# Does an economics education produce technocratic

# paternalists?

Experimental evidence from Tanzania

Supplementary material

# Appendix B. Descriptives

Table B 1.	Balance	across	treatment	arms
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	Control	Treatment	p-value (control vs treatment)
Age	29.933	30.135	0.772
	(0.525)	(0.458)	
Male	0.496	0.505	0.896
	(0.046)	(0.048)	
Born in Dar es Salaam	0.429	0.396	0.622
	(0.046)	(0.047)	
Major: Procurement and logistics	0.269	0.108	0.002
	(0.041)	(0.03)	
Major: Accounting and finance	0.092	0.162	0.115
	(0.027)	(0.035)	01110
Major: Business administration	0.580	0.658	0 226
	(0.045)	(0.045)	0.220
Major: Applied economics	0.059	0.072	0 687
	(0.033	(0.072	0.007
Vears studied economics	2 200	(0.023)	0.621
	2.398	2.332	0.021
Coording woolds (TCh)	122500 022	121102 027	0 710
spending weekly (TSN)	123509.022	(15812.02)	0.719
	(13723.899)	(15812.98)	0.400
Main Income source: Job	0.689	0.730	0.499
	(0.043)	(0.042)	0.004
Main income source: Family	0.151	0.108	0.331
	(0.033)	(0.03)	
Main income source: Loans	0.017	0.009	0.601
	(0.012)	(0.009)	
Main income source: Scholarship	0.025	0.072	0.102
	(0.014)	(0.025)	
Main income source: Other	0.118	0.081	0.355
	(0.03)	(0.026)	
Household assets: Radio	0.899	0.919	0.604
	(0.028)	(0.026)	
Household assets: TV	0.908	0.937	0.407
	(0.027)	(0.023)	
Household assets: Motor vehicle	0.882	0.910	0.495
	(0.03)	(0.027)	
Household size	5.958	5.586	0.294
	(0.252)	(0.249)	
Household no. of rooms	4.076	4.099	0.917
	(0.148)	(0.169)	
Working in addition to being student	0.798	0.802	0.948
	(0.037)	(0.038)	
Income cash last month (TSh)	1201496.076	55166840.225	0.319
	(112573.87)	(54044094.199)	
Planned work after studies: Self-employed	0.235	0.180	0.304
. ,	(0.039)	(0.037)	
Planned work after studies: Private sector	0.345	0.306	0.538
	(0.044)	(0.044)	
Planned work after studies: Public sector	0.336	0.396	0.346
	(0.043)	(0.047)	
Planned work after studies: Other	0.084	0 117	0,408
aea work after studies. Other	(0.026)	(0.031)	0.400
N	119	111	

*Note: Means of control and treatment group respondent characteristics, with standard deviations in parentheses.* 

