Supplementary Appendix to:

Fair Share?: Equality and Equity in American Attitudes towards Trade

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1 Appendix

1.1 Sample Recruitment, Demographics, and Balance

The studies were fielded with Survey Sampling International (SSI) as part of an omnibus panel-study conducted in late 2017, with 3,136 respondents completing our first experiment and 3,201 completing our second experiment. The broader panel recruited over 6,000 respondents in the first wave in November of 2017, with approximately half the respondents being randomly assigned to our study. The second wave of the panel sought to have at least 3,000 respondents participate, with all respondents participating in our second study. SSI uses an opt-in recruitment method, after which respondents are randomly selected for survey invitations, using population targets as opposed to quotas to achieve diverse national samples.

Table 1: Study 1 Demographics

	Percent of Sample
Age18 - 29	0.18
Age 30 - 44	0.25
Age 45 - 59	0.28
Age 60+	0.29
Women	0.55
Income $0 - $50,000	0.47
Income $50,001 - $100,000	0.33
Income $100,001 - $150,000	0.12
Income $150,00+	0.07
Democrat	0.35
Republican	0.28
Independent	0.28

Table 2: Study 2 Demographics

	Percent of Sample
Age18 - 29	0.17
Age 30 - 44	0.31
Age 45 - 59	0.36
Age 60+	0.16
Women	0.59
Income $0 - $50,000	0.47
Income $50,001 - $100,000	0.35
Income $100,001 - $150,000	0.11
Income $150,00+	0.07
Democrat	0.35
Republican	0.27
Independent	0.29

Balance Tests: The following three tables present the results of balance tests that evaluate whether treatment assignment was correlated with key demographic characteristics. For each study, we regress each treatment condition on our key demographic variables and find that treatment assignment is not correlated with population demographics. This gives us confidence that our random assignment achieved a well balanced study across treatment conditions.

Table 3: Study 1: Balance Test For Trade ConcessionsTreatments

	Study 1: Trade Concession Treatments		
	Equal	Favorable	Unfavorable
Age	−0.0003	−0.0001	0.0004
	(0.001)	(0.001)	(0.001)
Education	−0.007	0.004	0.003
	(0.009)	(0.009)	(0.009)
Income	0.002	0.004	−0.006
	(0.005)	(0.005)	(0.005)
Women	0.006	0.009	−0.015
	(0.018)	(0.018)	(0.018)
Constant	0.355***	0.310***	0.335***
	(0.036)	(0.035)	(0.036)
Observations	3,040	3,040	3,040
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 4: Study 2: Balance Test for Trade Balance Treatments

	Study 2: Trade Balance Treatments		
	Balanced	Favorable	Unfavorable
Age	0.001	−0.001	0.00005
	(0.001)	(0.001)	(0.001)
Education	0.003	−0.007	0.005
	(0.009)	(0.009)	(0.009)
Income	−0.001	0.001	−0.0003
	(0.005)	(0.005)	(0.005)
Women	0.043**	−0.020	−0.024
	(0.017)	(0.017)	(0.017)
Constant	0.268***	0.394***	0.338***
	(0.038)	(0.038)	(0.038)
Observations	3,187	3,187	3,187
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 5: Study 2: Balance Test for Productivity Treatments

	Study 2: Productivity Treatments		
	Equal	Productive	Unproductive
Age	−0.0003	0.0002	0.00004
	(0.001)	(0.001)	(0.001)
Education	0.007	−0.009	0.002
	(0.009)	(0.009)	(0.009)
Income	−0.004	0.00003	0.004
	(0.005)	(0.005)	(0.005)
Women	−0.004	−0.013	0.017
	(0.017)	(0.017)	(0.017)
Constant	0.342***	0.354***	0.304***
	(0.038)	(0.038)	(0.038)
Observations	3,187	3,187	3,187
Note:		*p<0.1; **p<0.05; ***p<0.01	

1.2 Study 2 - Instrument

The United States is part of a free trade agreement in which the United States and the other country reduced its tariffs – that is, the tax charged on foreign goods and services when they cross borders. The agreement has led to a [2 to 1 trade imbalance favoring the United States in which the United States exports twice as much as it imports from the other country *or* 2 to 1 trade imbalance favoring the other country in which the other country exports twice as much as it imports from the United States *or* relative balance in trade between the two countries in which each side imports about as much as it exports from the other country]. [Studies show that American workers are twice as productive as the workers in the other country *or* Studies show that workers in the other country are twice as productive as workers in the United States *or* Studies show that workers in both countries are about equally productive].

