Conferencia Interamericana de Seguridad Social

Centro Interamericano de Estudios de Seguridad Social

VOL. 3 NUM. 1 FIRST SEMESTER 2007

Well-being and Social Policy

Quality of Education
Guest Editor
Harry Anthony Patrinos

CISS

UNIVERSIDAD IBEROAMERICANA
CIUDAD DE MÉXICO

WELL-BEING AND SOCIAL POLICY
VOL 3, NUM. 1, pp. 5-24

INEQUALITY, QUALITY OF PRIMARY EDUCATION AND DEVELOPMENT IN LATIN AMERICA AND THE CARIBBEAN*

Sripad Motiram
Department of Economics, Dalhousie University
sripad.motiram@dal.ca

Jeffrey B. Nugent
Department of Economics, University of Southern California
nugent@usc.edu

Abstract

This paper draws on a political economy model to hypothesize that the quality of education is likely to be lowered by both economic and political inequalities. In particular, we utilize a panel data set across countries and over time to test the applicability of the hypothesis to quality of education indicators at the primary level. Among the four specific indicators of primary education assigned priority in the World Millennium Development Goals, Gross Enrollment Rates, Net Enrollment Rates, Pupil-Teacher Ratios and Survival Rates from Grades 1 to 5, our focus is on Pupil-Teacher Ratio because of its close association with quality. Because of its considerable variation in political and economic inequality across countries as well as over time and its general reputation for high income inequality and gradual but uneven transition to democracy, our application is to countries of the Latin America and the Caribbean region. While the results do not support the economic inequality hypothesis, they do support the political inequality hypothesis. The latter results appear to be rather robust to alternative choices of estimation methods and empirical specifications

Key words: Political Inequality, Income Inequality, Public Education, Educational Quality, Latin America and the Caribbean
Classification JEL: O41, P16, I22, D31

Introduction

The frequently observed low quality of public education is widely believed to contribute to the high and persistent poverty rates in low income countries (LDCs). We cite evidence of this and then hypothesize that both political inequality (wherein the majority of the population cannot

* Revised version of a paper presented at the Conference on "The Quality of Education in Latin America and the Caribbean" in Mexico City, Feb 2-3, 2007. The authors express their appreciation for research assistance provided by Ike Song, Parul Srivastava and Rabiga Ibrayeva and to conference participants, and especially our discussant David Mayer-Foulkes for many useful comments on the earlier version of the paper.

effectively participate in decision-making over public policy) and economic inequality (in terms of income or wealth) contribute to the low quality of basic public education and thereby to low overall quality of education in many LDCs. Given the fragility of democracy in the Latin America and Caribbean (LAC) region (and the many transitions of LAC countries in and out of democracy) and the region's generally high rate of income and wealth inequalities, in this paper we confine our attention largely to the LAC region.

Given that much smaller percentages of students advance to the secondary and higher levels of education in LAC and other regions of LDCs and that deficiencies in basic skills are hard to make up for at higher levels of education, it is at the elementary level where the breadth of participation in public policy decisions is most important. The quality of elementary education, moreover, is a crucial determinant of success in stimulating further education, reducing poverty and income inequality, encouraging social mobility and allowing development to spread beyond the confines of small, traditional elites.

For this reason, our focus is on the determinants of indicators of educational quality at the primary level. Since our political economy explanation for variations in educational quality at the primary level is most directly applicable to, and measurable at, the national level, in our search for empirical evidence we confine our attention to comparisons across countries and over time at the national level. As such, the paper is intended to be a complement to the other more micro-level studies presented in this volume.

The paper is organized as follows: Section 1 reviews some of the relevant theoretical literature on the political economy of public goods provision in general and education in particular. Special attention is given to studies on the LAC region. Section 2 provides a rather brief outline of our theoretical model, developed more thoroughly in a separate paper (Motiram and Nugent, 2006). Section 3 identifies the measures, sources of data and descriptive statistics. Section 4 presents the empirical model and the resulting estimates. Section 5 contains our conclusions.

1. Background and Literature

Our starting point is empirical evidence from several cross-sectional studies showing that (1) income and ethnic inequalities adversely affect public goods provision[1], (2) political economy arguments go a long way towards explaining these influences (Acemoglu and Robinson, 2000; Robinson, 2004), and (3) in most regions of LDCs educational quality at the primary level is well below that in both developed countries and transition countries (as presented in Table 1 below).

More specific to education, we also draw upon the following strands of literature: (1) demonstrations that in economies where credit-constraints are binding, inequality may breed inefficiency by preventing the poor from exploiting investment opportunities (as summarized by Ray, 1998, pp. 234-236),[2] (2) studies on the political economy of public good provision (e.g.,

[1] Examples of cross-country studies are Easterly and Levine (1997), Easterly (2002) and Filmer and Pritchett (1998a) and of within-country cross-section studies Filmer and Pritchett (1998b) and Nugent and Swaminathan (2006).

[2] These constraints may be especially relevant in the case of human capital investment due to the absence of suitable collateral.

Fernandez and Rogerson, 1995; Bourguignon and Verdier, 2000a, 2000b; Gradstein, 2003; Grossman and Kim, 2003), involving choices between general and vocational education (Bertocchi and Spagat, 2004; Krueger and Kumar, 2004) and/or between public and private provision (Glomm and Ravikumar, 1992);[3] (3) studies of Bourguignon and Verdier (2000b) and Galor et al. (2005) suggesting that the rich do not have incentive to support public education, (4) the historical work of Engerman and Sokoloff (1997, 2002) showing how the plantation technology of LAC gave rise to greater inequality and underdevelopment of education and property rights than the small-scale agricultural technology of North America, and (5) Chen (2005) who uses a dynamic model to show that, in the presence of credit constraints on borrowing by the poor, inequality will be lower and growth higher the larger is the share of public education even though the rich will tend to resist paying the taxes to finance such education.[4] Our own approach builds on this literature and the several possible mechanisms whereby initial inequality can affect educational outcomes. However, it also makes its own way from the following four common (but certainly not universal) characteristics of LDCs. (1) In the absence of well-functioning democracies but in the presence of ethnic or religious fragmentation, the poor and other disadvantaged groups are typically inadequately represented in political processes, often with serious consequences for public education (and other public goods).[5] (2) The private provision of education (especially at the primary level) is surprisingly important in LDCs.[6] (3) As indicated by the many countries with large natural resource wealth, the obstacles to improving public goods provision seem less due to insufficient resources than to inappropriate incentives and an unfavorable political climate (Easterly 2001, p. 232; Robinson 2004). (4) Although public education gives rise to externalities that should increase willingness to fund it, these spillover benefits are often perceived to be limited by ethnic, racial or other cleavages (Easterly and Levine, 1997; Alesina et al., 1999).

