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Why is so Little Spent on Educating the Poor?

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Abstract

If the poor are to benefit from economic growth, then they need the skills that are in growing demand, and the capacity to raise their productivity as smallholder farmers and micro-entrepreneurs. Yet, the poor seldom receive a satisfactory education. Too little is spent on primary education—the category of education of most direct benefit to the poor—while on average public subsidies to secondary education are roughly three times as high as subsidies to primary education, and subsidies to tertiary education are thirty times as high. In consequence, the higher income deciles benefit disproportionately from public spending on education—the share of the richest income quintile (28%) is roughly double that of poorest income quintile (13%) across countries. .../...

Keywords: poverty, income distribution, education, development

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Why do such inequalities in public spending prevail? We argue that their wealth enables the affluent to buy favourable policies from politicians. In contrast, the poor lack the resources for lobbying and they face more severe collective action problems. We find strong empirical evidence for this interest group model of politics (as opposed to the median voter model which predicts a more redistributive pattern of public spending). We find that income inequality—which is a proxy for the political bargaining power of the rich versus the poor—is significant in explaining cross-country variance in the ratio of public spending on primary education to tertiary education. Holding everything else constant, a one standard deviation increase in the Gini coefficient would reduce the ratio of primary-school spending to tertiary spending by 0.20 percentage point. We also find that conflict is significant in skewing public spending away from primary education, and that increased ethnic diversity tends to reduce the relative share of public spending on primary schooling (although this effect may be mitigated if the political system is democratic rather than authoritarian).

Our results raise some troubling issues for policy makers and aid donors. In particular, more attention must be given to reducing income inequality in order to reduce political constraints on pro-poor public expenditure reform (and on the effective implementation of the current wave of Poverty Reduction Strategy Papers). And reducing the prevalence of conflict would facilitate resource shifts from military spending to primary schooling, thereby lessening the need to introduce higher levels of cost recovery in the secondary and tertiary education sectors to facilitate higher investment in primary education.

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Introduction

If the poor are to benefit from economic growth, then they need the skills that are in growing demand, and the capacity to raise their productivity as smallholder farmers and micro-entrepreneurs. Educating poor people spreads the benefits of growth, aside from raising human development directly. And investment in the human capital of the poor raises growth itself.

Yet, the poor seldom receive a satisfactory education. Too few poor children enter primary school, too many fail to complete their education, and the quality of their schooling is often dismal. Girls, especially rural girls, are especially disadvantaged. Their enrolment rates are lower, and their dropout rates are higher than those of boys. An estimated 855 million adults—nearly one sixth of humanity—are functionally illiterate, and 64 per cent of illiterates are women (UNICEF 1999: 7, World Bank 2001a).

In aggregate, developing countries underinvest in primary education despite its benefits for the poor, and its public good characteristics. Government spending in primary education is too low, both absolutely and as a share of total public spending (and relative to military spending). Parents are often the main source of primary school funding, not the state.¹ In contrast, public subsidies to secondary and tertiary education are generally much higher than to primary education—roughly three times as high for secondary education and thirty times as high for tertiary education (Table 1). In consequence, the higher income deciles benefit disproportionately from public spending on education—the share of the richest income quintile (28%) is roughly double that of the poorest income quintile (13%) across countries (Table 2). Given this level and pattern of public spending, and given that the poor face a highly imperfect credit market—in which to borrow against expected higher future earnings to finance their investments in education—an important channel for getting out of poverty is denied to millions of people.

In highlighting this inequality in spending, we do not imply that the solution to low primary school spending is necessarily to transfer money from secondary and tertiary education into the primary level (see UNICEF 1999 on policy issues). Education spending must be considered as part of total public spending (and in relation to the possibility of raising more public revenue). There may well be large ‘unproductive’ lines of spending that can be redistributed to better uses. Indeed, halving military spending could double or triple total public spending on education (and health) in many countries (Table 3).²

Why do such inequalities in public spending prevail? We argue that the underlying cause of unequal public spending is the patron-client relationship—between the affluent

1 In Uganda for instance primary education is still largely funded largely by parents who contribute between 60 and 70 per cent of total spending on schools (Ablo and Reinikka 1998). The Ugandan government is now attempting to redress this problem.

2 And many have pointed to the scale of debt-service relative to social sector spending in SSA and elsewhere (Addison and Ndikumana 2000, Watkins 2001).

elite and the government—that prevails in many countries. Economic power and the wealth associated with it enable the affluent to buy favourable policies from politicians. In contrast, the poor lack the resources with which to lobby and they are less organized (the rural poor, given their number and limited resources, face a particularly severe collective action problem). They are, therefore, in many cases unable to influence the government in their favour. Our arguments and results are consistent with the political economy model of interest groups and policy makers as sketched in Pineda and Rodriguez (2000) based on Bernheim and Whinston (1986) and Dixit, Grossman and Helpman (1997). Our results stand in contrast to the predictions of the so-called median voter theorem, which suggests that the poorer the country, the stronger will be the median voter, leading to a more redistributive pattern of public spending at lower per capita income levels. We attribute the divergence between our results and the median voter theorem to the incompleteness of the democratic contract, and the nature of authoritarian rule, in many developing countries, particularly at the lowest per capita income levels.

Section 1 of this paper presents a summary of the available evidence on the distributional impact of public spending in education together with an analytical framework to understand the determinants of the structure of education spending. Preliminary empirical findings are set out in Section 2, which also indicates areas for further investigation. Section 3 concludes by emphasizing the importance of reducing high income-inequality to strengthening the political support for poverty reduction through pro-poor public spending and other means.

1 Analytical framework

We use the ratio of public spending (as a % of per capita GNP) per student on Primary to Tertiary education, as a proxy for inequality of public spending in education. To reduce the influence of short run fluctuations, we take an average of this ratio over the period 1993-1997. Our focus is therefore on underlying structural factors that determine patterns of spending, rather than on shorter-term, macro-economic, factors.

Available evidence suggests that allocating public money to primary education is largely pro-poor (Li Guo, Steele, and Glewwe 1999, van de Walle and Nead 1995). Whereas the poor gain from primary education, it is higher income groups that mainly gain from public spending in tertiary education. The reason is straightforward. Attainment and success in tertiary education requires the successful completion of primary and secondary school, but many of the poor fail to complete even four years of primary schooling (the minimum necessary for functional literacy) let alone secondary education (Filmer 1999). In India, for example, 82 percent of children from the richest 20 percent of households complete grade 8 but only 20 percent of children from the poorest 40 percent of households do so (Filmer and Pritchett 1999). Thus the lower the ratio of public spending in primary education to tertiary education, the higher is the inequality of public spending in education.

