Public Expenditures in Education and Elite Capture

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Abstract

Low income countries, and in particular countries in Sub-Saharan Africa, have invested huge resources over the last 40 years in financing higher (university level) education, compared with the number of students at that level and with the corresponding expenditures for lower levels of education. I propose and test an elite capture hypothesis: that expenditure in tertiary education is used as a tool for redistribution towards the elites close to the political leaders, when this level of education is accessible exclusively or mostly to such groups.

VERY PRELIMINARY AND INCOMPLETE

1 Introduction

Most countries spend more per student in higher education than at lower levels. The ratio of total expenditures to number of enrolled students increases with the education level because of the combined effect of numerator and denominator: on the one hand, operating a university level education system requires more resources compared to primary school; on the other hand, the number of people that go on to higher levels of education is bound to decrease from compulsory education levels. It is hence expected that the ratio of expenditures per university student to expenditures per student at lower levels should be a number greater than 1. It is also

understandable that this ratio is bigger in less developed countries: even assuming that the amount of resources needed to finance higher education is constant for societies at different levels of development, the ratio would be driven up by the much smaller numbers of students that reach that level in developing countries. Nevertheless, given the still poor conditions of basic education [add some statistics...], such high ratios between resources used in high versus basic education as those observed in developing regions of the world are counterintuitive (see Table **??**).

Moreover, even within the group of developing countries, Sub-Saharan African countries set themselves apart: their average ratio of expenditures per tertiary student to expenditures per primary student in 2003 was 198.5, more than 100 times what it was in OECD countries .

The amount spent for each university student in Sub-Saharan African countries looks even more disproportionate when it is related to GDP per capita (Figure **??**). Part of it is clearly due to very low GDP per capita levels in African countries; but the ratio of expenditures to GDP per capita is more than seven times bigger than the corresponding average across the others regions, much bigger than the difference in GDP per capita levels.

This pattern can be interpreted in light of general distortions afflicting the public sector financing system of many African countries, and the education sector in particular, as noticed by several other studies (see **?**): if, for various reasons, the marginal products of different inputs are not equalized, there will be inefficient overspending in some expenditure items; this might be the case for university education. This can be put together with the fact that the institutional settings and political economy in these countries present many challenges, to advance the hypothesis that the observed overspending in higher education, at least for the portion not explained by high costs and small numbers of students, is a form of inefficient redistribution, or a transfer of resources from the government or political leader to a specific target group effected through the budget allocation to high education. This is the hypothesis advanced and tested in this study.

A general objection raised against charges of inefficient redistribution is that there must be "[...] surely an easier way of accomplishing that objective!", to say it

with **?**. In a political economics model, a government can freely distribute "pork" as long as it compensates somehow voters' preferences and makes everybody just indifferent. Disposing freely of tax revenues should be an even easier task for autocrats, not constrained by elections. Still, there are many reasons why a political leader, even an autocrat, that wishes to redistribute resources towards her however defined constituency might be constrained from doing so overtly. In non homogenous societies, characterized for example by high ethnic fractionalization (see Table **??**), even absent electoral incentives, an autocratic leader might be constrained by the threat of social unrest or uprise of openly discriminated groups. Moreover, many of these countries are heavily dependent on their good standing with the international community, through many channels, one of which is development assistance. Table **??** shows the share of ODA to government expenditures: it averages 50.6% in SSA, and in some countries it exceeds 100%. Expenditures in university education is a category of spending that, although benefiting disproportionately the relatively restricted elite who has access to high education, would not be opposed by aid-giving institutions; this might not be the case for direct transfers targeted to that very same elite.