There is also an extensive descriptive and empirical literature on the problems of education at the primary level specific to Latin America. Much of this literature traces the educational problems in LAC to political economy considerations (Gomes, 1993; Beech, 2002; Engerman and Sokoloff, 1997, 2002).[7] For example, Plank (1990) pointed out that, even after the inauguration of an "Education for All" program following a transition to democracy in Brazil, because of income inequality and the power of elites, much of the additional funding provided was diverted to higher education and to private schools. Likewise, Psacharopoulos (1986) and Reimers (1991) pointed to the fact that political economy conditions were such as to make expenditures on basic education especially

[3] Note the implications of such derived by Epple and Romano, 1996; Glomm and Ravikumar 1998; Gradstein and Justman, 1997, and Cardak, 2004a,b.

[4] In contrast to our own focus, Chen's is on the effects of education on inequality (and growth) rather than the other way around.

[5] For some interesting examples see Burki (1976) for Pakistan of the 1950s, Dreze and Sen (2002) for contemporary India, and Easterly (2002) for LDCs in general.

[6] For example, according to the World Bank's World Development Indicators 2002, public spending on health (and probably also education) averaged only 1 percent of GDP in low income countries between 1997 and 2001 but private spending averaged 3 percent. Moreover, private provision (especially in education) tends to come at quite different quality levels, with better quality provision benefiting the higher income groups (Dreze and Sen, 2002, p. 153; De and Dreze, 1999; Srinivasan, 2004).

[7] Beech's study is especially comprehensive. Based on a review of eight books, it characterizes education in the LAC region to be in a "state of crisis in which quality, equity and efficiency are the main problems."

vulnerable to budget cuts in the aftermath of the Latin American debt crisis of the 1980s. Numerous authors, including some making use of achievement scores (e.g. Palafox et al., 1994), relate poor performance at the primary school to tell-tale signs of the poor quality of education, such as high repetition and drop-out rates. An empirical study by Brown and Hunter (1999) uses panel data for 17 LAC countries for 1980-92 to show that the sensitivity of social spending (an aggregate which includes educational expenditures) to economic and political constraints varies by the type of political regime. Wolff et al (1994) connected the 42 percent repeat rate among LAC first grade students to poor quality of education, the failure to provide compensatory measures for disadvantaged children and its distorted allocation of educational expenditures in favor of higher education as demanded by middle and upper class citizens.

Although not specific to Latin America, another relevant study with at least a number of Latin American countries in the sample is that of Lee and Barro (2001). This study made use of several school quality measures, including internationally comparable test scores for some 58 countries (but only five from the LAC region). Significant shortcomings of the study are that these tests were given to students in different age groups, subjects and time periods (from the 1960s to the early 1990s), with differing sample sizes of unknown comparability. Also, the study is unable to control for the extent that in a given country and year teachers may have "taught to the test", thereby biasing the scores upward. In particular, the authors attempted to estimate the determinants of test scores (or alternatively school dropout rates or repeat rates) with crude proxies for family inputs (average income and education of adults in the country as a whole) and school quality measures such as pupil-teacher ratios, average teacher salaries, and length of school days used as explanatory variables. The only consistent findings were that the test scores were positively related to desirable family background measures and negatively related to pupil-teacher ratios. They also included a dummy variable for East Asia which turned out to have a consistently positive influence in various specifications. While the authors offered no explanation for the East Asia result, we suggest that it could have something to do with East Asia's low income inequality. While they showed that school quality has a significant influence on test scores, they did not attempt to explain the cross-country differences in school quality (pupil-teacher ratios).

2. Brief Outline of the Model and its Results

In light of the above observations, we build a simple model to explain public choice over the quality of public education. We present the basic intuition here. For a full presentation of the model the reader is referred to Motiram and Nugent (2006).

Consider a situation characterized by unequal distribution of income and the absence of credit markets. Public education is funded by a proportionate tax on the income of all agents and the quality of public education increases in the tax revenue and thereby the tax rate chosen. The tax rate (and therefore the quality of public education) is decided not by the median voter, but rather by someone of higher rank in the income distribution. Private education also exists and is of high quality but is unaffordable to the majority (which includes the poor). Each agent has access to a technology that can generate income from human capital. There is also a "learning technology" that can generate future human capital for agents, based upon their current human capital and the quality of education that they receive.

The decisive voter (who chooses the quality of public education) has two options. First, she could choose public education for herself, in which case, she will choose a high tax rate and high quality public education. Second, she could choose private education for herself, in which case, she has no incentive to provide high quality public education and would therefore choose a low tax rate and provide low quality public education. The decisive voter will choose the option that gives her higher utility among the two.[8] Using standard specifications for preferences and production and learning technologies,[9] we can show that as long as the income of the decisive voter is higher than a particular threshold, she chooses the second option and vice-versa. If this condition holds (i.e. if the income of the decisive voter is higher than the threshold), in equilibrium a majority get low quality public education while those remaining (a minority) get high quality private education. On the contrary, if this condition does not hold (i.e. if the income of the decisive voter is less than or equal to this threshold), in equilibrium, a majority gets high quality public education and a minority may still choose private education.

The overall quality of education is the weighted average of the quality of public and private educations, where the weights are the proportions of the population choosing the respective kind of education. If economic inequality increases, the overall quality of education decreases if this increase in inequality is accompanied by a fall in the proportion of the population who are enrolled in private education (e.g. because the proportion of the population who can afford private education falls).[10] The reason for this is as follows. If the decisive voter chooses private education and therefore provides low quality public education, then a movement of some from private to public education will lower the overall quality. If the decisive voter chooses public education, the same result holds because, although the quality of public education provided is high, it is still lower than that of private education (otherwise no one would enroll in private education).

If political inequality increases (implying that a richer person becomes the decisive voter), the overall quality of education can only decrease. A sufficient condition for overall quality to decrease is that initially the decisive voter prefers public education, but after an increase in her income, she prefers private education. The reason for this result is as follows. If the income of the decisive voter is lower than the threshold, then the decisive voter chooses public education and therefore provides high quality public education and vice-versa. Hence, when a richer person becomes the decisive voter, there is a possibility that her choice will change from public to private education, implying a shift from providing high quality to low quality public education. This would lead to a reduction in the overall quality.

The above arguments and results would apply for other non-democratic specifications, e.g. if instead of a decisive voter, a minority elite decides the quality of public education. Moreover, by modifying the model slightly, we can make similar arguments regarding the quantity of public education.[11] The results derived from this simple model therefore provide the rationale for our

[8] Note the importance of the condition that the decisive voter be richer than the median voter. Otherwise, since the majority cannot afford private education, if there is majority voting, high quality public education will always be chosen.

[9] These are logarithmic preferences, Cobb-Douglas learning technology and a production technology that is exponential in human capital (i.e. Ah^{α} where h is the human capital, and both A and α are constants).

[10] Note that we are implicitly assuming that, before the change in inequality, some people are enrolled in private education. Also, we assume that when inequality changes, the income of the decisive voter remains the same.

[11] The modifications needed are as follows: (1) a learning technology depending on the quantity of education (instead of its quality) and (2) the quantity of education that an individual would receive from public or private education.

basic political economy hypothesis that the quality of education would tend to be lower the greater the political and economic inequality. By political inequality we mean the absence of democracy and by economic inequality we mean income or wealth inequality. This brings us to our empirical investigation of the hypothesis in the following section.