The median voter theorem suggests that the poorer the country, the poorer will be the position of the median voter; hence the theorem predicts that public spending should be more redistributive at lower per capita income levels. Therefore, the high inequality of public spending in education in poor countries is directly in contrast with the prediction

of the median voter theorem. On the other hand, this phenomenon is in line with the political economy model of interest group politics where money plays a central role in politics. Recent studies on governance do suggest that in many poor countries policies are often the outcome of the perverse patron-client relationship between the rich and the state (see for instance World Bank 2000). There is also considerable evidence that the rich benefit disproportionately from public subsidies, reflecting their political power (see for instance Alesina 1998).

The underlying mechanism of the interest groups model is as follows. Individuals mobilize to form interest groups through which they can bargain with politicians over policies and resources. An interest group's formation as well as its bargaining power depends on the group's resources; in exchange for favourable policies, politicians receive monetary transfers—either donations to political parties in systems with competitive elections and/or direct bribes. Consequently, the more unequal a society's income distribution, the lower will be the bargaining power of the poor compared to the rich, and thus the greater will be the extent of allocations in favour of the rich.

Pineda and Rodriguez (2000) empirically find that investment in human capital is inversely related to the capital share in total output (where the latter proxies for capital owners who are assumed to be the wealthiest in society). They formally sketch models of both the median voter and interest groups and show that while the median voter model cannot explain this negative correlation, such a correlation can be accounted for with a simple model of interest groups and political influence.

Our empirical exercise in understanding the political economy of public spending on education can therefore be viewed as a further extension of the approach of Pineda and Rodriguez (2000). We focus more directly on the extent of unequal public spending using the ratio of primary spending per student to tertiary spending per student as the dependent variable.

In order to capture the inequality in influence over the state between rich and poor, we use a measure on income inequality (the Gini coefficient) as one of our key explanatory variables. Moreover, to scrutinise the robustness of our hypothesis of interest group politics further, we also investigate how the income shares of the lowest 20 percent and lowest 40 percent relative to the income share of the top 20 percent affect public spending in education. According to our argument, the higher the share of the top quintile relative to bottom quintile and bottom 40 percent, the higher would be the inequality of public spending. Because of the potential simultaneity problem between unequal public spending and income inequality and the different quintile's share of income, we regress the ratio of public spending in primary to tertiary education (averaged over the period 1993-97) on the average value of the Gini coefficient (over the period 1980-89). Similarly, regarding quintile shares, we use the average value over 1980-89. Thus these inequality measures are predetermined with respect to public spending on education in our model and can therefore be viewed as proxies for initial inequality.

Another key explanatory variable in our empirical model is ethno-linguistic fragmentation. The literature on the impact of ethnic diversity on economic performance has grown substantially in recent years. The first generation of studies tends to find negative development effects from higher levels of ethnic diversity. Thus Easterly and Levine (1997), conclude that ethnic diversity encourages the adoption of growth-

retarding policies that foster rent-seeking behaviour; these in turn make it more difficult to form a consensus for public spending on public goods that promote growth. They therefore argue that Africa's high level of ethnic diversity is the key to its low growth.

The impact of ethnic diversity on the structure of spending has also been found to be adverse. In Alesina and Spolaore (1997), a public good such as a school brings less satisfaction to everyone in an ethnically diverse society because of different preferences for the language of instruction, curriculum, location etc. So less of the public good is chosen by the society, thereby lowering the level of output and growth. Using a sample of US cities, Alesina, Baqir and Easterly (1997) find that the level and variety of public goods worsens as ethnic diversity increases. Miguel (1999) likewise finds lower primary school funding in more ethnically diverse districts in Kenya. A burgeoning literature on matching and income inequality (Durlauf 1996, Benabou 1996, among others) shows how neighbourhood segregation by class can adversely affect the public provision of education. Although this literature does not emphasize ethnicity, segregation by class has a strong ethnic dimension (see Alesina *et al.* 1997). For instance, Cutler and Glaser (1995) find that African-Americans have worse outcomes for education, income and other social dimensions in more segregated metropolitan areas. Cutler, Elmendorf and Zeckhauser (1993) find that people have discriminatory preferences where they only care about the welfare of others within their ethnic community. Hence, even though comparatively disadvantaged minorities and/or groups in an ethnically fragmented and polarized economy demand favourable public policies to enable them to escape deprivation and destitution, such public policies may not be realized because of the absence of adequate consensus and thus the required tax base to finance such policies.³ Luttmer (1997) shows empirically that individuals increase their support for welfare spending if a larger fraction of welfare recipients in their area belongs to their racial group. Thus there is some evidence that public spending in education will be unequal, favouring the more politically and economically powerful ethnic group in an ethnically diversified economy.⁴

More recent (second-generation) research, however, finds that the relationship between ethnic diversity and development outcomes is more nuanced, at least for growth, and strongly depends on the characteristics of the country's political system. Thus Collier (2001) concludes that: "ethnic diversity has no adverse effects on growth in fully democratic societies, but reduces growth by up to three percentage points in dictatorships". In highly diverse societies, in which no one ethnic group is dominant, it may be more difficult for lobbies to form than in less diverse societies—where interest groups with regard to the allocation of public spending may form around dominant ethnic groups.

We therefore use ethno linguistic fragmentation as a regressor in order to investigate whether, in more ethnically diverse societies, concentration of political and economic power into the hands of one or a few ethnic groups results in a more unequal structure

3 Rubinfeld (1987) among others find that that African-Americans are more supportive of spending on public education than others.

4 Goldwin and Katz (1998) find that more ethnic and religious homogeneity fostered high school expansion from 1910 to 1930.

of public spending on education. Ethno linguistic fractionalization (ELF) measures the probability that two randomly selected people from a given country will not belong to the same ethno linguistic group (Atlas Narodov Mira 1964) and this variable has been widely used in the literature to proxy for ethnic fragmentation (for instance, Easterly and Levine 1997, Mauro 1995 among others). In order to capture a much broader dimension of ethnic diversity, we use a measure of ethnic fragmentation, that is an average of the probability that two randomly selected people from a given country (i) will not belong to the same ethno linguistic group, (ii) will not speak the same language (Muller 1964, Roberts 1962), (iii) the percentage of the population not speaking the official language (Gunnemark 1991) and (iv) the percentage of the population not speaking the most widely used language (ibid.). This index (termed AVELF) is also used in Easterly and Levine (1997) and is taken from there. As a robustness check, we run the regressions using this broad index of ethnic diversity as well as using ethnic fragmentation. The results are very similar and thus we only report the regression results that use AVELF as a regressor.