#### **Appendix C. Alternative estimations**

#### Table C 1. Mixed logit estimation

	(1)	(2)	(2)	(4)
Sampla	(1)	(2)	(3) Treatment group	(4)
Sumple Dependent veriable	Commany choice	Company shairs	Company shoise	Company choice
	company choice	company choice	company choice	Company choice
Mean	0 705**	0 700**	4 000	1.005
Mobile	0.785**	0.762**	1.092	1.065
	(0.09)	(0.09)	(0.11)	(0.17)
Interaction Mobile*Treatment	1.348**			0.884
	(0.20)			(0.21)
Profits	1.092**	1.110**	1.120*	1.112***
	(0.04)	(0.06)	(0.07)	(0.05)
Manufacturing (sector)	1.687***	1.787***	1.552***	1.721***
	(0.17)	(0.26)	(0.25)	(0.18)
Mining, oil, gas (sector)	2.290***	2.429***	2.557***	2.511***
	(0.28)	(0.41)	(0.49)	(0.32)
Services (sector)	1.091	1.067	1.130	1.117
· · ·	(0.10)	(0.14)	(0.16)	(0.11)
Local employees (share)	0.688***	0.662***	0.677**	0.701***
	(0.07)	(0.09)	(0.11)	(0.07)
China (country of origin)	1 /8/***	1 658***	1 356*	1 //79***
	(0.16)	(0.25)	(0.21)	(0.15)
Great Britain (country of origin)	1 612***	2.046***	(0.21)	(0.13)
	(0.17)	2.040	(0.21)	(0.17)
India (acumtru of origin)	(0.17)	(0.52)	(0.21)	(0.17)
India (country of origin)	1.449***	1.398**	1.558****	1.441***
	(0.15)	(0.22)	(0.24)	(0.15)
Exports (share of sales)	2.030***	2.036**	2.537**	2.260***
	(0.53)	(0.74)	(1.05)	(0.65)
Interaction Mobile*Years studied economics				0.880**
				(0.06)
Interaction Mobile*Treatment*Years studied economic	S			1.218**
				(0.10)
Standard deviation				
Mobile	2.062***	2.821***	1.691***	1.916***
	(0.25)	(0.51)	(0.26)	(0.29)
Interaction Mobile*Treatment	0.864			0.994
	(0.17)			(0.19)
Profits	1.376***	1.412***	1.366***	1.395***
	(0.09)	(0.13)	(0.13)	(0.11)
Manufacturing (sector)	1.747***	1.355	2.381***	1.710***
	(0.26)	(0.70)	(0.50)	(0.31)
Mining, oil, gas (sector)	2.706***	2.326***	3.030***	2.677***
	(0.43)	(0.62)	(0.60)	(0.43)
Services (sector)	0.821	1.661	0.656	0.704*
	(0.21)	(0.55)	(0.18)	(0.14)
Local employees (share)	1 710*	0.596**	2 3//***	1 896***
	(0.40)	(0.12)	(0.75)	(0.22)
China (acustry of avigin)	(0.43)	(0.13)	(0.75)	(0.33)
	1.500	1.440	1.104	(0.11)
	(0.26)	(0.32)	(0.27)	(0.11)
Great Britain (country of origin)	0.782	0.865	1.164	0.810
	(0.15)	(0.34)	(0.34)	(0.21)
india (country of origin)	1.351	2.061***	1.258	1.153
	(0.37)	(0.56)	(0.22)	(0.44)
Exports (share of sales)	2.595	0.357	9.603***	4.819***
	(3.23)	(0.47)	(5.57)	(2.32)
Interaction Mobile*Years studied economics				1.032
				(0.17)
Interaction Mobile*Treatment*Years studied economic	S			1.088
				(0.08)
N	4600	2380	2220	4580

*Note:* Odds ratios from mixed logit estimation, robust standard errors in parentheses, \*\*\* indicates significance at the 1% level, \*\* at 5%, \* at 10%. Variables reflect the attributes included in the first discrete choice experiment, as explained in Table 1. Interaction Mobile\*Treatment is the two-way interaction of the mobile attribute with the treatment dummy. Interaction Mobile\*Years studied economics is the two-way interaction of the mobile attribute attribute and the number of years a respondent has studied economics. Interaction Mobile\*Treatment\*Years studied economics is the three-way interaction of the mobile attribute, the treatment dummy, and the number of years a respondent has studied treatment dummy term is subsumed in the fixed effects in estimations (1) and (4), as are the individual Years studied economics variable and the two-way interaction of the Years studied economics variable in estimation (4).

#### Appendix D. Mechanism results for the control group

In Figure D1, we tabulate responses to an identity index created from responses to the following three questions: "Being an economist is an important part of my identity", "Economic models are a useful representation of how people make decisions", and "From a social point of view, more students should take economics rather than other subjects". Subjects responded their disagreement or agreement with these statements on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). To create the identity index, we took the average across questions, and rescaled from 0 to 1, with higher values reflecting greater agreement with the statements. As Figure D1 shows, students expressed a strong identity as economists, the mean answer on the three questions being "Agree", which is consistent with our information succeeding in making the professional identity of our subjects salient. However, our results could also reflect a possibility that our subjects have a strong sense of professional identity to begin with. In Table D2, first column, we run a conditional logit regression on our control group data, interacting the mobility dummy with the identity index. The results show that the effect of mobility does not significantly differ for subjects with high and low identity scores.