3. Measures of the Quality of Education at the Primary Level and of Their Determinants

Test scores and other standardized performance indicators may be better indicators of educational quality than some of the more traditional ones, such as school attendance, school and teacher characteristics. Happily, and especially thanks to the efforts of the OECD's PISA project, standardized test scores are creeping into increasing use, as demonstrated in several of the papers presented in this volume. However, few of these data sets are nationally representative and comparable across countries and over time. For this reason, in monitoring progress toward the achievement of the Global Millennium Development goals (to which all countries have committed themselves), UNESCO has chosen to monitor six of the more standard measures of school quality at the primary level: (1) gross enrollment rates, (2) literacy rates, (3) survival rates among those who enroll in the first year to the fifth years of school, (4) pupil-teacher ratios, (5) percentages of teachers who are trained, and (6) expenditures per pupil.[12]

Data on literacy rates are much affected by past history and therefore not reflective of educational quality at a given point in time. Educational expenditures per pupil are very scarce, hard to compare across countries and, if inefficiently allocated, may have little relevance for the quality of educational output.[13] The definition of "trained" teachers is ambiguous and the data very incomplete.

For this reason, in Table 1, we exclude these three indicators and concentrate attention on the first four indicators, by region for 2000-2001. We also add another indicator Net Enrollment Rates (NERs) which are closely related to but superior to Gross Enrollment Rates (GERs). Note that both developed and transition countries have Gross Enrollment Rates at the primary level (GERs), literacy rates and survival- to-grade-5 rates (SURV) approaching 100 percent and pupil-teacher ratios (PTRs) below 20. Yet, with the exception of GERs, LDCs as a whole and several regions thereof have rates far short of 100 percent and PTRs well above 20. As is well-known, (unlike NERs) the GERs of LDCs are quite substantially overestimated since included in the numerator are students of younger or older ages than those used in the denominator (those 6-11 in age). Since at present, attendance at primary school is also generally compulsory, one should not expect the reported GERs and NERs at the primary school level to be much below 100 percent. Yet, despite these sources of upward bias, even for the GERs, the percentages do not reach 95 percent in several regions.

[12] Other standard measures of school quality used in the literature include the teacher's years of schooling, text book availability, library availability and access, blackboard availability, instructional media, teacher punctuality and absenteeism, homework frequency, quality of the school principal, and teachers' incentives, etc. (Fuller, 1987). Yet, frequently, these have been shown either not to matter or not to be comparable across countries.

[13] In addition, many studies, such as the aforementioned Lee and Barro (2001), have shown no effect of this measure on performance indicators like test scores.

Table 1
Regional Averages of Quality Indicators of Primary Education for 2000/2001 by Region

Region	Gross Enrolment Rate (GER)	Net Enrollment Rate (NER)	Literacy	Survival to Grade 5 (SURV)	Pupil/Teacher Ratio (PTR)
	Weighted Avg	Weighted Avg	Weighted Avg	Median	Median
World	100.6	89	81.7	...	22
Transition Countries	103.6	94	99.6	94.9	19
Developed Countries	100.6	96	8.9	95	15
Developing countries	100.5		76.4	83.3	28
Arab States	92	82	62.2	94	22
East Asia and the Pacific	111.4	83	91.3	...	25
Latin America and the Caribbean	92.9	82.9	89.2	82.5	29
South and West Asia	93.9	80	58.3	77.8	40
Sub-Saharan Africa	84.9	57	62	66.6	44

Source: UNESCO EFA Global Monitoring Report 2005 and UNESCO Yearbooks various years.
Literacy measures are for 2000-2004.
... indicates that data are not available.

For the other three indicators of educational quality at the primary level, the picture for LDCs is much worse. Literacy rates barely reach 75 percent in LDCs as a whole and hover around 60 percent in the Arab States, South and West Asia and Sub-Saharan Africa. The survival-to-grade 5 rates (SURV) average below 80 percent in both the South and West Asia region and the Sub-Saharan Africa region. For these last two regions of LDCs, the PTRs average 40 and 44, i.e., much more than double the averages for developed and transition countries. These different indicators are, of course, not independent of each other. The high PTRs and other measures of poor quality are generally believed to contribute substantially to low GERs and SURVs. All four of these other indicators of quality contribute to the comparatively low literacy rates for LDCs as a whole and for the individual regions thereof.

Although the Latin America and Caribbean (LAC) region is not particularly low in most of these indicators, in view of its relatively high per capita income, one might have thought that the region would do considerably better on these indicators than it actually does. Indeed, since it is also a region with relatively fragile democracies and high inequality, as suggested above, it provides an interesting region for examining the applicability of our inequality hypothesis. Table 2 provides a comparison of the educational quality indicators, per capita income and inequality measures for approximately the year 2000. The variations across countries amply demonstrate the heterogeneity within the LAC region in both educational quality indicators and both income per capita and political and economic inequality.[14]

[14] Note also that there is some variation in life expectancy at birth which is used in our regressions (in lagged form).

Given the small number of explanatory variables used in our analysis and hence the risk of omitted variables bias in our estimates, we deem it important to make use of panel data for the maximum number of years possible at five year intervals. This is to allow us to make use of fixed effects estimators to eliminate the bias due to the presence of unmeasured heterogeneity across countries as well as to test for the validity of fixed and random effect estimators. For some countries the data on GER is available from as far back as 1950 to 2005. For other variables, such as SURV and the Gini coefficients, data availability across countries and over time is much more limited.

As indicated in Table 1, the primary source of the data for the four educational quality measures at the primary level is UNESCO, both UNESCO Yearbooks and the UNESCO website (http://stats.uis.unesco.org/ReportForlders/reportfolders.aspx) including their report on "Monitoring the Millennium Development Goals." But some data missing for some years and countries from this source is taken from the following World Bank website (http//ddp-ext.worldbank.org/ext/ddpreports). The data on the Gini coefficients (GINI) are obtained from the World Bank's World Development Indicators (WDI); from the United Nations, WIDER and other sources. The data for DEMOC (which is based on a 0-10 scale) is taken from the Polity IV database (http://www.cidcm.umd.edu/polity/). Since this database is updated on a regular basis, we looked at the most recent data at the time of writing this paper. Since, we used five year intervals in our analysis, for the DEMOC value for a particular year, we used the average of the four previous years from the Polity IV database (e.g. for 1950, we used the average DEMOC for 1945-49). Interruptions (code -66), interregnums (-77) and transitions (-88) are treated as missing values in the computation. Other variables to be explained below and included either as controls or as instruments (for DEMOC) are (1) GDP per capita at PPP prices (GDPPC) taken from World Development Indicators (WDI) CD ROM 2005, (2) the primary share in total exports (PRIMES) taken from the World Trade Organization and UNCTAD websites and the World Development Reports of various years, and (3) life expectancy at birth taken from the United Nations (2005) and the Oxford Latin America Economic History Database (http://oxlad.qeh.ox.ac.uk/index.phd).