1.3 Interpreting the Productivity Treatment

A key question for the second study is how respondents interpreted the productivity treatment. When considering fairness as equity, respondents should be thinking of workers inputs relative to outputs. In this manner, when the treatment condition specified that foreign workers are more productive, this should trigger respondents to think that they are putting more into the "inputs" and thus it would be more equitable for foreign workers to receive more of the outputs. However, productivity is also shaped by capital investments, such as technology that increases production efficiency, which is less likely to invoke equity concerns since productivity due to increased technology is not driven by worker effort. It is thus important to examine whether respondents interpreted our productivity treatment as being driven by workers' effort, capital and technological investments, or something else.

To evaluate whether respondents interpreted the productivity treatment in a manner consistent with our theory of equity, we evaluated the free responses that respondents provided. Each respondent was asked "While you were thinking about the previous question about the trade agreement, what first came to mind? Please take a minute to describe your thoughts." A review of the free responses demonstrates that respondents typically interpreted productivity to mean how hard the workers worked, which is consistent with our theoretical quantity of interest – how equity affects attitudes toward trade. Indeed, some respondents explicitly invoked concerns for equity in their evaluation, noting "If the other country works twice as hard and sends twice as many goods, they deserve more..." and "Why are Americans working harder and not reaping the bottom line reward?" Additional examples illustrating how the productivity treatment was interpreted are as follows:

Examples of free responses in the "workers in the other country are twice as productive as workers in the United States" treatment:

- If the other country works twice as hard and sends twice as many goods, they deserve more incentives.
- That the reason jobs are going overseas is because of them working more harder than us.
- ... workers in the other country work twice as hard as the ones in the US
- People are more productive in other countries because they have to work twice as hard...

- I can see other countries working harder and benefiting more so.
- About how the other Country's workers work harder than USA
- That foreign workers are judged to be working twice as hard as American workers
- Americans are lazy demanding, and egotistical. They have no idea of reality and how tough other countries have it, how hard they work for what they have...
- Workers in other countries work twice as hard as Americans

Examples of free responses in in the "American workers are twice as productive as workers in the other country" treatment:

- I was thinking how unfair it is for Americans to be working harder than the workers in the other country yet the other country were benefiting more.
- Why are Americans working harder and not reaping the bottom line reward?
- Proud that Americans are the harder workers.
- that americans work the hardest
- Americans works twice as harder as others in other countries
- If American workers are working twice as hard for the same return...why?
- It made me proud to realize how hard Americans work.

While the free responses provide substantial evidence that our respondents interpreted the productivity treatment in a manner consistent with a theory of equity, we also conducted a further test to evaluate whether equity perceptions based on productivity were relatively important when shaping attitudes toward trade. In the additional study, fielded on a large sample of Americans recruited by SSI, we described a trade agreement that "led to American job losses in the manufacturing sector due to increased competition", and then asked them to evaluate how fair the agreement was. In the control condition no additional information was provided. In the treatment conditions we randomly included additional information that said firms in the foreign country were more productive because they had [lower costs of living / fewer health and safety regulations / an abundance of unskilled labor / lower wages / that workers work harder]. Our results found that the productivity treatment –

workers tend to work harder – had the greatest effect on perceptions of fairness. Although the agreement led to American job losses, when foreign workers were more productive, the agreement was deemed to be fairer ($p < 0.03$) and the productivity treatment had the greatest effect on attitudes toward trade.[1] This gives us greater confidence that thinking of equity in terms of productivity, specifically how hard workers work, is central to the equity concerns captured in our study.

1.4 Mediation Analysis and Results

The mediation analysis presented in this paper is implemented using the R package by Imai et al. (2010), which uses a potential outcome framework to evaluate how much of the effect of the treatment travels through the mediator of interest. Under a given set of assumptions, this allows us to measure the average causal mediation effect (ACME), the average direct effect (ADE), and the total effect of the treatment. The results of the mediation analysis, displayed in Figure 5 of the paper, demonstrate that a large portion of the treatment effect on support for the trade agreement flows through the mediator of perceived fairness and that the results are robust to sensitivity analysis that tests the sequential ignorability assumption, as shown in Figure 1.

