The effect of education, income inequality and merit on inequality acceptance: A comment on Almås et al. (2017)

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I. Introduction

In their heterogeneity analysis, Almas, Cappelen, and Tungodden (2019) (hereafter "ACT") report a finding of potentially great importance for the study of distributive preferences. In a relatively unequal society (the United States), the high educated accept inequality significantly more than the low educated, whereas, in a relatively equal society (Norway), the low educated accept inequality more, but not significantly more, than the high educated. Further, this interaction between (individual) educational level and (societal) income inequality occurs only when the inequality is owing to *a difference in productivity*, i.e., it is a triple interaction effect involving a scrutinizer's level of education, the source of the inequality under scrutiny, and the overall level of inequality in the scrutinizer's society. Unfortunately, the finding is not interpreted or discussed.

This triple interaction effect has potentially far-reaching research and policy implications. With regard to research, it offers a new perspective on the four seemingly separate economic literatures on: human capital; the individual-level determinants of preferences for redistribution; the societal and contextual determinants and moderators of those preferences; and experiments identifying the effects of the source of inequality on inequality acceptance.[2] With regard to policy, ACT's result suggests that in highly equal societies education may not promote meritocratic values. This would be a concern if, as a consequence, investment in education was lower. However, this is not what we observe when we compare Norway and the United States. In the United States adults with tertiary degrees earn 75% more than those with upper secondary education, while in Norway this earnings gap is just 25% (OECD, 2017). Yet, despite the lower financial return to education, investment in human capital is higher in Norway (World Bank,

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[2] Participants in economic experiments are more likely to accept inequalities when: (1) they are more educated, they have a higher economic status or they are not unemployed (see, for example, Barr et al 2015; Barr, Miller and Ubeda, 2016; Jakiela, Miguel and te Velde, 2014); (2) they are from richer countries (see, for example, Cappelen et al, 2013; Jakiela, 2015); and (3) when the source of inequalities is a difference in effort or productivity (see, for example, Konow, 2000; Cherry, Frykblom, and Shogren, 2002; Frohlich, Oppenheimer, and Kurki, 2004.). For a survey of non-experimental research on preferences for redistribution, see Alesina and Giuliano (2011).

2019).[3] One possible explanation for this apparent mismatch is that non-financial intrinsic motivations to work and be productive also vary across societies and, in the case of Norway vs. the United States, are inversely related to the returns to education. When we compare the Employment Commitment Index values for Norway and the United States, this is precisely what we observe (Esser, 2009).[4] Thus, it would seem that investment in human capital and the desire to work are not inextricably linked to the financial returns associated with each and that more egalitarian values and other positive intrinsic motivations could pave the way to greater prosperity without greater inequality.

Here, using data from lab-in-the-field experiments, we show that the finding replicates when we compare Bilbao (a highly equal society) with Oxford, Córdoba (both relatively unequal societies), and with Cape Town (a highly unequal society). However, we also show that the drivers of the triple interaction effect vary depending on which societies are compared.

II. Method

We make use of the data generated by Barr et al (2015) and Barr, Miller and Ubeda (2016).[5] In total, we base our estimations on data from a series of four-person random dictator games (4PDG). The same experiment was conducted in four locations: Oxford (United Kingdom), Cape Town (South Africa), Bilbao and Cordoba (Spain). In the experiment, participants first engaged in a real-effort task and then played the 4PDG. There were two treatments. In the earned treatment, participants' initial endowments in the 4PDG were directly related to their within-session productivity rankings in the real-effort task—participants who were more productive started the 4PDG with higher initial endowments. In the random treatment, the initial endowments in the 4PDG were randomly assigned.[6] Table 1 compares the main characteristics of ACT's and Barr et al's experiments. There are several differences. However, both focus on redistributive decisions by participants who observe initial inequality owing to either productivity or luck. Our sample is not representative, but is large (n=626) and heterogeneous in terms of sex, age, economic status and education: 52% women; median age=29 (p10=24, p90=45); 36% report being low income or poor; and 44% with post-secondary education.

