

FIRST DRAFT  
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**Relationship between Income and Emergence of Democracy Reexamined,  
1820–2000: A non-parametric approach**

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The paper contrasts Lipset's modernization hypothesis and Przeworski-Limongi hypothesis that entries into democracy are random with respect to income. We use data on income and democracy going back to 1820, multiple definitions of democracy, and non-parametric testing focusing on the distribution of entrants' incomes. We find that income matters for entry into higher levels of democracy; but if we control for the previously achieved level of democracy, the income effect vanishes. This means that countries that enter into higher levels of democracy are not a random draw from the universe of all country incomes but are a random draw from the joint distribution of previous level of democracy and income. These results are compatible with the presence of a subgroup of (low) income and (low) democracy countries from which recruitment into democracy is seldom made. But for other countries, accession to higher levels of democracy is income-random. Income seems therefore both to matter (probably explaining why poor countries cannot improve their democracy levels) and not matter (explaining why for other countries improvements in democracy are income-random).

Keywords: Democracy, income, modernization

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## 1. The objective

The objective of this paper is to empirically assess the validity of the Przeworski and Limongi hypothesis (Przeworski and Limongi 1993, 1997; Przeworski 2004) according to which entries into democracy are determined by non-economic factors and hence random with respect to level of development. This hypothesis is set in explicit opposition to the standard Lipset hypothesis, formulated in the 1950s (Lipset, 1959, 1960), according to which increased income associated with rising educational attainment and growing share of the middle class “naturally” leads to demand for democracy. Thus, income to largely “causes” the emergence of democracy. We test the two hypotheses using the two large and recently created databases which more or less cover the period from 1820 to 2000. They are Angus Maddison’s (2004) series on economic growth and population and PolityIV data on democracy. We are thus able to test the two hypotheses using very rich data on income and democracy covering the entire period of modern history. The advantage of extending the period back in time is that both income and democracy variability was less then. If the sample starts in 1950 or 1960, there is a bias, noted by Boix and Stokes (2003, p. 10) that poor countries are overwhelmingly dictatorships and rich countries democracies: an empirical approach must account for that systematic difference and not assume it away.

We are employing mostly non-parametric techniques which, in this context, have not been used before. We are also concerned only with the narrow issue regarding *entries* into democracy and level of income, not

with a more complicated one of whether better performing or richer economies are able to *sustain* democracy longer.<sup>2</sup>

The structure of the paper is as follows. Section 2 presents a brief discussion of the Przeworski–Limongi hypothesis and reviews empirical evidence. Section 3 describes the data and gives descriptive statistics. Section 4 is the core of the paper: it empirically tests the hypotheses. The last section presents the conclusions.

## **2. A short discussion of the Lipset and Przeworski–Limongi hypotheses**

According to the well-known Lipset’s modernization theory increasing average income implies a more sizable and more educated middle class which tends to demand greater political rights thus ultimately leading to the emergence of democracy. In this view of the world, rising income or development is causally linked with political democracy. The experiences of Spain, Portugal, South Korea, Taiwan, Greece and more recently Eastern Europe and the USSR lend plausibility to this view. The Lipset hypothesis implies what we may call “a substantive endogeneity” between income and democracy.<sup>3</sup>

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<sup>2</sup> The Lipset hypothesis as formulated by O’Donnell (1973) and by Przeworski (2004, p. 492) implies two distinct statements: first, democracies are more likely to survive in rich countries, and second, as countries get richer they are likely to evolve into democracies. The first statement is, according to Przeworski, true, the second false. In this paper, we are interested in the second statement only.

<sup>3</sup> Boix and Stokes (2003) who extend Lipset’s theory call it a theory of “endogenous democratization”.

An alternative theory is formulated by Przeworski and Limongi (1997). Przeworski and Limongi hold that emergence of democracy responds to non-economic factors but that democracies are more durable at high income levels.<sup>4</sup> If the Przeworski-Limongi hypothesis were true, we would tend to observe in the data a greater prevalence of democracies among rich countries but there would be no substantive “endogeneity” between income and democracy but merely a “statistical” association, or as Przeworski and Limongi call it, the relationship between the two would be “exogenous.”. Clearly, the two hypotheses imply two very different views of the world and role of development in fostering democracy: democracy is either contingent on non-economic factors or is a product of development.

Barro (1996) does one of the early econometric testings of the Lipset hypothesis and concludes that “propensity for democracy rises with per capita GDP.” Barro’s approach consists in running a democracy regression with the right-hand side variables that include two lagged democracy values (five- and ten-year lags) and a number of control variables, the most important of which is income. The idea is that the level of democracy gradually converges to the level implied by the control variables. A positive and statistically significant coefficient on the income variable is interpreted to mean that there is the predicted causality running from income to democracy. Barro’s data are five-year averages

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<sup>4</sup> “We would…expect democracies to appear randomly with regard to development, but to die in poorer countries and survive in wealthier ones.” (Przeworski and Limongi, 1997, p. 157). Democracy appears in response to political contingencies. Przeworski and Limongi (1997) conclude: “The emergence of democracy is not a by product of economic development. Democracy is or is not established by political actors pursuing their goals, and it can be initiated at any level of development.”

that cover the period 1965–1995. Democracy is a continuous variable based on Gastil’s index while GDI per capita data are from Penn World Tables version 5.6. There is no instrumental variable approach so the possible reverse causality from democracy to income is not addressed.

More recently, Przeworski and Limongi (1997), and Boix and Stokes (2003) have tested the two hypotheses. Consider first the time periods and the data they use. This is important because in the empirical work such as this, the data play a key role. Przeworski and Limongi use the data from 135 countries covering roughly the period 1950 to 1990, Boix and Stokes study the period 1850–1990. For democracy (or its reverse), each set of authors use their own dichotomous (0–1) definition.<sup>5</sup> The GDI per capita data used by Przeworski and Limongi come from Penn World Tables 5.6; Boix and Stokes combine PennWorldTables (no version given) for the period after 1950 with Maddison’s (1995) data for the period before 1950.<sup>6</sup> Both sets of authors do parametric testing of the alternative hypotheses. Przeworski and Limongi (1997) reject the strong formulation

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<sup>5</sup> Przeworski and Limongi define dictatorship as where at least one of the following conditions holds: (1) executive leader is not elected, (2) legislature is not elected. (3) there is no more than one party, (4) even if none of the previous three rules holds, the regime refuses to yield power. Boix and Stokes (2003) use a Boix and Rosato (2001) definition of democracy which requires that elections be free and competitive, the executive be accountable to either citizens (in presidential systems) or to an elected legislature (in parliamentary systems) and that at least 50 percent of male electorate is eligible to vote.

<sup>6</sup> The combination is an odd one; it is unclear why one single source (Maddison) was not used throughout. Even if the correlation between the two sources is high (as reported by the authors in footnote 10, p. 11), it does not mean that income levels for the same country move seamlessly between the two sources. It is also unclear how the authors have “adjusted” the Maddison dataset to make it “comparable with the Summers–Heston dataset” (p.11).

of the Lipset hypothesis.<sup>7</sup> Boix and Stokes (2003), on the contrary, accept the Lipset hypothesis, and find it to hold particularly strongly in the pre-1950 period.<sup>8</sup>

The current paper differs in three respects from Przeworski and Limongi (1997) and Boix and Stokes (2003) papers. First, the time period covered is longer: it extends from 1820 until 2001, and the data on income and democracy are consistent (that is, each comes from a single source covering the entire period). Second, the definition of democracy is not dichotomous—that is, we test the two hypotheses by using different definitions of democracy. Third, the emphasis is on a more flexible non-parametric testing.