We also include an Africa dummy variable, since Africa has high levels of ethnic fragmentation. But in addition, many African countries have gone through a transition to multi-party politics over the last decade. By 1999, 45 countries had multi-party constitutions compared with only 8 in 1988 (Thomson 2000: 216). The inclusion of the African dummy may therefore partly control for the effect of democratization in dampening the effects of ethnic diversity in some African countries (i.e. the thesis advanced by Collier 2001).

Our third key issue for investigation is the impact of conflict on the structure of public spending in education. The role of conflict in determining expenditure outcomes (and fiscal policy more generally) has been a neglected issue, despite the prevalence of conflict in developing countries, particularly in Africa—29 African countries have recently gone through major conflict (Addison and Murshed 2000). There are several channels through which conflict can influence public education spending. Conflict reduces the tax base, thereby reducing the revenues for expenditures, and military expenditures rise at the expense of the social sectors. With the contraction in total resources, and the rise in private discount rates (due to increased uncertainty), interest groups will intensify their lobbying for shares in this reduced pie and the poor are likely to lose out further in the resulting wartime bargaining process (in Angola, for example, basic social spending has collapsed over the last decade). Conflict also has direct effects on education due to the destruction of physical capital, infrastructure (including school buildings), and human capital. This destruction is often greatest in rural areas, where most of the poor live in low-income countries (Mozambique is an example), and thus primary education expenditures are likely to contract proportionately more than spending on secondary and tertiary education which is tilted towards urban areas.

The fall in the share of primary education may not necessarily be reversed post-war since the rich may successfully lobby (or hold state power, as in Liberia) to skew reconstruction spending towards themselves. Moreover, war can significantly raise income inequality—often the poor are hit disproportionately hard, while the rich and the 'new rich' may reap wartime rents from preferential access to rationing etc.—thereby increasing their resources available for lobbying, to the detriment of pro-poor spending. Post-war growth may therefore be narrower in the distribution of its benefits than pre-war growth (Addison and Murshed 2000).

We try to proxy for the impact of conflict by using three different measures: the proportion of minorities belonging to minorities at risk in 1990, PROP90 (from Gurr 1993); an index of racial tensions in 1984, RACIALT (from Knack and Keefer 1995);⁵ and an index of the intensity of conflict over the period 1989-1997 (from the Uppsala Conflict Data Project).⁶

Finally, natural-resource rich countries are often characterised by extreme inequality in the distribution of the resource rents, which are frequently captured by rich elites particularly in mineral exporters (Botswana is one of the few exceptions). This phenomenon usually goes together with severe urban-bias in public spending—which in itself tends to be detrimental to expenditure on rural primary education. Countries that are rich in natural resources (particularly mineral resources) also have a high propensity to conflict, particularly in SSA (Murshed and Perälä 2000). We therefore include a dummy variable for whether a country is a major exporter of non-fuel primary commodities or not.⁷

The generic form of our empirical model can thus be represented as follows:

(1) Inequality of public education spending = f (X, economic inequality, ethnic fragmentation, conflict, Africa dummy, natural resource dummy)

where, X is a vector of standard controls such as the initial level of per capita GDP (in our model, 1990), RGDPPC90 and population density in 1997, POPDEN.⁸ Several variants of this model are estimated and the results are discussed in the following.

5 The value of the index is ranged between 1(low tension) and 6 (high tension).

6 Uppsala Conflict Data Project: States in Armed Conflict, Uppsala University, Sweden Wallensteen and Sollenberg (2000). The scale of intensity is as follows: 0-no conflict, 1-minor armed conflict, 2-intermediate armed conflict, and 3-war.

7 This takes a value of 1 for a major exporter of a non-fuel commodities, and 0 otherwise.

8 We also try the share of different age groups such as the share of the population aged between 0 and 14 and the share of population aged between 15 and 64 as controls. These variables turn out to be insignificant in explaining the inequality in public spending on education, and they worsen the overall fit of the model. We therefore exclude these controls from our final estimations.

2 Empirical findings

The key empirical findings of our political economy model of public spending in education are summarized in Table 4. The adverse effect of initial income inequality on the share of primary education in education spending—which supports our interest group hypothesis—and the adverse effect of ethnic fragmentation as discussed above are prominent in model 1. Both of these effects are highly statistically significant. Quantitatively, holding other things constant, one standard deviation increase in the Gini coefficient would decrease the ratio of primary spending to tertiary spending by 0.20 points. Similarly, one standard deviation increase in ethnic diversity would increase the inequality of public spending by 0.18 points. While both of the standard controls (real per capita GDP, 1990 and population density, 1997) are marginally significant at the 10% level (more specifically, at the 11% level), their respective coefficients imply that they do not have any economic significance on the public spending variable.

In models 2 and 3, we introduce two separate measures to proxy for conflict, PROP90 and RACIALT. Neither has a (statistically) significant effect on the distribution of public spending and, moreover, inclusion of each of these conflict measures reduces both the economic and statistical significance of AVELF. But the coefficient on income inequality remains highly significant.

Each of these conflict measures has an ethnic dimension and in fact, in our sample we find a reasonable degree of correlation between each of these variables and AVELF. The partial correlation coefficient between AVELF and PROP90 is 0.47, implying that the higher the ethnic fragmentation, the higher would be the proportion of population belonging to minorities at risk. Interestingly, the rather high and negative (-0.73) partial correlation coefficient between AVELF and RACIALT may imply that the higher is ethnic diversity, the lower will be racial tension—perhaps because higher ethnic diversity raises the willingness to co-habit among different ethnic/racial groups in the manner suggested by Collier (2001).

Because of this correlation between conflict measures and ethnic diversity and particularly given our small sample size, we further try to investigate the impact of conflicts in the absence of controlling for AVELF in order to assess the sensitivity of the effect of conflicts and ethnic diversity. Now in model 4, we find a highly statistically significant adverse impact of conflict, proxied by PROP90 on the distribution of public spending. Quantitatively, one standard deviation increase in PROP90 would increase the inequality of public spending in education by 0.20 points. However, RACIALT is still insignificant in model 5.

