

A tale of two Koreas: property rights and fairness

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Highlights

- We study the impact of institutions and cultures on preferences for giving.
- Native-born South Koreans are compared to North Korean refugees in lab experiments.
- North Korean refugees show different preferences regarding extensive and intensive margins of giving, relative to native-born South Koreans.
- North Korean subjects behave in a more self-interested manner when they participated in market activities in North Korea.

Abstract

We compare two groups of the non-student Korean population—native-born South Koreans (SK) and North Korean refugees (NK)—with contrasting institutional and cultural backgrounds. In our experiment, the subjects play dictator games under three different treatments in which the income source varies: first, the income is randomly given to the subject; second, it is earned by the subject; third, it is individually earned by the subject and an anonymous partner and then pooled together. We find that preferences for giving depend on the income source in different ways for the SK and NK subjects. The SK subjects become more selfish when the income is individually earned than when it is gifted to them. Furthermore, the NK subjects are not responsive to the earned income treatment but behave more pro-socially when individually earned incomes are pooled. The NK subjects behave in a more self-interested manner when they participated in market activities in North Korea.

JEL Classification: C92, C93, D03, P20.

Keywords: Selfish Behavior; Institutions; Division of Korea; Dictator Game; Earnings; Market Activities.

1 Introduction

Institutional arrangements of property rights and incentives, which place binding restrictions on human behavior, vary widely across nations and are a key to economic development and a nation's prosperity (e.g., Acemoglu and Robinson, 2012). They also influence the evolution of social values and norms that are pervasive in a society (e.g., Tabellini, 2008; Bowles, 1998).

How can we assess the role of property rights in shaping social preferences? One popular method used in lab experiments is to compare giving behavior in dictator games between the baseline that the initial endowment is given by luck (i.e., unearned income) and the case that it is legitimized with individual performance (i.e., earned income). The consensus in the literature is that the subjects in dictator games behave in a more self-interested manner when the income is earned. See, for example, Cherry, Frykblom, and Shogren (2002), List and Cherry (2008), and Oxoby and Spraggon (2008), among others. These experimental results are consistent with the notion that property rights are important in shaping social preferences. More generally, researchers have designed a variety of dictator games and have implemented them in different settings. For example, List (2007) shows that in a modified dictator game, far fewer subjects are willing to transfer money when the action set includes taking. His results point to the importance of the rules of a game and, broadly, that of institutions. Fershtman, Gneezy, and List (2012) consider different variants of dictator games and find a preference for selfishness when competition over resources is incorporated into the game. Cappelen, Moene, Sørensen, and Tungodden (2013) conduct a real-effort dictator game with students residing in Germany, Norway, Tanzania, and Uganda and find that entitlement considerations are more important than needs considerations. All these experimental results suggest that institutions matter in other-regarding preferences. However, there are intrinsic limitations on extrapolating these experimental results. Above all, all the subjects in the aforementioned studies were recruited from the undergraduate student body at universities. Specifically, the participating students are located in the United States (US) and Canada except those

subjects of Cappelen, Moene, Sørensen, and Tungodden (2013).

In this paper, we start with the following research question: to what extent are the findings in the literature true for individuals who have experienced different types of economic and political institutions in their lives? The purpose of this paper is to address this question by conducting lab experiments with non-student subjects who are either a native-born South Korean or a North Korean refugee. The sample of North Korean refugees is unique in that they were born in North Korea and spent a significant part of their early life in a society that is ruled by a dictatorship and has a centrally planned economy. If economic institutions, such as property rights, are important in determining giving behavior in dictator games, as suggested by the earned income treatment in the literature, the North Korean refugees may behave differently in comparison with undergraduate students from more advanced countries. To explore this possibility in a lab experiment, we recruit North Korean refugees and native-born South Koreans, with each group being a representative sample from its respective non-student population, and conduct lab experiments by varying the source of the initial endowment in dictator games.

In our experiments, the subjects consist of 161 North Korean refugees (whom we call the NK subjects from now on) and 161 native-born South Koreans (the SK subjects), and they do not know the group identity of participants. There were three treatments: unearned, earned, and pooled income. In the *unearned income* treatment, the initial endowment is randomly given to the subjects by the experimenter, while in the *earned income* treatment, the subjects earn the initial endowment by taking the Raven Progressive Matrices test prior to playing the dictator game. Unlike previous studies that based individual performance on effort, in our earned income treatment, performance depends on cognitive skills and effort. The third treatment, which we call the *pooled income* treatment, is similar to the experiment of Cappelen, Sørensen, and Tungodden (2010). In this treatment, each subject takes the Raven test to earn his or her individual endowment; after that, she is informed that he or she will be matched to a partner to pool the endowments of both parties. The randomly chosen dictator then allocates the pooled income to his or her partner.

The underlying hypotheses are as follows. First, the NK subjects may not differentiate the earned and unearned incomes in the same way as undergraduates in more advanced countries because they grew up in a communist society and, hence, may not possess the same notion of property rights as native-born citizens in a capitalist market economy. Second, the NK subjects may behave differently, depending on whether the income is earned by *sole* or *joint* performance, since they are from a society that is totalitarian and uses comradeship as propaganda.

We contribute to the literature that uses dictator games to explore the importance of institutions and cultures in shaping social preferences. For example, Jakiela (2011, 2015) shows that the effects of institutional components in dictator games, such as the status of the dictator or the earned income, differ substantially between the sample of the student body in the US and that of rural villagers in Kenya. She attributes the differential experimental results to differences in cultures. In a related study, Jakiela, Miguel, and Velde (2015) find that higher academic achievement shifts young Kenyan women toward a 50-50 split norm in a modified dictator game.¹ Barr, Burns, Miller, and Shaw (2015) present experimental evidence of differential entitlement effects with respect to the economic status of participants recruited in the United Kingdom (UK) and South Africa. Barr, Miller, and Ubeda (2016) conduct their study in Spain and report experimental evidence of becoming unemployed having a negative effect on acknowledging earned entitlement. Almås, Cappelen, and Tungodden (2019) carry out a social preference experiment in which the participants are from the US or Norway and find that Americans and Norwegians differ significantly in their distributive behavior, even when they make choices in identical situations. Our subjects are different in many ways from those in Kenya, Norway, South Africa, Spain, the UK, and the US. In particular, the NK subjects provide a unique opportunity to examine the role of different sources of the initial endowment in dictator games because they are from a non-capitalist country where private property holdings are officially prohibited. Just as the setting in Kenya (or in Spain) provides an exemplary case for

¹Jakiela and Ozier (2016) design a lab experiment to study the economic impacts of social pressure to share income with kin and neighbours in rural Kenyan villages.

investigating the external validation for those in less advanced countries (or in countries with high unemployment rates), our setting presents an ideal environment for studying the giving behavior of those who may possess a different notion of property rights.

More broadly, our paper is related to previous research focusing on the effect of property rights. A number of historical and empirical studies have shown that property rights and a supporting legal system have played a crucial role for economic growth through the development of financial markets, investment, innovation, and efficient resource allocation. See, for example, North and Thomas (1970), Barro (1996), Acemoglu and Johnson (2005), and Shiue and Keller (2007), among others. Di Tella, Galiani, and Schargrodsky (2007) exploit a natural experiment that induced an allocation of property rights in a squatter settlement in the outskirts of Buenos Aires. They find that squatters with legal titles report beliefs favoring a free market. Bubb (2013) investigates the factors that affect the evolution of property rights institutions using a regression discontinuity design at the international border in Africa.

This paper also contributes to the emerging literature that combines traditional lab experiments with historical contexts. For example, Callen, Isaqzadeh, Long, and Sprenger (2014) conduct experiments on a sample of Afghanistan civilians to investigate the relationship between violence and economic risk preferences. In our previous work (Kim, Choi, Lee, Lee, and Choi, 2017), we find that North Korean refugees behave very differently from South Korean students in dictator games with unearned incomes. In this paper, we show that they behave differently compared to non-student native-born Koreans under unearned, earned, and pooled income treatments.

Our experimental results yield a few noteworthy findings. First, we find that native-born South Koreans give nothing to anonymous partners by 16 percentage points more in the earned income treatment than in the unearned income treatment, while the earned income treatment does not influence North Korean refugees' behavior significantly. Therefore, the results of the earned income treatment suggest that the NK subjects have a different notion of property rights in comparison to the SK subjects whose average behavior corroborates findings reported in the literature. However, North Korean refugees make zero

offers by 20 percentage points less within the unearned income treatment when the randomized endowment decreases from 90K South Korean Won (KRW) to 30K KRW, whereas differential endowments do not affect South Koreans significantly. This indicates that the SK and NK subjects have different endowment effects on the extensive margin of giving behavior. Furthermore, North Korean refugees give a larger share in the pooled income treatment than in the unearned income treatment, regardless of the endowment level in the unearned income treatment. This provides another piece of evidence that the NK subjects' average behavior is difficult to explain using the simple logic of earned property rights. Interestingly, North Korean subjects behave in a more self-interested manner when they participated in market activities in North Korea.

