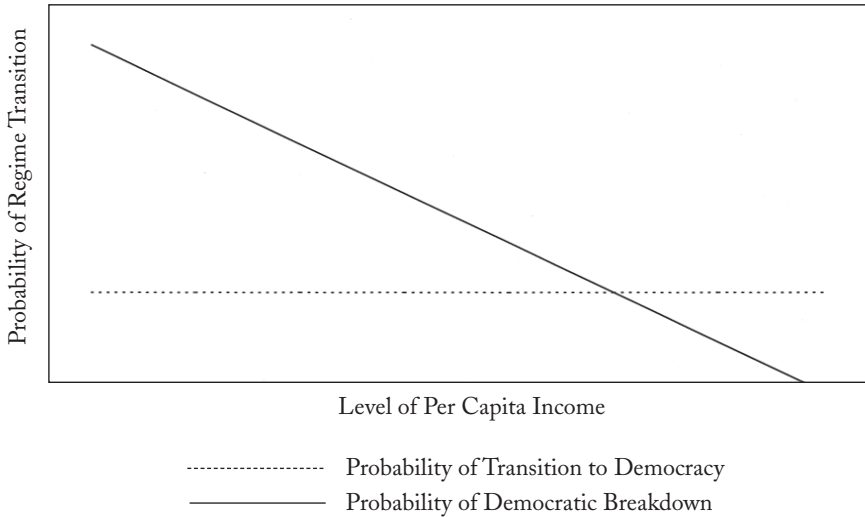


FIGURE 1
THE EXOGENOUS THEORY OF REGIME CHANGE

poorly institutionalized democracy, one in danger of reverting to dictatorship. But they need two stories. The first would assume a democracy and would have to show that the actors become increasingly likely to stick with democracy as the economy grows. The second would assume a dictatorship and would have to show that actors are not more likely to choose democracy as the economy grows.

Graphically, this theory would have to support the functional forms displayed in Figure 1, which depicts per capita income on the horizontal axis and the probability of regime transition on the vertical axis. Whereas the probability of a democratic breakdown (P_{DA}) is negatively correlated with per capita income, the probability of a transition to democracy (P_{AD}) is independent of the level of development.

We formalize both stories in the appendix. In one the status quo is dictatorship; in the other the status quo is democracy. In the former case, the dictator decides whether to hold elections or continue under dictatorship. If the dictator chooses not to democratize, then the opposing faction must decide whether to acquiesce to the dictator's rule or fight to take over the dictatorship. When the status quo is democracy, the ruling party decides whether to hold a new round of elections or fight for dictatorial powers. Either choice sets off a struggle, either to win elections or to win the fight for dictatorial powers. Following Przeworski and Limongi's intuitions, we assume that the fight for dictator-

ship is costly to both sides and that the utility they derive from income declines as income grows.⁷

We find that when the status quo is democracy, income growth does increase the stability of democracy (or at least it does so under certain assumptions about the likely outcomes of each type of struggle—whether by elections or by war—and about how the pie is divided between the winners and losers of elections). But when the status quo is dictatorship, the results are the same. Economic growth increases the incentives for the ruling faction to democratize (under the same conditions that apply to the first game). Hence, Przeworski and Limongi's intuitive story fails to produce the theoretical underpinnings for the idea that development favors democracy exogenously but not endogenously.

Having suggested that Przeworski and Limongi's intuitive story actually predicts that development will cause democracy under initial conditions of both democracy and dictatorship, we show in the next section that the facts accord with this theoretical prediction. Development is both an endogenous and an exogenous cause of democracy.

THE FACTS

To review Przeworski and Limongi's conclusions: "[There] are no grounds to believe that economic development breeds democracies." The higher frequency of democracy among high-income countries is fully explained by the fact that "once established, democracies are likely to die in poor countries and certain to survive in wealthy ones."⁸ Przeworski et al.'s version of this conclusion is equally emphatic: "[T]he reason [why wealth and democracy go together] is not that democracies are more likely to emerge when countries develop under authoritarianism, but that, however they do emerge, they are more likely to survive in countries that are already developed."⁹

⁷ According to Przeworski and Limongi, the second mechanism that reduces the likelihood of a democratic breakdown in rich countries concerns the way in which capital stock recovers from a war, since capital stock goes back to its steady state at a faster rate in a poor country than in a rich country. Although this reasoning fits squarely with the predictions of the classical Solowian growth model, which is based on a standard production function with diminishing returns, their conclusion that a faster catch-up rate should increase the value of being a dictator in a poor country is unwarranted. What should matter is not the rate at which the economy returns to its steady state but rather total national output, which determines the return (income flow) that the expropriator will obtain. Accordingly, the value of being a dictator is much higher in a wealthy country (ignoring any possible effect of a declining marginal utility of income).

⁸ Przeworski and Limongi (fn. 1), 167.

⁹ Przeworski et al. (fn. 4), 106. Summarizing the results of a multivariate dynamic probit analysis of transitions, Przeworski and his associates acknowledge "the impact of per capita income . . . is apparent for both regimes, but it is orders of magnitude larger for democracies" (p. 123). But, as the quote cited above suggests, they seem reluctant to embrace the finding that income growth causes democratization.

We argue in this section that their findings fail on three tests of robustness. First, they observe few transitions to democracy at high levels of income and infer that income does not cause such transitions, whereas this observation is in fact consistent with endogenous democratization. Second, their sample is subject to selection problems. And third, their analysis suffers from omitted variable bias.

ROBUSTNESS PROBLEM 1: DWINDLING NUMBERS

Przeworski and his collaborators initially test for exogenous and endogenous effects by examining the probabilities of transitions from democracy to authoritarianism and from authoritarianism to democracy at discrete levels of per capita GDP.¹⁰ Figure 2 is a graphic representation of data taken from *Democracy and Development*.¹¹ The table and figure indicate that the probability of a democratic breakdown falls with development, from 0.12 when per capita income is below \$1,000, to 0 when income exceeds \$7,000.¹² The probability of a democratic transition increases with per capita income, from less than 0.01 in countries with income below \$1,000, to 0.06 in countries with incomes between \$6,000 and \$7,000. The probability of a dictatorial breakdown and a democratic transition declines with per capita income in two cases: when countries move from the \$2,000–\$3,000 range to the \$3,000–\$4,000 (from 0.026 to 0.015) and, more abruptly, at income levels above \$7,000 (from a peak of 0.06 to 0.029).

Purely statistical reasons should lead us to treat the probabilities of transitions at high levels of development with caution. To see why, consider the following. Assume that modernization theory is right in both its exogenous and its endogenous forms. Development happens, countries get richer, and, as a result, dictatorships undergo transitions to democracy. And as countries get richer, democracy is more likely to stick. In this happy scenario the world gets increasingly rich and increasingly democratic. By the time the world becomes quite rich, the number of remaining dictatorships would be small. Because it is small, the possible number of transitions from dictatorship to democracy is also small. Therefore we would be ill advised to draw inferences about the proba-

¹⁰ In this article we follow Przeworski and his coauthors' terminology in equating "development" with growth of per capita income. Yet our discussion below implies that other aspects of development, especially growing income equality, are probably more relevant dimensions of development for political change than are growing incomes. We also follow these authors in using the terms "dictatorship" and "authoritarianism" as synonyms and in treating both as equivalent to nondemocracy. Nondemocracy becomes the more accurate term as we shift our analysis back in time, when regimes at risk of democratization included monarchies and parliamentary regimes with limited franchises, neither of which would fit today's concept of dictatorship.

¹¹ Przeworski et al. (fn. 4), 93, table 2.3.

¹² All figures are international prices of 1985.

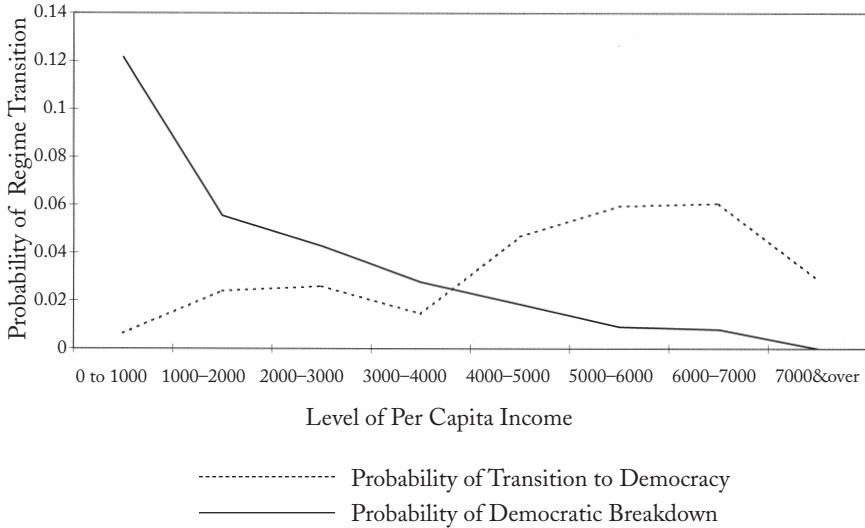


FIGURE 2
 PROBABILITY OF REGIME TRANSITIONS BY INCOME INTERVALS, 1950-90

bility that a dictatorship would fall: small variations in the number of transition events would cause large changes in our probability estimates. At the limit, consider that the year is 2050, there is one dictatorship left in the world, it rules a country whose per capita income is \$10,000, and all other dictatorships have fallen before achieving such a high income. If our one remaining dictatorship collapses at this level, we would infer that the probability of a dictatorship falling at \$10,000 is 1. If it doesn't, we would infer that the probability of a dictatorship falling at \$10,000 is 0. A changed outcome in just one case would lead us to one or the other extreme of the distribution of probabilities.