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<sup>7</sup> Przeworski also rejects it in his 2004 article (p. 493) where GDI per capita is shown as statistically not significant determinant of transition probability to democracy.

<sup>8</sup> In part, this seems to be due to what Boix and Stokes (p. 12) argue is the diminishing marginal effect of development on democracy—namely, that while the probability of transition to democracy goes up with income, the rate at which this probability increases gets smaller with higher income.

### 3. The data and some descriptive statistics

This paper uses two large and recently published databases: Angus Maddison's (2004) series on income, growth and population and PolityIV data on democracy. The two sets cover practically the same period. Maddison's series starts in 1820 and ends in 2001.<sup>9</sup> PolityIV series begins in 1800 and ends in 2002. A country/year is our basic unit.

*Gross domestic income and democracy data.* The Gross Domestic Income (GDI) per capita data are obtained from Maddison (2004) and cover between 5 (in the years 1821–29) and 162 countries annually for the period 1820–2001. The coverage is gradually expanding throughout the 19<sup>th</sup> century and from around 1880, the country coverage (measured by the share of world population) reaches more than 2/3. In some benchmark years like 1890, 1900, 1913, the coverage exceeds 95 percent. The average population coverage for the entire period is 73 percent. The democracy data set comes from PolityIV (version 2002). Polity IV provides the country scores on democracy, autocracy and a number of other political variables. The annual coverage ranges from the minimum of 20 countries in the early 19<sup>th</sup> century to 157 countries in 2002. The population coverage is in all but a few years greater than 60 percent of world population and since the 1950s it is between 90 and 100 percent.<sup>10</sup>

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<sup>9</sup> Actually, Maddison's data start with year AD 1 but a much denser and more reliable series is available from 1820 onwards.

<sup>10</sup> In a few years when the coverage dips this is owing to the wars in China (as for example in 1860–61) when due to the unsettled political circumstances there is no Polity coding.

The merging of the two data sets is more difficult than it might appear at first sight. This is because the approaches of Maddison and Polity IV differ in an important respect. Maddison takes, with a few exceptions, as his starting point the currently existing countries and tries to trace historical per capita income on the territory of the countries as they currently are. Thus, for example, Maddison's data (generally) aim to present GDI per capita of the populations that were living on the current territory of Germany or Austria or Russia regardless of the fact that these countries might have been larger or smaller at given historical dates. PolityIV data sets takes the opposite, legalistic, approach. It considers as its unit of analysis a "polity" (country) that is a member of the inter-state system at a given point in time and within its contemporaneous borders.<sup>11</sup> This means that the information on the level of democracy in Germany in (say) 1930 will pertain to all territories that were part of Germany then, including for example the territory that is today Poland or Russia. Maddison's German data for 1930, will, on the contrary, refer only to the income produced within what is currently German territory. More details regarding the merging of the two data sets is given in Milanovic (2005).

Figure 1 shows PolityIV data on democracy. Democracy is defined by the PolityIV variable called *polity2* which is equal to the score for democracy minus the score for autocracy. Since the democracy variable

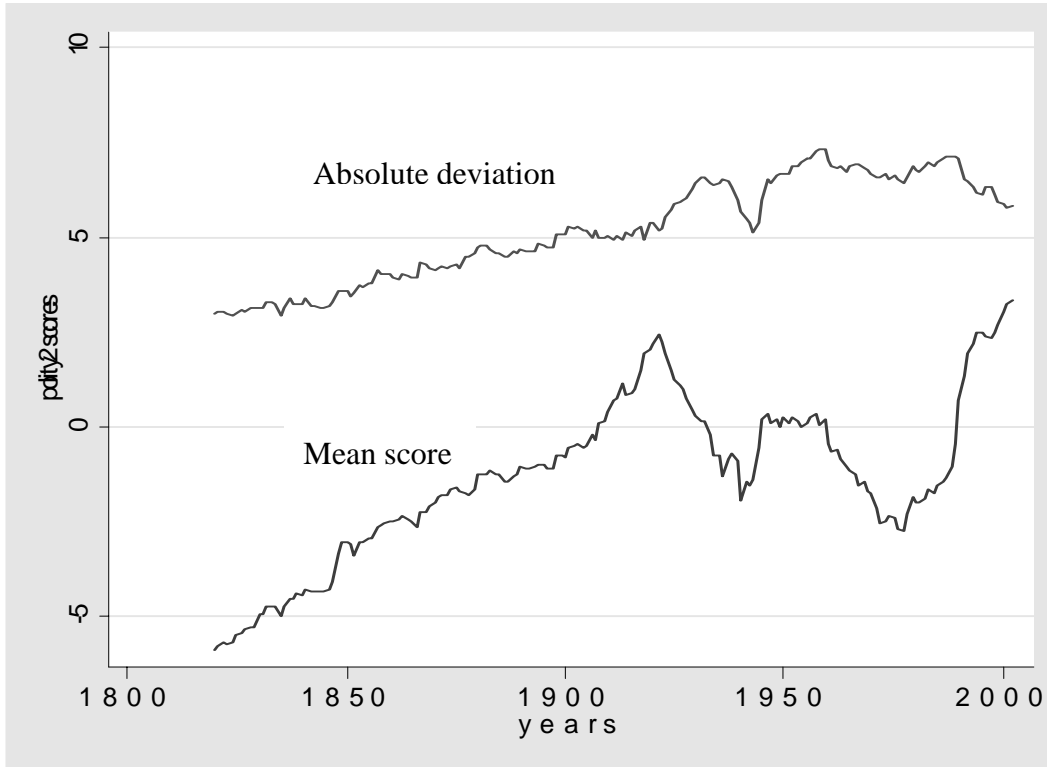
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<sup>11</sup> Being a member of the inter-state system is defined as being accepted as an independent entity either through membership of international organizations like League of Nations or United Nations or by being recognized as an independent entity by at least two major powers. The Polity definitions stems from the Correlates of War project (see Singer and Small, 1994). Only entities with population greater than half-million are included in either Polity or Correlates of War databases.



ranges between 0 and + 10, and autocracy likewise from 0 to + 10, the *polity2* variable varies between -10 (least democracy) to + 10 (most democracy). After a steady increase in the democracy score up to mid-1920's, the average world democracy score began an equally steady decline in the inter-war period and then another one as various Communist regimes and dictatorships in the newly independent countries came to power after the end of World War II. However the last twenty years have witnessed a major upswing in democracy so that its average level is now higher than at the previous peak in 1922. Variability in democracy scores has grown almost continuously from the 1850's to 1950's but has recently declined. In other words, country scores are now more similar than they were 20 or 30 years ago.

Figure 1. World mean score for democracy and mean absolute deviation of democracy scores 1820–2000



Source: variable *Polity2* from the Polity IV database. *Polity2* index ranges from -10 to +10. The world mean level of democracy is unweighted (each country in the sample counts the same). The deviation is the average absolute deviation from the mean.

#### 4. The hypotheses re-examined

*First test: entrants' income against incomes of all potential entrants*

The key factor that should help us distinguish between the Lipset and Przeworski-Limongi hypotheses is the entry-income, that is the income at which a country becomes a democracy. Under the Lipset hypothesis, there would be no entry below some threshold income and most countries would enter at some relatively high income. Obviously such a sharp discontinuity is unlikely to be observed in the real world where country-specific elements are always present: we would however expect to see the incidence of entry increasing in income.