4. Empirical Model and Estimation

Our empirical model for educational quality in country j in time t (Q_{jt}) is as follows:

$$Q_{jt} = \alpha + \beta X_{jt} + \delta DEMOC_{jt} + \varepsilon_j + u_{jt} \qquad (1)$$

where X_{jt} is a vector of control variables, for present purposes limited to the natural log of GDPPC (LnGDPPC) and its square (LnGDPPCSQ), the 5 year-lag of life expectancy at birth (LAGLIFE)[15] and the Gini coefficient (GINI). The subscript t represents the years at five year intervals between 1950 and 2005 for which information is available. Because of missing observations for some countries and years, the data set is an unbalanced panel.

[15] The rationale for life expectancy lagged five years is that five years after birth is when children would be at the primary school level. The higher the life expectancy, the higher would be the present value of investments in education and hence the demand by parents for quality in primary education.

We have used most of the measures of educational quality mentioned in Table 1 in our regression analysis. Yet, since GER, NER, and SURV are believed to be more closely associated with the quantity of education rather than the quality of education, for present purposes, we report results only for what is generally regarded as the measure that most closely corresponds to educational quality, namely, the pupil-teacher ratio (PTR). Since the most appropriate functional

Table 2
Educational Quality Measures, Inequality Indicators and Other Measures for Individual Latin American and Caribbean Countries and Territories for the Year 2000

Country	GER	NER	PTR	SURV	GDPPC	GINI	DEMOC	LIFE
Antigua			18.7		8812			
Argentina	118	99	21	98	7703	0.467	7.2	74.3
Bahamas	93	93	15		16600	0.453		69.5
Barbados	109	97	17	95				74.9
Belize	117	96	19	91	3331			71.9
Bermuda	103			93				
Bolivia	115	94	42	84	1010	0.52	9	63.9
Brazil	151	94	20	(73)	3461	0.60	8	70.3
Chile	100	(86)	24	99	4917	0.564	8	77.9
Colombia	112	87	20	69	1989	0.571	7	72.2
Costa Rica	108	92	19	94	4058	0.457	10	78.1
Cuba	105	98	19	98			0	77.2
Dominica	103	80	15	85	3801	0.48		
Dom Rep.	100	86	34	74	2392		7.4	67.1
Ecuador	115	98	17	78	1295	0.53	8.8	74.2
El Salvador	78	78	34	69	2081	0.489	7	70.7
Grenada	96	84	20.3	79	4047			
Guatemala	104	87	32.5	65	1727	0.59	7.2	67.1
Guyana	122	(90)	26.2	77	959	0.402	6	62.8
Haiti	(56)	(26)	29		468		7	51.5
Honduras	106	88	34		928	0.588	6.2	67.6
Jamaica	95	90	33.6	90	3100	0.364	9	70.7
Martinique			45		408	0.390		78.7
Mexico	109	98	27.2	90	5934	0.528	5.2	74.9
Nicaragua	103	83	35.7	65	794	0.503	8	69.5
Panama	109	98	24.7	90	3939	0.576	9	74.7
Paraguay	113	(89)	23	77	1412	0.591	6.8	70.9
Peru	121	98	29	86	2045	0.506	3	69.8
St. Lucia	102	96	23.2	97	4379	0.426		72.3
St Vincent	102	93	18.6	82	2891			71
Suriname	120	93	22		2054			69
Trinidad	104	(88)	21	71	6347	0.403	9.6	69.9
Uruguay	109	(95)	21	89	6189	0.446	10	75.5
Venezuela	102	90	23	94	4819	0.441	7.8	72.8

Notes: Numbers in parentheses indicate cases in which the observations are for 1998 or even earlier. Blank entries indicate data not available.
GER: Gross Enrolment Rate, NER: Net Enrolment Rate, PTR: Pupil to Teacher Ratio, SURV: Survival to grade 5, GDPPC: GDP per capita, GINI: Gini Coefficient, DEMOC: Democracy Index (0-10). LIFE: Life expectancy at birth (in years).

form for the hypothesized relation between PTR and both political and economic inequality cannot be identified from our theoretical model, as alternative variants of PTR we also use its inverse, the Teacher-Pupil Ratio (TPR) and its natural log transformation (lnTPR).

Table 3 presents the correlation matrix among all variables used in the analysis. As expected, there is high correlation among PTR, TPR and lnTPR. It is not surprising that LnGDPPC is positively correlated with both the lag of life expectancy and DEMOC. Similarly, it is unsurprising that DEMOC is positively correlated with lag of life expectancy and negatively correlated with GINI. But, since the correlations are quite modest, there is no evidence of a serious collinearity problem. Consistent with our inequality hypothesis, the correlation between PTR and GINI is positive and that between PTR and DEMOC negative (and the signs reversed in the case of the inverse of PTR, viz. TPR and lnTPR).

One of the problems encountered in estimating (1) is that DEMOC is potentially endogenous. We use the insight from Engerman and Sokoloff (1997, 2002) that commodity production is associated with higher inequality and broadly speaking non-democratic institutions. We therefore use the 5-year lagged value of the share of primary commodities in total exports (LAGPRIMES) as an instrument for DEMOC and run a two-stage estimation.[16] Table 4 presents the results for regressions on PTR using two alternative specifications. Model I includes only the log of GDP per capita and DEMOC as control variables, whereas Model II includes also the Gini coefficient (GINI) and the lag of life expectancy at birth (LAGLIFE). The disadvantage of the Model II specification is that because of data limitations on GINI, this version has the effect of reducing the sample size very substantially.

Table 3
Correlation Matrix

	PTR	TPR	lnTPR	lnGDPPC	GINI	DEMOC	LAGLIFE
PTR	1.000						
TPR	-0.895	1.000					
LnTPR	-0.974	0.971	1.000				
LnGDPPC	-0.391	0.405	0.408	1.000			
GINI	0.137	-0.148	-0.145	-0.343	1.000		
DEMOC	-0.205	0.162	0.191	0.393	-0.145	1.000	
LAGLIFE	-0.471	0.460	0.480	0.437	-0.169	0.468	1.000

Note: These variables are as defined in Table 2. LAGLIFE is the 5-year lagged value for life expectancy at birth (LIFE).

[16] Our strategy is a variant of the one employed by Easterly and Levine (2003), who use crops/minerals variables as instruments for a variable that captures the quality of institutions, and Easterly (2002), who uses a dummy for commodity exporting countries as an instrument for inequality. Their studies were based on cross-country rather than panel data at the global level.