Along these same lines, Przeworski and his associates claim that few dictatorships become wealthy and then undergo a transition to democracy. They write: "The hypothesis implied by [modernization] theory is that *if* a country develops over a longer period under dictatorship, so that all the modernizing consequences have time to accumulate, then it will embrace democracy. But for most dictatorships this premise is vacuous: only 19 dictatorships—to remind, out of 123—did develop over longer periods of time and reached 'modernity.'"¹³ More specifically, only nineteen dictatorships achieved a per capita income of \$4,115, the level at which, by their calculations, the probability of being a democ-

¹³ Przeworski et al. (fn. 4), 160.

racy is 0.5.¹⁴ Of the nineteen, some never fell, others fell not at the moment they surpassed the 0.5 threshold but later, and a few fell on time.

Yet Przeworski and Limongi may be drawing the wrong inference from the fact that few developing dictatorships became wealthy and then turned into democracies. Assume, again, that both endogenous and exogenous mechanisms are at work. Then there may be few dictatorships left at a high level of income precisely *because* development at lower levels of income already helped turn them into democracies and then helped keep them democratic. The premise of endogenous modernization is only “vacuous” if one accepts the proposition that countries can be considered to undergo development only when they achieve a high level of income. Przeworski and Limongi count as countries “that developed under authoritarianism and became ‘modern’” only ones that achieved a per capita income of \$4,115. But it is not obvious to us why countries that move from a per capita income of \$1,000 to \$2,000, or from \$2,000 to \$3,000, and so on are failing to undergo development. If they are developing, and if dictatorships collapse and are replaced by democracies as they achieve development at these lower levels, then their absence from the pool of dictatorships at higher levels of income does not refute endogenous modernization but instead supports it. Indeed, from this perspective the anomaly is not that the number of dictatorships that became rich and then democratized is small, but that some dictatorships survived at all, despite earlier development.

This dynamic is visible in the sample under analysis. Table 1 reproduces the number of annual observations by income bracket and type of regime.¹⁵ Notice that the number of country-years above \$7,000 is about 16 percent of the total sample and that within this subset only 5 percent were not democratic. Simply put, at a per capita income of \$7,000, the effects of development on political regime have already taken place: countries that were going to develop and democratize had already done so before reaching the range of the very rich.

To test whether this may be the case we proceed as follows. We reexamine the analysis undertaken in *Democracy and Development* to ascertain the relationship between development and regime type. We then subject these results to several tests of robustness. To assess the impact of development on democracy, Przeworski and his coauthors simultaneously examine the effect of per capita income on the yearly probability of democratic transitions and democratic breakdowns through a dynamic

¹⁴ In Przeworski et al. (fn. 4) the number of dictatorships rises to twenty.

¹⁵ Data are from Przeworski et al. (fn. 4), 93, table 2.3.

TABLE 1
ANNUAL OBSERVATIONS BY INCOME LEVEL AND TYPE OF REGIME (1950–90)

	<i>Total</i>	<i>Authoritarian Regimes</i>	<i>Democratic Regimes</i>	<i>Percent Democracies</i>
0–\$2,000	2,016	1,690	326	16.2
\$2,001–\$4,000	842	511	331	39.3
\$4,001–\$6,000	431	212	219	50.8
\$6,001–\$7,000	158	33	125	79.1
\$7,001–	679	35	644	94.8

SOURCE: Data taken from Przeworski et al. (fn. 4), table 2.3.

probit analysis. We have reestimated their central model, which includes per capita income as well as a full set of control variables: the growth rate; the rate of turnover of chief executives (calculated as the number of changes of chief executive during the life of a political regime divided by the number of years of that political regime); the index of religious fragmentation (calculated as a Hirsch-Herfindhal index of fractionalization of religious groups); the percentage of Catholics, Protestants, and Muslims; whether the country was a former colony or not; the number of democratic breakdowns suffered by the country in previous years; and the proportion of democracies in the world each year.¹⁶

We reproduce our reestimation in Table 2. Our results are practically identical to theirs. (The small differences we find may be due to the fact that we do not impose any restrictions on the sample by excluding oil exporters.) The analysis reports two coefficients: the beta coefficient, which indicates the probability of a transition from democracy to authoritarianism, and the alpha coefficient, which, summed with the beta coefficient, indicates the probability that an authoritarian regime will remain in place. Notice that both coefficients for per capita income are statistically significant. The beta coefficient is negative: the probability of a democratic breakdown declines with per capita income. The sum of the alpha and beta coefficients is also negative and significant: although it is small, its negative sign indicates that the stability of authoritarianism also declines with per capita income. In short, development increases the probability of a transition to democracy.¹⁷

¹⁶ Their estimation appears in Przeworski et al. (fn. 4), 124, table 2.17.

¹⁷ In table 2.17 in Przeworski et al. (fn. 4), the authors report the coefficients in two columns: beta (the coefficient of transition to dictatorship) in the first one; and beta plus alpha (the latter being the coefficient of remaining authoritarian conditional on being authoritarian in the previous period). We have opted, instead, to report beta and alpha in separate columns.

TABLE 2
ESTIMATION OF REGIME TRANSITIONS (1950–90)

<i>Dependent Variable: (1) Probability of Transition to Dictatorship: Beta Coefficient</i>		
<i>(2) Probability of Stable Dictatorship: Sum of Alpha and Beta Coefficients</i>		
<i>ALL COUNTRIES</i>		
<i>Independent Variables</i>	<i>Beta</i>	<i>Alpha</i>
Constant	0.065** (0.898)	3.305** (1.045)
Per capita income ^a (in thousand \$)	-0.546*** (0.122)	0.514*** (0.130)
Growth rate	-0.022 (0.017)	0.040** (0.020)
Rate of turnover of chief executives ^b	0.976*** (0.280)	-1.504*** (0.341)
Religious fragmentation ^c	2.561*** (0.990)	-2.665*** (1.091)
Percentage of Catholics	-0.011 (0.005)	0.010 (0.006)
Percentage of Protestants	-0.024 (0.016)	0.027 (0.016)
Percentage of Muslims	0.000 (0.005)	0.000 (0.006)
Former colony	-0.012 (0.450)	0.446 (0.496)
Number of previous democratic breakdowns	0.896*** (0.121)	-1.258*** (0.139)
British colony	-0.842** (0.424)	0.677 (0.471)
Proportion democracies in the world	-3.600* (1.861)	0.683 (2.207)
Log-likelihood	-291.89	
Prob > Chi ²	0.0000	
Pseudo R ²	0.8913	
Number of observations	3991	

*** p < 0.01; ** p < 0.05; * p < 0.10; standard errors in parentheses

^a Real per capita income (in constant dollars, Chain Index, expressed in international prices, base 1985), taken from Summers and Heston (fn. 21).

^b Number of changes of chief executives during the life of a political regime divided by the number of years of that political regime.

^c Level of religious fractionalization, measured as a Hirsch-Herfindhal index of fractionalization. Estimation: Dynamic probit model.

Figure 3 simulates the results in Table 2. Holding all other variables constant at their means, it plots the probability of regime transition as per capita income changes. The probability of a democratic breakdown declines steeply with income. The probability of a democratic transition rises moderately from 0.01 to about 0.06 percent per year.

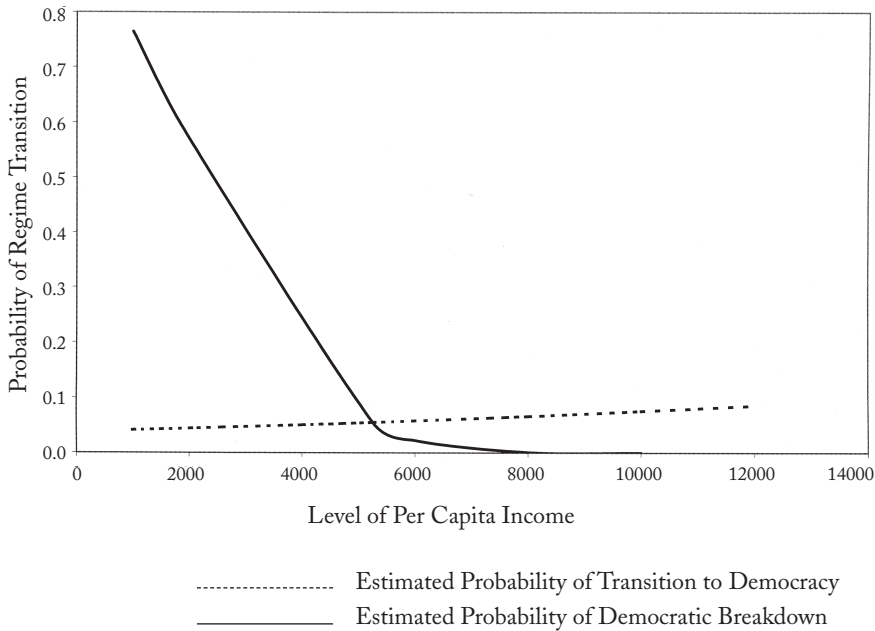


FIGURE 3
SIMULATED PROBABILITIES OF REGIME TRANSITION BY INCOME, 1950–90

ROBUSTNESS PROBLEM 2: SAMPLE SELECTION

To understand the relationship between democracy and development, we need to look more closely at the sample under investigation. Table 3 classifies countries depending on whether they entered the sample as authoritarian systems (upper panel) or as democratic regimes (lower panel). Within each category, it further divides countries by their level of per capita income according to when they first entered the sample and according to the last year we observed them. Finally, the table indicates which countries had the same regime at the beginning and the end of the period and which of them changed.