If alternatively the Przeworski-Limongi hypothesis is true then the distribution of entry-incomes should be exactly the same as the overall distribution of incomes in the world: if countries' incomes are distributed (say) lognormally, so should be the distribution of entry incomes. To quote Przeworski and Limongi (1997, p. 157), "we...expect to observe democracies to appear randomly with regard to level of development".<sup>12</sup> If becoming a democracy obeys non-income factors, then what country becomes a democracy is a random draw as far as income is concerned. This can be written as (1)

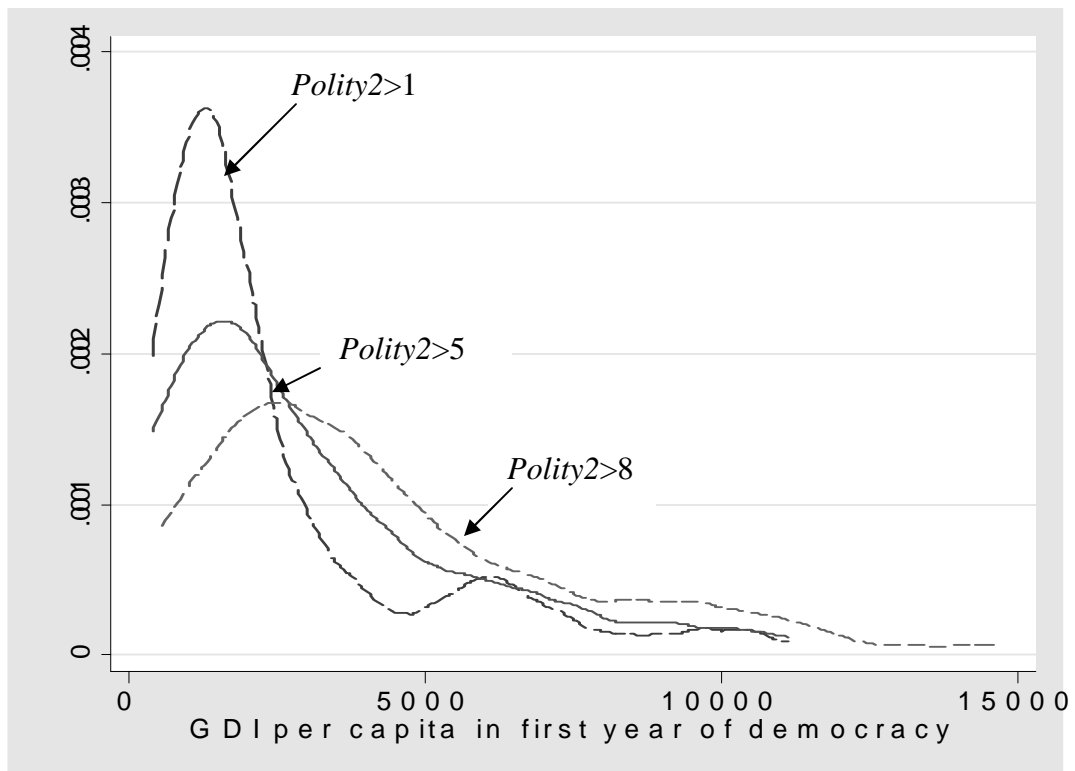
$$\text{Prob}(D_{it} | y_t) = \text{Prob}(D_{it}) \quad (1)$$

which means that probability of entry into democracy of level  $i$  and at time  $t$ , conditional on income, is the same as the unconditional probability of entry into democracy (country subscript is omitted).

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<sup>12</sup> See also a very telling Figure 2 in Przeworski (2004, p. 494).

Figure 2. GDI per capita in the year when country entered democracy



Note: Entry-year of democracy defined as the first year ever that a country has achieved level of democracy greater than 1, 5 or 8 as measured by polity2 variable.

Figure 2 gives the distribution of entry-incomes (in 1990 international dollars<sup>13</sup>) when *polity2* value is set alternatively at 1, 5 and 8.

<sup>14</sup> Consider for example income of entrants if the definition of democracy is taken to require a *polity2* value greater than 5. We note (see Annex 1) that there are countries like Burma, Botswana and Niger that have entered democracy at income level less than \$PPP 500 which is barely above subsistence. There are also countries that have entered democracy only

<sup>13</sup> These are dollars of equal purchasing power (PPP) across countries.

<sup>14</sup> The full list of entry-incomes and entry-years for *polity2*>5 and *polity2*>8 is given in Annex 1.

when their incomes reached high levels over \$10,000 (Slovenia and Taiwan). Moreover, there are in the year 2000 several countries with GDI per capita in excess \$PPP8,000 that have never been democracies. The range of entrants' incomes is therefore very high and this would seem to argue against Lipset's hypothesis.<sup>15</sup> However, the high range of entrants' incomes does not, by itself, invalidate the hypothesis. To see this suppose that in the universe of country-incomes, there are many countries with very low incomes and only a few with high incomes; suppose further, following Lipset, that income matters for entry. There would be proportionally many more rich countries that are democracies but that does not exclude the possibility that some poor countries make it too. What is important is whether probability of entry increases in income. But in order to know what is the probability of entry, we need to know what is the universe of country-incomes out of which "draws" into democracy are made. To this we turn next.

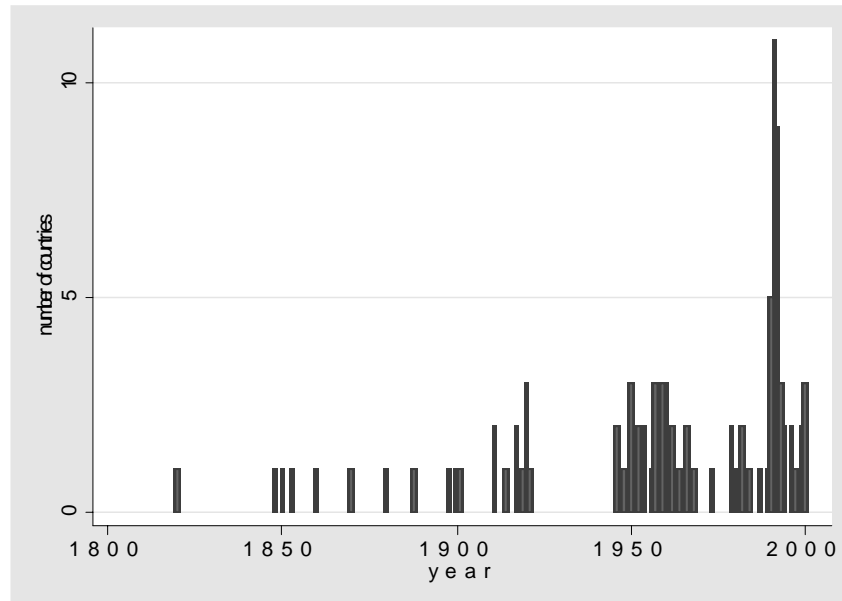
Our first relevant universe (called universe **A**) is composed of all countries' incomes in the years when there were entries into democracy (draws). For example, suppose that in years 1950, 1953, 1961, 1965 and 1970, there was one entry each into democracy; then the relevant universe **A** will be composed of all country-incomes existing in those five years (save, of course, for countries that already are democracies). In a further complication, entries into democracy are not uniform across years: in some years, we may have only one entry, in others ten. The spikes at the time of the "democratic revolutions" at the end of World War

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<sup>15</sup> The same is true for any level of *polity2* variable. If democracy is defined as *polity2*>8, the range of entrants' incomes goes from less than \$PPP 600 to more than \$14,000 (see Annex 1).

I and in 1990–91 are easily observable in Figure 3. This is equivalent to having a variable number of draws in different years. Since the underlying country–income distributions are different in different years we need to adjust for this. We do so by giving greater weights to the underlying distributions in the years where there were more draws. Going back to our example, if the number of draws into democracy were twice as great in 1970 as in 1950, then the weight attached to the underlying distribution of countries’ incomes in 1970 must be twice as high as for 1950. As mentioned, from these yearly distributions we exclude countries that are already democracies (according to whatever the definition of democracy is) since draws into new democracy cannot be made from these countries. To conclude, the universe of country–incomes **A** is thus composed of country–incomes in all years where there were draws into democracy weighted by the number of draws and adjusted downward for countries that already are democracies.