Figure D 1. Histogram of identity index

The result on mobility in the control group do not seem to reflect conservative opinions among students. In Figure D2, we present an index of how conservative students are, based on three underlying questions: "The role of the state in the economy should be minimized", "Provision of services like health and education should be done by the private sector", and "Differences in income are largely due to how hard people work". Similar to the identity index, subjects expressed their level of agreement with the statements on a 1-5 scale; we averaged responses across the three questions, and rescaled from 0 to 1. As seen in Figure D2, students are not really that conservative, the mean answer is slightly below Neither agree nor disagree on these questions.

*Note:* The Identity index is created from responses to the following three questions: i) "Being an economist is an important part of my identity", ii) "Economic models are a useful representation of how people make decisions", and iii) "From a social point of view, more students should take economics rather than other subjects". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions and rescales them from 0 to 1, with higher values reflecting greater agreement with the statements.





*Note:* The Conservative index is created from responses to the following three questions: i) "The role of the state in the economy should be minimized", ii) "Provision of services like health and education should be done by the private sector", and iii) "Differences in income are largely due to how hard people work". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions and rescales them from 0 to 1, with higher values reflecting greater agreement with the statements.

In Text box D1, we present two additional questions on redistributive preferences which were asked in the survey. Both questions start with a situation of unfair inequality; two anonymous individuals do the same job, one is paid 20,000 Tanzanian Shilling, the other nothing. Our subjects were asked whether they would want to redistribute money from the paid to the unpaid person, with the possibility of partly or fully equalizing payment. However, there is an efficiency loss to redistribution making the sum of money to allocate smaller with redistribution, with an efficiency loss of 75 per cent at full equalization in the first question, and 90 per cent in the second. Table D1 shows the distribution of responses. 75 per cent of our respondents want to redistribute partly or fully, even in the case where the efficiency loss is at the highest. Again, this confirms the impression from the conservative index that students are not tremendously conservative. Contrary to our expectations, more conservative students were also significantly more in favour of higher taxes on mobile corporations, as seen in the

results in Table D2, second column, where the mobile dummy has been interacted with the

conservative index.

## Text box D 1. Redistribution questions

······································
Again imagine two people that you don't know who work equally hard at the same job. One person receives 20.000 TSh for the job, the other person gets nothing. You can take some money from the first person and give to the second. But taking from one and giving to the other is even more costly, due to administration costs. So the two people get less money in total the more equally you divide the money. Which of these three options would you choose?
<ul> <li>A. Let the first person keep 20.000 TSh, and the second person get nothing. In total they get 20.000 TSh.</li> <li>B. Let the first person keep 10.500 TSh, and give the second person 500 TSh. In total they get 11.000 TSh.</li> <li>C. Let the first person keep 1.000 TSh, and give the second person 1.000 TSh. In total they get 2.000 TSh.</li> </ul>

### Table D 1. Responses to redistribution questions, proportions in control group

	(1)	(2)
Choice	75% efficiency loss	90% efficiency loss
No redistribution	25.21	24.37
Some redistribution	24.37	19.33
Full equalization	50.42	56.30

*Note:* Distribution of responses given to redistribution questions specified in Text Box D1.

Our student subjects are not representative of the general population; 90 per cent self-classify as middle class (half and half lower and upper middle class); half have fathers who are employees and a third high level employees, which speaks to a more privileged background than the average Tanzanian. There is, however, little to suggest that our control group results reflect a selection into economics studies of subjects with a personal or family interest in taxing more mobile assets less heavily. Our survey included the question "My family would gain economically if taxes on mobile assets such as financial capital were reduced, and taxes on immobile assets such as land and properties were increased", with agreement expressed on a 1-5 scale as for the preceding questions. Figure D3 shows a histogram of the responses where agreement has been rescaled from zero to one. The mean response is to neither agree nor disagree to the question, but our subjects seem to split into two groups on this issue. However, in Table D2 column three we interact the mobile dummy with the rescaled responses to this question. While those whose families would gain from lower taxes on mobile assets tend to have lower probabilities of choosing mobile companies to be more heavily taxed in our first discrete choice experiment, the interaction effect is not statistically significant.