Since each of these conflict measures has an ethnic dimension, we further investigate the combined effect of ethnic diversity and conflict on public spending in education by interacting AVELF and PROP90, AVELPRO in model 6 and AVELF and RACIALT (AVELRAC) in model 7. Now each of these combined measure of ethnic diversity and conflict seems to have a significant impact on inequality in public spending in education. Quantitatively, in model 6, one standard deviation increase in AVELPRO would increase the inequality in public spending by 0.20 points and in model 7, one

standard deviation increase in AVELRAC would increase the inequality in education spending by 0.22 points.⁹

The empirical findings provide strong support for an interest group theory of politics, with the unequal lobbying power of the rich and the poor resulting in a distribution of public spending in education that is tilted towards the former. We also find some support for the potentially adverse impact of ethno linguistic fragmentation, conflict, and the interaction of ethnic fragmentation and conflict, on the inequality of public spending in education.

To examine the robustness of our interest group hypothesis in further detail, we run a similar set of regressions, this time replacing the Gini coefficient by (i) the ratio of the income share of the lowest 20% to the highest 20% and (ii) the ratio of the income share of the lowest 40% to the highest 20% (Table 4). According to our hypothesis, the higher the initial income share of the poorest group(s) relative to the richest group, the greater will be their bargaining power over public spending. Public spending in primary education relative to tertiary spending will therefore increase (decrease) with the increase (decrease) of the income share of the bottom quintile or bottom 40% relative to the top 20% (models 8 to 14 in Table 4). As can be seen from Table 4, our prediction seems to be strongly supported by the empirical results.

Introducing an African dummy reduces the strength of the ethnolinguistic fragmentation variables but not their (negative) sign (Table 5). This may be because Africa is one of the most ethnically fragmented regions, the Africa dummy is capturing fragmentation per se, or because the democratic transition in some African countries over the last decade has diluted (but not reversed) the otherwise negative impact of ethnolinguistic fragmentation (thus supporting Collier 2001). We intend to investigate this issue further.

Introducing a dummy for the share of non-fuel primary commodity exports also has an adverse effect on inequality in public spending on education (Table 6).¹⁰ This may indicate that the rents from mineral exports are narrowly allocated towards the elite in many countries (Zambia, for example, failed to use its copper wealth to adequately invest in basic social services). We intend to investigate this issue in more detail.

Figures 1 to 4 graph the relationships between measures of inequality in public spending on education, and measures of income inequality and ethnolinguistic fractionalization.

⁹ We also undertook a similar exercise using the intensity of conflict (as mentioned above). While the results are similar, using intensity of conflict drastically reduces our sample size to 13-14. We thus exclude this indicator as a proxy for conflict.

¹⁰ The data on primary commodity exporters are from the World Bank's Global Development Network Database (<http://www.worldbank.org/research/growth/>).

3 Conclusions and policy implications

This paper has investigated why the distribution of public spending in education is often skewed away from primary education—the level of education of most benefit to the poor—despite the high private and social returns to investing in good quality primary schooling. We find that a high level of initial income-inequality is a determinant of such skewed public spending (thereby perpetuating, and even increasing, income inequality as well as poverty, over time) confirming the plausibility of the interest-group model as an explanation of spending outcomes. We also find that conflict is significant in skewing public spending away from primary expenditure and towards education expenditures of most value to the non-poor. In our results, ethnolinguistic fragmentation tends to reduce the relative share of primary spending (thus supporting the conclusions of the first-generation studies on this issue). But this issue needs further investigation by introducing democratization variables to capture the effect of democratization in reducing and reversing the negative effects of ethnic diversity (as argued by Collier 2001).

Our results raise some troubling issues for policy makers. First, efforts to shift public spending towards primary education in order to raise the participation of the poor in growth are likely to meet fierce resistance from the affluent in societies with high income inequality. The experiences of Brazil, Guatemala, and South Africa seem to bear this out. Relatedly, donor inspired Poverty Reduction Strategy Papers (PRSPs)—which supposedly commit governments to pro-poor actions, including pro-poor education policy—may not be translated into increased pro-poor spending once lobbying by the affluent kicks in. Indeed, parallel action to reduce income inequality—and thus the resources available to the affluent to block reform—may be necessary to the achievement of successful pro-poor expenditure reform. Hence, well-designed land reform together with the closure of pro-rich exemptions in the tax system (to name but two redistributive instruments) may therefore be necessary to ease political constraints on raising pro-poor public spending. This cuts against the present donor consensus that income inequality can be largely ignored in the creation of strategies for poverty reduction.

Second, efforts to raise pro-poor spending are constrained (and often reversed) by the prevalence of conflict, especially in SSA. Conflict prevention, together with credible peace agreements, therefore have potentially high returns to poverty reduction. Moreover, reducing the prevalence of conflict would facilitate resource shifts from military spending to primary schooling, thereby lessening the need to introduce higher levels of cost recovery in the secondary and tertiary education levels to fund higher investment in primary education.

Finally, if governments and donors wish to see the achievement of broad-based (poverty reducing) growth then they must recognize that raising pro-poor spending—so that the poor have the skills to contribute and benefit from that growth—is not simply a technocratic or managerial process, but one that is also deeply political in nature. Specifically, successful democratic transition can, in giving voice to the poor, increase their ability to shift spending towards themselves (i.e. median voter effects start to counteract lobbying by the affluent) and reduce (and reverse) the potentially harmful effects of ethnic diversity in authoritarian and dictatorial political systems. Hence, democratic transition is likely to be a necessary (although not sufficient) condition for achieving pro-poor growth in many countries.

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Table 1
Unit education subsidies by level in selected African countries

Country/year	Monetary unit	Monetary		Secondary as ratio of		Tertiary as ratio of
		Primary	Secondary	primary	Tertiary	primary
Côte d'Ivoire, 1995	CFAF	64,840	117,462	1.8	348,453	5.4
Ghana, 1992	Cedis	24,824	65,275	2.6	392,707	15.8
Guinea, 1994	GNF	47,625	116,812	2.5	2,595,705	54.5
Kenya, 1992/93	K Shs.	1,368	3,868	2.8	42,050	30.7
Madagascar, 1994	FMG	50,504	192,491	3.8	1,140,000	22.6
Malawi, 1994/95	Kwachas	220	909	4.1	15,523	70.6
South Africa, 1994	DBSA	1,124	2,055	1.8	5,657	5.0
Tanzania, 1993/94	T Shs.	6,600	7,500	1.1	–	–
Uganda, 1992/93	U Shs.	11,667	37,352	3.2	373,525	32.0

– Not available.