Testing my hypothesis requires the identification of this elite group that is close to the political leader, has access to high education and more in general captures public resources to its own benefit. This paper uses as a proxy the ethnic group to which the leader belongs. Sure enough, the overlap between a country's political elite and the group of coethnics of the leader is only partial. On the other hand, there is a wide literature, in particular with reference to African societies, revolving on the concept of "ethnic politics". It is easy to list reasons why, on the one hand, political support to a leader is often organized around the ethnic identity, and also, on the other hand, why a leader should target, or otherwise try to appeal to, her own coethnics[1]. An ethnic group is typically easy to mobilize, due to language and kinship ties, while at the same time the ascriptive nature of ethnic identity limits in a natural way the size of the group and partly screens oportunistic behavior. Moreover,

[1]There are also several reasons to argue the opposite, instead: [list some...]. In this specific case, the question is left open to the empirical analisys

from the individual supporter's perspective, ethnicity can be seen as a proxy for the candidate's or leader's preferences. On top of this, there is of course the perception, founded or not, of material benefits that can arise for a group when coethnics hold political power: in the popular discourse, it is widespread in many African societies the belief that people benefit from patronage in such situations; this emerges from the politicians' retorics, and from the observed patterns of voters' support, besides a few conspicuous examples (see **?**).

Against this background, the specific question asked in this paper is: does the ethnicity of the political leader (contribute to) explain the pattern of expenditures in high education, having in mind as channel some form of disguised redistribution to the leader's coethnics? To lend support to this hypothesis, this paper shows first of all that participation in education responds significantly to the ethnicity of the leader; in particular, school attendance increases when coethnics are in power. This happens at all education levels. I cannot distinguish if this pattern is due to supply side factors (for example, through construction of more schools or better connections in towns or areas dominated by coethnics, or through active discrimination of other groups) or demand side factors (for example, because coethnics of the leaders anticipate better prospects in a future career, maybe in the public sector, and hence invest more in education). However, some patterns in the data and in particular timing details lend support to the second interpretation.

Moreover, and this is the specific contribution of this study, I can observe a significant increase in public expenditures for tertiary education when the leader belongs to the ethnic group which is dominant among university students.

The rest of the paper is organized as follows: [...]

2 Data

In order to look at group specific patterns, I rely on an indirect method to construct ethnic-group level time series of the variables of interest: school attendance, at different education levels, and employment in a number of public sector related occupations. I use the information on ethnicity, attained education, (current) occu-

pation and age of the respondents from the most recent wave of the Demographic and Health Surveys to predict the population share, for each ethnic group, enrolled in each level of education and employed in each occupation, year by year over a period of about 40 years[2]. Of course, these projections may deviate from the actual numbers, for many different reasons, and should be seen as just an approximation.

These predicted data are then combined with country level statistics on education, collected by UNESCO, and information about the ethnicity of the leader in power, defined as the President, or the head of a Cabinet, or an autocratic leader, from **?**. Their sources include country histories, general and country-specific reference works, press reports, government websites and official biographies.

Table **??** reports some information about the sample. 20 DHS surveys among those available for African countries report the information about ethnicity, so this determines which countries can be included in my sample. The period covered refers to the years in which at least some respondents were between 18 and 25 year old; I use this as a reference because the tertiary education level is the main focus of my analysis. There is an average of 41 ethnic group in each country, which, over 40 years, generates about 14000 observations.

According to the information about the leaders, there were at most 6 changes in power for any given country during this period; only few of them happened under democratic rule (I code this as 1 if the country in that year has a polity score greater than 5), and many of them, on average more than one per country, happened as a coup or in connection to violent incidents[3]. As for the ethnic identity of the leader, in three cases it never changed over the whole time period; for the remaining countries, up to 4 different groups occupied power during the period considered. Finally, Table **??** reports also how often the leader belongs to the same group which had the absolute majority among university students. I call this the dominant group. In many cases, no group exceeded the 50% share, but only Gabon and Zambia never

[2]For example, to predict the number of university students belonging to ethnic group j in 1980 I use the number of respondents that in the survey year, f. i. 2006, are between 44 and 51 of age (18 to 25 back in 1980), report to have been enrolled in tertiary education and belong to group j. Table **??** reports the period covered for each country.

[3]This information comes from the Integrated Network for Societal Conflict Research.

had any dominant group; on the other hand, only in Rwanda there has always been one dominant group: Hutu before 1995, and Tutsi after. Figure **??** reports the aggregate patterns of persistence of groups in positions of power and of dominance in universities.