Our results point to the importance of both economic institutions and the prevalence of individual heterogeneity regarding social preferences. It is well documented that East and West Germans have different preferences and behave distinctively, even after a long period of reunification (see, e.g., Ockenfels and Weimann, 1999; Alesina and Fuchs-Schündeln, 2007; Brosig-Koch, Helbach, Ockenfels, and Weimann, 2011; Fuchs-Schündeln and Haliassos, 2019; Laudenbach, Malmendier, and Niessen-Ruenzi, 2019). There are also many studies in the literature focusing on individual heterogeneity in dictator games (see, e.g., Cappelen, Hole, Sørensen, and Tungodden, 2007; Fisman, Jakiela, Kariv, and Markovits, 2015). Cappelen, Hole, Sørensen, and Tungodden (2007) study a dictator game in which the distribution phase is preceded by a production phase. They find that the experimental subjects can be classified into several groups based on their fairness ideals. Fisman, Jakiela, Kariv, and Markovits (2015) find sharp differences in distributional preferences between subjects of varying degrees of eliteness. They report, among other findings, that Yale Law School subjects are less fair-minded and more efficiency-focused than relatively less elite subjects.

The remainder of the paper is organized as follows. Section 2 provides background information how Korea became divided, while Section 3 describes the experimental design, and Section 4 provides descriptive statistics of the baseline variables and checks their balance across the treatments. Section 5 presents the main experimental results, and Section

6 investigates treatment effect heterogeneity. Section 7 concludes, and Appendices A and B contain additional results that are not included in the main text. The online appendices contain detailed experimental instructions in both Korean and English.

2 Background

The subjects in our experiments provide a unique opportunity to study the role of institutional upbringing in the formation of social preferences. In this regard, an understanding of Korea's history and North Korean refugees will be useful. Korea had been unified for more than a thousand years, since AD 676, when it was divided at the end of the Second World War; the division was sudden and unintended. The separation along the 38th parallel, as a consequence of the Cold War between the US and the Soviet Union, divided the Korean peninsula into North and South Korea. The Cold War division of Korea in 1948 can be viewed as an ongoing natural experiment in institutional change (Acemoglu, Johnson, and Robinson, 2005). Since the beginning of the division, South Korea has pursued capitalism and democratic institutions with strong legal support for private property rights. On the contrary, North Korea adopted a socialist system with central planning and authoritarian political institutions. Private property rights have been strictly prohibited in North Korea, although the collapse of the central public distribution system in the mid-1990s forced the North Korean government to allow people to engage in market transactions within a limited scope. To examine the potential impact of market activities in North Korea on NK refugees' behaviors, we split the North Korean sample based on whether they had secondary job experience in North Korea.

It is effectively impossible to access a representative sample of the general population in North Korea. Instead, we recruited subjects from the population of North Korean refugees living in South Korea. The official count of North Korean refugees who have settled in South Korea is 31,339 as of the end of 2017.²

²<https://www.unikorea.go.kr/unikorea/business/NKDefectorsPolicy/status/lately>. (Accessed: 4 November 2019)

As prescribed by the South Korean constitution, North Koreans are treated as South Korean citizens upon arrival in South Korea. They acquire South Korean citizenship when they arrive in South Korea and are provided financial support for resettlement and housing from the South Korean government. Following a three-month period at ‘Hanawon’ (Unity House) for settlement education, they are discharged and live as ordinary South Korean citizens.

One caveat in our paper is that the refugees are a selected sample of the North Korean population; as a result, we cannot draw a general conclusion about the general North Korean population. Kim, Choi, Lee, Lee, and Choi (2017) and Kim (2017) compare the characteristics of samples of refugees and the North Korean population as a whole. Women and residents from bordering providences are over-represented in refugee samples than in the entire population. However, there is little difference in terms of educational attainment, the share of the Workers’ Party membership, and income class in North Korea. As we argue in Kim, Choi, Lee, Lee, and Choi (2017), since North Korean refugees chose to come to South Korea, it is likely that the differences between the North Korean refugees and South Korean natives in our study are a lower bound of the differences between the general North Korean population and South Korean natives.

3 Experimental Design

3.1 Preliminaries

All subjects in our experiment played dictator games. We presented the subjects with a series of budget sets with varying prices for payoffs between themselves and others at a given income level, m :

$$\pi_0 + p\pi_1 = m,$$

where the relative price of giving (p) was $1/3$, $1/2$, 1 , 2 , or 3 . The money allocation between *themselves*, denoted by π_0 , and *others*, denoted by π_1 , must satisfy this budget constraint.

To facilitate their decision-making at the five different price levels, subjects were allowed to transfer multiples of 10% of the income m in each decision problem, and the allocation decision was computerized.

3.2 Treatments

The income source varied in each of the three treatments. In the baseline treatment (hereafter, the *unearned income treatment*), the income was randomly gifted to subjects by the experimenter. The income amount was either 30K, 60K, or 90K in KRW. One of them was randomly chosen and assigned to each subject. Given a randomly chosen income level, the subject played dictator games as described above.

In the second treatment, prior to playing a dictator game, subjects were allowed a maximum of 20 minutes to take the standard Raven Progressive Matrices test.³ If he or she solved fewer than 24, between 24 and 30, or more than 30 questions correctly, the subject earned 30K, 60K, or 90K, respectively. Information regarding earnings was announced publicly before the subjects began the test. Once they finished the test, they were informed of their earnings and that they would be participating in a decision-making experiment involving earned income but were not given any further details at this time. Subjects were then asked to play the dictator games with their earned income. We call the second treatment the dictator game with individually earned income (hereafter, the *earned income treatment*).

In the third treatment, subjects took the Raven test, following the same procedures. Subjects were told that they would earn 15K or 45K, respectively, if they correctly answered fewer than 27 questions, or 27 or more questions. Each subject was also informed that in the next stage, his or her partner would compete the same task, and thus, the total amount of money the subject and his or her partner would earn was either 30K or 60K if

³The standard Raven Progressive Matrices test contains five different sets (i.e., set A through set E), each of which includes 12 questions. Questions become increasingly more difficult, requiring increasingly higher levels of intelligence to analyze information and recognize patterns in diagrams. We use 36 questions from sets C, D, and E.

Table 1: Experimental design

Treatment	Own income	Other income	Source of income
Unearned×30K	30K		Random
Unearned×60K	60K		Random
Unearned×90K	90K		Random
Earned×30K	30K		Score < 24
Earned×60K	60K		$24 \leq \text{Score} < 30$
Earned×90K	90K		Score ≥ 30
Pooled×30K	15K	15K	Both: Score < 27
Pooled×60K (Self: 15K)	15K	45K	Self: Score < 27 & Other: Score ≥ 27
Pooled×60K (Self: 45K)	45K	15K	Self: Score ≥ 27 & Other: Score < 27
Pooled×90K	45K	45K	Both: Score ≥ 27

Notes: ‘Earned,’ ‘Pooled,’ and ‘Unearned’ treatments refer to the earned income, pooled income and unearned income treatments, respectively. The variable ‘Unearned×30K’ refers to the unearned income treatment with earnings of 30K (in KRW), and the other variables are defined similarly. In the earned income and pooled income treatments, prior to playing a dictator game, subjects attempt to solve 36 questions from the standard Raven Progressive Matrices test in 20 minutes. ‘Score < 24’ indicates that the subjects correctly answered fewer than 24 questions, and the other expressions are understood analogously.

the subject earned 15K, or either 60K or 90K if the subject earned 45K. After being informed of their individual earnings, subjects proceeded to play dictator games with the total sum of incomes. Because subjects did not know how much their partner earned, they made the allocation decisions in each of the two cases where their partner earned 15K or 45K. We call the third treatment the dictator game with individually earned income being pooled together (hereafter, the *pooled income treatment*). The experimental design is summarized in Table 1.

In determining subjects’ payoffs, we use the following matching. Subjects in the baseline treatment were randomly matched with those in the treatment with individually earned income. For the treatment with pooled income, subjects were randomly matched

with their partners within this treatment. Because the number of NK and SK participants was the same, each subject were equally likely to be assigned a partner from their in-group or out-group. Information regarding the matching algorithm was publicly announced during the experiment. Specifically, the subjects were informed that they had a 50-50 chance of being matched with a SK or NK subject.