Figure D 3. Histogram of question of family gain from lower taxes on mobile assets

*Note:* Histogram capturing distribution of agreement with statement specified (in abbreviated form) on x-axis. Disagreement or agreement were elicited on a five point scale (1 - Disagree very strongly, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Agree very strongly), and rescaled from 0 to 1 in the figure, with higher values reflecting greater agreement with the statement.

	(1)	(2)	(3)
Sample	Control group	Control group	Control group
Dependent variable	Company choice	Company choice	Company choice
Mobile	0.694	0.569***	0.972
	(0.18)	(0.08)	(0.13)
Interaction Mobile*Identity Index	1.296		
	(0.44)		
Interaction Mobile*Conservative Index		2.438***	
		(0.71)	
Interaction Mobile*Family gain			0.764
			(0.17)
Pseudo R2	0.064	0.070	0.065
Ν	2340	2340	2340

# Table D 2. Conditional logit results (abbreviated) with interactions, control group

*Note:* Odds ratios from conditional logit estimation, robust standard errors in parentheses, \*\*\* indicates significance at the 1% level, \*\* at 5%, \* at 10%. All attribute variables included, some suppressed in output. In the interaction terms for Mobile, the Identity Index, Conservative Index, and Family gain variables are as specified in notes to Figure D1, D2, and D3, respectively, with their main effects subsumed in the fixed effects.

#### Appendix E. Mechanisms difference treatment and control groups

In this Appendix, we provide additional descriptive results which are consistent with the part technocrat - part democrat interpretation of our experimental results, while making some other possible interpretations less credible. Figure E1 presents a histogram of a democracy index, created from the respondents' level of agreement with the following two questions: "Democracy is preferable to any other kind of government" and "We should choose our leaders in this country through open, regular and honest elections". As for previous questions, agreement was signalled on a scale 1-5, we aggregate answers across the two questions, and normalize into an index between 0 and 1. As the Figure shows, students are overall very democratically inclined, the mean response is to answer "agree" to the two questions.



Figure E 1. Histogram of scores on democracy index

*Note:* The Democracy index is created from responses to the following two questions: i) "Democracy is preferable to any other kind of government", and ii) "We should choose our leaders in this country through open, regular and honest elections". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions and rescales them from 0 to 1, with higher values reflecting greater agreement with the statements.

In Figure E2, we present evidence that our subjects are technocratically inclined. A technocratic index has been constructed from four underlying questions: "Economic experts should have a greater say than popular opinion in shaping economic policy", "Economic theory is a better guide for economic policy than popular opinion", "Tanzanian voters are knowledgeable about economic issues in general", and "Tanzanian voters are knowledgeable about tax issues". Agreement was once again voiced on 1-5 scale. To create the technocratic index we invert the last two questions, add the responses to all four questions, and normalize between 0 and 1. Figure E2 shows that our economist subjects are fairly technocratic, the mean response to the questions is "Agree" (with the last two questions inverted), which is also reflected in answers to individual questions as presented in Figure E3.



Figure E 2. Histogram of scores on technocracy index

*Note:* The Technocratic index is created from responses to the following four questions: i) "Economic experts should have a greater say than popular opinion in shaping economic policy", ii) "Economic theory is a better guide for economic policy than popular opinion", iii) "Tanzanian voters are knowledgeable about economic issues in general", and iv) "Tanzanian voters are knowledgeable about tax issues". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions (with responses to the latter two questions inverted) and rescales them from 0 to 1, with higher values reflecting greater technocratic sentiments.