Table 4
Regression Results for PTR

Second Stage (Dependent Variable: PTR)

	(1)	(2)	(3)	(4)
Right Hand Side Variables	**Model I**		**Model II**	
	Fixed	**Random**	**Fixed**	**Random**
LnGDPPC	-20.500*	-18.776*	-21.524***	-14.796
	(6.337)	(5.839)	(12.999)	(9.442)
Democracy Index (DEMOC)	-1.542*	-1.591*	-1.495***	-1.552*
	(0.469)	(0.449)	(0.820)	(0.758)
5 year lag of life expectancy (LAGLIFE)			0.070	0.055
			(0.104)	(0.097)
Gini Coefficient (GINI)			0.066	0.040
			(0.197)	(0.177)
Constant	107.207*	101.437*	102.421*	81.838*
	(19.916)	(18.901)	(43.955)	(32.916)
Sample Size	169	169	103	103
R^2 Within		0.181		0.045
R^2 Between	0.201	0.195	0.302	0.285
R^2 Overall	0.184	0.179	0.192	0.164
First Stage (Dependent Variable: DEMOC)				
Right Hand Side Variables				
LnGDPPC	1.040	1.289	5.154	4.188
	(2.571)	(2.301)	(4.598)	(3.300)
5 year lag of life expectancy (LAGLIFE)			0.023	0.028
			(0.041)	(0.037)
Gini Coefficient (GINI)			0.134***	0.127*
			(0.070)	(0.062)
5 year lag of primary commodity share of exports (LAGPRIMES)	-0.120*	-0.118*	-0.093*	-0.090*
	(0.024)	(0.022)	(0.032)	(0.028)
Constant	11.570	10.422	-12.494	-9.411
	(9.857)	(9.043)	(15.819)	(11.813)
Sample Size	169	169	103	103
R^2 Within	0.213		0.223	
R^2 Between	0.087		0.075	
R^2 Overall	0.144		0.057	
Chi2 (2) from Hausman Test (prob>chi)		0.50		0. 95
		(0.779)		(0.918)

Standard Errors in Parentheses. *Significant at 1%. ***Significant at 10%.

Columns (1)-(4) of Table 5 present alternative empirical estimates when instead of GINI and LAGLIFE, other control variables are added to the model, the square of LnGDPPC, (LnGDPPCSQ) and the percentage of labor union members in the labor force (UNION)[17]. The rationale for the inclusion of UNION is the considerable anecdotal evidence of instances in which teachers unions are reported to impede the kinds of educational reforms which are believed to increase educational quality (Wiesner, 1998). For each alternative specification, both fixed effects and random effects estimates are presented. For each specification the fixed effects estimates are given in the first column and the random effects estimates in the second one. For each specification the results of a Hausman specification test are given at the bottom of the table. Columns (5) and (6) of Table 5 present the results when instead of DEMOC quite a different political equality or governance measure is used, namely the Political Constraints Index (POLCONiii). This is a measure coded on a 0-1 scale of the extent of checks and balances that are generally associated with competitive democracies.[18]

Turning first to the results for Model I in Table 4, we can see that, as hypothesized, when instrumented, our inverse measure of political inequality DEMOC has a negative and statistically significant effect on the inverse measure of educational quality, Pupil-Teacher Ratio (PTR). So, too, does the level of development measure (LnGDPPC). Neither of the other variables added to the specification in Model II, GINI or life expectancy, has a statistically significant effect on PTR. The finding with respect to GINI is quite important. Although the point estimate of the effect of GINI on PTR is as expected positive (and thereby consistent with the positive correlation between GINI and PTR reported in Table 3), the result shows that, after controlling for the instrumented DEMOC and also LnGDPPC, the estimated coefficient is not statistically significant. The statistical insignificance of GINI and LAGLIFE, together with the substantial loss in observations arising from the inclusion of GINI, lead us to prefer Model I over Model II.

Three other points should be made from this table. First, from the first stage results for Model I it is clear that our choice of LAGPRIMES (the lagged value of the share of primary exports in total exports) does a fairly good job as an instrument for DEMOC. This is in keeping with the suggestion of Engerman and Sokoloff (1997, 2002). Second, the outcome of the Hausman test fails to dictate the choice between the fixed and random effects estimates. Third, notice that there is remarkably little difference in the estimated magnitudes of the coefficient for DEMOC between Models I and II and also between the fixed effects and random effects estimators. In all these estimations, a one point increase in the 10-point DEMOC scale lowers the PTR by approximately one-and-one half students per teacher.

Since the inverse of PTR, namely the Teacher-Pupil Ratio (TPR), and the logarithmic forms of both would be equally legitimate measures of educational quality, we have also run versions of the Table 4 regressions using each of these alternative measures as the dependent variable in the second stage. Since the results are almost identical, in the interest of space, they are not presented

[17] Ideally, one would have wanted a measure of the extent to which teachers are unionized. But to our knowledge, no such data is available. The data for construction UNION is taken from the International Labor Office's special file on labor union membership.

[18] This is available from the following website: http://www-management.wharton.upenn.edu/henisz/_vti_bin/shtml.dll/POLCON/ContactInfo.html. Since this measure is supposed to represent checks and balances in government, it therefore represents the potential to make credible commitments.

Table 5
Robustness Checks: Regression Results for PTR with Changes

Second Stage (Dependent Variable: PTR)

Variable	Model 1 with LnGDPPCSQ Added		Model I with UNION Added		Model I with POLCON Instead of DEMOC	
	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed	Random	Fixed	Random	Fixed	Random
LnGDPPC	-60.982	-60.979	-18.672	-8.251	-1.496	-5.956
	(74.286)	(69.639)	(13.983)	(6.744)	(12.308)	(6.499)
LnGDPPCSQ	6.139	6.139				
	(11.381)	(10.669)				
Democracy Index (DEMOC)	-1.599*	-1.599*	-2.188**	-1.780**		
	(0.515)	(0.483)	(0.958)	(0.744)		
Political Constraints POLCON					-32.05**	-28.196**
					(15.769)	(13.401)
% of Labor Force Unionized UNION			-0.236	-0.178		
			(0.154)	(0.116)		
Constant	173.688	173.344	107.716**	69.841*	43.736	57.771*
	(122.083)	(176.641)	(49.789)	(23.358)	(38.025)	(19.624)
Sample Size	169	169	67	67	120	120
R^2 Within		0.185		0.174		0.064
R^2 Between	0.187	0.187	0.095	0.062	0.013	0.086
R^2 Overall	0.175	0.175	0.056	0.042	0.026	0.057

First Stage (Dependent Variable):			DEMOC		POLCON	
Variable	Model I		Model I		Model I	
	Fixed	Random	Fixed	Random	Fixed	Random
LnGDPPC	-38.593	-38.591	-5.384	-0.681	0.328	0.149
	(28.570)	(26.782)	(5.648)	(3.324)	(0.235)	(0.151)
LnGDPPCSQ	6.002	6.001				
	(4.309)	(4.039)				
% of Labor Force Unionized (UNION)			-0.111**	-0.102**		
			(0.050)	(0.044)		
Primary Commodity Share in Exports (LAGPRIMES)	-0.113*	-0.113*	-0.111**	-0.109*	-0.005**	-0.005*
	(0.024)	(0.023)	(0.047)	(0.040)	(0.002)	(0.0018)
Constant	75.918	75.714	33.832***	17.929	-0.400	0.173
	(47.233)	(71.362)	(19.026)	(11.879)	(0.880)	(0.583)
Sample Size	169	169	67	67	120	120
R^2 Within	0.224		0.212		0.123	
R^2 Between	0.063		0.017		0.004	
R^2 Overall	0.145		0.028		0.025	
Chi2 (2) Hausman Test (prob>chi)		0.00		0.76		0.18
		(1.00)		(0.858)		(0.915)

Standard Errors in Parentheses. *Significant at 1%. **Significant at 5%. ***Significant at 10%.

here but are available upon request. Instead, in Table 5 we present results for three alternative robustness tests.