Source: The Table is reproduced from Castro-Leal, Dayton, and Demery (1999: 63)

Table 2
Public spending on education by income quintile in selected developing countries, various years (per cent)

Country	Year	Quintile				
		1 (poorest)	2	3	4	5 (richest)
Armenia	1996	7	17	22	25	29
Côte d'Ivoire	1995	14	17	17	17	35
Ecuador	1998	11	16	21	27	26
Ghana	1992	16	21	21	21	21
Guinea ^a	1994	9	13	21	30	27
Jamaica	1992	18	19	20	21	22
Kazakhstan	1996	8	16	23	27	26
Kenya	1992/93	17	20	21	22	21
Kyrgyz Republic	1993	14	17	18	24	27
Madagascar	1993/94	8	15	14	21	41
Malawi	1994/95	16	19	20	20	25
Morocco	1998/99	12	17	23	24	24
Nepal	1996	11	12	14	18	46
Nicaragua	1993	9	12	16	24	40
Pakistan	1991	14	17	19	21	29
Panama	1997	20	19	20	24	18
Peru	1994	15	19	22	23	22
Romania	1994	24	22	21	19	15
South Africa	1993	21	19	17	20	23
Tanzania	1993	13	16	16	16	38
Vietnam	1993	12	16	17	19	35

Source: The Table is reproduced from World Bank (2001b: 80).

Note: ^a Includes only primary and secondary education

Table 3

. Public expenditure on health, education, and the military as percentages of GNP in Sub-Saharan Africa

	Public Expenditure on Health (% GNP)	Public Expenditure on Education (% GNP)	Military Expenditure (% GNP)
	1990-98	1997	1997
Angola	3.9	---	20.5
Benin	1.6	3.2	1.5
Botswana	2.7	8.6	5.1
Burkina Faso	1.2	1.5	2.8
Burundi	0.6	4.0	6.1
Cameroon	1.0	--	3.0
Central African Republic	1.9	--	3.9
Chad	2.4	1.7	2.7
Congo, Democratic Rep.	1.2	--	5.0
Congo, Rep.	1.8	6.1	4.1
Cote d'Ivoire	1.4	5.0	1.1
Eritrea	2.9	1.8	7.8
Ethiopia	1.7	4.0	1.9
Ghana	1.8	4.2	0.7
Guinea	1.2	1.9	1.5
Kenya	2.2	6.5	2.1
Lesotho	3.7	8.4	2.5
Madagascar	1.1	1.9	1.5
Malawi	2.8	5.4	1
Mali	2	2.2	1.7
Mauritania	1.8	5.1	2.3
Mozambique	2.1	--	2.8
Namibia	3.8	9.1	2.7
Niger	1.3	2.3	1.1
Nigeria	0.2	0.7	1.4
Rwanda	2.1	--	4.4
Senegal	2.6	3.7	1.6
Sierra Leone	1.7	--	5.9
South Africa	3.2	7.9	1.8
Tanzania	1.3	--	1.3
Togo	1.1	4.5	2.0
Uganda	1.8	2.6	4.2
Zambia	2.3	2.2	1.1
Zimbabwe	3.1	--	3.8

Source: DFID (2001: 24-25)

A larger proportion of military spending is 'off budget' compared with education and health spending in many countries. Accordingly, the reported data on military spending should be treated as lower bounds.

Table 4

Dependent variable- Public spending per student (as a % of GNP) in primary education/Public spending per student (as a % of GNP) in tertiary education*

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13
RGDPPC90	0.00 (1.65)	0.00 (1.67)	0.00 (1.60)	0.00 (2.00)	0.00 (1.76)	0.00 (2.00)	0.00 (1.61)	0.00 (1.43)	0.00 (1.47)	0.00 (1.72)	0.00 (1.81)	0.00 (1.54)	0.00 (1.56)
POPDEN	-0.00 (1.64)	-0.00 (1.97)	-0.00 (-1.39)	-0.00 (-2.98)	-0.00 (-1.57)	-0.00 (-2.71)	-0.00 (5.27)	-0.00 (-1.41)	-0.00 (-1.42)	-0.00 (-3.06)	-0.00 (-2.94)	-0.00 (-1.20)	-0.00 (-1.22)
AVELF	-0.61 (-2.08)	-0.33 (-1.03)	-0.42 (-1.33)					-0.75 (-2.16)	-0.70 (-2.04)				
GINI80s	-0.02 (-3.91)	-0.02 (-3.69)	-0.02 (-3.03)	-0.02 (-3.60)	-0.02 (-3.20)	-0.02 (-3.68)	-0.01 (-3.05)						
PROP90		-0.52 (-1.53)		-0.74 (-2.97)						-0.65 (-1.53)	-0.62 (-1.52)		
RACIALT			0.03 (0.52)		0.08 (1.40)							0.11 (1.74)	0.10 (1.64)
AVELF*PROP90 (AVELPRO)						-1.07 (-3.79)							
AVELF*RACIALT (AVELRAC)							-0.29 (-2.22)						
TOPBOT20								1.68 (2.05)		2.56 (2.83)		1.67 (1.92)	
TOPBOT40									0.79 (2.40)		1.14 (2.98)		0.78 (2.22)
# of observations	41	26	38	26	38	26	38	36	36	23	23	33	33
Adj. R ²	0.26	0.52	0.19	0.51	0.20	0.50	0.25	0.21	0.21	0.45	0.47	0.17	0.18

Constant term is not reported. White's Heteroskedasticity Consistent t-ratios are in parentheses

* Income Inequality Measures are from the WIDER Inequality Database (all OKIN categories), RGDPPC90 and Public Expenditure per student (as a % of GNP) at primary, secondary and tertiary are from the World Bank World Development Indicators database levels, AVELF, PROP90 and RACIALT are from the Easterly and Levine (1997).

Table 5

Regression results with Africa Dummy. Dependent variable- Public spending per student (as a % of GNP) in primary/Public spending per student (as a % of GNP) in tertiary education

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
RGDPPC90	0.00 (1.66)	0.00 (1.88)	0.00 (1.69)	0.00 (1.44)	0.00 (1.45)	0.00 (1.48)	0.00 (1.59)	0.00 (1.63)	0.00 (1.50)	0.00 (1.52)
POPDEN	-0.00 (-2.18)	-0.00 (-3.38)	-0.00 (-1.83)	-0.00 (-3.42)	-0.00 (-1.83)	-0.00 (-1.86)	-0.00 (-2.92)	-0.00 (-2.84)	-0.00 (-1.32)	-0.00 (-1.33)
AVELF	-0.39 (-1.20)				-0.54 (-1.45)	-0.50 (-1.34)				
GINI80s	-0.02 (-3.76)	-0.02 (-3.92)	-0.02 (-3.31)	-0.02 (-3.52)						
PROP90		-0.44 (-1.78)					-0.76 (-2.09)	-0.73 (-2.12)		
RACIALT			0.07 (1.17)						0.10 (1.59)	0.10 (1.50)
Dummy for Sub Saharan Africa	-0.27 (-2.71)	-0.41 (-4.69)	-0.41 (-5.86)	-0.45 (-4.68)	-0.31 (-2.74)	-0.32 (-2.80)	-0.44 (-3.86)	-0.45 (-5.57)	-0.36 (-5.37)	-0.34 (-5.35)
TOPBOT20					1.51 (1.89)		2.30 (2.50)		1.64 (1.87)	
TOPBOT40						0.72 (2.25)		1.05 (2.78)		0.77 (2.15)
# of observations	41	26	38	44	36	36	23	23	33	33
Adj. R ²	0.26	0.69	0.32	0.29	0.32	0.33	0.66	0.68	0.15	0.16

Constant term is not reported. White's Heteroskedasticity Consistent t-ratios are in parentheses.