We conclude this subsection by commenting on the use of the Raven test in the experiments. Individual performance on the Raven test is affected by personal effort (e.g., attention) as well as cognitive ability. Instead of using a simple, tedious task, such as counting zeros, which is often used in the literature, we opted for the Raven test because it would allow individual performance to be determined by both effort and cognitive ability. Our point of departure from the literature in this regard is that we consider both effort and cognitive ability to induce a sense of ownership. In the context of North and South Korea, property rights and ownership are influenced by a variety of institutional arrangements. Private property rights are promoted actively through market activities in South Korea (i.e., a capitalist economy), whereas they are, in principle, replaced by state ownership in North Korea (i.e., a socialist economy). Both personal effort and cognitive ability play a key role in determining individual performance in a market economy. Therefore, in order to capture such real-world contexts, we used the task whose performance was determined jointly by effort and cognitive ability.

3.3 Procedures and Recruitment

The experiments were conducted in collaboration with a branch of a leading global survey company in Seoul, South Korea. The company has ample experiences with conducting surveys of a representative sample of native-born South Koreans, as well as NK refugees in South Korea, prior to our study. We use the stratified sampling method, in terms of socio-demographic information, to recruit SK and NK subjects who are representative of their own populations.

We conducted the experiments in 12 sessions over 6 days, two sessions per day, in late

Table 2: Details of the three experimental treatments

Session number	Treatment	Session date and time	Number of Participants
Native-Born South Koreans			SK Total: 161
1	Earned	May 24 at 11:00	28
2	Earned	May 24 at 15:00	26
3	Pooled	May 26 at 14:00	26
4	Pooled	May 26 at 19:30	27
5	Unearned	May 30 at 14:00	27
6	Unearned	May 30 at 19:30	27
North Korean Refugees			NK Total: 161
7	Earned	May 27 at 14:00	34
8	Earned	May 27 at 19:30	23
9	Pooled	May 28 at 14:00	39
10	Pooled	May 28 at 19:30	13
11	Unearned	May 29 at 14:00	31
12	Unearned	May 29 at 19:30	21

Notes: ‘Earned,’ ‘Pooled,’ and ‘Unearned’ treatments refer to the earned income, pooled income, and unearned income treatments, respectively. The total number of participants is 322.

May 2014. Table 2 presents information on the sessions and treatments, as well as the number of participants in a given session. In total, 322 subjects took part in our study, split equally between NK refugees and SK natives. Randomization was performed at the session level.⁴

4 Baseline Variables and Randomization

This section provides descriptive statistics of the baseline variables.

⁴Because randomization at the session level was a simpler and more convenient way to implement the experiments, it was easier for our subjects (especially, the North Korean refugees) to understand the experimental procedure.

4.1 Comparison of the NK and SK Subjects

Table 3 presents summary statistics of the subjects' individual and household characteristics. Unsurprisingly, the NK and SK subjects are substantially different in almost all regards. Among the NK subjects, there are more females, which reflects the fact that females comprise about 70% of the NK refugee population. The NK subjects are younger by about 2 years on average. They are considerably less likely to be married, as well as have a smaller household and fewer children, on average.

There is a significant gap in education. It is difficult to compare education because NK and SK education systems are markedly different. However, according to the South Korean government (i.e., the Ministry of Unification), higher education in NK is equivalent to a 2- or 4-year college/university education in SK. Based on this standard, about 80% of the SK subjects have completed some higher education, while only about 24% of the NK subjects have done so.

Household economic and financial conditions are very different. The average monthly household income is about 5,200K KRW for the SK subjects, whereas that of the NK subjects is 1,500K KRW, less than 30% of SK subjects' average income.⁵ The average monthly expenditures are also significantly higher for the SK subjects. About 64% of the SK subjects believe that their households are middle- or upper-income classes, while the percentage is only 13% for the NK subjects. About 60% of the SK subjects are currently working, while only 42% of the NK subjects are working. Only 8.1% of the NK subjects have traded stocks, while 57% of the SK subjects have experience with the stock market. About 85% of the SK subjects hold some sort of financial assets (e.g, savings, funds, or insurance), while 48% of the NK subjects do so.

We also attempt to measure risk aversion by asking the subjects about the minimum probability of precipitation that would prompt them to carry an umbrella. We intention-

⁵According to the National Statistical Office's Household Income and Expenditure Survey 2014, the average monthly household income is 4,300K KRW. The average income of our sample is a bit higher, probably because our sample only includes households in Seoul, Incheon, and Gyeonggi province, which are more affluent than the other areas. In 2014, the population of these areas comprised 49.5% of the total population in South Korea. Furthermore, 64.7% of NK refugees resided in these areas as of February, 2013.

Table 3: Summary Statistics

	SK		NK		p-value	Sample size
	Mean	SD	Mean	SD		
Male*	0.491	0.501	0.286	0.453	<0.001	322
Age	42.9	11.8	40.6	12.1	0.084	322
Married*	0.689	0.464	0.373	0.485	<0.001	322
Post-secondary education*	0.820	0.385	0.236	0.426	<0.001	322
Household size	3.25	1.12	3.09	2.58	0.485	322
Number of children	0.957	0.918	0.621	0.821	<0.001	322
Household income	523	262	150	134	<0.001	304
Household expenditures	423	231	122	94	<0.001	308
Working*	0.602	0.491	0.416	0.494	<0.001	322
Middle or upper class (subjective)*	0.640	0.482	0.130	0.338	<0.001	322
Stock market participation*	0.565	0.497	0.081	0.273	<0.001	322
Savings, fund, or insurance*	0.845	0.363	0.478	0.501	<0.001	322
Risk aversion	40.8	20.5	36.7	32.6	0.183	322
Protestant*	0.242	0.430	0.677	0.469	<0.001	322
Atheist*	0.472	0.501	0.267	0.444	<0.001	322
Health Status*	0.596	0.492	0.280	0.450	<0.001	322
Stressed*	0.398	0.491	0.447	0.499	0.368	322
Discrimination*	0.068	0.152	0.142	0.233	<0.001	322

Notes: The table shows the mean and standard deviation of each variable for native-born South Koreans (SK) and North Korean refugees (NK) separately. The p-value for testing the equality between two means is shown in the second to last column. Household income and expenditures are monthly and their units are 10,000 KRW. The variables with * are binary indicator variables. The risk aversion variable is measured by asking the subjects about the minimum probability (in percentages) of precipitation that would prompt them to carry an umbrella.

Figure 1: Pairwise Plots



Notes: The left panel of the figure shows the pairwise plot for three variables—age, household income, and household expenditures—for the South Korean sample. The right panel displays the pairwise plot for the North Korean refugee sample.

ally chose this question because the NK and SK subjects' concept of risk could be somewhat different.⁶ According to this measure, NK subjects are a bit more risk averse; however, the difference is statistically insignificant.

Most of the NK subjects (68%) are Protestants, and only 27% of them are atheist.⁷ The omitted category here is other religions. It is because in South Korea, many non-governmental organizations for NK refugees' settlement are based on churches. In terms of subjective health measure, NK subjects are less healthy; 28% of them responded that they have good or above average health status, while 60% of the SK subjects gave this response. Lastly, NK subjects are more likely to be emotionally stressed and feel discriminated against. The former is not statistically significant.

Figure 1 depicts the pairwise plots for three variables—age, household income, and household expenditures—for the SK sample and for the NK refugee sample, separately. It can be seen that household income and expenditures are concentrated on the lower end for the North Korean refugees, across all ages.

4.2 Summary Statistics for the NK Subjects

Table 4 presents summary statistics for the baseline variables that are specific to the NK subjects. The first two columns in Table 4 show the average and standard deviation of each variable. In our sample, the NK subjects had lived in SK for 7 years and arrived in SK at the age of 34 by traveling through third countries, such as China, for 41 months, on average. About 60% of them felt assimilated to SK, and more than 40% of them defected because of economic reasons. They had spent 30 years, on average, in NK. One year prior

⁶Alternatively, a more general risk question could have been used. It would be an interesting topic for future research to investigate whether a more general risk question on a survey can be validated for NK refugees by an incentive-compatible experiment, as in Dohmen, Falk, Huffman, Sunde, Schupp, and Wagner (2011).

⁷There are multiple expat communities. As many refugees are helped by Christian churches and ministers during their escape from North Korea and settlement in South Korea, churches are one of the main communities where North Korean refugees meet and share their life experiences. There is also a considerable number of voluntary organizations established by North Korean refugees. Because North Korean refugees use the same language and have the same ethnic background as native-born South Koreans, there are no noticeable expatriate communities of NK refugees isolated from ordinary SK citizens. Furthermore, NK refugees typically do not create social conflict.