In columns (1) and (2) of Table 5 we present the corresponding results when the square of per capita income (LnGDPPCSQ) is added to the right hand side of the regression. These results do support the suspected nonlinear relationship between per capita GDP and the inverse measure of school quality (PTR). But, due to the high correlation between them, individually, neither the coefficient of the linear term nor that of the quadratic term is statistically significant. In all other respects, however, these results are very similar to those in the first two columns of Table 4. In particular, the first stage results again show LAGPRIMES to be a rather satisfactory instrument for DEMOC and the second stage results show the effect of DEMOC to be negative and significant. This confirms our hypothesized positive effect of political equality on primary school quality. Once again also, the Hausman test outcome leaves us rather indifferent between the fixed and random effects estimates.

From columns (3) and (4) of Table 5 it can be seen that due to the limited data available on the unionization rate (UNION), adding UNION to Model I has the effect of reducing the number of observations from 169 to 67. The effect of UNION on PTR is negative but not significant, but its effect on DEMOC in the first stage equation is negative and significant. Since UNION pertains to the whole labor force, it is undoubtedly only a very weak proxy for the extent to which teachers are unionized. For this reason and the small number of observations, these results should not be taken too seriously. Yet, the results would seem to suggest that to the extent there is a negative effect of UNION on primary school quality, it would seem to come indirectly through its negative effect on DEMOC rather than through its direct effect on PTR. Once again, neither the strong negative effect of DEMOC on PTR nor the strong negative effect of LAGPRIMES on DEMOC is appreciably affected.

Columns (5) and (6) present the fixed and random effects estimates when POLCON is used as the measure of political equality instead of DEMOC. As with UNION and GINI, because of limitations on data availability for this variable, its introduction results in a substantial reduction in sample size (and unfortunately also a substantial reduction in explanatory power). In particular, both the magnitude and statistical significance of the negative effect of LnGDPPC on PTR are substantially reduced. But once again, the direction of the effect of the instrumented measure of political equality POLCON on PTR is negative and significant as is the effect of LAGPRIMES on POLCON. While in both these cases the magnitudes of the coefficients change considerably, this is attributed to the difference in scales used in the two measurements (0-10) for DEMOC but (0-1) for POLCON.

Generally speaking, the specifications used in Table 4 are to be preferred to those in Table 5. We believe that DEMOC is a better measure of political equality than POLCON used in columns (5) and (6) of Table 5; the results of columns (1) and (2) of Table 5 suffer from the collinearity introduced by the high correlation between LnGDPPC and LnGDPPCSQ; finally, UNION in columns (3) and (4) is too crude a measure of unionization of teachers and even so is subject to severe data constraints. Yet, taken together, the basic results appear to be quite robust to these and other changes in specification and estimation. Despite the crudeness of our measure of educational quality at the primary school level, the small number of available observations and the highly aggregative character of the analysis, the results appear to be surprisingly supportive of one implication of our political economy model, namely, that in which political inequality should be expected to lower educational quality. This is reflected in the consistently negative effects of DEMOC (or its alternative POLCON)

on the inverse measure of school quality PTR (and as reported above but not presented the consistently positive effects on TPR). On the other hand, other than the positive correlation between GINI and PTR in Table 3, there is no support for the hypothesized effect of economic inequality measured by GINI on educational quality.

The explanation for this sharp difference in empirical support for the two different kinds of inequality effects on the quality of primary education remains uncertain. One interesting possibility (kindly suggested by David Mayer-Foulkes) is that it could be the result of the fact that our measures of educational quality represent an average of the qualities of private and public education whereas one might think that income inequality would have its primary effect in lowering the quality of public schools for given average income. Another explanation could simply be the weakness of the data on GINI, random measurement error in this variable biasing the estimates of GINI toward zero. Third, it could be the result of the fact that income inequality may be much less relevant to choices of educational quality than wealth inequality.[19]

Despite our primary focus on the effects of economic and political inequality on the quality of primary education, from the results of Table 4 at least it should be admitted that the effect of a doubling of income per capita from its sample average would have a considerably greater effect in increasing educational quality than would an equivalent halving of either economic or political inequality.

5. Conclusions and Caveats

Several of the results reported here require further study. Quite conceivably we could go further back in history in the search for explanations for the contemporary values of DEMOC and PTR. It would be much more appropriate to obtain a more specific index of unionization such as the extent that teachers are unionized than the unionization measure used in this study. Likewise, the demand for education should receive more attention than we have given it here.

Taken at face value, however, the results would seem to raise a number of further questions concerning the application of our hypotheses to the LAC region. First, do the results differ from similar estimates for other regions? In a previous paper, however, we found similar results based on pure international cross-section analysis for a sample of over one hundred countries. Second, since in many countries the relevant educational quality decisions would be made at the level of individual states, municipalities or communities, would the same results hold within countries across states or communities?[20] Third, since the educational quality data used in this study pertained to country aggregates, would they hold up if the data could be restricted to public education alone? Fourth, in view of the fact that there are numerous other potential measures of political equality (including of such related factors as freedom of the press and civil liberties) besides DEMOC and POLCON that we have used, it would be interesting to see how sensitive the results

[19] Several studies, such as Deininger and Squire (1998) and Galor and Zeira (1993) have shown that the effects of wealth inequality on investments are typically more pernicious than those of income inequality.

[20] Note for example, that Nugent and Swaminathan (2006), using household and community data across communities and over time for Indonesia, show that the negative effect of income inequality on educational investments shows up even at the local level across different communities.

might be to alternative measures. Fifth, would the results hold up if we were able to introduce additional controls for population growth, parental education, and peer-group influences?[21] Sixth, is the source of the low quality too little expenditure on primary education or is it inefficiency in the allocation of those expenditures? To answer each of these important questions would require a substantial extension of the present study, in each case in a different direction.

Another puzzle suggested by the present study and others revealing the relatively low educational quality measures for Latin America and other developing countries is: how to explain the coexistence of low educational quality and frequently observed high Rates of Return (ROR) to years of education at the primary level? Indeed, most studies of the rates of return to different levels of education in developing countries have found these rates to be remarkably high at the primary level but to decline with the level of education (Psacharopoulos, 1973, 1994; Psacharopoulos and Patrinos 2004). More recently, however, the validity of these findings has been challenged (Behrman and Birdsall, 1983, 1987; Bennell, 1996; Behrman and Deolalikar, 1992; Lee and Barro, 2001; Schultz, 2004). Notably, it has been common in this literature to attribute the newly found much lower and perhaps declining rates of return to primary education to the poor and often declining quality of primary education (Knight and Sabot, 1987; Knight et al., 1992; Bennell, 1996). Also, ROR calculations are bound to reflect numerous other factors such as parental education and background, capital and infrastructure. Hence, when properly measured, for the contemporary period at least, there need not be any incompatibility between the available ROR estimates and low quality of education at the primary level.