Two points relevant for the study of political transitions are worth underlining. First, at the outset, in 1950, the distribution of regimes was not random but highly correlated with per capita income. Among countries entering the sample at less than \$2,000 per capita, seventy-two out of ninety were dictatorships. By contrast, among those with over \$4,000 per capita income, seventeen out of twenty countries were democratic. In light of this distribution, a complete theory of democratization cannot be drawn without exploring the dynamics that led to

TABLE 3
INCOME AND POLITICAL MOBILITY ACROSS TIME AND COUNTRIES IN THE
POSTWAR PERIOD

<i>Per Capita Income at Entry Point</i>		<i>Per Capita Income at Exit Point</i>				<i>Total</i>
		<i>0–2,000</i>	<i>2,001–4,000</i>	<i>4,001–6,000</i>	<i>6,000–</i>	
0–2000	Authoritarian	43	14	1	2	72
	Democratic	5	4	1	2	
2,001–4,000	Authoritarian	0	3	3	1	10
	Democratic	0	1	1	1	
4,001–	Authoritarian	0	0	0	1	3
	Democratic	0	0	0	2	
Total		48	22	6	9	

<i>Per Capita Income at Entry Point</i>		<i>Per Capita Income at Exit Point</i>				<i>Total</i>
		<i>0–2,000</i>	<i>2,001–4,000</i>	<i>4,001–6,000</i>	<i>6,000–</i>	
0–2000	Democratic	5	6	1	3	21
	Authoritarian	4	2	0	0	
2,001–4,000	Democratic	0	2	2	8	12
	Authoritarian	0	0	0	0	
4,001–	Democratic	0	0	2	15	17
	Authoritarian	0	0	0	0	
Total		9	10	5	26	

this skewed distribution and without accounting for the democratization dynamics of the high-income countries. That is, we need to push our sample back in time to the point where no democracies existed and then observe what generated the process of democratization.

Second, growth patterns are not randomly distributed either. Out of 135 countries, 57 started and ended with less than \$2,000 and 89, with less than \$4,000. We know that before 1800 per capita income was uniformly low across all countries.¹⁸ It was only after the early nineteenth century and the industrial takeoff of several nations that there was selective economic development and overall divergence across the globe.

¹⁸ Paul Bairoch, *Economics and World History: Myths and Paradoxes* (Chicago: University of Chicago Press, 1993), chap. 9; Angus Maddison, *Monitoring the World Economy, 1820–1992* (Paris: Organization for Economic Co-operation and Development, 1995).

To refute the endogenous theory of democratization we must therefore show that democratization did not follow development among those nations that took off in the nineteenth century. Here, too, we must gather observations from a point in time when differential development was just beginning.

To do so we combine Przeworski et al.'s data set for the period 1950–90 with Boix and Rosato's data set on political regimes from 1800 to 1949.¹⁹ The new data set codes countries as democracies if they meet three conditions: elections are free and competitive; the executive is accountable to citizens (either through elections in presidential systems or to the legislative power in parliamentary regimes); and at least 50 percent of the male electorate is enfranchised.²⁰ To measure per capita income, we have merged the previous data from Summers and Heston with per capita income data reported by Maddison, adjusting the Maddison data to make it comparable with the Summers–Heston data set.²¹ The combination of all these data gives us a panel of over 6,500 country-year observations for the period 1850 to 1990.

To underline the fact that democracy was especially endogenous to development before World War II, we first report the results of dynamic probit estimations for two separate periods: 1950–90 and 1850–1949 (Table 4, models 1 and 2). We do not have the full set of controls employed in Table 2 for the period before 1950 and therefore only estimate the model with per capita income. In these estimations democracy is coded as 1 (Przeworski and associates code it as 0). The substantive results for the postwar period in model 1 are very similar to the estimates for per capita income obtained in Table 2: per capita income slightly increases the probability of democratization and substantially reduces the chances of a democratic breakdown. But in the period from the mid-nineteenth century until World War II, the reverse is true. In this period per capita income has a strong positive and statistically significant effect on transitions to democracy (beta coefficient in Table 4, model 2). By contrast, income growth does not reduce the probability of a democratic breakdown—the alpha coefficient is not statistically significant (although it is in a joint test with the beta coefficient, that is, with the unconditional effect).

¹⁹ Carles Boix and Sebastian Rosato, "A Complete Data Set of Political Regimes, 1800–1999" (Department of Political Science, University of Chicago, Chicago, 2001).

²⁰ Boix and Rosato (fn. 19) report both a full discussion of the coding and the data set.

²¹ Maddison (fn. 18); Robert Summers and Alan Heston, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1988," *Quarterly Journal of Economics* 106 (May 1991). Although the two data sets employ different definitions of per capita income, their observations are extremely well correlated. For the period 1950–90 the Summer–Heston data and the Maddison data on per capita income have a correlation coefficient of 0.987.

TABLE 4
ESTIMATION OF REGIME TRANSITIONS (1850–90)

<i>Dependent Variable: (1) Probability of Transition to Democracy: Beta Coefficient</i>						
<i>(2) Probability of Stable Democracy: Sum of Alpha and Beta</i>						
<i>Independent Variables</i>	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
	<i>1950–1990</i>		<i>1850–1949</i>		<i>1850–1990</i>	
	<i>Beta</i>	<i>Alpha</i>	<i>Beta</i>	<i>Alpha</i>	<i>Beta</i>	<i>Alpha</i>
Constant	-2.035*** (0.067)	3.173*** (0.147)	-2.709*** (0.277)	4.171*** (0.436)	-2.445*** (0.468)	3.461*** (0.612)
Per capita income (in thousand \$)	0.023 (0.017)	0.215*** (0.048)	0.294*** (0.125)	-0.056 (0.180)		
1850–1924					-1.948** (0.969)	2.762* (1.470)
1945–90					0.418 (0.473)	-0.294 (0.629)
Per capita income (in thousand \$) in 1850–1924					1.067*** (0.348)	-0.635 (0.588)
Per capita income (in thousand \$) in 1925–44					0.067 (0.245)	0.250 (0.281)
Per capita income (in thousand \$) in 1945–90					0.022 (0.017)	0.222*** (0.049)
Log-likelihood	-463.82		-116.09		-568.37	
Prob > Chi ²	0.0000		0.0000		0.0000	
Pseudo R ²	0.8413		0.9037		0.8645	
Number of observations	4404		1739		6143	

*** p < 0.01; ** p < 0.05; * p < 0.10; standard errors in parentheses
Estimation: dynamic probit model

To determine more precisely how development affects regime dynamics in different periods and to avoid any bias from truncated samples, we report in Model 3 an estimation for the whole sample where we distinguish between three periods: the first democratization wave, which ended in 1924, when the number of democracies peaked at twenty-eight (or two-fifths of all sovereign nations); the period from 1925 to World War II, when the number of democracies declined by more than half; and the period after 1945.²²

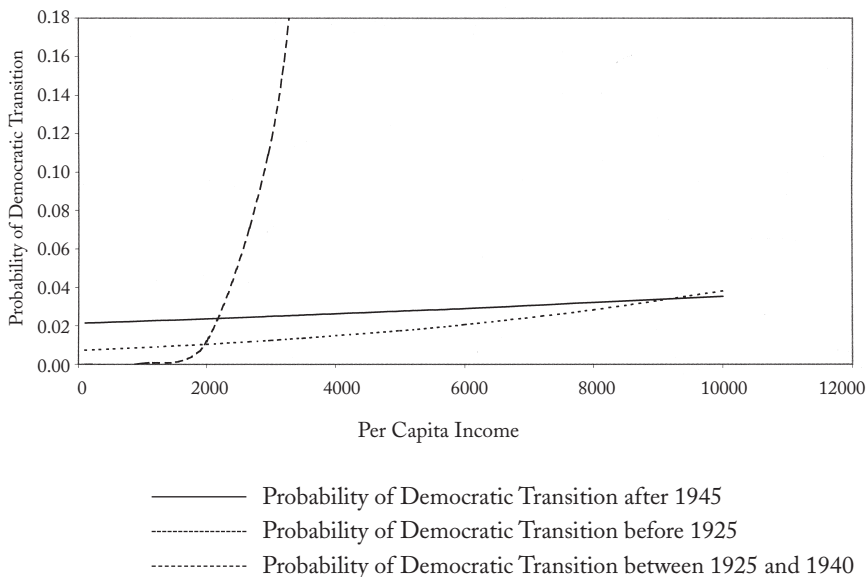
²² Running the same regression with different periods does not alter the main results of Table 4, model 3. The dummy for the interwar period has been dropped from model 3 to avoid collinearity.

