

# Pre-Analysis Plan: Trading-off Equity and Efficiency: The role of Information\*

Stefan Meißner<sup>†</sup>

4. September 2018

## Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
1.1	Abstract	2
1.2	Motivation	2
1.3	Research Questions	3
<b>2</b>	<b>Research Strategy</b>	<b>3</b>
2.1	Sampling	3
2.1.1	Sample Selection	3
2.1.2	Data Collection	3
<b>3</b>	<b>Research Design</b>	<b>3</b>
3.1	Treatments	4
3.2	Balancing Checks	5
<b>4</b>	<b>Empirical Strategy</b>	<b>7</b>
4.1	Research Question	7
4.2	Hypothesis	7
4.3	Heterogeneity	7
4.4	Outliers and Data cleaning	7
<b>5</b>	<b>Statistical Analysis</b>	<b>8</b>
5.1	Testing the main hypothesis	8
5.2	Testing for heterogeneity	8
	<b>Bibliography</b>	<b>9</b>
	<b>Appendices</b>	<b>10</b>

---

\*This work was supported by the Research Council of Norway through its Centres of Excellence Scheme, FAIR project No 262675.

<sup>†</sup>Norwegian School of Economics and FAIR Stefan.Meissner@nhh.no.

# 1 Introduction

## 1.1 Abstract

- The experiment poses the question: Are people willing to provide additional information in situations where some will make better and some will make worse decisions based on the information?
- It adds to our understanding of inequality acceptance.

## 1.2 Motivation

- Previous studies in economics have investigated the question how people trade-off equity and efficiency. [Fehr et al., 2006]. Those participants can be motivated by different kinds of preferences [Engelmann and Strobel, 2004]. Several authors argue that in general people seem to demand a strong increase in efficiency to prefer a more efficient to a more equal outcome [Bolton and Ockenfels, 2006].
- More recent studies added a new perspective to the problem, using impartial third-parties to elicit fairness preferences and distributive decisions [Cappelen et al., 2007][Cappelen et al., 2012].
- This study follows the approach of impartial third parties making redistributive decisions. In this paper, we ask the question if a mechanism that enhances efficiency but creates inequity is perceived as fair. The specific mechanism that is studied involves information. Information supply is seen as an important underpinning of rational decision-making (e.g. [Ganguly and Tasoff, 2017]) and the provision of information plays a large role in numerous recent policy initiatives [Bao and Ho, 2015]. Some recent work has shown that the effects of information provision, for example reminders, can be heterogeneous and not universally beneficial. [Medina, 2017] documents a number of cases where informational nudges lead to heterogeneous changes in behavior that can be harmful for some individuals. This is driven by heterogeneous changes in attention to options for decision-makers that can lead some individuals to pay too little attention in other domains [Bordalo et al., 2017]. Other examples for heterogeneous effects of information provision are provided in a wide array of applications like health [Kőszegi, 2003], education [Avitabile and de Hoyos, 2018], financial decision-making [Xiong, 2013] and financial education [Brown et al., 2014].
- These effects could systematically affect welfare consequences of information interventions. Given that the effects are heterogeneous among recipients, this can lead to an increase in inequality. Therefore, it is relevant to ask the question if this form of inequality is perceived as fair.
- This study tries to investigate the question if increased efficiency that comes from informational interventions is seen as acceptable if inequality increases at the same time. To my knowledge, this is the first study that systematically investigates this question. This will add to the growing literature on inequality acceptance and will also inform policy discussions about information interventions.

### 1.3 Research Questions

- Are people willing to provide information that will make some people better off and some people worse off and increase overall welfare?
- Are they more willing to do so compared to a financially equivalent mechanism that would increase welfare to the same extent? Is there a special nature of information?

## 2 Research Strategy

### 2.1 Sampling

- In the experiment, data is collected for a group of impartial third parties, spectators, and workers. These groups will be recruited separately. This pre-analysis-plan will be submitted to the AEA RCT registry before I had access to the data. I will first outline the recruitment of the two groups of participants.