[3] The Human Capital Index values for Norway and the United States are 0.77 and 0.76 respectively (World Bank, 2019).
[4] In 2005, the Employment Commitment Index values for men and women in Norway were 3.82 and 3.95 respectively and the Employment Commitment Index value for both men and women in the United States was 3.48 (Esser, 2009).
[5] This is the first time that all the data from the two projects has been pooled.
[6] Additional details can be found in Barr et al (2015), Barr et al (2016) and Demel et al (2018).

TABLE 1

A COMPARISON OF THE TWO EXPERIMENTS

	ACT	Barr et al.
TYPE OF EXPERIMENT	Virtual experiment	Lab-in-the-field experiment
# OF PARTICIPANTS	2,000	626
DECISION-MAKER	Unincentivized third-party	Incentivized random stakeholder
GROUP SIZE	Pairs (exc. decision-maker)	Triads (exc. decision-maker)
SAMPLE	Representative	Heterogeneous
SOCIETIES*	Norway and United States	Bilbao, Oxford, Cordoba, Cape Town

* Ordered with reference to Gini coefficient, most to least equitable.

From the Barr et al data, we use an adaptation of ACT's method (equation 5) to construct a variable *Implemented inequality*, that captures the inequality across final payoffs assigned to the other three stakeholders in the 4PDG by dictator i.[7] Formally:

$$Implemented\ inequality_i = \frac{|y_j - y_k| + |y_j - y_l| + |y_l - y_k|}{2(y_j + y_k + y_l)} \in [0,1],$$

where y_j, y_k and y_l are the final incomes that i chooses for group members j, k and l respectively, the numerator is the sum of bilateral final income differences across all stakeholders (excluding the dictator), and the denominator normalizes the measure to lie between zero (all stakeholders, excluding the dictator, earn the same amount) and one (one stakeholder receives a positive final income, the other two receive zero).[8]

In direct accordance with ACT, our three independent variables of specific interest are *high education*, equal to one for those who completed the equivalent of high school in their

[7] We exclude the dictator's final income from the calculation, thereby, focusing attention on the inequality that the dictator implements across the other three stakeholders.

[8] Both ACT's method and our adaptation of it, generate a useful measure of implemented inequality, given the research question, only if no or very few participants invert the distribution. ACT's figure 2 indicates that very few of their participants did this. In the Barr et al experiment, possibly because initial inequality, rather than being set to 1, ranged between 0.11 and 0.60, a larger share of around 5% inverted the distribution. We exclude the data points for these participants from the analysis presented below. Alternative approaches to accommodating such inversions, e.g., multiplying the measure by -1 when the distribution in inverted, yield results similar to the ones we present below.

country, *merit*, equal to one for those under the experimental treatment where productivity ranking determined initial endowments in the 4PDG, and, in place of ACT's indicator for experimental participants in Norway, the more equitable of their two societies, we use an indicator for experimental participants in Bilbao, the most equitable of our four societies. The Gini index for disposable incomes in Bilbao and Norway are remarkably close (slightly above 0.25), while the Gini indexes for Córdoba and Oxford are similar to the index for the United States (close to 0.4), and the Gini index for Cape Town is markedly higher (above 0.6).