Figure 4a–b simulates the results in Table 4, model 3. The probability of democratic transition for the three periods is represented in Figure 4a. The probability of a democratic breakdown is depicted in Figure 4b. Whereas in the postwar period development increases the likelihood of democratic transitions only modestly, before 1925 development contributed powerfully to democratization. In the earlier period the annual probability of a transition to democracy was negligible—less than 5 percent per year—for a country with a per capita income of \$1,000. But it increased very quickly to reach an annual probability of more than 20 percent at \$3,500. By contrast, although democratic breakdowns were dampened by a higher level of development, the effect of per capita income was much smaller than in the postwar period; see Figure 4b.

In short, democratization is a process endogenous to development. But this fact is less salient when we look only at a post-1950 sample. Countries that were economically developed by 1950 were already democratic by that time. And most countries that were not developed by 1950 either did not develop enough to make their way into democracy in the following decades or were prevented from democratizing by some exogenous variable (such as Soviet domination).

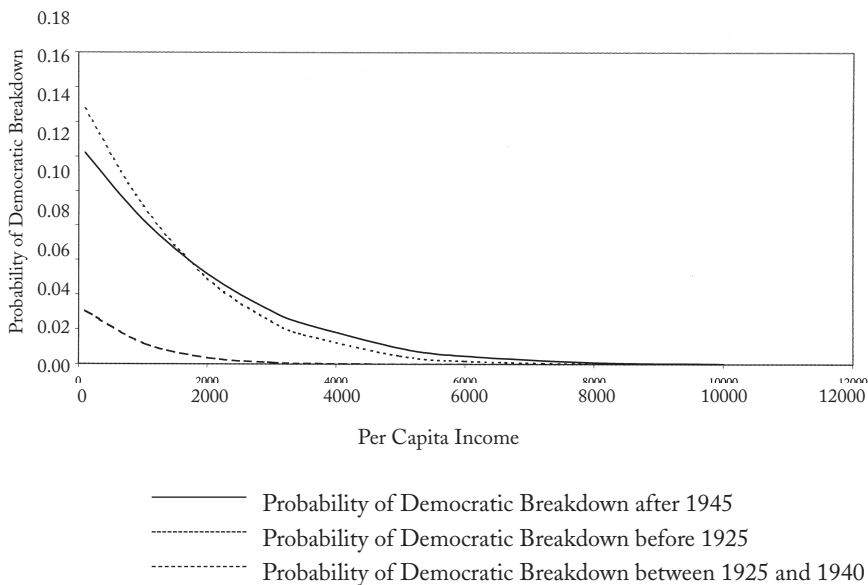
A second look at Figure 2 shows some evidence that the probability of regime change, and particularly the probability of democratic transitions, may vary with the level of per capita income. Drawing on the extended sample from 1850 to 1990, Table 5 reports a spline function in which we estimate how transition dynamics change at low, medium, and high levels of development—below \$3,000, between \$3,000 and \$6,000, and above \$6,000 respectively.²³ Two results are worth noting. First, although more development always increases the probability that a transition to democracy will occur, the rate at which development increases the probability of a democratic transition declines with income—in other words, the impact of development on democratization exhibits diminishing returns. A simulation of the results shows that for low and medium levels of development, the probability of a transition to democracy grows by about 2 percent for each \$1,000 increase in per capita income. For high levels of development, the probability of a democratic transition still goes up with income, but only by about 0.5

²³ The income variables are defined as the corresponding per capita income above a given threshold and zero below. To choose the thresholds for this estimation, we have first examined the variation in our coefficient for different per capita segments through separate functions.



(a)

ANNUAL PROBABILITY OF DEMOCRATIC TRANSITION BY HISTORICAL PERIODS



(b)

ANNUAL PROBABILITY OF DEMOCRATIC BREAKDOWN BY HISTORICAL PERIODS

FIGURE 4
PROBABILTY OF DEMOCRATIC TRANSITION AND BREAKDOWN

TABLE 5
THE IMPACT OF DEVELOPMENT ON REGIME TRANSITIONS BY
LEVEL OF DEVELOPMENT

*Dependent Variable: (1) Probability of Transition to Democracy: Beta Coefficient
(2) Probability of Stable Democracy: Sum of Alpha and Beta*

<i>Independent Variables</i>	<i>Model 1</i>	
	<i>Beta</i>	<i>Alpha</i>
Constant	-2.471*** (0.123)	3.493*** (0.226)
Per capita income (in thousand \$)	0.282*** (0.072)	0.123^^^ (0.128)
Per capita income above \$3,000 (in thousand \$)	-0.119** (0.055)	-0.020^^^ (0.091)
Per capita income above \$6,000 (in thousand \$)	-0.136*** (0.037)	0.093^^^ (0.07)
Log-likelihood	-578.82	
Prob > Chi ²	0.0000	
Pseudo R ²	0.8620	
Number of observations	6143	

*** p < 0.01; ** p < 0.05; * p < 0.10; standard errors in parentheses
 Estimation: dynamic probit model
 ^^ p < 0.01 in joint test of all alpha coefficients of per capita income

percent for each additional \$1,000. Second, the same effect of diminishing returns actually takes place for the impact with which development stabilizes democracies. Whereas the probability of democratic breakdowns declines rapidly as income goes up at low and middle levels of development, the marginal impact of additional wealth at high levels of development is very light.

ROBUSTNESS PROBLEM 3: OMITTED VARIABLES

In this section we probe the robustness of Przeworski and his associates' rejection of endogenous democratization by introducing theoretically plausible independent variables that they have omitted from their analysis.

Przeworski and Limongi write: “[If] modernization theory is to have any predictive power, there must be some level of income at which one can be relatively sure that the country will throw off the dictatorship. One is hard put to find this level.”²⁴ This is in contrast to the probability that democracies will collapse and become dictatorships, which falls

²⁴ Przeworski and Limongi (fn. 1), 163.

to 0 when a country's per capita income goes above about \$6,000. They show that some dictatorships survive beyond the point at which the odds of being a democracy are even, and that some dictatorships have lasted a long time in rich countries.

Yet from a purely statistical point of view, the predictive value of the model may be greater and the persistence of rich dictatorships less inconsistent with the endogenous model of democratization than Przeworski and his associates contend. The existence of measurement error and of omitted variables should lead anyone to expect a number of outliers in the fitted model. As Cleary points out in this same context, outliers are not the same as logical contradictions.²⁵ And in this case the number of outliers is not so large. Returning to Przeworski and Limongi's list, of the nineteen countries that developed above \$4,115 income per capita, two of them, Chile and Czechoslovakia, had dictatorships that fell the exact year (1989) when the probability of the country being a democracy, given its income, went to 0.5.²⁶ Of the seventeen countries remaining, five more underwent transitions within four years of breaking the 0.5 probability barrier.²⁷ Income data are missing for East Germany and Bulgaria, which leaves only ten true anomalies, fewer than 10 percent of the observations. Only if our expectations were deterministic and monocausal should we reject endogenous democratization in light of these exceptions.

Assume, again, that endogenous and exogenous democratization are both at work but that wealth is one of several factors that determine whether a dictatorship falls and whether a democracy lasts. If multiple causes jointly determine whether a dictatorship falls, then the survival of some rich dictatorships is less surprising.

Heeding Boix, perhaps another factor is the mobility of capital.²⁸ Even though on average capital becomes more mobile as countries develop, there may be some rich countries where it remains fixed, say, oil producers.²⁹ Let us imagine, hypothetically, that the following equation

²⁵ Matthew Cleary, "Testing Endogenous and Exogenous Modernization Theory" (Paper presented at the annual meeting of the American Political Science Association, Atlanta, September 2–5, 1999).

²⁶ As Przeworski and Limongi note, Chile broke through the \$4,115 threshold twice but underwent a transition only on the second breakthrough.

²⁷ The list, with the year they achieved \$4,115 first and the year of the transition second, is Brazil (1980, 1978), South Korea (1985, 1988), Greece (1970, 1974), Poland (1985, 1989), and Portugal (1973, 1975). Poland also achieved the threshold income in 1974, without democratizing.

²⁸ Carles Boix, *Democracy and Redistribution* (New York: Cambridge University Press, 2003).