Table 6

Regression results with Dummy for Nonfuel Primary Commodities Exporters (PRIMNFX). Dependent variable-
Public spending per student (as a % of GNP) in primary/Public spending per student(as a % of GNP) in tertiary education

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
RGDPPC90	0.00 (1.62)	0.00 (1.64)	0.00 (1.88)	0.00 (1.72)	0.00 (1.41)	0.00 (1.44)	0.00 (1.55)	0.00 (1.60)	-0.00 (1.51)	0.00 (1.53)
POPDEN	-0.00 (-1.81)	-0.00 (-2.19)	-0.00 (-3.07)	-0.00 (-1.68)	-0.00 (-1.54)	-0.00 (-1.55)	-0.00 (-2.85)	-0.00 (-2.77)	-0.00 (-1.36)	-0.00 (-1.36)
AVELF	-0.54 (-1.91)	-0.38 (-1.17)			-0.69 (-2.00)	-0.65 (-1.88)				
GINI80s	-0.02 (-3.04)	-0.02 (-3.26)	-0.02 (-2.96)	-0.01 (-2.02)						
PROP90			-0.64 (-2.63)				-0.84 (-2.19)	-0.81 (-2.20)		
RACIALT				0.07 (1.33)					0.10 (1.61)	0.10 (1.54)
Dummy for Sub Saharan Africa		-0.23 (-2.48)								
TOPBOT20					1.44 (1.60)		2.16 (2.27)		1.37 (1.45)	
TOPBOT40						0.69 (1.88)		0.98 (2.48)		0.65 (1.67)
PRIMNFX	-0.17 (-1.71)	-0.11 (-1.32)	-0.24 (-2.19)	-0.23 (-2.02)	-0.19 (-1.63)	-0.18 (-1.56)	-0.29 (-2.22)	-0.30 (-2.30)	-0.23 (-2.09)	-0.21 (-1.85)
# of observations	41	41	26	38	36	36	23	23	33	33
Adj. R ²	0.25	0.24	0.56	0.20	0.19	0.20	0.52	0.54	0.16	0.17

Constant term is not reported. White's Heteroskedasticity Consistent t-ratios are in parentheses. Data on primary commodity exporters are from the World Bank's Global Development Network Database