#### 2.1.1 Sample Selection

- Data for the third-parties is collected on a nationally representative sample of the US-population (over 18 years old) based on observable characteristics (age, gender, geography, income). To achieve this goal, I recruit participants using Research Now, which is one of the leading data collection agencies in the United States. In total I plan to recruit 2400 participants in that way.
- Data for the workers will be collected on Amazon mechanical Turk (mTurk), an international online labor market. I plan to recruit 240 workers in that way.
- Spectators and workers will not be matched in a 1:1 matching but the spectator decisions that will be implemented will be randomly selected from the sample. This will be made salient to the spectators.

#### 2.1.2 Data Collection

- The data collection for the spectators was conducted in September 2018. It will be aided by the recruitment of Research Now to ensure that the quotas for representativeness will be met.
- Data will be collected in the form of responses to survey questions for the third-parties and the responses to a guessing game for the workers.

## 3 Research Design

- In the experiment, spectators are asked to make a decision that will affect the earnings of the workers that were recruited on mTurk. In both treatments (base and information) spectators do not directly allocate earnings to one specific worker but make a decision that will affect a pair of workers. The main variable of interest is a binary choice of third parties to either implement a more efficient but less equal distribution or a completely equal one.

### 3.1 Treatments

- The main variable of interest is a binary choice that spectators make between either two information environments or two payment schemes that will in expectation lead to the same outcome as the information environments.
- In this paper, the "efficient allocation" is defined as the one that maximizes total payout. The two treatments can be seen in the next table:

Spectator Treatments			
Baseline Choice between		Treatment Choice between	
Equal Payment- Both Workers earn 3.30\$	Efficient Payment - One Worker earns 5\$, the other 2.5\$	No additional information - Both workers earn 3.30\$ in expectation	Additional Information - One worker earns 5\$ and the other worker earns 2.50\$ in expectation

- The exact choices that are presented to the spectators are the following:

#### Baseline

We now ask you to make a choice that might have consequences for a real life situation.

We are recruiting individuals via an international online market place to take part in a study for which they are paid. These individuals are randomly matched into pairs. You are now making a decision for one randomly selected pair of individuals. We plan to pay both 3.30 USD for their participation.

We ask you now to make the following decision: You can decide that we randomly select one of the two individuals to earn 5.00 USD, 1.70 USD more than before. The other individual then earns 2.50 USD, 0.80 USD less than before.

Your decision will be implemented with a certain probability and therefore might have real consequences.

- I want to implement the alternative earnings
- I do not want to implement the alternative earnings

## Treatment

We now ask you to make a choice that might have real consequences for a real life situation. We are recruiting individuals via an international online market place to take part in a study in which they are asked to estimate the share of red balls in a container with a large number of red and blue balls. Their earnings in the study are determined by the precision of their estimate. The real share of red balls in the container is 50% and they earn 5.00 USD if their estimate is correct. Their earnings are reduced by 10 cents per percentage point their estimate differs from the correct number.

Two individuals, let us call them individual A and individual B, are matched in a pair. Each individual will see a result of three random draws from the container. One ball is drawn at a time, the color is reported to the individual and the ball is put back into the container.

The situation in which you are asked to make a decision is the following: Individual A has seen a draw of 2 red and 1 blue ball (a share of 67% red balls) while individual B has seen 2 blue and 1 red ball (a share of 33% red balls). Based on the three draws, Individual A estimates that the share of red balls is 67% (a 17 percentage point deviation from the correct number) while individual B estimates that the share of red balls is 33% (a 17 percentage point deviation from the correct number). If this is their final estimate, individual A earns 3.30 USD and individual B earns 3.30 USD.

We now ask you to decide whether or not you want to show the two individuals the color of one additional ball that is randomly drawn. If you do, one of the two individuals will have seen 2 red and 2 blue balls while the other individual will have seen 3 balls of one color and 1 of the other color. Based on the four balls, one individual will estimate that the share of red ball is 50% (no deviation) and the other individual will estimate that the share of red balls is either 25% or 75% (a 25 percentage point deviation). One individual will therefore earn 5.00 USD, 1.70 USD more than before and the other individual will earn 2.50 USD, 0.80 USD less than before.

Your decision will be implemented with a certain probability and therefore might have real consequences.