III. Results

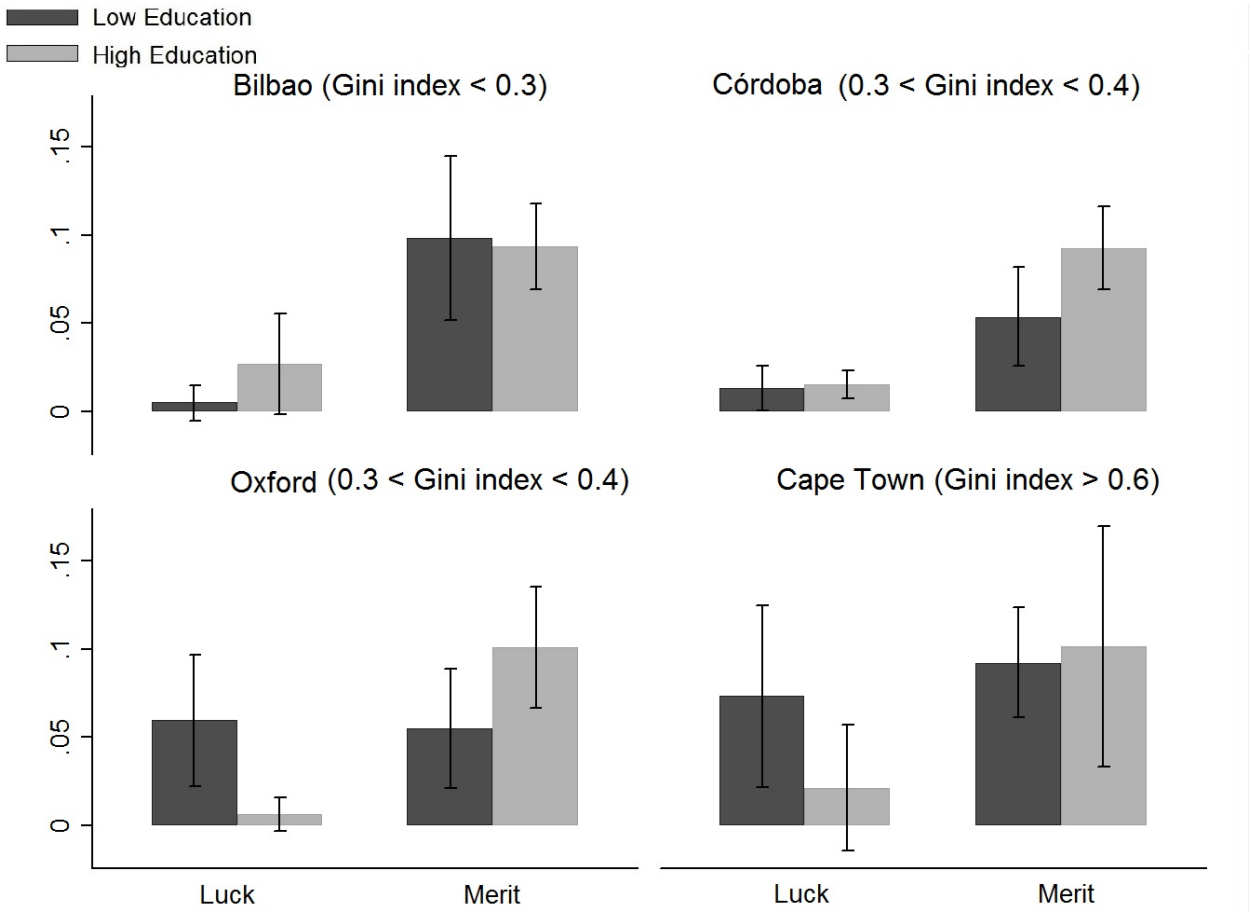
Figure 1 graphs the average *Implemented inequality* for the dictators with each level of education, under each experimental treatment and within each society.[9] It is constructed in the same way as the panels focusing on education in ACT's Figure 5. Table 2 presents eight regressions each focusing on one of Barr et al's four research locations. For each society, two regressions are presented. The first (Panel A) takes *Implemented inequality* as the dependent variable and *merit* and a set of standard controls as the explanatory variables. The second (Panel B) builds on the first by including *high education* and its interaction with *merit* as additional regressors. Table 3 presents four regressions taking *Implemented inequality* as the dependent variable and using a model specification similar to that used by ACT in the middle column of their Table 4.[10]