Figure 1
Primary to tertiary spending ratio and income inequality

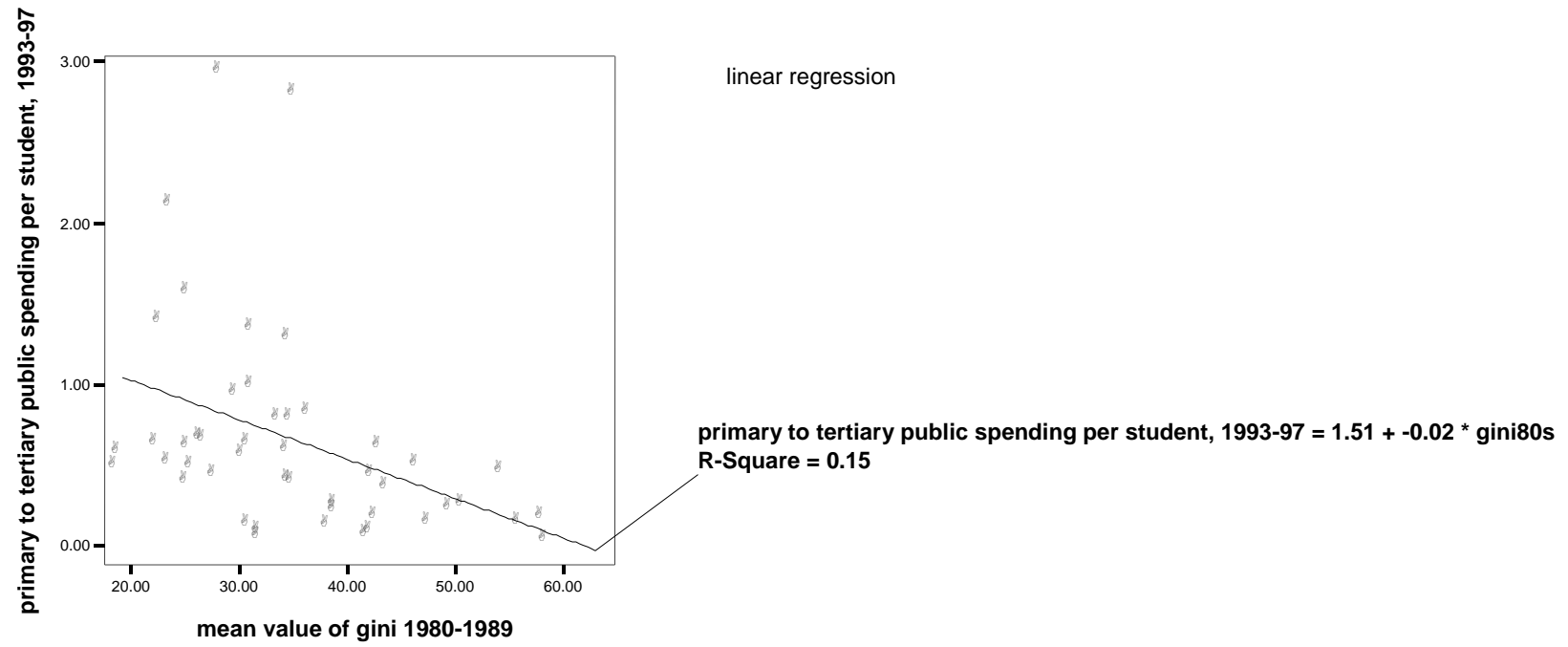


Figure 2

Primary to tertiary spending ratio and income share of bottom 40% to top 20%

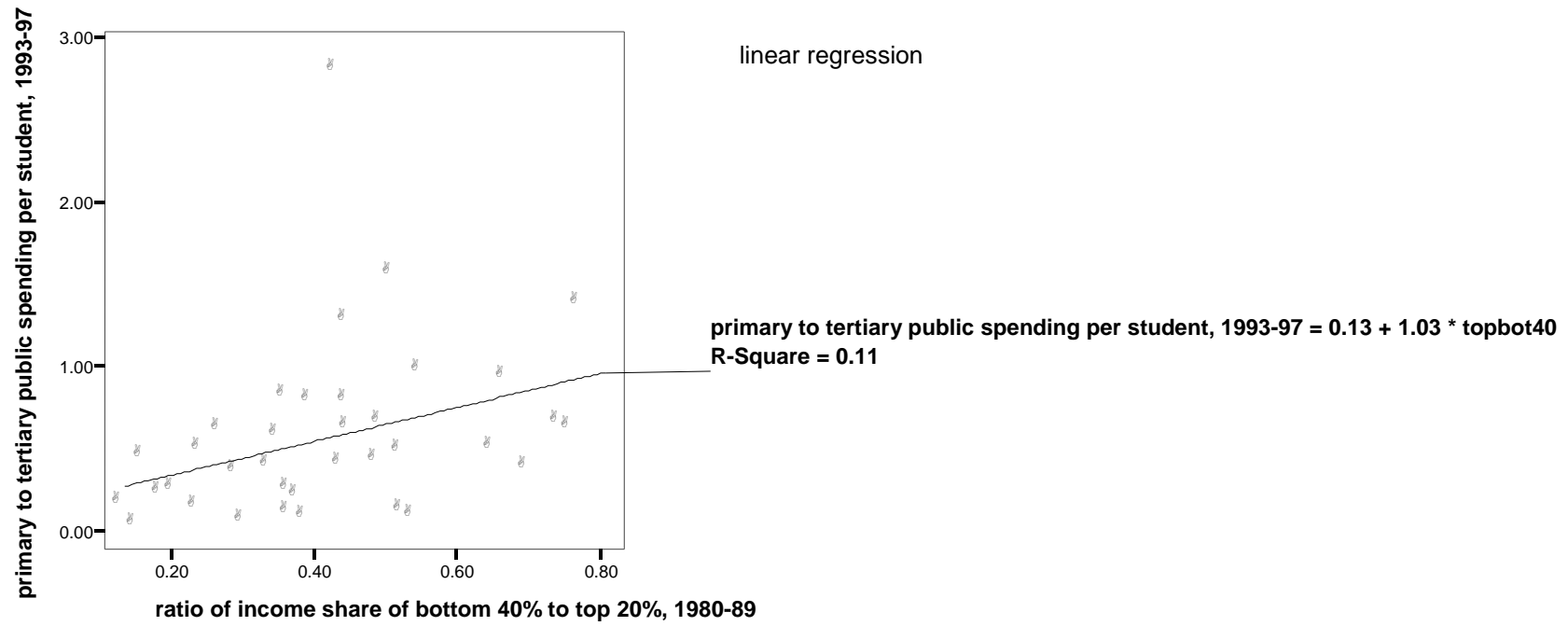


Figure 3

Primary to tertiary spending ratio and income share of bottom 20% to top 20%

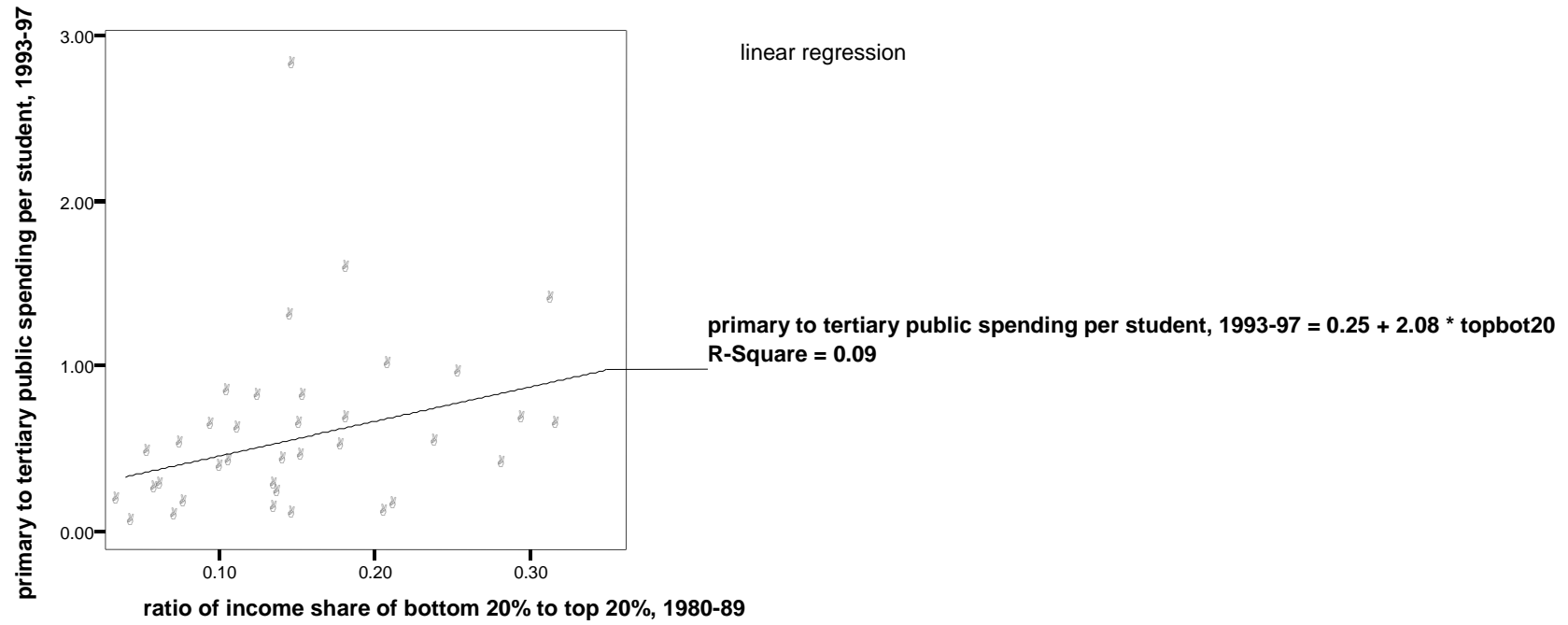
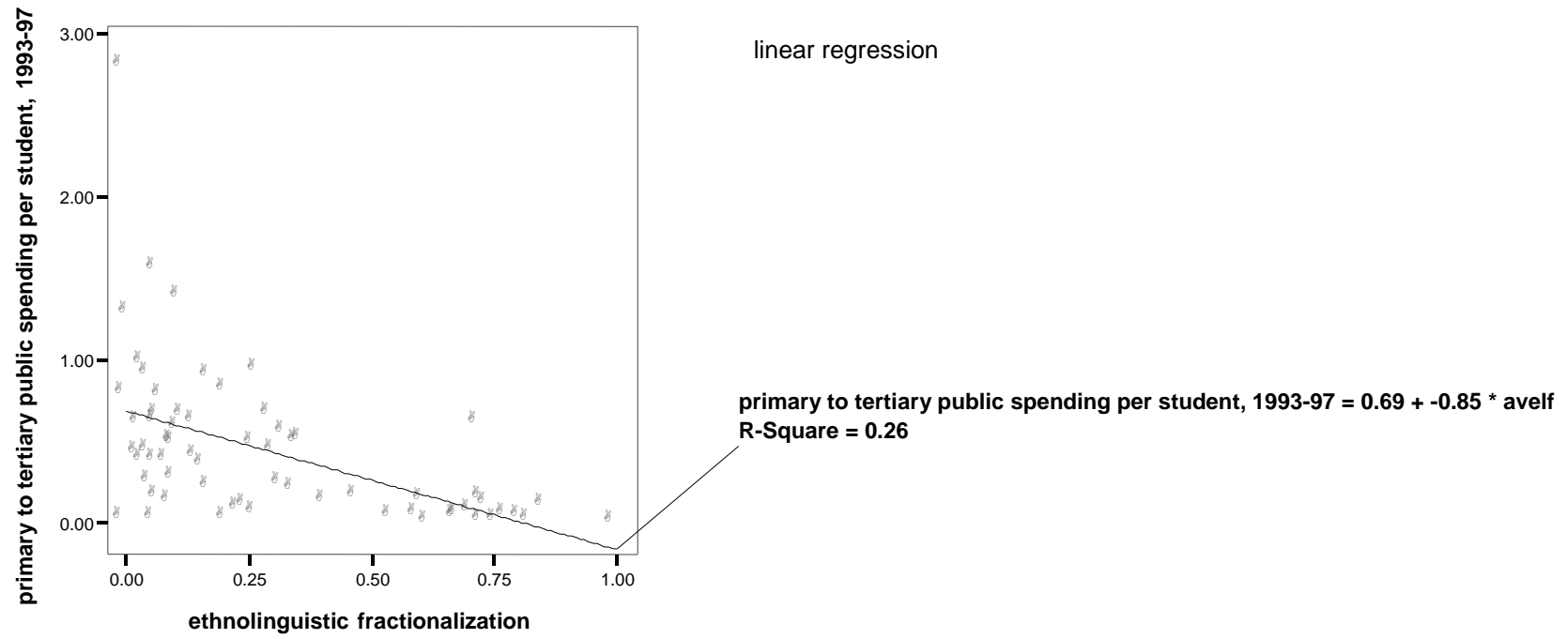


Figure 4

Primary to tertiary spending ratio and ethnolinguistic fractionalization



Appendix I
Summary statistics of sample observations

Variable	Obs	Mean	Std. Dev.	Min	Max
edu93971	75	.4932195	.563659	.0050974	2.921217
rgdppc90	183	1.54e+13	1.07e+14	14970	1.31e+15
popden	183	1067.513	4112.393	1.982975	41831.48
avelf	159	.3283762	.3017278	0	1
prop90	84	.272556	.2744174	.0057	1.01
racialt	108	3.62963	1.666563	0	6
gini80s	93	36.61401	10.10854	19.22	62.9
avelpro	84	.1350144	.1897885	0	.826079
avelrac	107	.8657628	.7978526	0	3.186667
topbot20	69	.1549487	.0754966	.0383693	.349779
topbot40	69	.423211	.1677662	.1350919	.8069196
ssa	212	.2358491	.4255331	0	1
primnfx	211	.2559242	.4374172	0	1

Appendix II
Partial correlation coefficients

	edu93971	rgdppc90	popden	avelf	prop90	racialt	gini80s
edu93971	1.0000						
rgdppc90	0.3657	1.0000					
popden	-0.3856	-0.0865	1.0000				