As mentioned earlier, additional evidence for low school quality and the lack of validity of the earlier quite high ROR estimates for years of schooling comes from recent findings suggesting that aggregate growth rates in per capita income are not closely related to growth in average years of education or other common measures of human capital growth (Caselli et al., 1996; Pritchett, 2001). In our opinion, instead of suggesting that education and human capital accumulation are unimportant for economic growth and development, these studies may merely reflect the already demonstrated low quality of the education accumulated. In most developing countries, where the poor seldom proceed past the primary level, it is the poor quality of primary education that is relevant.

Another possible objection to identifying the problem as the low quality of public education in developing countries is that much of the primary education takes place within private schools. Several comments, however, are in order. First, many of the private schools are administratively private but publicly funded. Hence, the quality of such schools is very much the result of public choice which, as our model suggests, results in low quality. Second, the relatively high shares of private schools in total primary school enrollments in such countries may be the direct result of the very poor quality of public schools, especially since in many contexts private education is considerably more expensive. Third, even in cases where private school enrollments are subsidized by government, incidence studies often show that the majority of such subsidies go to relatively rich households (Meerman, 1979; Selowsky, 1979; Lopez-Acevedo and Salinas, 2000; Lanjouw et al., 2001; Sakellariou and Patrinos, 2004).[22]

[21] At present, these are at least partly accounted for in our fixed effects estimation procedure.

[22] Moreover, at higher education levels public expenditure per student is often twenty or more times that at the primary level and even further skewed toward the more wealthy households (Addison and Rahman, 2001).

Hence, despite the earlier high estimates of RORs for, and the quantitative importance of private education in, primary education in developing countries, there is at least reason to believe that low quality public education at the primary level is an important contributor to enduring poverty and underdevelopment in developing countries. If so, raising the quality of such education should indeed be deserving of the attention afforded to it as part of the Millennium Development Goals.

Admittedly, we have been silent on exactly what is needed to raise educational quality. This indeed seems to be still an open question deserving serious attention by educators. We are very pleased to see research presented in this volume providing some possible clues as to how to do it. For example, the small funds provided to parent committees at local schools that Gertler, Patrinos and Rubio (2007) show to have been effective in getting school administrators in Mexico to deliver on the very improvements that parents believe to be most important. Their low cost would seem to make programs of this sort extremely cost-effective.[23] Making greater use of vouchers and other means of tapping private initiatives in primary schooling may also be relatively cost-effective. But additional efforts may be needed to improve school quality across the region and some of these may be more expensive. While certainly there is little evidence suggesting that merely throwing more money at primary education is either a necessary or sufficient condition for improving its quality, it is also hard to believe that one can easily lower a country's PTR or raise some other measures of quality without increasing educational budgets.

[23] As David Mayer-Foulkes kindly pointed out to us, such mechanisms would seem to be a convenient means of marrying private motivations of the consumers of public education with the management of public suppliers.

References

Acemoglu, Daron, and James A. Robinson. "Political Losers as a Barrier to Economic Development." *The American Economic Review* 90, no. 2 (May 2000): 126-30.

Addison, Tony, and Aminur Rahman. "Why is so little spent on educating the Poor?." World Institute for Development Economics Research Discussion Paper No. 2001/29. Helsinki: United Nations University, 2001.

Alesina, Alberto, Reza Baqir, and William Easterly. "Public Goods and Ethnic Divisions." *The Quarterly Journal of Economics* 114, no. 4 (November 1999): 1243-84.

Beech, Jason. "Latin American Education Perceptions of Linearities and the Construction of Discursive Space." *Comparative Education* 38, no. 4 (November 2002): 415-27.

Behrman, Jere R., and Nancy Birdsall. "The Quality of Schooling: Quantity Alone is Misleading." *The American Economic Review* 73, no. 5 (December 1983): 928-46.

Behrman, Jere R., and Nancy Birdsall. "Comment on Returns to Education: A Further International Update and Implications." *The Journal of Human Resources* 22, no. 4 (Autumn 1987): 603-06.

Behrman, Jere R., and Deolalikar, Anil. "School Repetition, Dropouts and the Returns to School: The Case of Indonesia." *Oxford Bulletin of Economics and Statistics* 53, no. 4 (1991): 467-80.

Bennell, Paul. "Rates of Return to Education: Does the Conventional Pattern Prevail in Sub-Saharan Africa?." *World Development* 24, no. 1 (January 1996): 183-99.

Brown, David S., and Wendy Hunter. "Democracy and Social Spending in Latin America." *The American Political Science Review* 93, no. 4 (December 1999): 779-90.

Cardak, Buly. "Education Choice, Neoclassical Growth and Class Structure." *Oxford Economic Papers* 56, no. 4 (October 2004a): 643-66.

Cardak, Buly. "Education Choice, Endogenous Growth and Income Distribution." *Economica* 71, no. 1 (February 2004b): 57-81.

Chen, Hung-ju. "Educational Systems, Growth and Income Distribution: A Quantitative Study." *Journal of Development Economics* 76, no. 2 (April 2005): 325-53.

Deininger, Klaus, and Lyn Squire. "New Ways of Looking at Old Issues: Inequality and Growth." *Journal of Development Economics* 57, no. 2 (1998): 259-87.

Easterly, William. *The Elusive Quest for Growth.* Cambridge: MIT Press, 2001.

Easterly, William. "The Middle Class Consensus and Economic Development." *Journal of Economic Growth* 6, no. 4 (December 2002): 317-35.

Easterly, William, and Ross Levine. "Africa's Growth Tragedy: Policies and Ethnic Divisions." *The Quarterly Journal of Economics* 112, no. 4 (November 1997): 1203-50.

Easterly, William, and Ross Levine. "Tropics, germs, and crops: how endowments influence economic development." *Journal of Monetary Economics* 50, no. 1 (January 2003): 3-39.

Engerman, Stanley, and Kenneth L. Sokoloff. "Factor Endowments, Institutions, and Differential Growth Paths among New World Economies." Essay in *How Latin America Fell Behind: Essays on the Economic Histories of Brazil and Mexico,* edited by: Stephen Haber. Palo Alto: Stanford University Press, 1997.

Engerman, Stanley, and Kenneth L. Sokoloff. "Factor Endowments, Inequality, and Paths of Development Among New World Economies." *Economía* 3, (Fall 2002): 41-102.

Epple, Dennis, and Richard Romano. "Ends against the middle: Determining public service provision when there are private alternatives." *The Journal of Public Economics* 62, no. 3 (November 1996): 297-325.