Table 4: Summary Statistics by Treatment: North Korean Refugees (NK)—NK Specific Variables

	All			Unearned			Earned			Pooled			n	
	Mean	SD		Mean	SD		Mean	SD		Mean	SD			
Years of stay in SK	6.91	3.47		6.85	3.44		7.04	3.64		6.83	3.36		0.942	161
Age at SK arrival	33.7	12.2		33.4	12.8		34.4	13.0		33.2	10.9		0.855	161
Months of stay in a third country	41.0	42.6		42.8	46.6		39.9	39.8		40.3	42.2		0.932	161
Subjective assimilation to SK	0.578	0.495		0.615	0.491		0.509	0.504		0.615	0.491		0.429	161
Reason for defection: Economic	0.435	0.497		0.385	0.491		0.474	0.504		0.442	0.502		0.644	161
Reason for defection: Political	0.280	0.450		0.288	0.457		0.281	0.453		0.269	0.448		0.977	161
Reason for defection: Family	0.186	0.391		0.231	0.425		0.158	0.368		0.173	0.382		0.599	161
Years lived in NK	30.0	12.8		29.6	13.9		30.8	13.6		29.3	10.9		0.804	161
Number of family members in NK	3.84	1.59		3.87	1.52		3.82	1.64		3.85	1.64		0.991	161
Household income in NK (in 1000 PKW)	116	471		140	624		51	187		165	516		0.467	137
Economic class in NK: high	0.267	0.444		0.231	0.425		0.281	0.453		0.288	0.457		0.772	161
Economic class in NK: middle	0.323	0.469		0.25	0.437		0.333	0.476		0.385	0.491		0.338	161
Economic class in NK: low	0.410	0.493		0.519	0.505		0.386	0.491		0.327	0.474		0.125	161
Perceived private property holdings	0.288	0.320		0.336	0.330		0.234	0.283		0.300	0.343		0.243	161
Secondary job	0.429	0.496		0.423	0.499		0.439	0.501		0.423	0.499		0.982	161
Workers' Party member	0.174	0.380		0.154	0.364		0.158	0.368		0.212	0.412		0.688	161

Notes: The table shows the mean and standard deviation of each variable by treatment. The p-value for testing the equality of means across treatments is shown in the second to last column. The sample size (n) is given in the last column.

to defection, they had about 4 family members (including themselves), and their average monthly household income in NK was 116,000 PKW (Korean People’s Won—the official currency of North Korea). The subjective view of their economic class in NK is spread out from high to low, with a higher percentage in the low class. They are also asked to estimate the proportion of neighbors who held private property (e.g., cash, foreign currencies, or assets) when they lived in NK. About 30% held the private property according to this questionnaire. Forty-three percent held had a secondary job in NK, and 17% were a Workers’ Party member. Here, secondary job refers to income-generating activities, mostly in markets, which include trading, producing basic consumer goods, smuggling, repair, private services, feeding cattle, and cultivating private plots (Kim, 2017).⁸ The second to last column reports p-values for testing the null hypothesis that the means across the three treatments are the same. None of the p-values are smaller than 0.1, suggesting that balance is achieved in terms of the variables in Table 4.

Figure 2 displays the pairwise plot for six variables that are specific to the North Korean refugee sample. It shows that the level of heterogeneity is high even in the North Korean refugee sample. A few of them had a high household income level when they lived in North Korea.

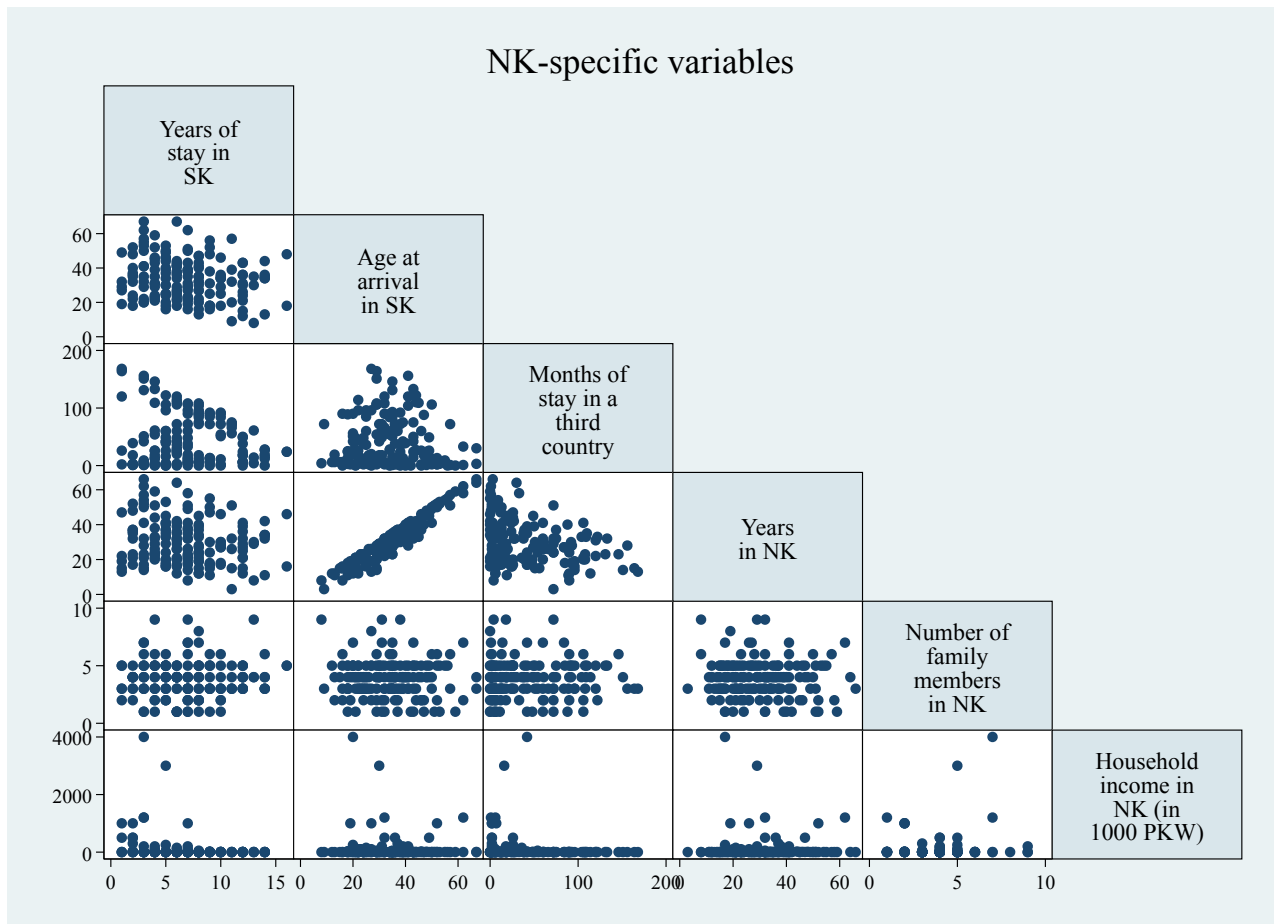
5 Main Experimental Results

5.1 Raven Test Results

Subjects in the earned income and pooled income treatments took the Raven test and earned their income based on their performance on the test, and the results are presented in Table 5 and Figure 3. The results reveal that there exists a staggering gap between the NK and SK subjects in terms of cognitive ability. The average z-score of the SK subjects is 0.7, whereas the average score of the NK subjects is much lower—only -0.7. The highest z-

⁸In the context of North Korea, a secondary job might be the only job for those who do not work officially or get permission from managers to be absent from the official workplace.