Figure E 3. Histograms of underlying answers to technocracy questions

*Note:* Histograms capturing distribution of agreement with statements specified on the x-axes. Disagreement or agreement were elicited on a five point scale (1 - Disagree very strongly, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Agree very strongly), and rescaled from 0 to 1 in the figure, with higher values reflecting greater agreement with the statements.

An alternative interpretation of our treatment effect is that democratic views are tempered not by technocratic views, but by elitist attitudes, i.e. of sentiments of superiority over or scorn towards lower classes of ordinary citizens. Figure E4 presents an index of elitism, constructed from answers to three underlying questions; "Income differences in society are acceptable since they just reflect survival of the fittest", "Providing aid to the poor does not work since they will just consume the assistance and stay poor", and "It is acceptable for someone in my family to marry someone from a lower social class". Agreement as before is voiced from 1-5, we invert responses to the last question, add them together, and normalize into an index between zero and one. As seen in Figure E4, our respondents do not profess particularly elitist attitudes, the mean response is somewhere below the middle of the index, and this is confirmed also in responses to the individual questions presented in Figure E5.



Figure E 4. Histogram of scores on elitism index

*Note:* The Elitist index is created from responses to the following three questions: i) "Income differences in society are acceptable since they just reflect survival of the fittest", ii) "Providing aid to the poor does not work since they will just consume the assistance and stay poor", and iii) "It is acceptable for someone in my family to marry someone from a lower social class". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions (with responses to the final question inverted) and rescales them from 0 to 1, with higher values reflecting greater elitism.





*Note:* Histograms capturing distribution of agreement with statements specified on the x-axes. Disagreement or agreement were elicited on a five point scale (1 - Disagree very strongly, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Agree very strongly), and rescaled from 0 to 1 in the figure, with higher values reflecting greater agreement with the statements.

It is also possible that our treatment moves responses towards citizen preferences not out of respect for their opinions, but through a greater emphasis on redistributive issues triggered by our treatment. In other words, we could be observing an effect of inequality becoming more salient as a result of the treatment, rather than deference to public opinion. To test for this, Table E1 presents results from regressions based on the redistribution variables presented in Text box D1. The dependent variable is the extent to which a respondent chooses to redistribute between the two individuals, taking the value 0 in the case of no distribution (alternative A), 0.5 in the case of some redistribution (alternative B), and 1 in the case of full equalization of payments (alternative C). We regress this variable on the treatment indicator,

for the 75 per cent efficiency loss case in column one of Table E1, and for the 90 per cent efficiency loss case in column two. The treatment has no significant related to redistributive preferences in either case. In the third column, we regress levels of agreement with an additional question of whether economics is primarily concerned with distributional issues, and find no effect of our treatment on responses to this question. In sum, these results suggest that increased salience of distributional issues is not driving the treatment effect.

	(1)	(2)	(3)
Sample	Full	Full	Full
			"In economics, we are
Devendentweriskle	Redistribution (75%	Redistribution (90%	primarily concerned
Dependent variable	efficiency loss)	efficiency loss)	with distributional
			issues"
Treatment dummy	-0.049	-0.088	0.010
	(0.06)	(0.06)	(0.03)
Constant	0.626***	0.660***	0.686***
	(0.04)	(0.04)	(0.02)
R2	0.003	0.011	0.001
Ν	230	230	224

Table E 1. Regressions of redistribution variables on treatment

*Note:* Ordinary least squares estimations, robust standard errors in parentheses, \*\*\* indicates significance at the 1% level, \*\* at 5%, \* at 10%. Dependent variables in columns 1 and 2 based on redistribution questions in Text box D1, taking the value 0 in the case of no distribution (alternative A), 0.5 in the case of some redistribution (alternative B), and 1 in the case of full equalization of payments (alternative C). Dependent variable in column 3 level of agreement with statement of whether economics is primarily concerned with distributional issues, five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly) rescaled from 0 to 1.