Figure 3. Number of country-entries into democracy, 1820-2002  
(with democracy defined as  $polity2 > 5$ )



Note: Entry into democracy occurs in the first year ever when country achieves  $polity2$  score greater than 5.

Figure 4 displays the distributions of entry-incomes and the four corresponding distributions of **A** universe when democracy is defined alternatively as  $polity2 > 1$ ,  $polity2 > 3$ ,  $polity2 > 5$  and  $polity2 > 8$ . While for the lower levels of democracy ( $polity2 > 1$  and  $polity2 > 3$ ) the distributions of entry-incomes and universe **A** are fairly similar, as the level of democracy increases, the distributions visually diverge from each other. In other words, as we increase our  $polity2$  cut-off level, the distribution of entry-incomes shifts much more to the right than the distribution of the income universe and the two distributions gradually become more dissimilar. Indeed the Kolmogorov-Smirnov test which at low levels of democracy accepts (at 1 percent level) the hypothesis of equality of the two distributions, strongly rejects the hypothesis as soon as the  $polity2$  cut-off reaches 5 (see Table 1). Notice an almost strict monotonic relationship: the hypothesis of equality of the two distributions is accepted (at 1 percent level) for low values of democracy; then gradually  $p$ -values

become smaller and smaller so much that for the two highest democracy levels, the hypothesis is easily rejected at far less than 1 percent level.

This result is confirmed by the parametric tests of the means (Table 1). Again, as the definition of democracy becomes more demanding, the means of entrants' incomes and universe **A** increasingly diverge with the former being greater (see *t*-values in Table 1).<sup>16</sup>

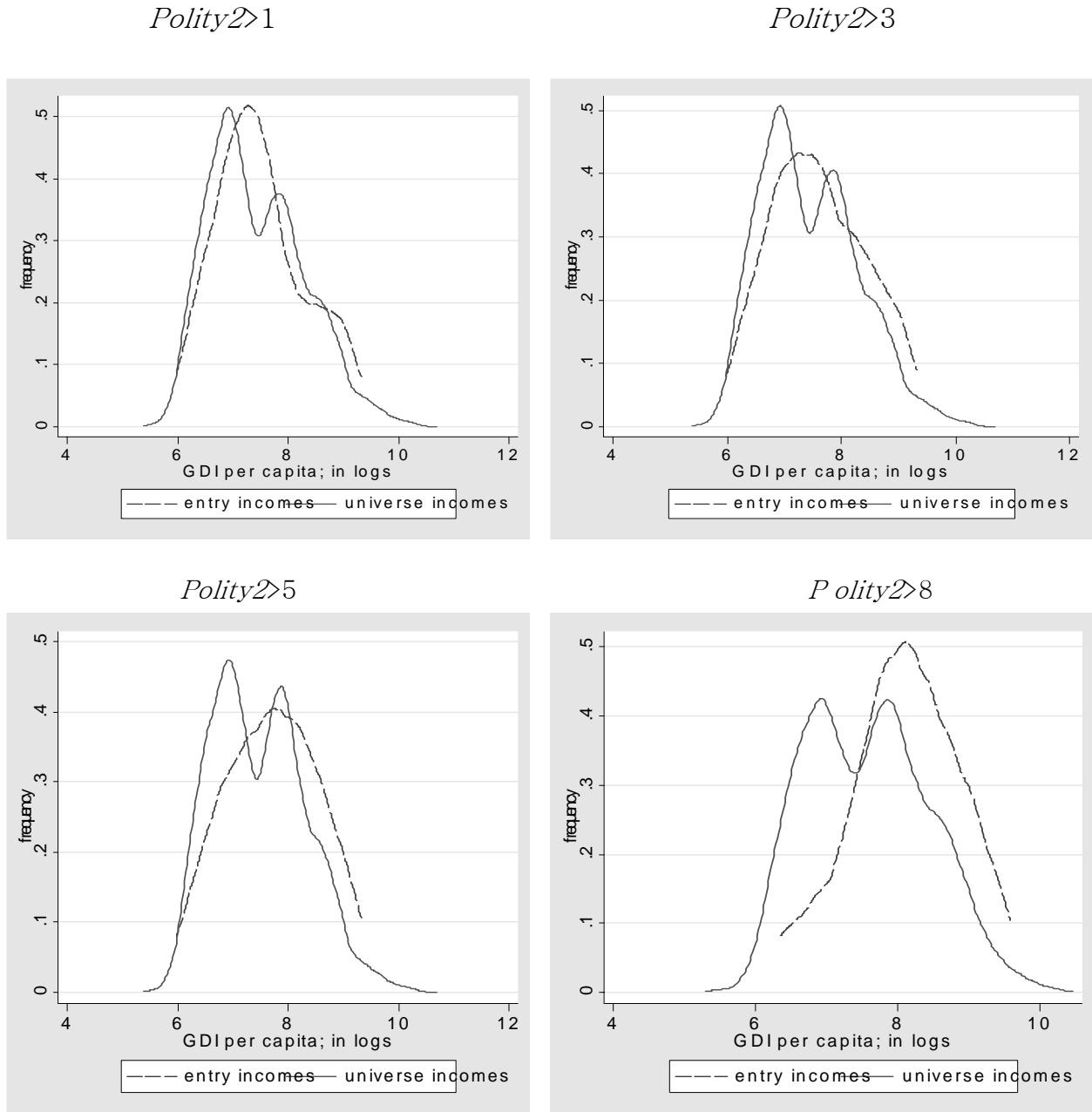
We conclude that the less demanding our definition of democracy the more likely is the Przeworski hypothesis to be accepted. But for the more demanding definitions of democracy income level seems to play a significant role. The draws into democracy are no longer purely random—*viz.* they are associated with higher income.

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<sup>16</sup> The same results are obtained using probit regressions for the entry into democracy. Income has no statistically significant effect (at 1 percent level) until *polity2* values reaches 7 after which it is very strongly and positively associated with the probability of entry into democracy (see Annex 2 top table).



Figure 4. Distributions of entry-incomes and the relevant universe of country-incomes **A** (using different definitions of democracy)



Note: Universe incomes = solid line. Entry incomes = dashed line. All incomes are in natural logarithms. Data on GDI per capita in 1990 international Geary-Khamis dollars.

Table 1. Kolmogorov-Sminov (KS) and means tests of equality of two income distributions : incomes of countries that entered democracy and the universe of country-incomes **A** 2/

Definition of democracy	Hypothesis of equality of distributions		Hypothesis of equality of the means 1/		Number of observations	
	Value of KS test	<i>p</i> -value of KS test	<i>t</i> -value	<i>p</i> -value of the test	Entrants into democracy	Universe of country incomes <b>A</b> 2/
<i>Polity2</i> score greater than...						
1	0.129*	0.038	0.795	0.213	118	1701
2	0.134*	0.036	1.255	0.105	112	1772
3	0.126	0.057	1.612	0.054	110	1893
4	0.136*	0.035	1.696*	0.045	108	2061
5	0.175**	0.004	2.262*	0.012	99	2231
6	0.200**	0.001	2.543**	0.005	90	2317
7	0.239**	0.000	2.644**	0.004	73	2906
8	0.323**	0.000	3.595**	0.000	51	2486
9	0.331**	0.001	3.299**	0.000	33	1395

1/ Tested versus the alternative that the mean income of the entries is higher (hence income plays a role).