We observe the following: (1) A difference in productivity instead of luck causes a large and statistically significant increase in inequality acceptance in all locations except Cape Town (Bilbao: $p = 0.004$; Oxford: $p = 0.092$; Córdoba: $p < 0.001$; Cape Town: $p = 0.167$) (see Table 2); (2) high education dictators respond more strongly than low education dictators to the introduction of a difference in productivity in the two most unequal OECD locations (Oxford: $p = 0.047$; Córdoba: $p = 0.088$), while there is no statistically significant effect of education in Bilbao ($p = 0.805$) or Cape Town ($p = 0.169$) (see Table 2); (3) the pairwise differences between Bilbao, on the one hand, and Oxford, Córdoba and Cape Town, on the other, in the interaction between *merit* and *high education* are statistically significant (Bilbao vs. Oxford: $p = 0.011$; Bilbao vs. Córdoba: $p = 0.096$; Bilbao vs. Cape Town: $p = 0.075$) (see Table 3, columns 1-3);

[9] The mean levels of *Implemented inequality* are much lower for every defined sub-sample in our data compared to ACT's. This may be because, in ACT initial inequality was 1, while in Barr et al it ranged between 0.11 and 0.60.
[10] The principle difference is the omission from the model of the indicator variable for the efficiency treatment, for which there was no equivalent in the Barr et al experiments, and all the interactions involving that variable.

and (4) when we pool the data from the three most unequal locations (Oxford, Córdoba and Cape Town), we find that the triple interaction between *merit*, *high education* and an indicator for Bilbao is also statistically significant ($p = 0.024$) (see Table 3, column 4).

FIG. 1.-*Implemented inequality* by defined sub-samples



Note: The figure shows the average level of implemented inequality for each subgroup in the two treatments. The whiskers indicate standard errors.

When we focus on the three OECD locations, this summary of results appears broadly consistent with ACT. However, when we bring Cape Town into the frame, only one of the four findings holds. Further, when we look carefully at the regressions in Table 3 and at Figure 1, we see that not only Cape Town but also Oxford appears different to Bilbao and Córdoba. Further still, when we compare Figure 1 to the middle panel of ACT's Figure 5, we see that, while the graphs for Bilbao and Córdoba are each qualitatively similar to those for Norway and the United States, the notable differences between Bilbao and Córdoba, on the one hand, and Norway and

the United States, on the other, are distinct. The notable difference between Bilbao and Córdoba is in the extent to which the low educated tolerate inequality owing to differences in productivity. The notable differences between Norway and the United States are, first, the overall difference in inequality acceptance and, second, the extent to which the high educated tolerate inequality owing to differences in productivity.

Finally, the graphs for Oxford and Cape Town are very distinct. The critical difference here is that, in both Oxford and Cape Town, the low educated implemented much higher levels of inequality in the luck treatment - levels that were statistically indistinguishable from those that they implemented in the merit treatment. This difference may be owing to the fact that the low educated in Oxford and Cape Town were considerably less educated than the low educated in Bilbao, Córdoba, Norway and the United States; in the Barr et al data, the low educated had, on average, 10 years of education in Cape Town, 11 in Oxford and 14 in Bilbao and Córdoba.

IV. Summary and discussion

A large number of observational and experimental studies have explored the determinants of individual preferences for redistribution. In general, inequalities are more likely to be accepted by people of a higher socioeconomic status, in richer societies and when inequalities are perceived as jusfifiable owing to differences in productivity. ACT identified a triple interaction between these three variables.

We have replicated ACT's triple interaction effect finding using data from experiments conducted in four locations across three countries all distinct from the ones studied by ACT. However, a closer look at the data indicates that the origin of the triple interaction effect varies depending on which societies one compares. ACT's data for Norway and the United States indicate that meritocratic values among the high educated are less prevalent in more equal societies and that this is the driver of the triple interaction effect. In contrast, in Barr et al's data the triple interaction effects have multiple drivers: in the comparsion of Bilbao and Cape Town, the principle driver appears to be that the very low educated in the relatively unequal society are relatively accepting of inequality even when it is owing to luck; in the comparison of Bilbao and Córdoba the principle driver appears to be that the low educated in the relatively unequal society are less accepting of inequality owing to differences in productivity; and in the comparison of Bilbao and Oxford both of these drivers are present.