²⁹ When we extend our analysis back to the mid-nineteenth century, other fixed assets suggest themselves. Yet what is critical is not just that an asset is fixed and that it plays a large role in a country's exports, but also that it accounts for a large portion of the country's GDP. Britain's coal industry in the nineteenth century, for example, would not fit these criteria.

captures the relationship between income, fixed assets, and the probability of a transition to democracy:

$$P(t|a) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon|a$$

$P(t|a)$ is the probability of a transition to democracy given that a country is a dictatorship, X_1 is the per capita income of the country, and X_2 is a measure of the immobility of its capital assets. In some set of countries, X_2 is so large that it will swamp the effect of per capita income, even when the country becomes very rich. All the countries where X_2 is small have already become democracies, and their increasing wealth has—happily—gotten them stuck under a democratic regime. Under these assumptions we would expect development to have the impact that we have shown it to have: most countries develop and then become democracies, but a few remain dictatorships despite considerable wealth.³⁰

International forces that Przeworski and his associates omit from their estimations may also help explain the persistence of some relatively wealthy dictatorships. During the cold war the United States and the Soviet Union exerted powerful pressures on the internal politics of countries within their respective spheres of domination. Whereas U.S. preferences for democracy or dictatorship in Latin American and the Caribbean shifted with political events and with U.S. administrations, the Soviet Union exerted uniform pressure against democratization in Eastern Europe and did so consistently through almost the entire period covered by the Przeworski data set. We would expect this influence, then, to constitute a countervailing pressure against democratization, even as these countries developed economically.

In Table 6 we estimate the same dynamic probit model we reproduced in Table 2 excluding all countries under Soviet control (model 2) and Soviet-dominated and oil-rich countries (model 3).³¹ The sum of alpha and beta coefficients gives us the effect of each independent variable on the estimated probability that a dictatorship will remain stable. Comparing this sum in the model that includes all countries with the sum in the model that excludes countries under Soviet influence, the latter sum remains a negative number but has a larger absolute value (−.063 versus −0.032). This means that, once we control for the exogenous factors of international politics and factor endowments, economic development makes democratization more likely.

³⁰ For evidence on the negative impact of oil on democratic transitions, see Boix (fn. 28), chap. 3.

³¹ We exclude all the Soviet-dominated countries (rather than employ a dummy variable for these cases) because the variable gauging its conditional effect on regime transition is perfectly collinear with the variable democracy and drops out of the estimation.

TABLE 6
ESTIMATION OF REGIME TRANSITIONS WITH AND WITHOUT
SOVIET-DOMINATED AND OIL-RICH COUNTRIES

<i>Dependent Variable: (1) Probability of Transition to Dictatorship: Beta Coefficient (2) Probability of Stable Dictatorship: Sum of Alpha and Beta Coefficients</i>						
<i>Independent Variables</i>	<i>All Countries</i>		<i>No Soviet Countries</i>		<i>Neither Soviet nor Oil Country</i>	
	<i>Beta</i>	<i>Alpha</i>	<i>Beta</i>	<i>Alpha</i>	<i>Beta</i>	<i>Alpha</i>
Constant	0.065** (0.898)	3.305** (1.045)	0.065 (0.898)	3.233*** (1.045)	-0.046 (0.917)	3.476*** (1.078)
Per capita income ^a (in thousand \$)	-0.546*** (0.122)	0.514*** (0.130)	-0.546*** (0.122)	0.483*** (0.130)	-0.492*** (0.119)	0.389*** (0.129)
Growth rate	-0.022 (0.017)	0.040** (0.020)	-0.022 (0.017)	0.038** (0.020)	-0.024 (0.017)	0.042** (0.020)
Rate of turnover of chief executives ^b	0.976*** (0.280)	-1.504*** (0.341)	0.976*** (0.280)	-1.477*** (0.342)	0.957*** (0.280)	-1.414*** (0.342)
Religious fragmentation ^c	2.561*** (0.990)	-2.665*** (1.091)	2.561*** (0.990)	-3.030*** (1.107)	2.298*** (1.024)	-2.695** (1.142)
Percentage of Catholics	-0.011 (0.005)	0.010 (0.006)	-0.011** (0.005)	0.011* (0.006)	-0.011** (0.005)	0.010* (0.006)
Percentage of Protestants	-0.024 (0.016)	0.027 (0.016)	-0.024 (0.016)	0.030* (0.017)	-0.021 (0.016)	0.026 (0.017)
Percentage of Muslims	0.000 (0.005)	0.000 (0.006)	0.000 (0.005)	0.001 (0.006)	0.001 (0.005)	-0.002 (0.006)
Former colony	-0.012 (0.451)	0.446 (0.496)	-0.012 (0.450)	0.559 (0.498)	-0.111 (0.483)	0.696 (0.533)
Number of previous democratic breakdowns	0.896*** (0.121)	-1.258*** (0.139)	0.896*** (0.121)	-1.229*** (0.140)	0.859*** (0.120)	-1.139*** (0.142)
British colony	-0.842** (0.424)	0.677 (0.471)	-0.842** (0.424)	0.719 (0.470)	-0.681 (0.467)	0.561 (0.516)
Proportion democracies in the world	-3.600* (1.861)	0.683 (2.207)	-3.600* (1.861)	0.780 (2.209)	-3.458* (1.877)	0.380 (2.259)
Log-likelihood	-291.89		-287.40		-264.08	
Prob > Chi ²	0.0000		0.0000		0.0000	
Pseudo R ²	0.8913		0.8899		0.8881	
Number of observations	3991		3847		3447	

*** p < 0.01; ** p < 0.05; * p < 0.10; standard errors in parentheses

Estimation: dynamic probit model

^a Real per capita income (in constant dollars, Chain Index, expressed in international prices, base 1985), taken from Summers and Heston (fn. 21).

^b Number of changes of chief executives during the life of a political regime divided by the number of years of that political regime.

^c Level of religious fractionalization, measured as a Hirsch-Herfindhal index of fractionalization.

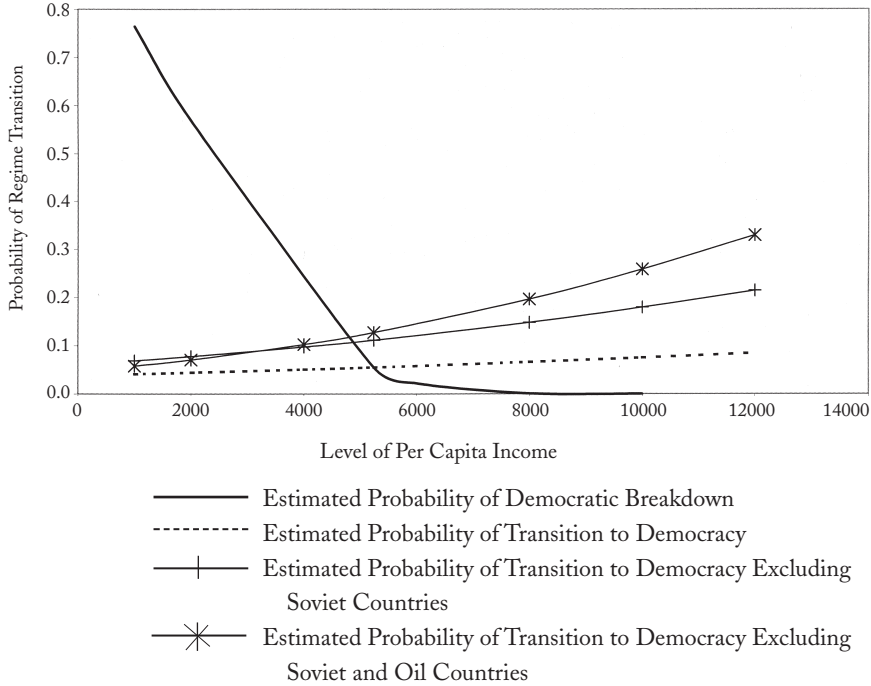


FIGURE 5
SIMULATED PROBABILITIES OF REGIME TRANSITION BY INCOME (1950-90)

The magnitude of the effect of development on democratic transitions can be seen in Figure 5, which simulates the effect of economic growth on the probability of transitions to democracy in the post-war period, among the full sample of countries and among non-Soviet-dominated and non-oil-producing countries. For all countries in the sample, the probability of a transition more than doubles when one moves from the poorest to the wealthiest income level (from \$1,000 to \$12,000). For countries outside of the immediate zone of Soviet domination, the same rise in income is associated with a 300 percent increase in the probability of a transition to democracy, from 0.07 to 0.21. If one removes from the sample both Soviet-dominated and oil-producing countries, the corresponding increase in probabilities of a transition is from 0.06 to 0.33, which means a non-oil-producing, non-Soviet country that had somehow remained a dictatorship up to the highest income level would be expected to democratize in three years after reaching a per capita income of

\$12,000. Far from being nonexistent, for many countries the endogenous effect of development on democracy is profound.³²

ENDOGENOUS GROWTH

Development itself may be endogenous to the type of political regime, that is, it may partly depend on the presence of democratic institutions. If that were the case, we would observe higher proportions of democracies among developed countries precisely because the introduction of democratic procedures caused development in the first place. If this were true, estimates of the impact of per capita income on regime dynamics would be biased by the endogeneity of economic growth to regime type. More specifically, if democracies led to more growth than authoritarian regimes, this would mean that our models (estimated in Tables 2, 4, and 6) overstate the impact of income on maintaining democracies in power. Still, that potential effect of democracies on growth would not diminish the proposition that democratic transitions are fostered by economic development.