Figure 2: Pairwise Plots: NK-Specific Variables



Notes: The figure shows the pairwise plot for six variables that are specific to the North Korean refugee sample.

score among the NK subjects is slightly above 1; in terms of the raw score, this corresponds to 29 correct answers out of 36 questions.⁹

Table 5: Summary Statistics for the Raven Test Z-Scores

	Mean	SD	Min	Max
SK	0.707	0.640	-1.405	1.701
NK	-0.694	0.779	-1.593	1.042
Total	-0.000	1.000	-1.593	1.701

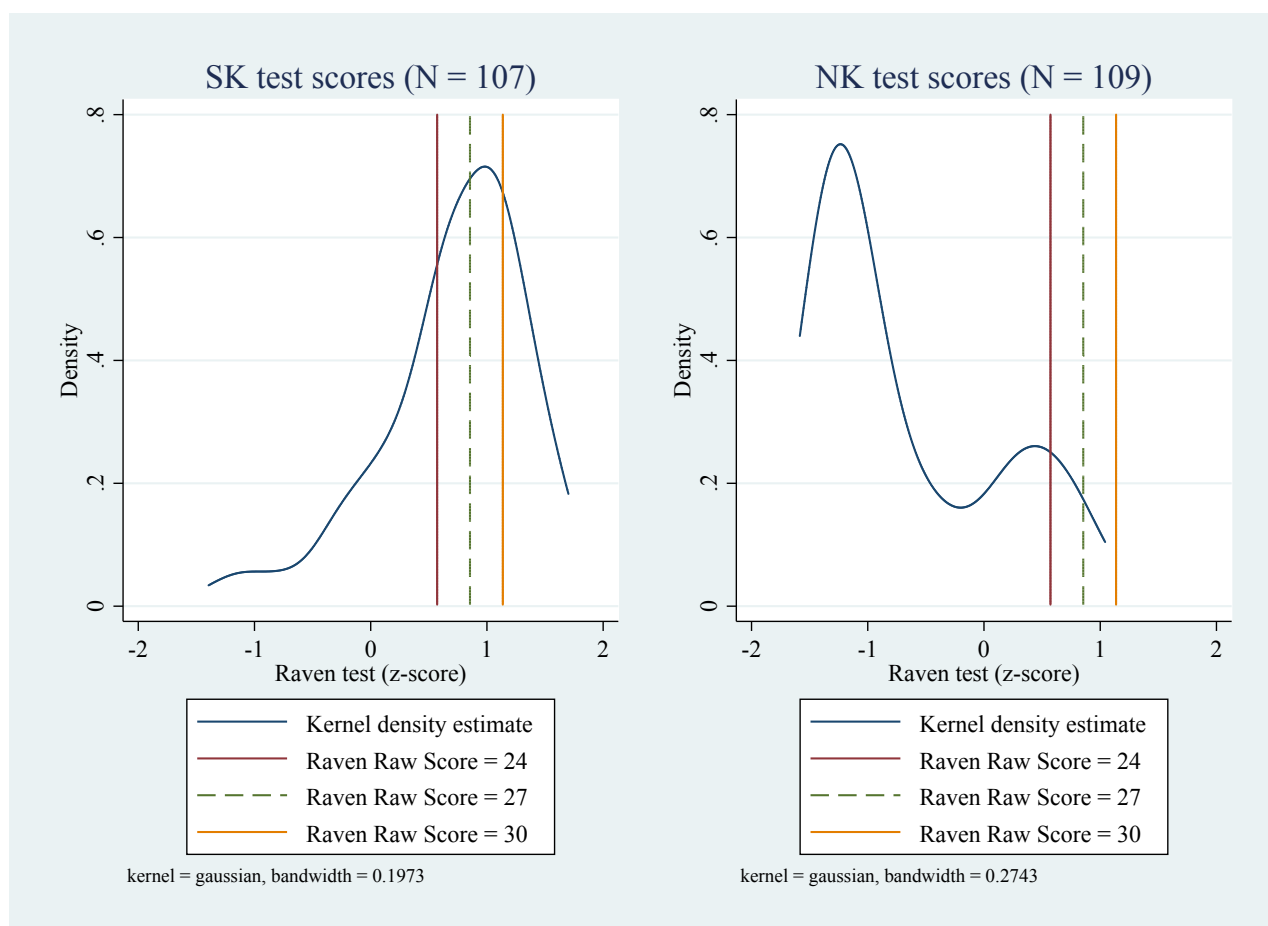
The equality of the distributions between the SK and NK subjects is rejected at the 1% level (with a p-value of 0.000); however, the equality of the distributions between the earned income and pooled income treatments is not rejected at any conventional level using the Kolmogorov-Smirnov test for both NK (with a p-value of 0.764) and SK (with a p-value of 0.124).

NK subjects' relatively poor performance on the Raven test resulted in skewed income distributions in both the earned and pooled income treatments. All but three NK subjects (94.7%) in the earned income treatment and all but four NK subjects (92.3%) in the pooled income treatment ended up earning the lowest income. For SK subjects, the distribution is pretty well spread out in both treatments. In the earned income treatment, 19 SK subjects (35.2%) earned 30K, while 22 (40.7%) earned 60K, and 13 (24.1%) earned 90K in the earned income treatment; in the pooled income treatment, 31 out of 53 (58.5%) subjects obtained scores of 27 or greater, so they belong to the higher income categories.¹⁰ When income is randomized in the unearned income treatment, the numbers of both SK and NK subjects across the three income levels were, more or less, evenly distributed: (30K,60K,90K) = (17,21,16) for SK and (30K,60K,90K) = (17,19,16) for SK.

⁹In a meta-analysis of 798 samples from 45 countries, Brouwers, de Vijver, and Hemert (2009) found that substantial gaps exist in Raven test scores across countries. For example, in their data, the average score for Syria is 24.3 while that for Norway is 88.6. Kim and Lee (2018) compared Raven test scores for North Korean refugees with those reported in Brouwers, de Vijver, and Hemert (2009) and found that North Korean refugees' cognitive skills are, on average, lower than those of African countries (e.g., Ghana, Congo, and Kenya).

¹⁰The NK subjects earning less income than SK subjects in the experiment is in line with real-world income differences between these two groups of Koreans.

Figure 3: Raven Test Results



Notes: The figures show kernel density estimates of Raven test z-scores for SK and NK subjects, respectively. The total points of the raw score are 36. Subjects in the earned and pooled income treatments took the test. In the earned income treatment, the income is 30K if the number of correct answers is less than 24, 60K if it is 24-29, and 90K if it is 30 or more. In the pooled income treatment, the income is 15K if the number of correct answers is less than 27 and 45K if it is 27 or more. These threshold points are superimposed on the figures.

Even if the earned incomes were balanced, it would still be difficult to interpret the differential impacts across different income levels as causal effects. This is because the subjects self-select into different income levels based on their test scores. Specifically, within the earned or pooled income treatment, the subjects are not *ex ante* identical across income levels since those who earn higher income might have higher cognitive abilities. However, this selection issue does not apply to the unearned income treatment since, in that case, the different income levels are assigned randomly. Therefore, in the next section, we focus on cases of three treatments (unearned, earned, and pooled) and five treatments: unearned×30K, unearned×60K, unearned×90K, earned, and pooled.

5.2 Treatment Effects

Since the SK and NK subjects are markedly different, as shown in Section 4.1, we estimate the treatment effects separately for SK and NK and focus on average differences across treatments within the NK or SK subjects. Specifically, we estimate the treatment effects using the following simple regression for SK and NK separately:

$$Y_{ip} = \alpha_0 + \alpha_1 \text{Earned}_i + \alpha_2 \text{Pooled}_i + \rho \ln(p) + \varepsilon_{ip}, \quad (5.1)$$

or

$$Y_{ip} = \beta_0 + \beta_1 (\text{Unearned} \times 30\text{K})_i + \beta_2 (\text{Unearned} \times 60\text{K})_i + \beta_3 \text{Earned}_i + \beta_4 \text{Pooled}_i + \rho \ln(p) + X_i \gamma + \varepsilon_{ip}, \quad (5.2)$$

where the dependent variable, Y_{ip} , is the incidence of making a zero offer or the giving share of individual i , when the relative price of giving is p , X_i consists of gender, age, and age squared, and ε_{ip} is the regression error term.

Note that the omitted reference group is Unearned_i in (5.1) and $(\text{Unearned} \times 90\text{K})_i$ in (5.2). Thus, the interpretation of α_1 is different from that of β_3 . The former measures the effect of the earned income treatment relative to the aggregate unearned income treat-

ment, whereas the latter represents the earned income effect with respect to unearned income with the endowment of 90K. The two would be identical if the endowment level has no effect in the unearned income treatment. Otherwise, they are different parameters of interest.

Each subject decides his or her giving share when $p = 1/3, 1/2, 1, 2,$ or 3 . Thus, there are five observations per individual subject in the unearned and earned income treatments and 10 observations per subject in the pooled income treatment since, in this case, each subject was asked to make two decisions, depending on the income of the anonymous partner, for each price. To avoid giving more weight to the observations in the pooled income treatment, we run weighted regression with a one-half weight to each of the observations in the pooled income treatment. Finally, we cluster standard errors by experimental sessions.¹¹

Table 6 presents the estimation results when the dependent variable is one if a subject gives nothing and zero otherwise. Columns (1)-(3) report the results for SK subjects, whereas columns (4)-(6) report the NK subjects' results. Specifically, columns (1) and (4) are the baseline specification in (5.1), whereas columns (2) and (5) are the specification of five treatments in (5.2) without demographic controls, and columns (3) and (6) correspond to (5.2) with controls for gender, age, and age squared. The demographic variables are added such that the constant term can be interpreted as the estimated probability under the unearned \times 90K treatment for males who are age 40, facing the unit price.