Table **??** shows some descriptive statistics of the variables of interest at the level of ethnic group, organized by different criteria: in the first panel, ethnic groups that have never been in power are contrasted to groups that have been in power at least once; for these last ones, the second panel shows separately the averages for the years when they were in power against the years when they were not in power; finally, the third panel compares the ethnic groups which are dominant among university students against all the other groups. The numbers in the Table are shares of the population in the relevant age belonging to a specific group; for example, the top-right cell says that, on average for groups that have never been in power, 64% of children between 7 and 12 attend primary school; and so on. The highlighted numbers indicate that the difference within the table panel is significant at conventional levels.

I singled out 4 occupations from the DHS classification which can be more directly related to the public sector: the civil servants heading includes governament officials and MPs, when applicable, as well as administrative and bureaucratic personnel; the second heading groups together custom officers and tax authority employees; the education sector includes teachers and administrative or other support staff, although for this category I cannot distinguish between public and private schools; finally the last column reports police and military personnel[4]. As the middle panel shows, groups that are currently in power (the coethnics of the current leader) are more represented among civil servants and military personnel, and also in the higher education level; there aren't instead many significant differences in terms of occupation between the groups that are dominant in high education and the others; hence, being dominant in high education is not sufficient for a group to obtain a significantly bigger share of public sector occupations. Lastly, groups that have been at least once in power

[4]The occupation classification from the DHS can be different in different countries, and some of these categories are missing in some countries; the figures reported should hence be viewed as approximations.

seem to have, expectedly, more civil servants on average.

The simple averages reported in the table above don't make use of the panel structure of the data, pooling together groups that belong to different countries and observed at different points in time. In the next section, I discuss instead difference-in-difference estimations for those same population shares, both in the three education levels and in the four occupation categories, asking whether the annual change in a group's members that participate in a given level of education or are employed in a given occupation is significantly different in the years when the political leader is a coethnic compared to other groups within the country. These results, also supported by recent findings in **?**, are meant to be suggestive about the presence and extent of "ethnic politics" in general, showing whether people actually react to having a coethnic in power, and whether they benefit from it, for example in terms of occupational prospects.

The main focus of this paper is though related to the public expenditure puzzle, namely trying to ascertain if the presence of "ethnic politics" in these 20 African countries has a role in explaining the pattern of overspending in higher education documented above. To this end, the next section reports also estimation results on the effect of having a leader belonging to the dominant group on the level of public expenditures in tertiary education.

3 Results

Figure **??** and **??** show graphically the d-i-d estimates for the three education sectors and the four public-sector related occupations. As anticipated, the shares of students participating in school increases significantly for a group compared to other grous in the country in the years when a coethnic is in power. The same happens for the share of people of working age that are employed as civil servants; but not for other occupations.

Can this be related to the patterns observed in expenditures? Figure **??** shows the cross-country variation of expenditures within SSA: although the levels are consistently higher than in the rest of the developing world, as shown in Figure **??**, they

vary across different countries, and in particular seem related to GDP per capita, quite intuitively, and also to the number of enrolled students, although much more weakly. To start with, I try to exploit also in this case the panel dimension of the data on expenditures, and report fixed effect estimations: the deviation from country-specific trends of observed expenditure levels in connection with the rule of a leader belonging to the dominant group in the country's university system. A caveat is in order though: the existing data on budget allocations are not complete and balanced over the whole time period. Moreover, the typical behavior of sectoral budget appropriations is very persistent over time, with not much yearly variation, and variable lags due to bureaucratic processes. This implies that the estimates are somewhat unstable and sensitive to the specification, and I can't perform as many robustness checks as I would like.

Table **??** reports the fixed effect estimations for the panel data on expenditures. In the years when the political leader belongs to the group to which a majority of university students also belong, the share of expenditure allocated to primary and secondary education goes down while the share of tertiary education goes up. The lag and the forward, used as a placebo test, have no effect. The size of the coefficient indicates that the countries that have in power a leader belonging to the dominant group spend in those years 22.3 USD millions more, which is more than half of the within country variation. These results are robust to using the alternative dependent variable, the ratio of expenditures per student to GDP per capita.