The theoretical literature on the impact of democratic institutions on growth is split on the issue. In the nineteenth century liberal and socialist thinkers agreed that democracy, based on universal suffrage, threatened property and therefore capitalism. In the postwar period several scholars argued that dictatorships were more effective at increasing saving and investment rates and at insulating political elites from rent seeking and particularistic interests.³³ Yet a wide set of arguments have also been forwarded claiming that democracies lead to higher growth rates. Democracies constrain the confiscatory temptations of rulers and thereby secure property rights. They increase political accountability and reduce corruption and waste. They are more likely to provide public goods essential to development. From an empirical point of view, the evidence that the type of political regime matters for growth is rather scant. Reviewing all previous studies on that issue, Przeworski and Limongi report that eight found evidence in

³² We do not pretend here to exhaust the list of omitted variables that might reduce the number of democratic transitions among a subset of wealthy nations. A third possibility would be that there are different types of dictatorships with differential probability rates of breakdown. For example, military governments may be less resilient than civilian juntas to development effects. We thank Adam Przeworski for suggesting this possibility to us.

³³ For the literature on the effect on savings and investment, see Walter Galenson, "Introduction," in Galenson, ed., *Labor and Economic Development* (New York: Wiley, 1959); Karl de Schweinitz, Jr., "Industrialization, Labor Controls and Democracy," *Economic Development and Cultural Change* 7 (July 1959); Samuel P. Huntington, *Political Order in Changing Societies* (New Haven: Yale University Press, 1968). For the literature on insulated elites, see Stephan Haggard, *Pathways from the Periphery: The Politics of Growth in the Newly Industrializing Countries* (Ithaca, N.Y.: Cornell University Press, 1990).

favor of democracy, eight found evidence in favor of dictatorships, and five discovered no difference.³⁴ Barro finds that democracy has a positive impact on growth at medium levels of development.³⁵ More recently, Przeworski et al. conclude, after a systematic analysis of growth rates and political regimes since 1950, that “there is little difference in favor of dictatorships in the observed rates of growth” and “even that difference vanishes once the conditions under which dictatorships and democracies existed are taken into account.”³⁶ In short, these cumulated findings cast doubt on any endogeneity of growth to democracy.³⁷

EQUALITY, DEVELOPMENT, AND DEMOCRACY

If development causes dictatorships to fall to democracy and causes democracy to last, why is this so? Boix offers an explanation of the connection between development and democracy. As countries develop, incomes become more equally distributed.³⁸ Income equality means that the redistributive scheme that would win democratic support (the one supported by the median voter) would deprive the rich of less income than the one the median voter would support if income distribution were highly unequal. Hence the rich find a democratic tax structure

³⁴ Adam Przeworski and Fernando Limongi, “Political Regimes and Economic Growth,” *Journal of Economic Perspectives* 7 (Summer 1993).

³⁵ Robert Barro, *Determinants of Economic Growth* (Cambridge: MIT Press, 1997).

³⁶ Przeworski et al. (fn. 4), 178.

³⁷ Although democracies may not affect growth too much, we do not deny that particular constitutional structures matter for growth, for example, having some form of liberal structure with an independent legislature. Indeed, there seems to be growing evidence that a constrained executive leads to higher levels of development. Douglass North, *Institutions, Institutional Change and Economic Performance* (Cambridge: Cambridge University Press, 1990); Bradford J. DeLong and Andrei Shleifer, “Princes and Merchants: European City Growth before the Industrial Revolution,” *Journal of Law and Economics* 36 (October 1993); Daron Acemoglu, Simon Johnson, and James A. Robinson, “The Colonial Origins of Comparative Development: An Empirical Investigation,” *American Economic Review* 91 (December 2001). It is difficult to claim, however, that the introduction of democracy, understood as competitive elections and universal suffrage, was at the root of the industrial takeoff of the West. A more plausible argument, and one that we partly pursue in the following section, is that once certain liberal institutions, sustained by a social and economic balance of power, led to growth, this generated particular conditions, such as growing income equality, which in turn opened the door to democratic constitutions.

³⁸ Boix (fn. 28). Recent data collected by Deininger and Squire on income inequality, consisting of 692 comparable observations (587 of them with Gini coefficients), show that, at low levels of economic development, the degree of inequality is highly variable across countries. For economies under a per capita income of \$5,000, the mean Gini index is 42.5 with the values ranging from 20.9 to 66.9 and a standard deviation of 10.4. At higher levels of economic development, the occurrence of inequality diminishes. In economies with a per capita income of more than \$10,000 (constant prices of 1985), the average Gini index is 34.2 with a standard deviation of 3.6. Klaus Deininger and Lyn Squire, “A New Data Set Measuring Income Inequality,” *World Bank Economic Review* 19 (September 1996). Boix’s fuller discussion also examines the effect of economic development on capital mobility and of capital mobility on democratization.

to be less expensive for them as their country gets wealthier, and they are more willing to countenance democratization.

As Boix makes clear, this model explains how development reduces the incentives actors face to choose dictatorship, whether the status quo is dictatorship or democracy. Even though the choice of a democratic (or nondemocratic) government precedes the actual process of voting about the distribution of assets, it is informed by the outcomes each political agent anticipates will take place under each alternative political regime. Capitalists living in a rich dictatorship are more likely to choose democracy than capitalists living in a poor dictatorship, just as capitalists living in a rich democracy are more likely to favor continued democracy than capitalists living in a poor democracy. Hence Boix's theory is simultaneously about sustaining democracy and about democratization.³⁹

Our data support the idea that democracy is caused not by income per se but by other changes that accompany development, in particular, income equality. A second look at Figure 4a supports the point. Notice that transitions to democracy before 1949 occurred at much lower levels of per capita income than those that came after 1950. If the level of per capita income strictly speaking caused political transitions, then the shape of the transition probability would be the same across periods.

Further evidence that per capita income is a proxy for other causes appears in Figure 6, which displays the proportion of democratic regimes by per capita income after 1950, before 1950, and before 1900. During the postwar period 50 percent of countries with a per capita income above \$4,000 were democracies. Before 1950, about 90 percent of the countries with a per capita above \$4,000 were democratic. The threshold above which the odds of being a democracy were at least even was about \$2,500. Again, if per capita income per se caused democracy, we would not expect these differences in threshold.

Boix examines the economic variables that shape democratic transitions and stability in a data set spanning the period 1850 to 1980, that is, in a universe that includes the political transitions of the second half of the nineteenth century and the first half of the twentieth century.⁴⁰

³⁹ The long-term trend toward income equality as economies develop suggests other plausible mechanisms linking development with democratization. For example, assume as a starting point a dictatorship in which poor people are excluded from participation. As the country develops, incomes become more equal. If the desire to participate grows among the poor and middle class as their incomes begin to catch up to the those of the wealthy (as Lipset long ago claimed it would) and if their organizational capacity also grows, then the costs of repression will rise as a function of economic development. In this case even if—contra Przeworski and Limongi—the marginal returns of capital remain stable, development would cause transitions to democracy.

⁴⁰ Boix (fn. 28).

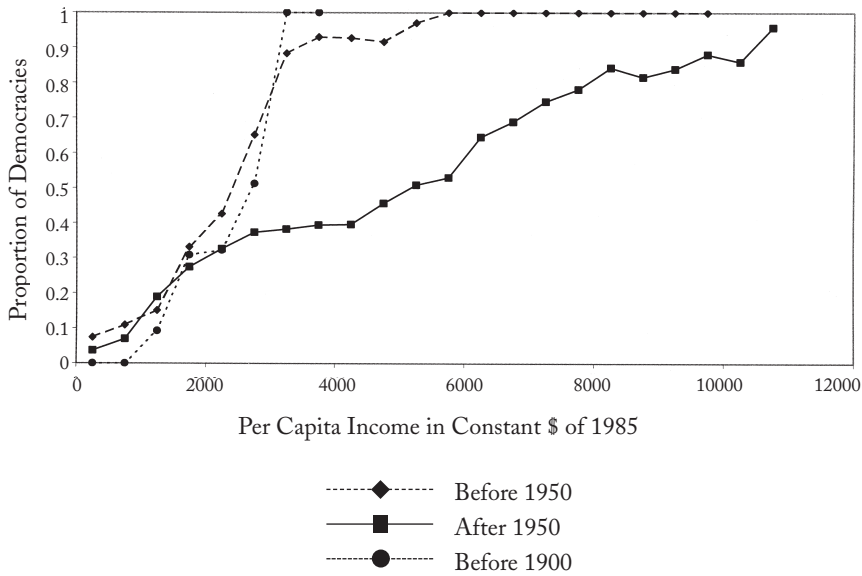


FIGURE 6
DISTRIBUTION OF DEMOCRACIES

We summarize his results here to clarify the relationship between development and democratization. Since data on income inequality are practically nonexistent for any country before World War II, Boix relies on two indicators that predict the extent of economic inequality considerably well: the distribution of agricultural property⁴¹ and the quality of human capital.⁴² For the period after 1950 the correlation coefficient

⁴¹ The distribution of agricultural property is measured by the area of family farms as a percentage of the total area of holdings. This measure, gathered and reported by Vanhanen, defines family farms as those “that provide employment for not more than four people, including family members . . . that are cultivated by the holder family itself and . . . that are owned by the cultivator family or held in ownerlike possession”; Tatu Vanhanen, *Prospects of Democracy: A Study of 172 Countries* (London: Routledge, 1997), 48. This definition, which aims at distinguishing family farms from large farms cultivated mainly by hired workers, is not dependent on the actual size of the farm—the size of the farm varies with the type of product and the agricultural technology used. The percentage of family farms captures the degree of concentration and therefore inequality in the ownership of land. The data set, reported in averages for each decade, covers the period from 1850 to 1979. It varies from countries with 0 percent of family farms to nations where 94 percent of the agricultural land is owned in family farms; the mean of the sample is 30 percent with a standard deviation of 23 percent. An extensive literature has related the unequal distribution of land to an unbalanced distribution of income.