Because the mediation analysis relies on a sequential ignorability assumption, which is a strong assumption that may be violated by unobserved variables that affect both the mediator and the outcome, we conduct sensitivity tests to determine the robustness of our mediation results to violations of this assumption. While we control for observed pretreatment variables – including age, education, income, political party, gender, national attachment, and cooperative internationalism – there are an infinite number of potentially unobserved confounding variables that could violate this assumption. For example, if someone recently lost their job due to foreign competition, that experience would likely shape their attitude toward trade agreements and how fair they perceive such agreements to be. However, due to practical considerations in survey design we cannot attempt to measure all such confounders, and thus many remain functionally unobserved. Although it is an imperfect solution, we analyze the sensitivity of the mediation results which are displayed in Figure 1, which plots the the average causal mediation effect for each of our mediation tests against changes in ρ, which is potential levels of correlation between the error terms of the mediator and the outcome models. The plots illustrate that the ACMEs are robust to significant changes in ρ, giving us greater confidence in the mediation analysis.

[1] The producitivty treatment had the greatest effect on perceptions of fairness.

Figure 1: Sensitivity Tests of Mediation Analysis

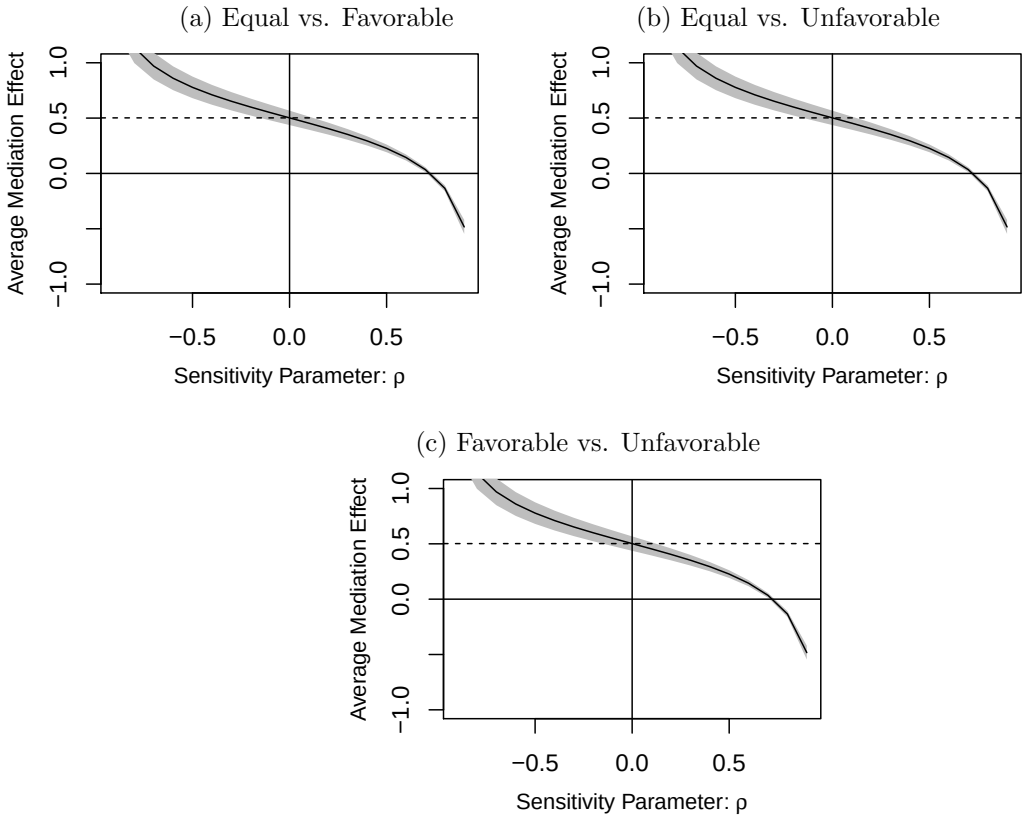


Figure 1 plots the Average Causal Mediation Effects (ACME) against changes in values of ρ to test the robustness of the results to violations of the sequential ignorability assumption. Analysis conducted using the `mediation` package by Imai et al. (2010).

1.5 Effects of Individual Concern for Equality

In addition to our main analysis, we also test whether individual-level variation in concern for equality shapes perceptions of fairness for trade agreements. To do so, our survey instrument included a series of questions that measured how fair respondents believed specific situations were that were based on the equality principle. Specifically, the instrument asked respondents to rate "How fair is each of these choices to you?" with the options ranging on a six-point scale from "extremely unfair" to "extremely fair."