The regressions include a control for the identity of the group in power, to avoid a potential omitted variable, namely group specific preferences about high education. Suppose a given group attaches high value to education. Then this cultural identity will cause at the same time that, on one hand, the group will be dominant in high education, and on the other hand, when in power, the group will spend more for education, without any implication about patronage. The effect reported is instead relative to years when the same group is in power, but is not dominant among university students.

As a robustness check, Table **??** reports the estimates using an alternative dependent variable, namely expenditures per student as a share of GDP per capita.

The basic result holds true: expenditures decrease, although not significantly, at the lower levels while increasing strongly at the tertiary level. Also in this case, the coefficient explains roughly half of the variation in the measure. The second column in each pair uses a continuous measure of the share of students who are coethnic with the leader in power, instead of the dummy variable used above. The coefficients tell once more a similar story, although the estimates are not significant; probably the sample size is not sufficient to estimate a continuous measure.

Given the limitations of the data discussed above, as a further test I collapse them at the country level, using the most recent data on expenditures. The idea is that current levels of expenditures are the result of a history of public investments and subsequent budget allocations, which might have been affected by the political history of the country, so that a summary measure of this history should partly explain current cross-country differences. Table **??** shows the relation between current expenditure level and the share of years during which the dominant group has been in power. The first column in each pair uses as a dependent variable the same measure of expenditures as in Figure **??**, namely expenditures per student in the relevant education level as a fraction of per capita GDP: the patterns visible in the graph with respect to income and number of students don't seem to have statistical significance. On the other hand, this measure of expenditures for the university level is significantly related to the share of years during which the dominant group has been in power. In the second column of each pair, this relationship is shown to hold also when looking at the absolute level of expenditures, and controlling for the total expenditures in education, per capita income and number of students. Notice that the share of years when the dominant group in tertiary education is in power has no effect on primary and secondary level education expenditures; also, a much bigger fraction of the variation in tertiary level expenditures is explained by the model, as implied by the R^2.

4 Conlcusions

A Tables and figures

Table 1: **Expenditures per tertiary student as a ratio of expenditures per student at lower levels, year 2003**

Region	*Primary*	*Secondary*
OECD	1.8	1.5
East Europe / FSU	2.0	1.5
Latin America	4.3	4.0
South Asia	5.6	3.3
Middle East / North Africa	5.4	5.3
East Asia	12.5	6.5
Sub-Saharan Africa	198.5	81.1

Source: **?**

Figure 1: **Expenditure per student in tertiary education as a fraction of GDP per capita**

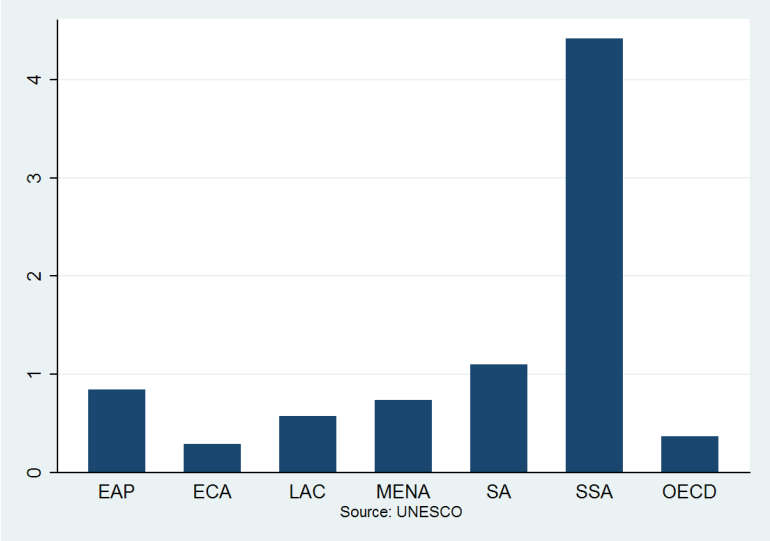


Table 2: **Summary statistics at the country level, 2000-2005, by region**

Region	GDP p/c	Public expenditures	Number of students	Ethno-linguistic fractionalization	ODA as share of Gov.t spending
EAP	1527	390	1506206	.462	22.3
ECA	1940	510	939732	.401	20.6
LAC	3482	1004	580833	.437	18
MENA	3216	415	587042	.334	6.08
SA	904	1379	1822142	.471	24.8
SSA	1026	79.3	83768	.663	50.6
OECD	23842	11320	1485715	.237	.