2/ Universe **A** is composed of all country incomes in the years when there were entries into democracy (weighted by the number of entries and adjusted for countries that already are democracies).

Note: One (two) asterisks indicate significance level less than 5 (1) percent.

*Second test: entrants' incomes against income of potential entrants with the same previously achieved level of democracy*

Yet the following argument could be made in defense of the Przeworski-Limongi hypothesis. Suppose that entries into democracy depend also on the previously achieved level of democracy as expressed in equation (2).

$$\text{Pr ob}(D_{it} | y_t, D_{h,t-1}) = \text{Pr ob}(D_{it}) \quad (2)$$

where probability of entry into democracy of level  $i$  at time  $t$  is viewed as conditional not only on income but on the previously achieved level of democracy  $D_{h,t-1}$  ( $h < i$ ).<sup>17</sup> The universe of incomes with which we are concerned now is not composed of all country-incomes at a given year but only of incomes of countries whose previously achieved level of democracy is the same as the previously achieved level of democracy of the new entrants. We call this universe **B**. If a given country enters democracy in year  $t$ , its income should not be—according to this argument—contrasted with incomes of all countries which in year  $t$  could have entered democracy but only with incomes of a subset of countries that had the same level of democracy as the entrant country. In this case, the probability of entry into democracy may be independent of income but may depend on the previous level of democracy ( $D_{t-1}$ ).

We test this hypothesis next. The entrants into democracy (for each level of *polity2*) remain the same as before, but the universe with which to

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<sup>17</sup> Previously achieved level of democracy is technically the same thing as one-period lagged democracy. We prefer the former term because it conveys more exactly from what point do countries move (or fail to move) to higher levels of democracy.

compare their distribution changes. As an illustration, compare the distribution of entry incomes when democracy is defined as  $polity2 > 8$  with the universes **A** and **B**. In Figure 5a (left panel), the comparator is the universe of all country-incomes, *i.e.*, the universe **A**, while in Figure 5b (right panel) the comparator is the more restricted universe **B**. It is clear that while the two distributions are visually different in Figure 5a, the differences are much less in Figure 5b. In fact, the Kolmogorov-Smirnov hypothesis of equality of the two distributions is rejected in the former and accepted in the latter case.

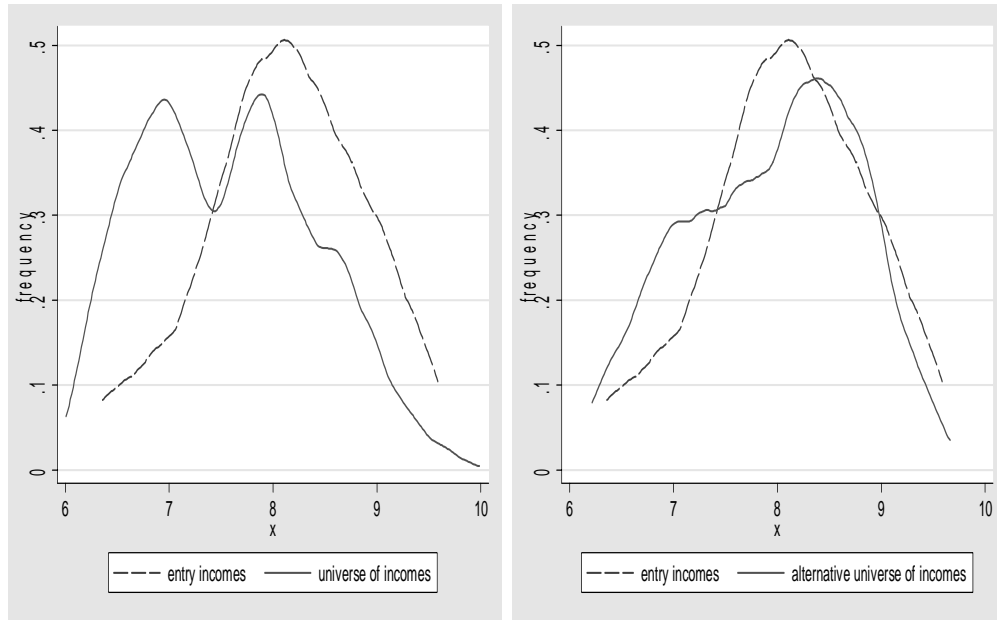
Table 2 shows that the new universe of incomes **B** and incomes of entrants into democracy are not statistically different whether we use non-parametric or parametric testing (except in out of ten cases for each test, and this rather marginally at barely less than 5 percent). The relationship (2) is therefore accepted almost throughout, that is for all levels of democracy.<sup>18</sup>

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<sup>18</sup> It is also confirmed by the probit regressions shown in Annex 2 (table on the bottom). The income coefficient is statistically insignificant throughout.

Figure 5. Distribution of entry incomes vs. two alternative definitions of the universe of country incomes  
(democracy level:  $polity2 > 8$ )

(a) universe **A**: all country incomes      (b) universe **B**: country incomes with the same previous level of democracy



Note: all country incomes in logs. Entry incomes: broken line Universes **A** and **B**: solid line.

Table 2. Kolmogorov–Sminov (KS) and means tests of equality of two income distributions : incomes of countries that entered democracy and the universe of countries' incomes **B**

Definition of democracy	Hypothesis of equality of distributions		Hypothesis of equality of the means 1/		Number of observations	
	Value of KS test	p-value of KS test	t-value	p-value of the test	Entrants into democracy	Universe of country incomes <b>B</b> 2/
<i>Polity2</i> score greater than...						
1	0.12	0.13	0.58	0.28	118	291
2	0.15	0.052	1.11	0.13	111	298
3	0.15	0.054	1.19	0.12	109	285
4	0.12	0.16	1.12	0.13	108	298
5	0.13	0.12	1.78*	0.04	99	319
6	0.14	0.10	0.85	0.20	89	329
7	0.17*	0.045	1.54	0.06	72	301
8	0.12	0.51	0.80	0.21	49	215
9	0.22	0.14	-1.29	0.90	31	97

1/ Tested versus the alternative that the mean income of the entries is higher (hence income plays a role).

2/ Universe **B** is composed of incomes of all countries that had the same previous (past year's) level of democracy as the new entrants into democracy.

Note: One (two) asterisks indicate significance level less than 5 (1) percent.

We conclude that if we control for the already achieved level of democracy, incomes of entrants into a higher level of democracy do not display either a statistically different distribution or the mean from the incomes of the countries who do not move to a higher level of democracy. Consequently, conditional on the previously attained level of democracy, income does not seem to play a role in making countries more or less likely to accede to a higher level of democracy. We can write it more formally:

**Proposition 1.** Countries that enter into higher levels of democracy are not a random draw from the universe of all country incomes; but countries that enter higher levels of democracy are a random draw from the joint distribution of previous level of democracy and income.

*A reconciliation and a different hypothesis*

How do we explain Proposition 1? Consider the following story. Suppose that at some initial point in time all countries have the same low income, and that in terms of democracy they are randomly distributed reflecting a contingent nature of creation of democratic institutions as argued by Przeworski and Limongi. Let their growth be random with respect to democracy but such that Alpha countries do not grow at all and Beta countries do (at uneven rates). Assume further that Alpha's levels of democracy and of course income remain the same throughout time while—crucially—the draws into higher democracy are made only from among the Beta countries. At each period, as Betas grow, some of them, will randomly (that is, independently of their income) accede to higher democracy levels and others will not. Our universe **B** will be composed of Beta countries only and the draws out of that universe will be random with respect to income. However, the universe **A** is composed both of stationary Alphas and the (unequally growing) Betas. The distribution of entrants' incomes will, when compared with the universe **A**, tend to be skewed to the right (toward richer countries) while, of course, it will be the same as the distribution of universe **B**. We obtain the results identical to what we have found here. The key factor is that entries into higher democracy are made from the growing countries only, but once the countries are growing the draws are indeed random.