In column (1), the SK subjects make zero offers significantly more by 16% percentage points in the earned income treatment than in the unearned treatment. The finding of the earned income treatment making subjects more selfish corroborates the overall findings in the literature (e.g., Cherry, Frykblom, and Shogren, 2002). The average difference between the unearned and pooled income treatments is statistically insignificant. In columns (2)-(3), there are no significant differences within the earned income treatments by endow-

¹¹Since the number of sessions is 6, the significance of the t-test is determined by critical values from the t_5 distribution. When the number of clusters is small, the simplest common small-sample correction is to use a t distribution with the degrees of freedom equal to the number of clusters minus 1 (Cameron and Miller, 2015).

Table 6: Regression analysis of making zero offers in the dictator game

Dependent variable = 1 if a subject gives nothing; 0 otherwise

Variables	Native-Born South Koreans (SK)			North Korean Refugees (NK)		
	(1)	(2)	(3)	(4)	(5)	(6)
Earned	0.1630*** (0.0270)	0.1634** (0.0612)	0.1442** (0.0481)	-0.0262 (0.0457)	0.0748 (0.0501)	0.0711 (0.0442)
Pooled	0.0333 (0.0265)	0.0337 (0.0609)	0.0180 (0.0478)	-0.0904** (0.0302)	0.0106 (0.0365)	0.0094 (0.0381)
log(Relative price)	0.0682** (0.0176)	0.0682** (0.0176)	0.0682** (0.0176)	0.0170* (0.0066)	0.0170* (0.0066)	0.0170* (0.0067)
Unearned × 30K		0.0081 (0.0155)	-0.0118 (0.0160)		0.2213*** (0.0169)	0.2073*** (0.0272)
Unearned × 60K		-0.0054 (0.0776)	-0.0407 (0.0428)		0.0783* (0.0384)	0.0816* (0.0332)
Female			-0.0596 (0.0354)			0.0313 (0.0563)
Age – 40			-0.0052* (0.0021)			0.0004 (0.0015)
(Age – 40) ² /100			-0.0089 (0.0106)			0.0074 (0.0068)
Constant	0.0630* (0.0259)	0.0625 (0.0607)	0.1394** (0.0512)	0.1385*** (0.0151)	0.0375 (0.0255)	0.0069 (0.0294)
Observations	1,070	1,070	1,070	1,065	1,065	1,065
R-squared	0.0723	0.0724	0.1178	0.0177	0.0467	0.0508

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively. The omitted dummy variable is 'Unearned' in columns (1) and (4), whereas it is 'Unearned×90K' in columns (2)-(3) and (5)-(6).

ment.

However, in columns (4)-(6), the NK subjects behave very differently. In column (4), the average difference between the earned and unearned income treatments is small and insignificant, but the NK subjects make zero offers significantly less by 9% percentage points in the pooled income treatment than in the unearned income treatment. In columns (5)-(6), they tend to make zero offers significantly more by about 21-22% percentage points in the unearned \times 30K income treatment than in the unearned \times 90K income treatment. In other words, compared the SK subjects, there is a significant and substantial difference between the unearned \times 30K and unearned \times 90K treatments. Furthermore, the average difference between the unearned \times 90K and earned income treatments is about a one-half of the estimate for the SK subjects, and it is statistically insignificant. Similar to the SK subjects, the average difference between the unearned \times 90K and pooled income treatments is small and statistically insignificant. Hence, the significantly negative effect of the pooled income treatment relative to the unearned income treatment in column (4) is driven by the differential impacts of the unearned income by endowment.

We now comment on the effects of other variables. First, as expected from rational choice theory, both the SK and NK subjects tend to make more selfish choices as the relative price of giving increases. However, the price gradient is much steeper for the SK subjects than the NK subjects. Second, there is no significant gender effect in either column (3) or (6) in Table 6. Third, as the SK subjects' age increases, they tend to make fewer selfish choices, but the evidence for this effect seems only marginally significant; however, we do not find any significant age effect for the NK subjects.

Next, we focus on Table 7, in which we report the estimation results for when the dependent variable is the fraction of money given to a partner. In each column, the specification of the right-hand side explanatory variables is exactly the same as that of Table 6. However, the estimation results differ from the case in which the dependent variable indicates whether the subject makes a zero offer. First, in columns (1)-(3), no treatment variable for the SK subjects is significant except for the pooled income treatment indicator in column (3). In columns (4)-(6), we can see that the NK subjects tend to give a larger

Table 7: Regression analysis of the fraction of money given in the dictator game

Dependent variable = the share of money given

Variables	Native-Born South Koreans (SK)			North Korean Refugees (NK)		
	(1)	(2)	(3)	(4)	(5)	(6)
Earned	-0.0129 (0.0578)	-0.0113 (0.0541)	0.0095 (0.0566)	0.0516 (0.0600)	0.0561 (0.0572)	0.0603 (0.0581)
Pooled	0.0118 (0.0297)	0.0134 (0.0214)	0.0307** (0.0116)	0.1542** (0.0411)	0.1588*** (0.0368)	0.1664** (0.0562)
log(Relative price)	-0.1180*** (0.0124)	-0.1180*** (0.0124)	-0.1180*** (0.0124)	-0.1050*** (0.0066)	-0.1050*** (0.0066)	-0.1050*** (0.0066)
Unearned × 30K		0.0093 (0.0949)	0.0348 (0.0831)		0.0663 (0.0454)	0.0832* (0.0340)
Unearned × 60K		-0.0035 (0.0328)	0.0330** (0.0096)		-0.0469 (0.0415)	-0.0514 (0.0444)
Female			0.0285 (0.0380)			-0.0955 (0.0574)
Age – 40			0.0046** (0.0017)			-0.0010 (0.0019)
(Age – 40) ² /100			0.0104 (0.0110)			0.0057 (0.0072)
Constant	0.3716*** (0.0264)	0.3700*** (0.0165)	0.3070*** (0.0318)	0.3108*** (0.0349)	0.3062*** (0.0297)	0.3615*** (0.0817)
Observations	1,070	1,070	1,070	1,065	1,065	1,065
R-squared	0.1357	0.1358	0.1870	0.1505	0.1600	0.1881

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively. The omitted dummy variable is 'Unearned' in columns (1) and (4), whereas it is 'Unearned×90K' in columns (2)-(3) and (5)-(6).

share (by more than 15 percentage points) in the pooled income treatment than in the unearned income or unearned \times 90K income treatment; there is little difference between columns (4) and (5) since there are no differential effects among different income levels within the unearned income treatment. The effect of the pooled income treatment for the NK subjects is much larger than that for the SK subjects (only about 3 percentage points).

Regarding other variables, as in Table 6, both the SK and NK subjects give a smaller share to others as the relative price of giving increases. It can be seen that the price gradient with respect to the share seems to be of the same magnitude between the SK and NK subjects, unlike Table 6. In addition, the SK subjects tend to give a larger share to others as their age increases, and the NK females seem to give less by 10 percentage points. However, the latter finding is statistically insignificant.

Overall, the results in Tables 6 and 7 suggest that the SK and NK subjects have different preferences regarding extensive and intensive margins of giving. However, using the experiment design in the paper, we cannot pin down the underlying reasons for these differences. Most likely, our results are driven by the SK and NK subjects having different notions of property rights. Since the North Korean society is based on public ownership, NK subjects' aversion to pursuing self-interests, especially in a collective production context, is likely to be driven by the socialist ideology of egalitarianism. Our findings are also consistent with the evidence that former residents in East Germany continue to prefer government-led redistribution in unified Germany, largely due to ideological indoctrination (Alesina and Fuchs-Schündeln, 2007).

6 Treatment Effect Heterogeneity

In this section, we examine treatment effect heterogeneity by running the baseline regression in (5.1) for various subsamples. We focus on the case that the dependent variable is the share of money given in the dictator games. In Appendix B, we present the estimation results for when the dependent variable is an indicator whether the subject makes a zero offer.