- I want to show them the additional ball
- I do not want to show them the additional ball

## 3.2 Balancing Checks

- For spectators, treatment and control group should both be representative samples from the US-population. I aim for  $n=1200$  in both groups.

- Balance will be tested for observable demographic characteristics. These will include age, sex, income, geography and education.
- The choice that spectators make is a forced choice. They have no opportunity to opt out of answering the question. So selective attrition should not be a big concern.

The demographic background questions are the following:

- What is your sex?
  - Male
  - Female
- How old are you?
  - Choice of Age between 18 and 99
- In which state do you currently reside?
  - List of the 50 states, DC and Puerto Rico
- What is the highest level of education you have completed?
  - Less than High School
  - High School/GED
  - Some College
  - Associate's Degree
  - Bachelor's Degree
  - Master's Degree
  - Professional Degree (JD,MD)
  - Doctoral Degree
- What is your household's combined yearly income (gross income before taxes are deducted)?
  - Less than 29,999\$
  - 30,000\$ to 59,999\$
  - 60,000\$ to 99,999 \$
  - 100,000\$ to 149,999\$
  - 150,000\$ or more

## 4 Empirical Strategy

### 4.1 Research Question

This paper investigates the question whether an information mechanism changes the preferences over equity and efficiency for spectators. I study this question by presenting two decision-situations with real-life consequences to spectators.

### 4.2 Hypothesis

**Hypothesis 1 (H1):** *A significantly higher share of participants is willing to create a more efficient but less equal situation when the cause of inequality is an information mechanism.*

The proposed explanation of this is the special role of the information mechanism. Provision of additional information is perceived as a valid reason for inequality. This hypothesis is derived from the observed popularity of policy measures that provide additional information to decision makers.

### 4.3 Heterogeneity

I will also study heterogeneity in the spectator choice using the background data collected in the survey. I will focus on age, sex, income and education. I will test if there are differences for the following groups:

- **Age:** Below and above median age in the United States (age 18+)
- **Sex**
- **Income:** Below and above median income in the United States
- **Education:** No college degree and college degree

Interactions between the demographics and the treatment assignment will be tested as outlined in section 5.2.

### 4.4 Outliers and Data cleaning

- Results will be reported for the full, unrestricted sample and two different restrictions of the sample
  1. Response times are captures for both treatments. Participants are excluded from the sample if their response time for either question is indicative of not having read the question (page submit in less than 3 seconds).
  2. Attention filters are used in the survey. Participants who fail both of the attention filters will be excluded from the sample

## 5 Statistical Analysis

### 5.1 Testing the main hypothesis

- Due to the fact that the main variable of interest is a binary choice variable, I test for significant differences in the propensity of third-parties to choose the more efficient and less equal outcome.
- For this purpose, a Chi-Square-Test is used.

### 5.2 Testing for heterogeneity

- As outlined in Section 4.3, I will also test for heterogeneity based on the observed demographics.
- For this purpose, an OLS is run:

$$Y_i = \beta_0 + \beta_1 D_j + \beta_2 T + \beta_3 T D_j \quad (1)$$

where  $Y_i$  is the share of participants choosing the less equal but more efficient allocation,  $D_j$  is a dummy variable that takes the value 1 for the variables that are outlined in the Section 4.3 and  $T$  is a variable that takes the value 1 if individuals are in the treatment condition.