⁴² To measure the level of human capital, Boix (fn. 28) relies on Vanhanen’s “index of knowledge distribution,” which consists in the arithmetic mean of the percentage of literates in the adult population and the “level of students.” The level of students is the number of students per 100,000 inhabitants, normalized so that 1,000 students per 100,000 inhabitants corresponds to a level of 100 percent. The Vanhanen index of education, which also covers the period 1850–1979, varies from 0.5 to 99 percent with a mean of 29.2 and a standard deviation of 22.7.

TABLE 7
ESTIMATING THE PROBABILITY OF POLITICAL TRANSITION FROM 1850 TO 1980

Independent Variables	Model 1		Model 2		Model 3		Model 4	
	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha
Constant	-2.086*** (0.061)	3.329*** (0.142)	-2.2382*** (0.1377)	3.1132*** (0.2325)	-2.3789*** (0.1541)	3.1472*** (0.2651)	-2.447*** (0.2375)	3.0080*** (0.3586)
Per capita income (in thousands) ^a	0.0297* (0.0157)	0.2308*** (0.0499)	0.1004*** (0.0342)	0.1268** (0.0668)	0.0579*** (0.0435)	0.1212*** (0.0857)	-0.0085*** (0.0968)	0.1267*** (0.1484)
Percentage of family farms ^b			-0.0017*** (0.0036)	0.0143*** (0.0053)	-0.0031*** (0.0036)	0.0145*** (0.0054)	-0.0060*** (0.0051)	0.0195*** (0.0074)
Index of education ^c					0.0087*** (0.0036)	-0.0022 (0.0078)	0.0066*** (0.0065)	0.0010*** (0.0114)
Index of occupational diversification							0.0110*** (0.0096)	-0.0024*** (0.0145)
Log-likelihood	-589.19		-385.84		-382.38		-281.66	
p > Chi ²	0.0000		0.0000		0.0000		0.0000	
Pseudo R ²	0.8595		0.8683		0.8695		0.8759	
Number of observations	6143		4267		4267		3275	

*** p < 0.01; ** p < 0.05; * p < 0.10; standard errors in parentheses

Estimation: dynamic probit model

*** p < 0.01 in joint test of interactive terms and its components; ** p < 0.05 in joint test of interactive terms and its components; * p < 0.10 in joint test of interactive terms and its components

SOURCES: per capita income—Summers-Heston (fn. 21) and Maddison (fn. 18); family farms—Vanhanen (fn. 41); education—(fn. 41); occupational diversification—Vanhanen (fn. 41) Democratic Institutions: own code (Boix and Rosato, fn. 19) for 1850–1949 and Przeworski et al. (fn. 4) for 1950–90.

^a Per capita income. Log of per capita GDP in \$ in 1985 constant prices.

^b Area of family farms as a percentage of the total area of holdings.

^c Arithmetic mean of the percentage of literates in the adult population and the “level of students.” The level of students is the number of students per 100,000 inhabitants normalized so that 1,000 students per 100,000 inhabitants corresponds to a level of 100 percent.

^d Arithmetic mean of percentage of nonagricultural population and percentage of urban population. Urban population is defined as population living in cities of 20,000 or more inhabitants.

between the Gini index of economic inequality (excluding socialist economies) and the percentage of family farms is -0.66 .⁴³ For countries with a per capita income below \$2,000 the correlation coefficient is -0.75 . The coefficient of correlation of the index of education and the Gini index reported by Deininger and Squire for the period 1950–90 is -0.59 .

These data produce a panel of over 6,100 country-year observations just with per capita income and between 4,400 and 3,300 observations once we introduce the other variables. The results of the estimations (again using a dynamic probit model) are reproduced in Table 7. To investigate the behavior and sensitivity of per capita income to these additional variables, Table 7 reports four models. Model 1 estimates the effects of the per capita income alone on democratic transitions and stability for the whole period from 1850 to 1990. Model 2 adds the proportion of family farms. Model 3 includes as well the extent of human capital. Model 4 incorporates the degree of occupational diversification on regime transitions. This variable, also developed by Vanhanen, is the average percentage of the nonagricultural population and the percentage of urban population. The urban population is defined as people living in cities of twenty thousand or more inhabitants.

Per capita income, which is significant from both a statistical and a substantive point of view in model 1, progressively loses strength in successive estimations. The statistical significance of per capita income (both its alpha and beta coefficients) is strongly eroded by the introduction of the index of education. From a substantive point of view, the introduction of education cuts the impact of per capita income on democratic stability (the sum of the alpha and beta coefficients) by half. This finding seems to indicate that per capita income, as employed in the modernization literature in postwar samples, behaves mostly as a proxy for other more fundamental factors.⁴⁴

In contrast to per capita income, economic equality (measured in the countryside in farm ownership and in general in literacy rates) increases both the chances of a democratic transition and the stability of democratic regimes. Still, the mechanisms through which countries become democratic and the causes of democratic breakdowns are partly different. Whereas the distribution of rural property has a small effect on democratization, the chances of a transition to democracy increase considerably as the economy becomes more diversified: the yearly probability of a

⁴³ The Gini index is taken from Deininger and Squire (fn. 38).

⁴⁴ The introduction of the index of occupational diversification (without the variables of family farms and education) only reduces the statistical significance of the beta coefficient of per capita income. This estimation is not displayed in Table 7.

democratic transition goes from less than 1 percent when less than a quarter of the economy is urbanized and industrialized to about 10 percent when more than three-quarters is urbanized and industrialized.

In turn, both the economic structure and asset specificity determine the robustness of democracies. The probability of a democratic breakdown in any given year reaches 20 percent in highly unequal and underdeveloped countries. As either rural equality or industrialization increases, the authoritarian threat disappears. In an agrarian economy the probability of a democratic breakdown falls to 0 as one moves from concentrated land ownership (as in countries such as Russia before the Stolypin reforms and the Soviet Revolution, Spain for most of the twentieth century, and most Latin American nations) to the highly fragmented property systems (as in countries such as Norway, the United States, and Canada, where at the turn of the twentieth century family farms represented between three-fifths and four-fifths of all land). Even when the distribution of property remains highly unequal, the chances of an authoritarian backlash disappear as the economy industrializes.

To sum up, per capita incomes rise in countries where incomes are becoming more equal. Not higher income but income equality cause countries to democratize and to sustain democracy. If early-industrializing countries achieved income equality at lower levels of per capita income than did later-industrializing ones, this would explain why the endogenous democratizing effect was powerful before 1950 and weaker after 1950.⁴⁵

CONCLUSIONS

The work of Przeworski and Limongi, as well as their work with Alvarez and Cheibub, has been agenda setting. They have put facts on the table and asked for some explanations. Among their many important

⁴⁵ Data on income inequality are too scarce before 1950 to test this hypothesis. However, if we look at its proxies, such as education and the distribution of agrarian property, inequality seems to have been less acute in advanced countries than in developing countries for similar levels of per capita income. For example, taking our country-year observations with per capita income lower than \$2,000, the mean literacy index is around 40 percent of the population in developed countries and 20 percent in developing nations. For observations with a per capita income between \$2,000 and \$4,000, the average literacy index is 50 percent in advanced countries and 41 percent in developing countries. The average percentage of family farms is 39 percent and 28 percent in developed and developing countries for per capita incomes lower than \$2,000. The difference gets larger for per capita incomes between \$2,000 and \$4,000: the average percentage of family farms is 42 percent in advanced countries and 25 percent in the rest. The universe of advanced countries includes North America, Western Europe, Japan, Australia, and New Zealand.

contributions is to warn us that the dynamics of achieving democracy and of sustaining it may not be the same. But we must be sure that all of the questions they pose are the right ones. We hope we have shown that the right question is not why development fails to increase the chances of a transition to democracy, even though it does increase the chances that an already-existing democracy will last. Instead, the right questions are the following. First, given that economic development predicts both transitions to democracy and the stability of democratic regimes, why did the income threshold for democratization rise in the period after 1950? In other words, why in effect could a country “buy” democracy more cheaply—for a lower level of per capita income—in late-nineteenth-century England or Norway than in late-twentieth-century Chile or Benin? Second, why were early-industrializing despots more vulnerable to economic development—more at risk of being replaced by elected regimes—than were their late-industrializing counterparts? Why in the century leading up to World War II was the main contribution of economic growth to bring democracy about, whereas its main contribution after World War II was to protect democracy once it already existed?