Table 8: Regression analysis of the fraction of money given: subsample analysis (SK)

Variables	<i>Dependent variable = the share of money given</i>								
	(1) All	(2) Male	(3) Female	(4) Age < 44	(5) Age ≥ 44	(6) Not married	(7) Married	(8) H.I. < 500	(9) H.I. ≥ 500
Earned	-0.013 (0.058)	-0.103 (0.048)	0.073 (0.071)	-0.080 (0.053)	0.044 (0.073)	-0.233 (0.083)	0.079 (0.037)	-0.005 (0.075)	-0.016 (0.056)
Pooled	0.012 (0.030)	-0.024 (0.037)	0.044 (0.022)	-0.044 (0.042)	0.058 (0.035)	-0.083 (0.021)	0.058 (0.029)	0.013 (0.061)	0.009 (0.046)
log(Relative price)	-0.118 (0.012)	-0.135 (0.028)	-0.102 (0.013)	-0.136 (0.018)	-0.101 (0.013)	-0.121 (0.021)	-0.116 (0.015)	-0.115 (0.016)	-0.121 (0.016)
Constant	0.372 (0.026)	0.401 (0.034)	0.346 (0.019)	0.371 (0.040)	0.372 (0.011)	0.434 (0.021)	0.341 (0.021)	0.382 (0.059)	0.362 (0.004)
Test for equality (p- and q-values)		0.008 (0.158)		0.068 (0.951)		0.0013 (0.030)**		0.993 (1.000)	
Observations	1,070	530	540	510	560	335	735	520	550
R-squared	0.136	0.197	0.117	0.184	0.117	0.270	0.149	0.136	0.135

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Table 9: Regression analysis of the fraction of money given: subsample analysis (NK)

Variables	<i>Dependent variable = the share of money given</i>								
	(1) All	(2) Male	(3) Female	(4) Age < 40	(5) Age ≥ 40	(6) Not married	(7) Married	(8) H.I. < 128	(9) H.I. ≥ 128
Earned	0.052 (0.060)	0.172 (0.117)	0.000 (0.010)	0.150 (0.050)	-0.033 (0.053)	0.070 (0.090)	0.021 (0.052)	0.055 (0.100)	0.066 (0.030)
Pooled	0.154 (0.041)	0.163 (0.137)	0.152 (0.010)	0.143 (0.048)	0.167 (0.045)	0.121 (0.048)	0.208 (0.052)	0.097 (0.051)	0.221 (0.033)
log(Relative price)	-0.105 (0.007)	-0.115 (0.006)	-0.101 (0.009)	-0.100 (0.014)	-0.109 (0.009)	-0.106 (0.011)	-0.102 (0.011)	-0.117 (0.014)	-0.091 (0.009)
Constant	0.311 (0.035)	0.329 (0.107)	0.303 (0.010)	0.286 (0.022)	0.333 (0.045)	0.316 (0.027)	0.302 (0.049)	0.336 (0.034)	0.267 (0.029)
Test for equality (p- and q-values)		0.200 (1.000)		0.0036 (0.078)*		0.366 (1.000)		0.019 (0.367)	
Observations	1,065	300	765	515	550	665	400	530	535
R-squared	0.151	0.169	0.175	0.165	0.190	0.129	0.216	0.142	0.188

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Table 10: Regression analysis of the fraction of money given: subsample analysis continued (NK)

		<i>Dependent variable = the share of money given</i>							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Years in SK < 7	Years in SK ≥ 7	Age at arrival < 34	Age at arrival ≥ 34	Second job experience in NK no	Second job experience in NK yes	Workers' Party non-member	Workers' Party member
Earned	0.052 (0.060)	0.023 (0.057)	0.084 (0.061)	0.143 (0.057)	-0.042 (0.048)	0.076 (0.057)	0.018 (0.067)	0.054 (0.073)	0.038 (0.045)
Pooled	0.154 (0.041)	0.130 (0.029)	0.183 (0.052)	0.164 (0.049)	0.140 (0.044)	0.211 (0.048)	0.076 (0.032)	0.140 (0.040)	0.187 (0.057)
log(Relative price)	-0.105 (0.007)	-0.111 (0.015)	-0.099 (0.008)	-0.099 (0.015)	-0.111 (0.009)	-0.097 (0.007)	-0.116 (0.017)	-0.104 (0.008)	-0.108 (0.014)
Constant	0.311 (0.035)	0.346 (0.029)	0.273 (0.038)	0.282 (0.021)	0.340 (0.044)	0.287 (0.042)	0.343 (0.022)	0.300 (0.036)	0.367 (0.039)
Test for equality (p- and q-values)		0.0063 (0.132)		0.027 (0.490)		0.0015 (0.035)**		0.361 (1.000)	
Observations	1,065	515	550	505	560	610	455	870	195
R-squared	0.151	0.136	0.178	0.163	0.184	0.200	0.118	0.138	0.218

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Table 8 presents the results for the subsamples of SK subjects by gender, age, marital status, and household income. In column (1), we reproduce the baseline results for comparison. In columns (2)-(3), the SK subjects are split into two subsamples based on gender. Analogously, different subsamples are constructed in columns (4)-(9). There are some noticeable differences among different demographic groups within the SK subjects. The effect of the earned income treatment seems larger among males, the younger, the unmarried, and those with household incomes below the median. The effect of pooled income is relatively small for all subsamples.

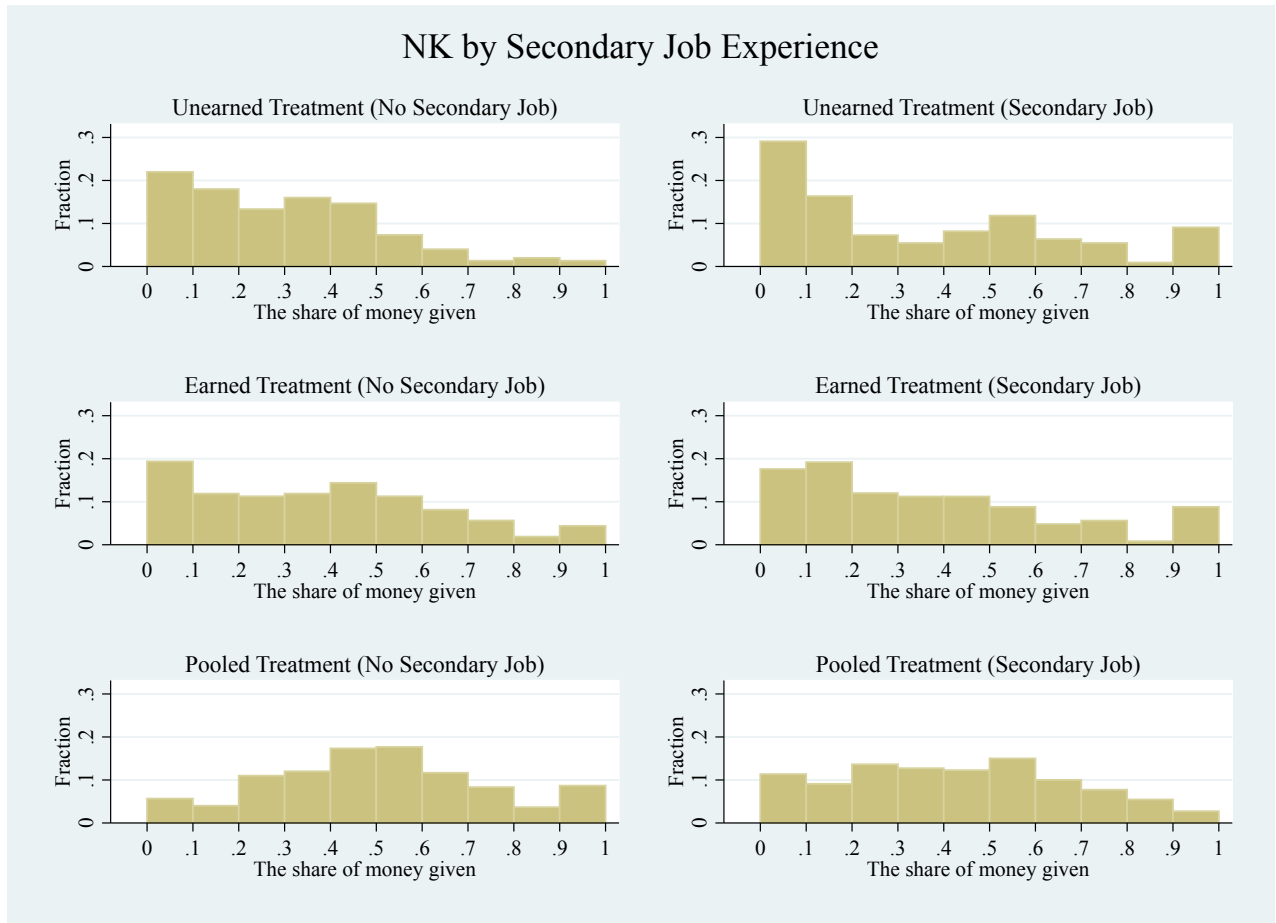
For each sample splitting, we test jointly whether the coefficients for the earned and pooled income treatment indicators, as well as the log relative price, are the same between the two subsamples. The resulting p-values are given in the table. Throughout the paper, including the tables in Appendix B, there are 24 individual p-values for tests of the equality between the two subsamples. We control the family-wise rate using the Holm (1979) procedure. It turns out that in Table 8, only the effect of the marital status remains significant after applying the Holm procedure. It seems that the difference mainly due to the differential effect between the unearned and earned income treatments for the unmarried.