Fernandez, Raquel, and Richard Rogerson. "On the Political Economy of Education Subsidies." *Review of Economic Studies* 62, no. 2 (April 1995): 249-62.

Filmer, Deon, and Lant Pritchett. "The Effect of Household Wealth on Educational Attainment Around the World: Demographic and Health Survey Evidence." World Bank Policy Research Working Paper No. 1980. Washington: World Bank, 1998.

Filmer, Deon, and Lant Pritchett. "Determinants of Education Enrollment in India: Child, Household, Village and State Effects." DECRG. Washington: The World Bank, 1998. Mimeographed.

Galor, Oded, and Joseph Zeira. "Income Distribution and Macroeconomics." *The Review of Economics Studies* 60, no. 1 (January 1993): 35-52.

Gertler, Paul, Harry Patrinos, and Marta Rubio. "Do Supply-Side-Oriented and Demand-Side-Oriented Education Programs Generate Synergies? Evidence from rural Mexico." Paper presented at the meeting The Quality of Education in Latin America and the Caribbean, Mexico City, February 2007.

Glomm, Gerhard, and B. Ravikumar. "Public versus. Private Investment in Human Capital: Endogenous Growth and Income Inequality." *The Journal of Political Economy* 100, no. 4 (August 1992): 818-834.

Glomm, Gerhard, and B. Ravikumar. "Opting out of publicly provided services: A majority voting result." *Social Choice and Welfare* 15, no. 2 (1998): 187-99.

Gomes, Candido. "Education, Democracy and Development in Latin America." *International Review of Education* 39, no. 6 (November 1993): 531-40.

Gradstein, Mark. "The Political Economy of Public Spending on Education, Inequality, and Growth." World Bank Policy Research Working Paper No. 3162. Washington, D.C.: The World Bank, 2003.

Gradstein, Mark, and Moshe Justman. "Democratic Choice of an Education System: Implications for Growth and Income Distribution." *Journal of Economic Growth* 2, no. 2 (July 1997): 169-84.

Gugerty, Mary Kay, and Edward Miguel. "Ethnic Diversity, Social Sanctions, and Public Goods in Kenya." Department of Economics, University of California at Berkeley, 2002. Mimeographed.

Kingdon, Geeta. "The Quality and Efficiency of Private and Public Education: A Case-Study of Urban India." *Oxford Bulletin of Economics and Statistics* 58, no. 1 (February 1996): 57-82.

Knight, John B., and Richard H. Sabot. "The Rate of Return on Educational Expansion." *Economics of Education Review* 6, no. 3 (June 1987): 255-62.

Knight, John B., Richard H. Sabot, and D.C. Hovey. "Is the Rate of Return on Primary Schooling Really 26 Per cent?." *Journal of African Economies* 1, no. 2 (August 1992): 192—205.

Lanjouw, Peter, Menno Pradhan, Fadia Saadah, Haneen Sayed, and Robert Sparrow. "Poverty, education, and health in Indonesia: Who benefits from public spending?." World Bank Policy Research Working Paper No. 2739. Washington, D.C.: The World Bank, 2001.

Lee, Jong-Wha, and Robert J. Barro. "Schooling Quality in a Cross-Section of Countries." *Economica* 68, no. 272 (November 2001): 465-88.

Motiram, Sripad, and Jeffrey B Nugent. "Economic and Political Inequality and the Quality of Public Education: An Empirical Analysis." Department of Economics, Dalhousie University, 2006. Mimeographed.

Nugent, Jeffrey B., and Shailender Swaminathan. "Household Investments and Income Inequality at the Community Level: Evidence from Indonesia." Chapter 7 in *Poverty, Inequality and Development: Essays in Honor of Erik Thorbecke*, edited by: Alain de Janvry, and Ravi Kanbur. New York: Springer Science, 2006.

Palafox, Juan Carlos, Juan Prawda, and Eduardo Velez. "Primary School Quality in Mexico" *Comparative Education Review* 38, no. 2 (May 1994): 167-80.

Plank, David N. "The Politics of Basic Educational Reform in Brazil." *Comparative Education Review* 34, no. 4 (November 1990): 538-59.

Polity IV Project: Political Regime Characteristics and Transitions, 1800-2004. *Center for International Development and Conflict Management.* Available online at: http://www.cidcm.umd.edu/polity/.

Pritchett, Lant. "Where has all the Education Gone?." *The World Bank Economic Review* 15, no. 3 (October 2001): 367-91.

Psacharopoulos, George. "Problemas Socio-económicos y el Papel de la Educación: El Caso de América Latina." *Docencia* 14, no. 1 (1986): 37-48.

Psacharopoulos, George. *Returns to Education: An International Comparison. Studies on Education; Vol. 2.* New York: Elsevier Scientific Publishing Company, Inc., 1973.

Psacharopoulos, George. "Returns to Investment in Education: A Global Update." *World Development* 22, no. 9 (September 1994): 1325-43.

Psacharopoulos, George, and Harry A. Patrinos. "Human Capital and Rates of Return." Chapter 1 in *International Handbook on the Economics of Education*, edited by: Geraint Johnes, and Jill Johnes. Cheltenham: Edward Elgar Publishing Ltd, 2004.

Ray, Debraj. *Development Economics.* Princeton: Princeton University Press, 1998.

Robinson, James. "When is a State Predatory?." Harvard University, 2004. Mimeographed.

Sakellariou, Christos, and Harry A. Patrinos. "Incidence Analysis of Public Support to the Private Education Sector in Côte d'Ivoire." World Bank Policy Research Working Paper 3231. Washington, D.C.: The World Bank, 2004.

Selowsky, Marcelo. *Who Benefits form Government Expenditure? A Case Study of Colombia.* New York: The World Bank Research Publication, Oxford University Press, 1979.

Srinivasan, G. "The Kumbakonam Tragedy." *Frontline* 21, no. 16 (Jul. 31 – Aug. 13 2004).

UNESCO. *Statistical Yearbook.* Paris: Institute for Statistics, 1999.

UNESCO. The *Quality Imperative, the EFA Global Monitoring Report.* Paris: 2005.

United Nations. *World population Estimates and Projections.* New York: United Nations, Department of Economic and Social Affairs, Population Division, 2005.

Wiesner, Eduardo. "Transaction Cost Economics and Public Sector Rent-seeking in Developing Countries: Toward a Theory of Government Failure." Chapter in *Evaluation and Development: The Institutional Dimension*, edited by: Robert Picciotto, Eduardo Wiesner, and James Wolfensohn. New Brunswick: Transaction Publishers, 1998.

Wolff, Laurence, Ernesto Schiefelbein, and Jorge Valenzuela. "Improving the Quality of Primary Education in Latin America and the Caribbean: Toward the 21 Century." World Bank Discussion Paper 257. Washington, D.C.: The World Bank, 1994.

World Bank. World Development Indicators, CD-ROM.

World Bank. *World Development Report*, various issues. Available online at: http://econ.worldbank.org/.