We began this article by asking whether Chile’s relatively higher per capita income in 1985 made it more likely to democratize than Benin, which that same year had roughly one-third of Chile’s per capita income. The answer is yes. We have shown that economic development both causes democracy and sustains it. Yet a full answer to why this is so requires us to understand the hidden mechanisms and consequences of economic development.

APPENDIX: TRANSITION GAMES

GAME 1: STATUS QUO DEMOCRACY

Consider first the situation in which two factions compete in a democracy. The incumbent ($F1$) decides whether to hold elections or undertake the “fight for dictatorship.” If $F1$ holds elections, it wins with probability e or loses with probability $1-e$. If $F1$ decides to fight, it wins with probability r or loses with probability $1-r$. If there’s a fight, both $F1$ and $F2$ pay a cost of war (w); the winner of the fight for dictatorship takes all the income (Y), the loser gets nothing. If an election is held, the winner takes a larger portion (s) of the income, the loser a smaller portion ($1-s$). The expected payoffs are listed at the bottom of Figure 7:

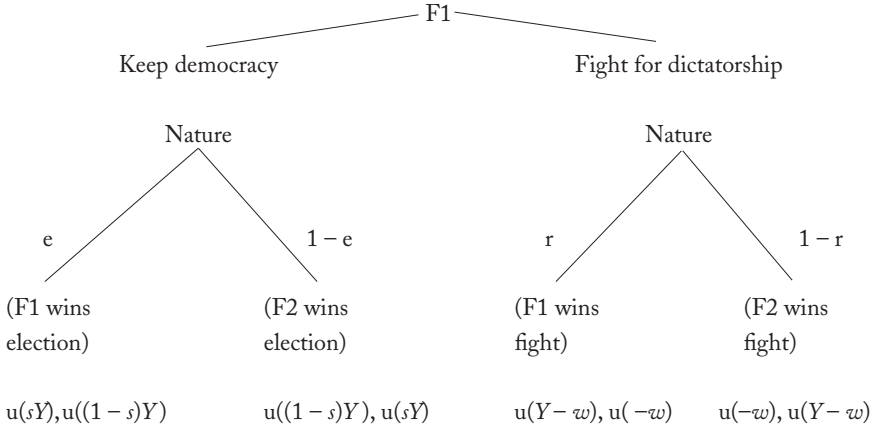


FIGURE 7
A GAME OF REGIME CHOICE (STATUS QUO DEMOCRACY)

Following Przeworski and Limongi, we assume declining marginal utility of income; specifically, we assume utility equals the square root of income. *F1* chooses democracy iff

$$r(u(Y - w)) + (1 - r)(u(-w)) - e(u(sY)) - (1 - e)(u((1 - s)Y)) < 0 \quad (1)$$

Taking the first-order derivative of u with respect to Y tells us the effect of development on democracy. Development causes democracy when

$$\frac{1}{2} [r(Y - w)^{-1/2}] - \frac{1}{2} [e(Y)^{-1/2} s^{1/2}] - \frac{1}{2} [(1 - e)(Y)^{-1/2} (1 - s)^{1/2}] < 0$$

which simplifies to

$$r(Y - w)^{-1/2} - Y^{-1/2} [e(s)^{1/2} + (1 - e)(1 - s)^{1/2}] < 0 \quad (2)$$

Focusing on the denominators $(Y - w)^{-1/2}$ and $Y^{-1/2}$ on the left-hand side of inequality 2, we see that, ceteris paribus, development increases the magnitude of the second expression in relation to the first and hence the probability of democracy.

Naturally, the choice of strategy is affected by other parameters: on one side, by the probability (r) that the ruling faction would win a war for dictatorship; on the other, by the relative probabilities that the ruling faction or the opposition wins the election ($e, 1 - e$), and by the shares of income going to the winner and the loser of elections ($s, 1 - s$).

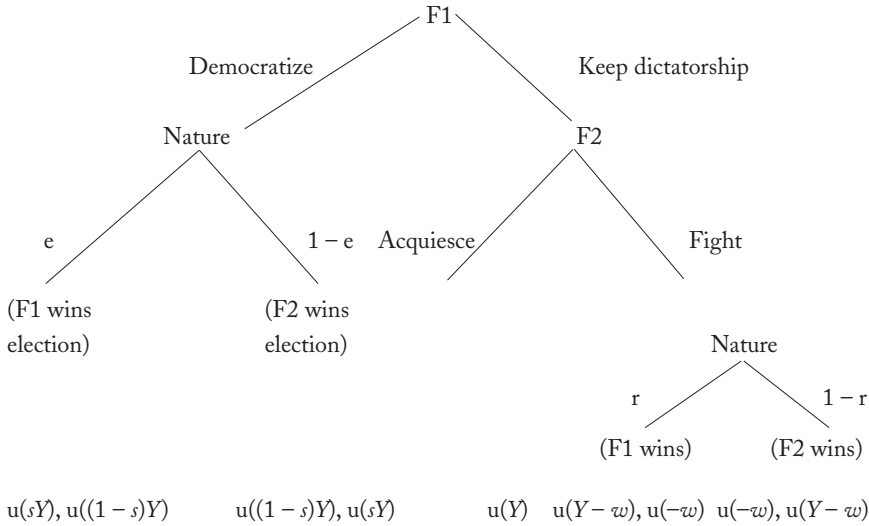


FIGURE 8
GAME OF REGIME CHOICE (STATUS QUO DICTATORSHIP)

Holding everything else constant, the chances of democracy decrease with a larger r yet increase with e and s . Still, the conditional effects of higher economic development on e and s are more ambiguous: perhaps counterintuitively, the greater the incumbent’s probability of winning elections and the greater his share of income if he wins, the less economic development generates democracy. This, however, remains a marginal effect generally trumped by the direct boost democracy gets from development.

GAME 2: STATUS QUO DICTATORSHIP

Now consider that faction $F1$ is a dictator and must decide whether to remain as a dictator or undertake a transition to democracy, in which case (as before) $F1$ wins with probability e and takes portion s of income Y or loses with probability $1 - e$ and takes a smaller portion $1 - s$ of income. If $F1$ decides against a transition, $F2$ must decide whether to acquiesce or to fight to take over the dictatorship. If it acquiesces, it gets no income and $F1$ gets it all. If $F2$ fights, it gets all the income minus the cost of war (w) with probability $1 - r$; or just pays the cost of war with probability r . See Figure 8.

By backward induction, faced with the choice of whether to acquiesce or fight the dictatorship, $F2$ will always fight unless the condition specified in inequality 3 holds:

$$r(u(-w)) + (1 - r)(u(Y - w)) < 0 \quad (3)$$

If this inequality holds, *F2* would always acquiesce and—anticipating his acquiescence—*F1* would never democratize.

This inequality leads us to consider the utility loss to the loser of fighting and losing, weighted by the probability of the dictator winning, compared to the utility of fighting and winning, weighted by the probability that those currently out of power win. If the latter weighted utility is larger than the former, democracy never happens.

Assuming inequality 3 does not hold, at the first decision node *F1* will democratize iff

$$r(u(Y - w)) + (1 - r)(u(-w)) - e(u(sY)) - (1 - e)(u((1 - s)Y)) < u(0)$$

Taking the first-order derivative of u with respect to Y (assuming $u(y) = Y^{1/2}$) again tells us the effect of development (marginal changes in Y) on democracy:

$$1/2[r(Y - w)^{-1/2}] - 1/2[e(s)^{1/2} + (1 - e)(1 - s)^{1/2}(Y)^{-1/2}] < 0$$

which simplifies to

$$r(Y - w)^{-1/2} - Y^{-1/2} [e(s)^{1/2} + (1 - e)(1 - s)^{1/2}] < 0$$

Notice that the latter is the same inequality as (2) in the first game. When inequality 2 holds, development encourages the dictatorship to democratize. Again bracketing for the moment all but the denominators of the first and second terms, it seems unambiguous that development encourages democracy. This means, in turn, that the same mechanisms that reduce the incentive of a staging a coup (the declining marginal utility of income) apply to explain the cases in which *F1* should acquiesce to democracy. The growth of per capita income predicts both a fall in the likelihood of democratic breakdowns and a rise in the likelihood of democratic transitions. In sum, employing the parameters of Przeworski and Limongi, endogenous democratization theory still holds: dictatorships will democratize under the stimulus of economic development.

In several senses, these games are not particularly successful. Some of the comparative statics they yield fail to conform to intuition. As in the first game, there are some values of r (the probability of the dictator winning a fight for continued dictatorship), $e/(1 - e)$ (the ratio of the

dictator's and opponent's probabilities of winning elections), and $s/(1-s)$ (the relative share of the national income going to winners and losers of elections) for which growing development marginally reduces the probability of democracy. A more compelling theoretical model of the relation between economic growth and democracy might less ambiguously predict that growth would cause democracy. But our central point is that these models do not sustain the claim that development causes democratic stability but not transitions to democracy. If it were empirically true that development was related to democracy exogenously but not endogenously, then we would need a theoretical foundation that is different from the games sketched here. Our main goal, however, is to cast doubt on the empirical claim and hence on the need to provide a theory to sustain that position.