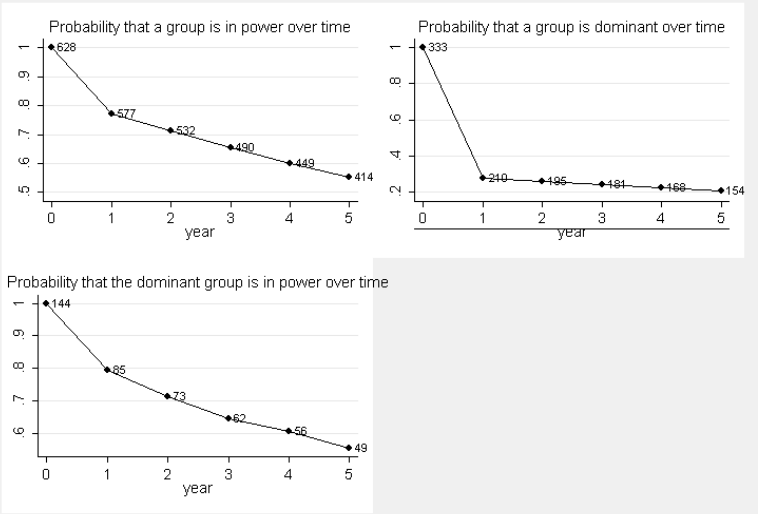
Source: Education data from UNESCO, GDP and ODA from the World Development Indicators. Public expenditures and number of students both refer to the tertiary sector. Gdp p/c is in 2000 USD. Expenditures are in 2000 USD millions.

Table 3: Time period covered, ethnic groups in power, number and type of transitions

Country	Year of survey	Period covered		Number of groups	Groups in power	Number of transitions	Leader from dominant group	Democratic transitions	Violent transitions
Benin	2001	1963	2003	11	3	6	6	2	2
Burkina Faso	2003	1963	2003	11	2	4	7	0	3
Central African	1995	1963	2002	11	3	2	0	0	1
Chad	2004	1963	2003	14	2	1	2	0	0
Congo, Dem. Rep.	2007	1965	2003	10	2	1	0	0	0
Congo, Rep.	2005	1963	2003	69	4	4	0	0	2
Cote d'Ivoire	2005	1973	2003	6	2	1	0	0	1
Ethiopia	1997	1963	2003	70	3	3	25	0	3
Gabon	2000	1963	2003	11	2	1	0	0	0
Guinea	2005	1963	2003	7	2	1	0	0	1
Kenya	2003	1966	2003	14	2	1	0	0	0
Liberia	1986	1963	1991	19	4	4	1	0	2
Mali	2006	1964	2003	11	1	0	6	0	0
Namibia	2000	1963	2003	11	1	1	0	1	0
Niger	2006	1964	2003	9	3	2	7	1	1
Rwanda	1992	1963	1995	4	2	1	30	0	1
Senegal	2006	1963	2003	7	2	1	1	0	0
South Africa	1998	1966	2003	5	2	1	19	1	0
Togo	1998	1963	2003	8	1	0	0	0	0
Zambia	2002	1963	2003	55	2	2	0	1	0

Source: Ethnicity of the leader from **?**. Violent transitions from INSCR. "Period covered" refers to the years in which at least some respondents were between 18 and 25 year old, so it refers to the coverage of higher education variables. The coverage of lower school levels and jobrelated variables can differ slightly. "Dominant group" refers to the ethnic group to which belong the most tertiary students, if any group exceeds 50%.

Figure 2: **Persistence of group positions over time**



The labels report the number of observations.