avelf	-0.4904	-0.2979	0.3451	1.0000			
prop90	-0.3506	-0.1906	0.0538	0.3518	1.0000		
racialt	0.3183	0.1464	-0.4116	-0.7410	-0.5056	1.0000	
gini80s	-0.5113	-0.1479	-0.1592	0.1049	0.2572	0.0968	1.0000
avelpro	-0.3922	-0.1831	0.2401	0.5716	0.8979	-0.6071	0.2140
avelrac	-0.4148	-0.3423	-0.2053	0.6429	0.1309	-0.1450	0.2165
topbot20	0.4663	0.1428	0.1838	-0.0922	-0.1883	-0.1982	-0.9034
topbot40	0.5203	0.1513	0.1348	-0.1524	-0.2118	-0.1318	-0.9381
ssa	-0.2520	-0.0753	-0.0947	0.5319	-0.2088	-0.1343	0.0134
primnfx	-0.2300	-0.1356	-0.1736	0.1379	-0.2054	0.0970	0.2299

	avelpro	avelrac	topbot20	topbot40	ssa	primnfx
avelpro	1.0000					
avelrac	0.1687	1.0000				
topbot20	-0.1580	-0.2656	1.0000			
topbot40	-0.1955	-0.2836	0.9903	1.0000		
ssa	-0.1014	0.6599	-0.0339	-0.0568	1.0000	
primnfx	-0.1923	0.2726	-0.2013	-0.2049	0.5492	1.0000

Appendix III

List of countries in the large sample size (i.e., n = 41)

Australia	Israel	Sweden
Austria	Italy	Thailand
Belgium	Japan	Tunisia
Bulgaria	Korea, Rep	Turkey
Chile	Lesotho	United States
China	Malaysia	
Colombia	Mauritania	
Cote d'Ivoire	Mauritius	
Denmark	Mexico	
Ethiopia	Morocco	
Finland	New Zealand	
France	Norway	
Greece	Philippines	
Guatemala	Poland	
Honduras	Portugal	
Hungary	Romania	
India	Singapore	
Ireland	Spain	

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