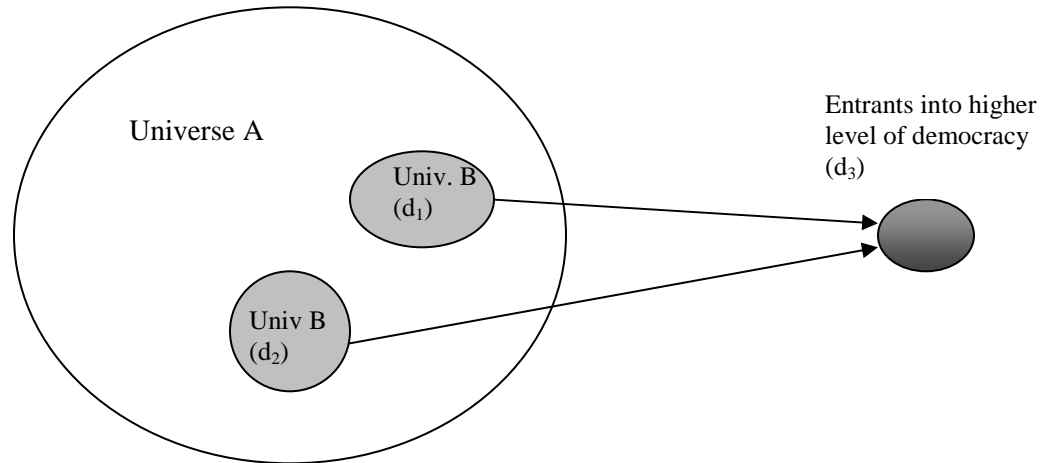
This explanation is illustrated in Figure 6. The draws into higher levels of democracy are made solely from Universe **B** (from two different levels of democracy  $d_1$  and  $d_2$ ; see the shaded areas). The draws are income-random, and thus the distribution of income among the entrants into democracy  $d_3$  ( $d_3 > d_2$  and  $d_3 > d_1$ ) is not statistically different from the distribution of incomes in the universe **B**. But the distribution of entrants' incomes is different (skewed toward higher income countries) from the distribution of incomes in the universe **A**. This is possible only because incomes in the “excluded” area (universe **A** exclusive of universe **B**, that is, **A~B**) are systematically lower than incomes in the **B** areas.

To summarize, we deal with three kinds of countries:

- (i) entrants into democracy
- (ii) countries that did not enter democracy but had the same  $D_{t-1}$  as those that did (universe **B**)
- (iii) countries that did not enter democracy and did not have the same  $D_{t-1}$  as any of the countries that entered democracy. They are the “excluded” countries.



Figure 6. Entrants into higher level of democracy and the two universes of income



Note:  $d_3 > d_2$  and  $d_3 > d_1$  are various levels of democracy. Universe **A** includes universe **B** ( $B \subseteq A$ )

We move now to the study of this hypothesis. First, we confirm that the “excluded” countries have lower income on average and different distribution (skewed to the left) than the entrants into democracy or universe **B**.<sup>19</sup> However is their prior democratic achievement ( $D_{t-1}$ ) lower too? We do not know that because countries acceding to higher levels of democracy could have had come from relatively high or relatively low democracy countries. To see how this is possible, look at the universe **B** when democracy is defined to be higher than *polity2* value of  $d_3$  (Figure 6). Countries from which the new entrants into  $d_3$  were recruited had previously achieved democracy levels of  $d_1$  and  $d_2$ . But we do not know if these levels were relatively high or low, and correspondingly if the

<sup>19</sup> We check that using the same tests of distributions and the means as before. We find that the hypothesis of the equality of incomes between the “excluded” country/years and the entrants into democracy is rejected (results available from the author on request).

“excluded” countries had, on average, democracy levels that were greater or lower than  $d_1$  or  $d_2$ .<sup>20</sup> We study this in Table 3 which compares democracy levels of “excluded” countries and universe **B**. The interpretation of the results as follows. Consider democracy to be *polity2* >1. In the years where there were draws into democracy, let the entrants’ previously achieved levels of democracy be  $x$ ,  $y$  and  $z$ . All countries (whether they entered or not democracy) with such levels are part of universe **B**. On average, the universe **B** was characterized by  $D_{t-1}$  equal to  $-2.9$  (Table 3). How about the excluded countries? They were, on average, significantly less democratic than the universe **B** countries. Their mean  $D_{t-1}$  was  $-6.29$  (and different from  $-2.9$  at less than 0.1 percent level of significance). The difference between the two means steadily increases as we raise the bar for our definition of democracy. For example, when democracy is defined as *polity2* >8, the universe **B** was composed of countries with the previous (past year’s) average democracy score of 5. The excluded countries’ average score was only  $-2.7$ .

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<sup>20</sup> We know that they could not have had levels  $d_1$  or  $d_2$  since they would not be “excluded” then.

Table 3. Test of equality of previously achieved democracy ( $D_{t-1}$ ) between universe **B** countries and “excluded” countries

Definition of democracy	Previously achieved level of democracy (mean)		Hypothesis of equality of the means 1/		Number of observations	
	Universe B	“Excluded” countries	t-value	p-value of the test	Universe B	“Excluded” Countries
<i>Polity2</i> score greater than...						
1	-2.90	-6.21	12.46**	0.000	290	1582
2	-2.47	-5.95	12.50**	0.000	297	1677
3	-2.31	-5.75	12.38**	0.000	284	1783
4	-2.05	-5.45	12.32**	0.000	297	1954
5	-1.53	-5.01	10.65**	0.000	319	2110
6	0.07	-4.45	13.88**	0.000	329	2162
7	1.48	-4.17	15.89**	0.000	301	2768
8	5.01	-2.72	18.83**	0.000	215	2382
9	8.56	-1.46	17.18**	0.000	97	1378

1/ Tested versus the alternative that the mean income of the two groups is the same.  
 Note: One (two) asterisks indicate significance level less than 5 (1) percent.