Table 4: Shares of enrolled or employed in the relevant age group (mean and sd)

	Primary education	Secondary education	Tertiary education	Civil servants	Customs or tax office workers	Education sector	Police and military
Never in power	.645	.288	.0417	.00318	.000405	.0316	.00168
	.341	.298	.117	.0152	.00928	.104	.0198
At least once in power	**.594**	.299	.0452	**.00932**	.000706	**.0237**	.00153
	.308	.248	.0795	.0283	.0029	.0313	.00522
Currently not in power	.592	.297	.0411	.00791	.00101	.026	.00128
	.31	.24	.0726	.0183	.00346	.0357	.00546
Currently in power	.598	.302	**.0527**	**.0119**	**.000151**	**.0196**	**.00198**
	.306	.261	.0903	.0405	.00118	.0201	.00472
Other groups	.642	.295	.0411	.00382	.000377	.0301	.00158
	.337	.293	.11	.0171	.00839	.0965	.0179
Dominant group	.592	.291	**.072**	.00501	**.00208**	.0218	.00044
	.254	.226	.126	.00856	.0042	.0197	.000845

Source: Elaborations on the DHS surveys.

"Dominant group" refers to the ethnic group with the biggest share of tertiary students, if bigger than 0.5.

Table 5: **Public expenditures in education in the sample**

Country	Expenditures per student (USD)			Total expenditures (USD mil.)		
	Primary	Secondary	Tertiary	Primary	Secondary	Tertiary
Benin	48.2	155	509	29.2	14.6	11.2
Burkina Faso	39.7	179	2607	25.8	4.77	8.78
Central African	28.7	131	2964	8.84	3.86	5.1
Chad	13.6	51.4	604	10.1	6.25	3.75
Congo, Dem. Rep.	.	.	.	.	.	.
Congo, Rep.	117	214	3637	49.7	23.9	25.8
Cote d'Ivoire	107	780	1879	210	150	80.8
Ethiopia	34.5	59	841	93.8	43.6	29.2
Gabon	.	.	.	.	.	.
Guinea	40.2	111	1308	30.4	12.7	9.7
Kenya	76.9	153	2103	404	92	57.9
Liberia	.	198	2015	.	6.75	4.84
Mali	45.2	138	871	22.9	14.4	8.83
Namibia	403	635	2113	160	65	22.4
Niger	38.8	220	.	29.8	12.6	.
Rwanda	28.4	203	2337	18.4	5.54	6.31
Senegal	79.9	268	1809	59.8	38.6	24.4
South Africa	462	558	1653	3418	2394	1002
Togo	24.3	78.2	1325	17.1	12	11.5
Zambia	23.5	271	2861	30.6	25.3	13.7
Total	107	268	1860	343	183	138