## Bibliography

- C. Avitabile and R. de Hoyos. The heterogeneous effect of information on student performance: Evidence from a randomized control trial in Mexico. *Journal of Development Economics*, 135: 318 – 348, 2018. ISSN 0304-3878. doi: <https://doi.org/10.1016/j.jdeveco.2018.07.008>. URL <http://www.sciencedirect.com/science/article/pii/S0304387818304565>.
- J. Bao and B. Ho. Heterogeneous effects of informational nudges on pro-social behavior. *The BE Journal of Economic Analysis & Policy*, 15(4):1619–1655, 2015.
- G. E. Bolton and A. Ockenfels. Inequality aversion, efficiency, and maximin preferences in simple distribution experiments: comment. *American Economic Review*, 96(5):1906–1911, 2006.
- P. Bordalo, N. Gennaioli, and A. Shleifer. Memory, attention, and choice. Working Paper 23256, National Bureau of Economic Research, March 2017. URL <http://www.nber.org/papers/w23256>.
- A. Brown, J. M. Collins, M. D. Schmeiser, and C. Urban. State Mandated Financial Education and the Credit Behavior of Young Adults. Finance and Economics Discussion Series 2014-68, Board of Governors of the Federal Reserve System (U.S.), Sept. 2014. URL <https://ideas.repec.org/p/fip/fedgfe/2014-68.html>.
- A. Cappelen, J. Konow, E. Sørensen, and B. Tungodden. Just luck: an experimental study of fairness and risk taking. resubmitted to the. *American Economic Review*, 2012.
- A. W. Cappelen, A. D. Hole, E. Ø. Sørensen, and B. Tungodden. The pluralism of fairness ideals: An experimental approach. *American Economic Review*, 97(3):818–827, 2007.
- D. Engelmann and M. Strobel. Inequality aversion, efficiency, and maximin preferences in simple distribution experiments. *American economic review*, 94(4):857–869, 2004.
- E. Fehr, M. Naef, and K. M. Schmidt. Inequality aversion, efficiency, and maximin preferences in simple distribution experiments: Comment. *American Economic Review*, 96(5):1912–1917, December 2006. doi: 10.1257/aer.96.5.1912. URL <http://www.aeaweb.org/articles?id=10.1257/aer.96.5.1912>.
- A. Ganguly and J. Tasoff. Fantasy and dread: The demand for information and the consumption utility of the future. *Management Science*, 63(12):4037–4060, 2017. doi: 10.1287/mnsc.2016.2550. URL <https://doi.org/10.1287/mnsc.2016.2550>.
- B. Köszegi. Health anxiety and patient behavior. *Journal of Health Economics*, 22(6):1073 – 1084, 2003. ISSN 0167-6296. doi: <https://doi.org/10.1016/j.jhealeco.2003.06.002>. URL <http://www.sciencedirect.com/science/article/pii/S0167629603000766>.
- P. C. Medina. Selective attention in consumer finance : Evidence from a randomized intervention in the credit card market. 2017.
- W. Xiong. Bubbles, Crises, and Heterogeneous Beliefs. NBER Working Papers 18905, National Bureau of Economic Research, Inc, Mar. 2013. URL <https://ideas.repec.org/p/nbr/nberwo/18905.html>.

# Appendices

**Introduction** The spectators are presented with the following introduction when they take part in the survey:

## **Introduction**

Welcome to this research project. We appreciate your participation. This study is a project conducted by FAIR/The Choice Lab at NHH Norwegian School of Economics. The project is funded by several research institutions. Participants are recruited via Research Now with the aim of surveying a representative sample of Americans.

## **The present study**

This study is concerned with attitudes towards different decision-situations. It contains both hypothetical and real choices and parts of your answers will have real-life consequences for other people.

## **Confidentiality**

All data obtained from you will be used for research purposes only. Data will be collected and published in an anonymized format. Researchers will have no access to any information that can be used to personally identify you. The collected anonymized data will be used and shared for research purposes only and will be stored in open access repositories.

## **Voluntary participation**

It is voluntary to participate in the project, and you can at any time choose to withdraw your consent without stating any reason.

## **Questions about the survey**

If you have questions about this study or your rights, please get in touch with the customer service of the survey provider.

## **Consent**

I have received information about the project and am willing to participate.

- Yes
- No

### Quotas for third-parties

Quotas for spectators		
Demographic category	Target Share in %	Target Number
<b>Sex</b>		
Male	49.20	1181
Female	50.80	1219
<b>Age</b>		
18-34	30.60	734
35 - 44	17.50	420
45 - 54	19.20	461
55 - 64	15.60	374
65 and above	17.20	413
<b>Region</b>		
Northeast	17.40	418
Midwest	21.00	504
West	23.70	569
South	37.90	909
<b>Annual Household Income</b>		
Less than 29,999\$	25.48	611
30,000\$ to 59,999\$	25.07	602
60,000\$ to 99,999\$	21.76	522
100,00\$ to 149,999\$	14.13	339
150.000\$ and above	13.57	326