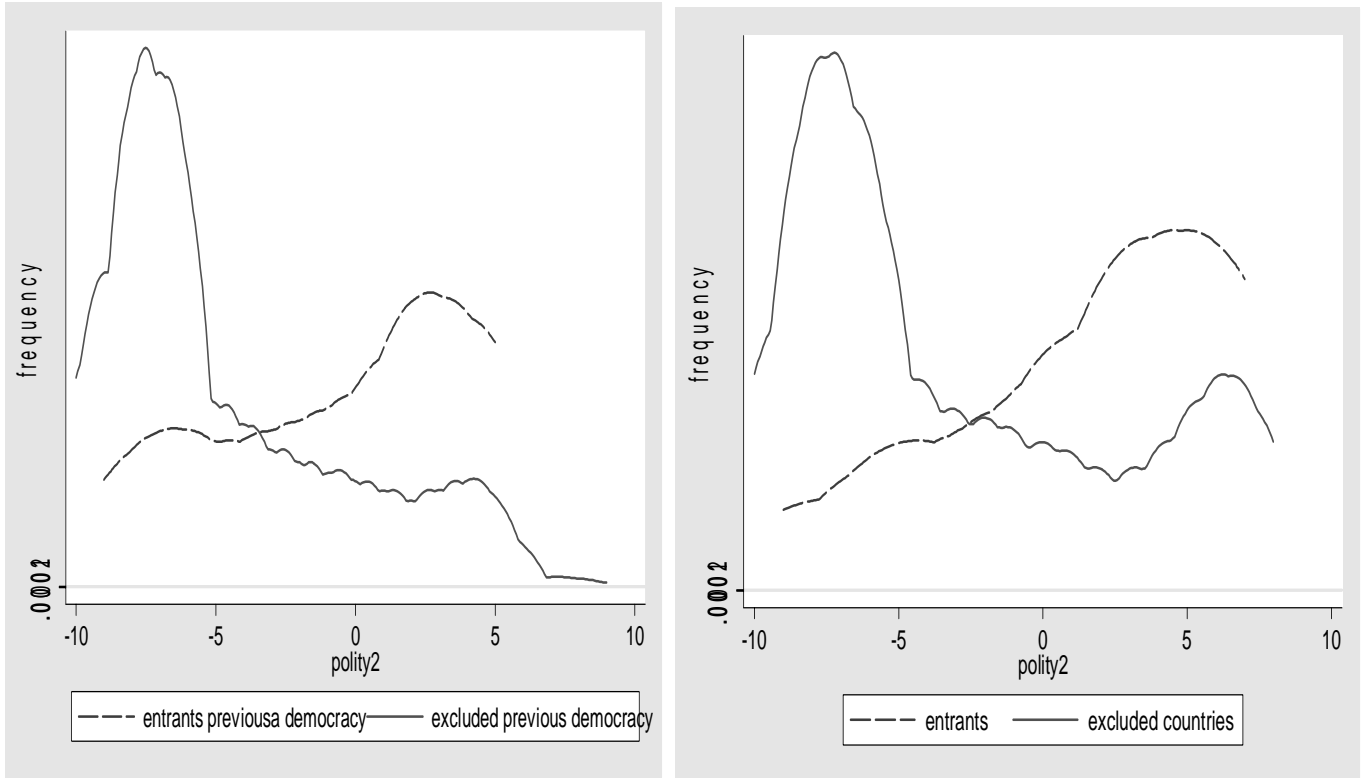
The results are the same if we use non-parametric testing. Figure 7 illustrates the big difference in the achieved democracy levels prior to the accession to two different levels of democracy. For example, if  $democracy = polity2 > 5$ , most of the entrants had prior democracy scores of 5 or just under 5. But more than eighty percent of the excluded countries had previous democracy levels below zero with the mode being -8 and the median -7.<sup>21</sup>

<sup>21</sup> There are a few apparently odd cases of excluded countries with  $D_{t-1}$  greater than 5. This happens as follow. A country in year  $t-1$  may have democracy level of 7. In year  $t$ , it drops to (say) 4. There is a democracy draw in year  $t$  but none from countries with democracy level of 4. Then the country is treated as excluded even if its previous year’s democracy was higher than 5. One such example is Bangladesh in 1961. In 1960, its democracy score was 8, in 1961 after the coup it became -7. It was an excluded country in 1961. (The same logic applies when democracy is defined as  $polity2 > 8$ ).

Figure 7. Distribution of the previously achieved level of democracy ( $D_{t-1}$ ) of entrants and excluded countries

(a) democracy:  $polity2 > 5$

(b) democracy:  $polity2 > 8$



Note: entrants, broken line; excluded countries, solid line.

We conclude that the “excluded” countries are both poorer on average and with significantly lower past achievement of democracy than the universe **B** countries, that is, the countries from among whom the recruitment into democracy is made.

Which are the excluded countries? This would of course vary with our definition of democracy. As an example consider  $polity2 > 5$  to be the definition of democracy, and limit the data to the period after 1950. Between 1950 and 2002, there were 71 entries into democracy. They took

place in thirty years (i.e. there was positive draws in thirty out of fifty-three years). In most of these years only 1 new country entered, but in 1990 five and in 1991 eleven did. Consider for example year 1990. Five countries that acceded were Hungary (with  $D_{t-1} = 4$ ), Nicaragua ( $D_{t-1} = -1$ ), Haiti ( $D_{t-1} = -6$ ), Bulgaria (with  $D_{t-1} = -7$ ), and Namibia (missing value for  $D_{t-1}$ ). To be excluded means that country's  $D_{t-1}$  was different from these four values. Now, if this happens repeatedly (in all years when there are draws into democracy), the implication is that the excluded country is sufficiently different from the democratic entrants that it is unlikely ever to be "drafted" into democracy. Again, taking  $polity \geq 5$  as our definition of democracy, consider the list of countries that have been excluded in more than 25 out of 30 years when there were draws into democracy (over the period 1950–2002).<sup>22</sup> The list is given in Table 4. Several of them (Afghanistan, Jordan, Iraq, Saudi Arabia) were excluded from all thirty draws. They never came close to being recruitment candidates for democracy.

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<sup>22</sup> We can visualize entries into democracy as annual lotteries. Suppose that black men, black women, white men, and white women participate. In some years, no one wins the prize, in other years, some members from two groups (say, black women and white men) win. To be excluded in one year means that no one from a given group (say, black men) has won. But if this continues year after year, that group (black men) will indeed feel quite excluded. If one is a black men, he would feel excluded not solely because he has failed to win (many people did) but because no one from your group ever did.

Table 4. List of the most frequently excluded countries when “draws “ into democracy (defined as *polity2*>5) were made, period 1950–2002

	Number of exclusions	GDI per capita in 2001	Polity2 value in 2002
Morocco	26	2782	-6
Guatemala	26	3363	8
Liberia	27	846	0
Indonesia	27	3256	7
Iran	28	4911	3
Ethiopia 1/	28	660	n.a.
Albania	28	2807	5
Iraq	29	1294	-9
Egypt	29	2992	-6
Cuba	29	2477	-7
China	29	3583	-7
Libya	29	2284	-7
North Korea	29	1154	-9
Saudi Arabia	30	8015	-10
Jordan	30	4055	-2
Oman	30	6926	-9
Afghanistan	30	453	n.a.

1/ Inclusive of Eritrea before the separation.

As we can see, these are generally poor countries (with the exception of two oil-rich kingdoms) with low democracy scores. The unweighted 2001 mean GDI per capita for this group is \$PPP 3,050 which is less than half of world average in the same year, and their mean *polity2* value is -3.1 compared to the world average of 3. However, being excluded is not an immutable fate as we can see from the examples of Guatemala and Indonesia which respectively in 1998 and 1999 acceded to democracy.

## 5. Conclusions

The objective was to investigate the effects of income (and implicitly income growth) on accession to democracy. The paper uses two long-term data series which have only recently become available and combines them in a new fashion. It also departs from some other tests done previously because it emphasizes non-parametric testing.

First, the paper rejects the dyadic view of democracy vs. non-democracy. We do not start with an a priori definition of democracy, but rather study how entries into democracy systematically vary with the changing definition of what democracy is. It then emerges that our view as to whether higher income encourages emergence of democracy or not depends on what our definition of democracy is. If that definition is relatively broad, we find that the entrants into democracy do not, on average, have significantly higher incomes than those that do not enter democracy. However if the definition of democracy is more demanding (narrow), we conclude that the distribution and the mean values of entrants' incomes are respectively different (more skewed to the right) and higher than those of the countries that fail to democratize. The monotonic relationship between the increase in the level of democracy and rejection of the Przeworski-Limongi hypothesis is quite unambiguous.

However, if in addition to a simple probability of entry into democracy conditional on income, we posit that the entry is conditional also on the previously achieved level of democracy, we find that income no longer plays a role in the selection of countries that enter democracy. This holds for practically all levels of democracies. In other words, the

role of income in “helping” entry into democracy seems to vanish once we control for the previously achieved level of democracy.