Source: UNESCO

Figure 3: **Share of enrolled for each ethnic group (annual change)**

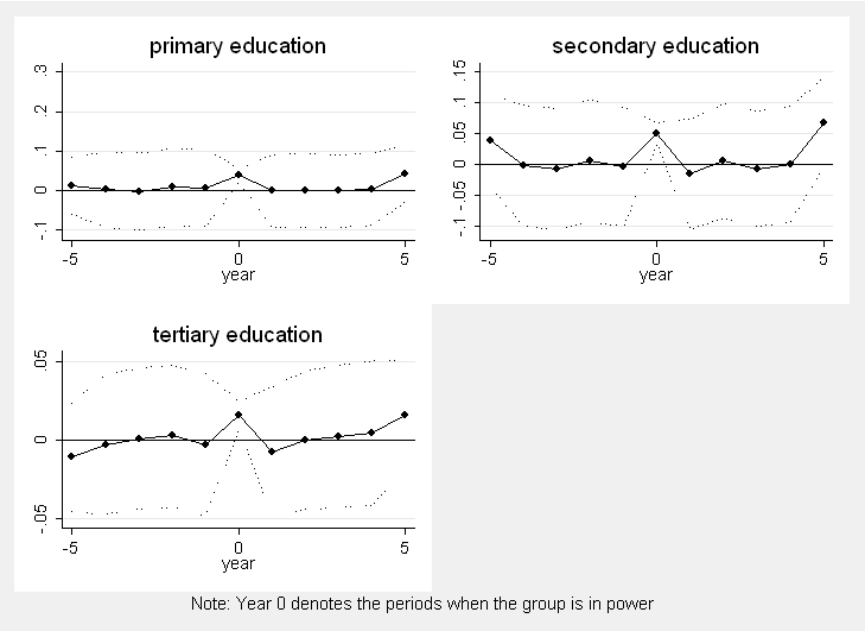


Figure 4: **Share of employed for each ethnic group (annual change)**

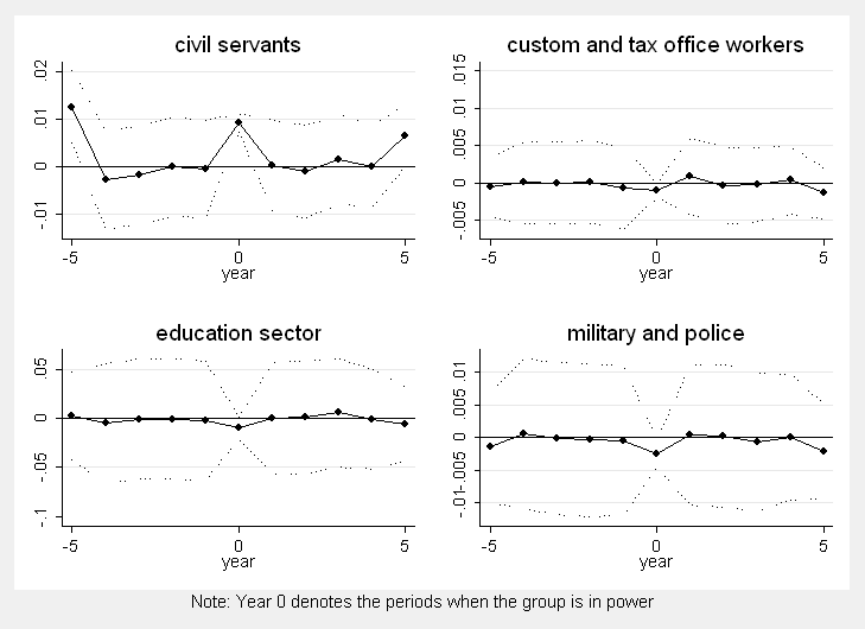


Figure 5: **Average public expenditure per university student as a fraction of GDP per capita, SSA**

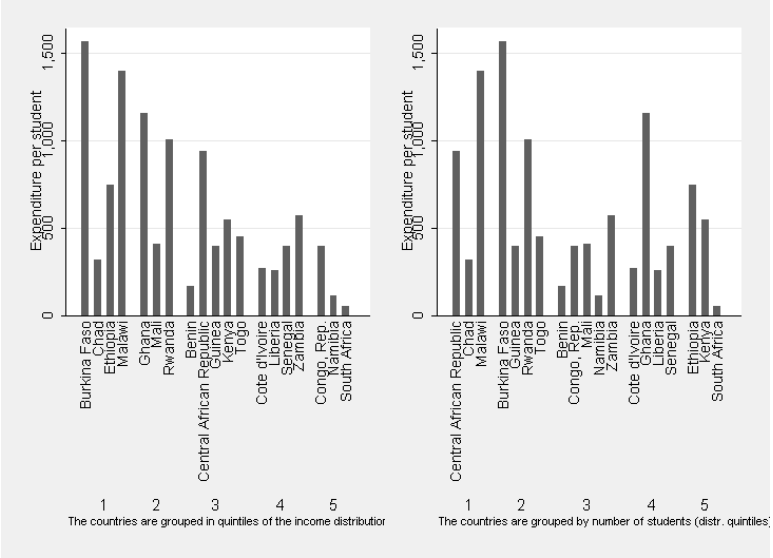


Table 6: Public expenditures per tertiary student

	(1) USD	(2) USD	(3) % of p.c. GDP	(4) USD
Leader from dominant group	717.7**		225.2*	528.4
	(300.5)		(120.9)	(722.2)
Share of coethnic students		1440.2**		
		(536.6)		
Tertiary enrollment	-9521.1**	-9011.6**	-3453.2*	-11222.4*
	(4328.1)	(3720.0)	(1695.6)	(6267.0)
GDP per capita	3.537*	3.717*	0.617	2.301**
	(1.750)	(1.815)	(0.468)	(0.886)
Constant	-199.9	-729.1	322.5	931.4
	(1060.4)	(1233.4)	(329.6)	(718.3)
R^2	0.164	0.187	0.125	0.156
Countries	20	20	19	
Country*Leaders				33
Observations	97	97	86	97