Our results could reflect greater apparent clarity of experimenter demand effects in the control group (where it is clear in which direction the given argument points) than in the treatment group (where two different arguments point in opposite directions). To test this, we added questions at the very end of the survey designed to address possible experimenter demand effects. We generated an experimenter demand index from three questions; "I have a clear understanding of what this survey is about", "I think I know what the researchers behind this survey expect to find", and "I get the feeling that the researchers behind this

survey expect me to answer in a certain way". Agreement with these statements was given on a scale 1-5, we added up the responses across the three questions, and normalized into an experimenter demand index running from zero to one. Column one in Table E2 presents results from a regression of this index on the treatment indicator, and shows that the treatment group did not have a significantly different view of the purpose of the study than those of the control group. In column two, we also regress an indicator value for whether respondents answered "Don't know" to any of the three questions (coded as missing in the regression in column one), and we find that the treatment group actually had a significantly lower proportion of respondents providing "Don't know" answers to these questions than the control group. These results hence do not support the idea that our treatment effect reflect differential transparency of experimenter demand effects across treatments. Moreover, our survey ended with the open question "In your opinion, what is this study about?". In the responses our students typed in, no one was even close to guessing that our study was about testing the relative influence of technocratic and democratic arguments on economists' views of optimal public policy.

	(1)	(2)
Sample	Full	Full
Danandantugrighta	Experimenter demand	Experimenter demand
	index	missing values
Treatment dummy	-0.005	-0.088**
	(0.02)	(0.04)
Constant	0.666***	0.151***
	(0.02)	(0.03)
R2	0.000	0.020
Ν	205	230

Table E 2. Regressions of experimenter demand variables on treatment

*Note:* Ordinary least squares estimations, robust standard errors in parentheses, \*\*\* indicates significance at the 1% level, \*\* at 5%, \* at 10%. The experimenter demand index is created from responses to the following three questions: i) "I have a clear understanding of what this survey is about", ii) "I think I know what the researchers behind this survey expect to find", and iii) "I get the feeling that the researchers behind this survey expect me to answer in a certain way". Disagreement or agreement with these statements were elicited on a five point scale (1 – Disagree very strongly, 2 – Disagree, 3 – Neither agree nor disagree, 4 – Agree, 5 – Agree very strongly). The index averages responses across questions and rescales them from 0 to 1, with higher values reflecting greater agreement with the statements. The experimenter demand missing values variable is an indicator value for whether respondents answered "Don't know" to any of the three questions (coded as missing in the regression in column one).

### Table E 3. Heterogeneous effects, Identity Index.

Panel A	(1)	Panel B	(2)
Discrete choice experiment	First	Discrete choice experiment	Second
Dependent variable	Company choice	Dependent variable	Tax choice
Mobile	0.695	Efficiency loss high	0.561
	(0.17)		(0.24)
Interaction Mobile*Treatment	1.841*	Interaction Efficiency loss high*Treatment	1.488
	(0.65)		(0.92)
Interaction Mobile*Identity Index	1.297	Interaction Efficiency loss high*Identity Index	1.397
	(0.43)		(0.80)
Interaction Mobile*Treatment*Identity Index	0.622	Interaction Efficiency loss high*Treatment*Identity Index	0.855
	(0.29)		(0.71)
Covariates	All attributes	Covariates	All attributes
Pseudo R2	0.054	Pseudo R2	0.071
N	4520	Ν	1380

*Note:* Odds ratios from conditional logit estimation, robust standard errors in parentheses, \*\*\* indicates significance at the 1% level, \*\* at 5%, \* at 10%. All attribute variables included, some suppressed in output. In the interaction terms for Mobile, the Identity Index is as specified in the note to Figure D1, with its main effect subsumed in the fixed effects.



Figure E 6. Histogram of views of how well democracy works in Tanzania

*Note:* Histogram capturing distribution of agreement with statement specified on x-axis. Disagreement or agreement were elicited on a five point scale (1 - Disagree very strongly, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Agree very strongly), and rescaled from 0 to 1 in the figure, with higher values reflecting greater agreement with the statement.