Taken together, ACT and the Barr et al data indicate very strongly that individuals' education, the level of inequality in their societies and the origins of the inequality that they perceive interact to determine the extent to which they accept that inequality. However, the mechanisms driving the interaction vary depending on which societies we look at and compare. If we are to gain a complete understanding of these mechanisms, more work is needed.

TABLE 2
REGRESSION RESULTS ON IMPLEMENTED INEQUALITY

	(1) Bilbao	(2) Córdoba	(3) Oxford	(4) Cape Town
Panel A				
Merit	0.071***	0.062***	0.042*	0.034
	(0.024)	(0.012)	(0.024)	(0.025)
Constant	-0.066	0.037	0.021	0.057
	(0.100)	(0.047)	(0.043)	(0.049)
Observations	174	214	110	126
Additional controls	Yes	Yes	Yes	Yes
Panel B				
Merit	0.086	0.035*	-0.008	0.010
	(0.065)	(0.020)	(0.035)	(0.030)
High Education	0.009	0.000	-0.063*	-0.067
	(0.059)	(0.019)	(0.038)	(0.043)
Merit x High Edu	-0.017	0.042*	0.099**	0.077
	(0.070)	(0.025)	(0.049)	(0.056)
Constant	-0.073	-0.001	0.037	0.058
	(0.108)	(0.001)	(0.045)	(0.049)
Observations	174	214	110	126
Additional controls	Yes	Yes	Yes	Yes

Note: Table reports estimated coefficients from regressions for *Implemented inequality* on the listed explanatory variables plus additional controls – *age*, *female* and *subjective economic status*. Standard errors, clustered at the session level, reported in parentheses. Additional controls are *age*, *female* and *subjective economic status*. Data samples defined in column titles. ∗∗∗– sig. at 1%; ∗∗– sig. at 5%, ∗– sig. at 10%.

TABLE 3
HETEROGENEITY ANALYSIS ON IMPLEMENTED INEQUALITY

	(1) Oxford vs Bilbao	(2) Córdoba vs Bilbao	(3) Cape Town vs Bilbao	(4) Bilbao vs others
Merit	-0.010	0.039**	0.010	0.018
	(0.027)	(0.018)	(0.029)	(0.016)
Bilbao	-0.048**	-0.009	-0.065**	-0.040***
	(0.021)	(0.014)	(0.032)	(0.015)
High Education	-0.063**	-0.001	-0.067**	-0.039***
	(0.027)	(0.008)	(0.030)	(0.014)
Merit x Bilbao	0.095***	0.052	0.075*	0.071**
	(0.034)	(0.032)	(0.038)	(0.029)
Merit x High Edu	0.103***	0.039*	0.079*	0.065***
	(0.037)	(0.021)	(0.043)	(0.019)
Bilbao x High Edu	0.070***	0.021	0.077**	0.054***
	(0.023)	(0.013)	(0.033)	(0.017)
Merit x Bilbao x High Edu	-0.120**	-0.064*	-0.098*	-0.087**
	(0.045)	(0.038)	(0.053)	(0.036)
Constant	0.029	0.014	0.048	0.025
	(0.031)	(0.010)	(0.049)	(0.021)
Observations	284	388	300	524
Additional controls	Yes	Yes	Yes	Yes
lincom:				
Merit (not Bilbao, High Edu)	0.093***	0.077***	0.089***	0.082***
	(0.017)	(0.012)	(0.038)	(0.011)
Merit (Bilbao, Low Edu)	0.085***	0.090***	0.085***	0.088***
	(0.025)	(0.026)	(0.026)	(0.024)
Merit (Bilbao, High Edu)	0.067***	0.065***	0.066***	0.066***
	(0.019)	(0.018)	(0.019)	(0.019)

Note: Table reports estimated coefficients from regressions for *Implemented inequality* similar in specification to that in column 2 of Table 4 in ACT. Additional controls: *age*, *female* and *subjective economic status*. Data samples defined in column titles. Standard errors, clustered at the session level, reported in parentheses. ***– sig. at 1%; **– sig. at 5%, *– sig. at 10%.

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