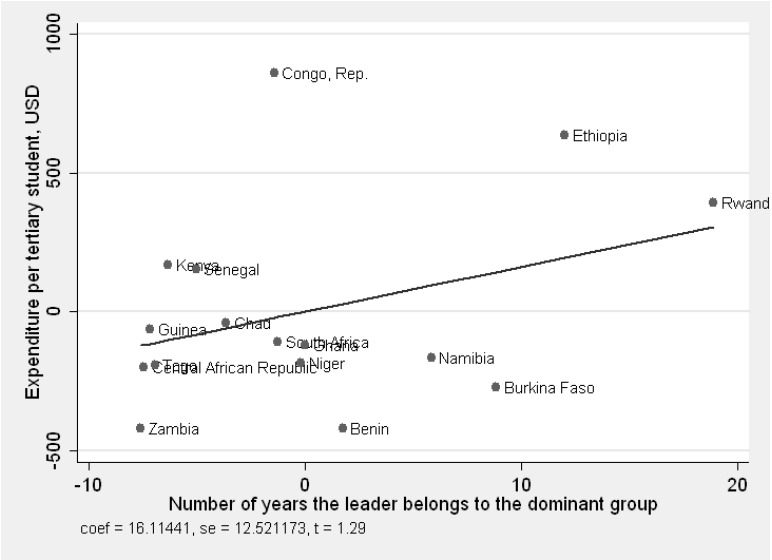
Standard errors clustered at the country level in parentheses.

Table 7: Public expenditures per student at the lower level

	(1) Primary	(2) Primary	(3) Secondary	(4) Secondary
Leader from dominant group	-16.22	-1.408	20.05	-0.0645
	(11.22)	(11.24)	(32.62)	(26.78)
GDP per capita	0.101***	0.0759	0.685	0.0631
	(0.0257)	(0.0535)	(0.590)	(0.295)
Primary enrollment	-4.511*	-3.299***		
	(2.557)	(1.084)		
Secondary enrollment			-124.2**	-71.33***
			(53.89)	(19.80)
Constant	44.43**	55.50	-110.8	220.0
	(17.84)	(34.21)	(324.5)	(165.0)
R^2	0.092	0.101	0.234	0.137
Countries	19		20	
Country*Leaders		32		36
Observations	114	114	110	110

Standard errors clustered at the country level in parentheses.

Figure 6: **Expenditures and frequency in power of the dominant group, conditional on GDP p.c. and number of students**



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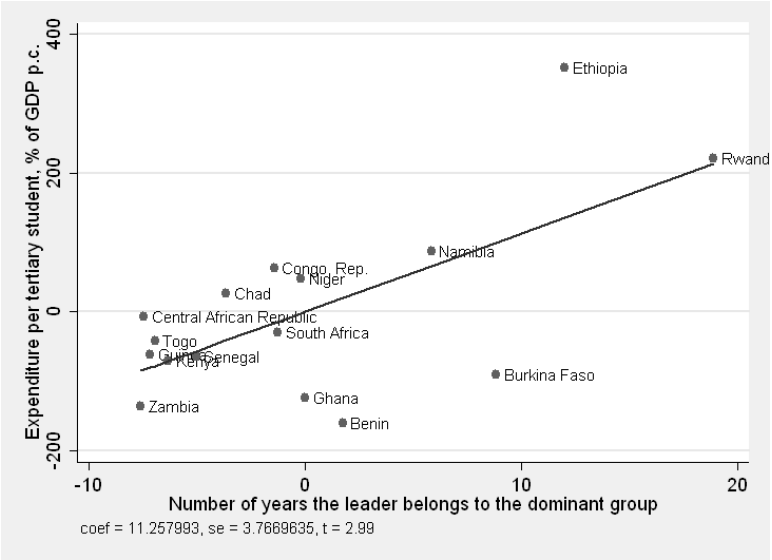

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