How do we reconcile these two different findings? We argue that the results imply that there is a subgroup of “excluded” countries that exhibit both low levels of income and democracy. They are defined not simply by the fact that they have failed to enter democracy (defined as, say, *polity2* value of 5 or 6 or 7), but that no country with their level of democratic achievement has succeeded in acceding to *polity2* > 5 or *polity2* > 6 etc. In other words, these countries are significantly different from the set of countries from which the recruitment into democracy is made. Obviously, a country need not be “excluded” throughout all the years. In some years, another country with the same low level of previous democratic achievement can accede to democracy. But this is unusual.

Now, from the other group of countries from which the draws into democracy are made, the entries into democracy are income-random. There is thus a major discontinuity or the split in the sample. Income both matters and does not matter. It matters because low income is probably the reason why the “excluded countries” are unable to improve their democracy levels and move to a group of countries wherefrom the recruitment into democracy is made. But, on the other hand, income does not matter for other countries’ accession to higher democracy levels since the accession occurs randomly.



**Annex 1.** Year and GDI per capita when country entered democracy  
(democracy defined as *polity2* > 5)

Country	Entry GDI per capita	Year of entry	Country	Entry GDI per capita	Year of entry
Burma	396	1950	Singapore	2186	1959
Botswana	473	1966	New Zeal.	2212	1860
Niger	509	1992	Canada	2249	1888
Malawi	522	1994	Japan	2336	1952
Bangladesh	526	1959	Serbia/Montenegro	2354	2000
Lesotho	577	1966	Bolivia	2394	1982
India	619	1950	Colombia	2400	1957
Pakistan	638	1956	Austria	2412	1920
Laos	661	1957	Ireland	2533	1921
Uganda	694	1962	Jamaica	2541	1959
Madagascar	715	1992	Germany	2586	1919
Mali	758	1992	Israel	2817	1950
Zambia	797	1991	Mauritius	2907	1968
Gambia	846	1965	Italy	2920	1947
Nigeria	854	1960	Sweden	3048	1914
S.Leone	858	1961	Indonesia	3107	1999
Greece	880	1870	Guatemala	3232	1996
Sudan	889	1954	Paraguay	3237	1992
Nepal	961	1999	Namibia	3278	1990
Haiti	1041	1990	Romania	3307	1996
Mongolia	1049	1992	Syria	3453	1954
Mozambique	1084	1994	Ukraine	3477	1880
S. Korea	1105	1960	Moldova	3519	1993
Sri Lanka	1159	1948	Netherlands	3627	1917
Benin	1162	1991	Macedonia	3644	1991
Ghana	1210	1979	S. Africa	3698	1992
Portugal	1242	1911	Australia	3839	1901
USA	1257	1820	Denmark	3857	1911
Somalia	1277	1960	Ecuador	4060	1979
Turkey	1430	1946	Peru	4205	1980
Senegal	1433	2000	Panama	4361	1989
Dom. Rep.	1437	1963	Chile	4693	1964
Nicaragua	1454	1990	Poland	4738	1991
Malaysia	1455	1957	Uruguay	4957	1952
Switzerland	1488	1850	Thailand	5290	1992
Brazil	1501	1946	Armenia	5297	1991
France	1529	1848	Ukraine	5485	1991
Finland	1581	1917	Bulgaria	5597	1990
Costa Rica	1624	1920	Slovakia	5907	1993
Spain	1786	1900	Russia	6293	1992
Honduras	1833	1982	Hungary	6459	1990
Norway	1900	1898	Trinidad/Tob	6514	1962
Belgium	1962	1853	Mexico	6541	1997
Philippines	2040	1987	Croatia	6632	2000
El Salvador	2091	1984	Belarus	7076	1991
			Czech	7819	1993
			Argentina	7962	1973

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Lithuania	8139	1991
Latvia	8888	1991
Estonia	9744	1991
Venezuela	9816	1958
Slovenia	10402	1991
Taiwan	11128	1992

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Note: Countries ranked by their entry income. Democracy defined as *polity2* value greater than 5. The year is the first year when country reached such level of democracy.

Year and GDI per capita when country entered democracy  
(democracy defined as *polity2* > 8)

Country	Entry GDI per capita	Year of entry
Lesotho	577	1966
India	619	1950
Madagascar	715	1992
Greece	880	1870
Mongolia	1049	1992
United States	1257	1820
Malaysia	1455	1957
Switzerland	1488	1850
Costa Rica	1624	1920
Finland	1658	1919
Norway	1900	1898
Austria	1956	1946
Bolivia	2181	1985
New Zealand	2212	1860
Turkey	2221	1961
Canada	2249	1888
Japan	2336	1952
Jamaica	2541	1959
Ireland	2653	1927
France	2811	1919
Israel	2817	1950
Mauritius	2907	1968
Sweden	2968	1916
Italy	3063	1948
Germany	3282	1949
Belgium	3389	1919
Netherlands	3627	1917
Peru	3630	2001
Botswana	3659	1997
South Africa	3755	1994
Australia	3839	1901
Ecuador	4060	1979
Denmark	4110	1914
United Kingdom	4637	1922
Colombia	4821	1991
Thailand	5290	1992
Panama	5329	1994
Uruguay	5567	1985
Poland	5623	1995
Bulgaria	5644	2001
Hungary	6459	1990
Portugal	6814	1976
Slovakia	7592	1998
Czech	7819	1993
Lithuania	8139	1991
Spain	9023	1978

Chile	9841	2000
Venezuela	10262	1969
Slovenia	10402	1991
Trinidad and Tobago	11273	1984
Taiwan	14598	1997

Note: Countries ranked by their entry income. Democracy defined as *polity2* value greater than 8. The year is the first year when country reached such level of democracy.

**Annex 2. Hypothesis A: Probit regression**  
(dependent variable: entry into democracy)

	Democracy level ( <i>polity2</i> greater than...)									
	0	1	2	3	4	5	6	7	8	9
GDI per capita from (universe <b>A</b> )										
<i>p</i> -value	0.00001 (0.624)	0.00001 (0.416)	0.00002 (0.201)	0.00002 (0.104)	0.00002 (0.087)	0.00003 (0.025)	0.00004 (0.012)	0.00003 (0.01)	0.00005 (0.001)	0.0001 (0.002)
Constant	-1.46995 (0)	-1.544 (0)	-1.604 (0)	-1.657 (0)	-1.708 (0)	-1.802 (0)	-1.882 (0)	-2.067 (0)	-2.209 (0)	-2.216 (0)
No of Obs	1652	1819	1884	2003	2169	2330	2407	2979	2537	1428
Log likelihood	-432.628	-436.545	-423.990	-424.934	-427.93	-407.35	-381.29	-339.97	-244.85	-152.70

**Hypothesis B: Probit regressions**  
(dependent variable: entry into democracy)

	Democracy level ( <i>polity2</i> greater than...)									
	1	2	3	4	5	6	7	8	9	
GDI per capita from (Universe <b>B</b> only)										
<i>p</i> -value	0.00002 (0.563)	0.00003 (0.256)	0.00003 (0.230)	0.00003 (0.267)	0.0001 (0.081)	0.00002 (0.386)	0.00002 (0.128)	0.00004 (0.535)	0.00002 (0.113)	-0.0001 (0.113)
Constant	-0.597 (0)	-0.682 (0)	-0.674 (0)	-0.710 (0)	-0.857 (0)	-0.855 (0)	-0.987 (0)	-0.940 (0)	-0.940 (0)	-0.3517 (0.107)
No of Obs	409	409	394	406	418	418	373	264	128	128
Log likelihood	-245.565	-239.461	-232.60	-234.56	-227.31	-217.37	-183.27	-129.38	-71.67	-71.67

Note: Coefficient significant at less than 1 percent level shaded. GDI per capita is in logs.

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