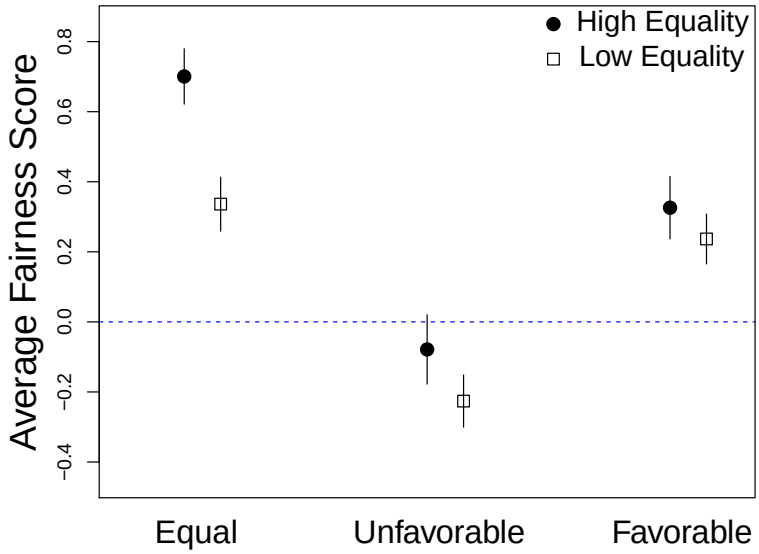
> A bonus pool is distributed across workers at a firm. Everyone receives the same bonus.
>
> An inheritance from recently deceased parents is divided among several siblings. The siblings each receive an equal share.
>
> A homeless shelter is distributing meals but might not have enough. Everyone is entitled to a meal on a first-come, first-serve basis.

Using responses from the three questions, we created an index that allowed us to categorize respondents based on the degree to which they defined fairness in terms of equality. For each respondent, we summed the response scores for each question (1-6), resulting in a scale from 3 to 18. The respondents' whose scores were in the top quartile are considered "High Equality" respondents and those in the bottom quartile are "Low Equality" respondents. If concern for equality is a significant factor in shaping attitudes toward trade, we would expect the High Equality respondents to believe the equal trade agreement is much fairer than the Low Equality respondents, and that the effect of switching from the unfavorable or favorable treatments to the equal treatment will be significantly larger for the High Equality respondents than the Low Equality respondents.

The results for the heterogenous treatment effects based on concern for equality are displayed in Figure 2. As expected the High Equality respondents believe the equal treatment is significantly fairer than the Low Equality respondents (0.36, $p < 0.01$). Furthermore, the effect of moving to the equal treatment from the unfavorable or favorable treatment is significantly larger for the High Equality respondents than the Low Equality respondents, with the differences in treatment effects being 0.22 ($p = 0.03$) and 0.28 ($p < 0.01$) respectively.

These results demonstrate that those individuals who believe fairness is based on equality have a much stronger response to our equality treatment than those that do not. The advantage of this

Figure 2: Perceived Fairness of Agreement by Trade Flows



Note: Figure 2 displays the average fairness score for the agreement by treatment type and respondents' concern for equality, measured from -2 to 2, with 95 percent confidence intervals. Higher values represent a greater perceived fairness.

individual-level measure is that it does not suffer from the same consistency-seeking bias that potentially affects our mediation analysis. Given our main results, and that we see heterogenous effects in a manner consistent with fairness shaping attitudes toward trade, we conclude that individuals incorporate concerns for fairness when evaluating international trade agreements in a manner that follows how they use fairness to evaluate their interpersonal relationships as well.

1.6 Study 2: Support for Renegotiating

In addition to the main effects of our balanced, favorable, and unfavorable treatments on support for renegotiation, we also analyze whether the "equity bonus" translates into less support for renegotiating the agreement. Since the greatest equity bonus occurred in the balanced trade flow treatment, we test whether the balanced trade flow with equal productivity results in less support for renegotiation than the balanced trade flows with productive or unproductive workers. The results show that there is no difference in support for conditions, with the differences being -0.01 ($p = 0.90$) for the productive treatment and 0.03 ($p = 0.65$) for the unproductive treatment. These results demonstrate that in our trade balance study, although there is an equity bonus when it comes to perceptions of fairness, equity does not have a significant effect on support for renegotiating the agreement.

References

Imai, Kosuke, Luke Keele, Dustin Tingley and Teppei Yamamoto. 2010. Causal Mediation Analysis Using R. In *Advances in Social Science Research Using R*, ed. H. D. Vinod. New York: Springer-Verlag.