Table 9 presents analogous results for the subsamples of NK subjects. There are some differences between the subsamples; however, the evidence is not very strong after we apply the multiple testing procedures. Only the heterogeneity due to age seems marginally important. The effect of the earned income is close to zero for subjects age 40 or older. The younger subjects seem to give more under the earned income treatment (or, equivalently, give less under the unearned income treatment).

Table 10 reports treatment effect heterogeneity in terms of the variables that are specific to North Korean refugees. The most striking result is that NK subjects behave differently depending on whether they had secondary job experience when they lived in North Korea. The p-value for testing equality is 0.0015, which rejects the equality between the two subsamples when the family-wise error rate is controlled at the 5 % level. The effect of pooled income is much smaller for those who had a secondary job in North Korea.

To complement this estimation result, in Figure 4, we plot the experimental results

Figure 4: The Share of Money Given by Treatment (NK) and Secondary Job Experience



Notes: This figure shows the experimental results for the North Korean refugee sample by the indicator variable whether they had a secondary job when they lived in North Korea.

for the North Korean refugee sample by secondary job experience. It shows that the NK subjects behaved in a more self-interested manner with secondary job experience, especially under the unearned and pooled treatments. This result is in line with Haggard and Noland (2010), who claim that significant changes in North Koreans' attitudes and behavior are caused by marketization from below as a consequence of state failure. Since the secondary job experience in NK consists of engaging in some sort of market activities, this result is also consistent with the view that those who experienced a market economy might have similar notions of property rights as native-born South Koreans.

Returning to Table 10, there are some differences due to how long the NK subjects had lived in South Korea, as well as their age when they arrived; however, equality between the subsamples is not rejected in either case. The difference due to the Workers' Party membership is less noticeable.

7 Concluding Remarks

We have found that when we varied the source of endowments in the dictator games, NK subjects seemed to show different preferences regarding extensive and intensive margins of giving, compared to the SK subjects. However, using the experiment design in the paper, we cannot pin down the underlying reasons for the differences in the treatment effects. It is a topic for future research to uncover the causal chain behind the experimental evidence reported in this paper.

We conclude the paper by making a broad policy recommendation based on our findings. The most salient result regarding treatment effect heterogeneity is that North Korean refugees behave differently depending on whether they had any secondary job experience when they lived in North Korea. We find that those with secondary job experience in North Korea behave in a manner closer to the subjects who were born in South Korea. It could be the case that prior experience with market activities through secondary jobs in North Korea influenced the preferences of North Korean refugees to deviate from those of the traditional socialist norms and shift toward those of South Korean natives. This find-

ing suggests that market activities in informal sectors might be able to transform social norms and, thus, help North Koreans to become better prepared for a future transition to a market economy.

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A Randomization across Treatments

Table 11: Summary Statistics by Treatment: Native-Born South Koreans (SK)

	Unearned		Earned		Pooled		p-value	<i>n</i>
	Mean	SD	Mean	SD	Mean	SD		
Male	0.463	0.503	0.500	0.505	0.509	0.505	0.880	161
Age	42.2	12.1	42.9	11.7	43.6	11.7	0.837	161
Married	0.667	0.476	0.722	0.452	0.679	0.471	0.811	161
Post-secondary education	0.796	0.407	0.852	0.359	0.811	0.395	0.743	161
Household size	3.41	1.14	3.19	1.10	3.15	1.13	0.441	161
Number of children	0.926	0.908	0.926	0.908	1.02	0.951	0.835	161
Household income	533	293	548	268	487	222	0.458	158
Household expenditures	379	204	476	256	411	224	0.099	153
Working	0.556	0.502	0.630	0.487	0.623	0.489	0.691	161
Middle or upper class	0.685	0.469	0.648	0.482	0.585	0.497	0.556	161
Stock market participation	0.593	0.496	0.519	0.504	0.585	0.497	0.699	161
Savings, fund, or insurance	0.852	0.359	0.815	0.392	0.868	0.342	0.742	161
Risk aversion	37.0	22.1	44.2	17.8	41.1	20.9	0.189	161
Protestant	0.278	0.452	0.204	0.407	0.245	0.434	0.671	161
Atheist	0.407	0.496	0.593	0.496	0.415	0.497	0.094	161
Health Status	0.556	0.502	0.630	0.487	0.604	0.494	0.732	161
Stressed	0.463	0.503	0.407	0.496	0.321	0.471	0.322	161
Discrimination	0.078	8.188	0.070	0.141	0.057	0.120	0.768	161

Notes: The table shows the mean and standard deviation of each variable by treatment. The p-value for testing the equality of means across treatments is shown in the second to last column. The sample size (n) is given in the last column.

In Tables 11 and 12, we compare subjects' characteristics across three treatment groups. We find that within the NK or SK subjects, there is little difference in both individual and household characteristics across the different treatment groups. If we examine the p-values for testing the equality of means across treatments, none of the p-values are smaller than 0.05, and most of them are quite large. This indicates that the balance between treatment groups is achieved by randomization.

Table 12: Summary Statistics by Treatment: North Korean Refugees (NK)

	Unearned		Earned		Pooled		p-value	<i>n</i>
	Mean	SD	Mean	SD	Mean	SD		
Male	0.288	0.457	0.298	0.462	0.269	0.448	0.945	161
Age	40.2	12.7	41.4	12.6	40.0	11.1	0.802	161
Married	0.365	0.486	0.368	0.487	0.385	0.491	0.977	161
Post-secondary education	0.231	0.425	0.193	0.398	0.288	0.457	0.505	161
Household size	2.71	2.33	3.30	2.78	3.25	2.61	0.433	161
Number of children	0.558	0.777	0.632	0.879	0.673	0.810	0.770	161
Household income	125	82	144	145	180	161	0.103	146
Household expenditures	105	71	118	106	143	99	0.124	155
Working	0.404	0.495	0.316	0.469	0.538	0.503	0.061	161
Middle or upper class	0.154	0.364	0.123	0.331	0.115	0.323	0.828	161
Stock market participation	0.039	0.194	0.088	0.285	0.115	0.323	0.349	161
Savings, fund, or insurance	0.519	0.505	0.368	0.487	0.558	0.502	0.111	161
Risk aversion	40.3	34.4	30.9	34.1	39.5	28.6	0.247	161
Protestant	0.654	0.480	0.737	0.444	0.635	0.486	0.480	161
Atheist	0.269	0.448	0.246	0.434	0.288	0.457	0.881	161
Health Status	0.231	0.425	0.298	0.462	0.308	0.466	0.637	161
Stressed	0.423	0.499	0.474	0.504	0.442	0.502	0.868	161
Discrimination	0.138	0.236	0.137	0.230	0.150	0.237	0.951	161

Notes: The table shows the mean and standard deviation of each variable by treatment. The p-value for testing the equality of means across treatments is shown in the second to last column. The sample size (*n*) is given in the last column.

B Additional Experimental Results

This part of the appendix contains additional experimental results that are not included in the main text. In particular, we present the estimation results that are parallel to those in Section 6, when the dependent variable indicates whether the subject makes a zero offer. Table 13 presents the results for the subsamples of SK subjects by gender, age, marital status, and household income. Table 14 presents analogous results for the subsamples of NK subjects. Table 15 reports treatment effect heterogeneity in terms of the variables that are specific to North Korean refugees. In all three tables, there is no rejection of the equality between the subsamples at the 10% level, after controlling the family-wise error rate. Figures 5 and 6 show the experimental results by treatment and price for the native-born South Korean sample and for the North Korean refugee sample, respectively.

Table 13: Regression analysis of making zero offers: subsample analysis (SK)

Dependent variable = 1 if a subject gives nothing; 0 otherwise

Variables	(1) All	(2) Male	(3) Female	(4) Age < 44	(5) Age ≥ 44	(6) Not married	(7) Married	(8) H.I. < 500	(9) H.I. ≥ 500
Earned	0.163 (0.027)	0.209 (0.043)	0.115 (0.045)	0.270 (0.062)	0.078 (0.031)	0.213 (0.116)	0.152 (0.043)	0.231 (0.053)	0.106 (0.051)
Pooled	0.033 (0.027)	0.024 (0.040)	0.040 (0.020)	0.023 (0.057)	0.051 (0.056)	-0.051 (0.042)	0.075 (0.028)	0.045 (0.006)	0.028 (0.045)
log(Relative price)	0.068 (0.018)	0.084 (0.036)	0.053 (0.016)	0.104 (0.030)	0.035 (0.011)	0.093 (0.034)	0.057 (0.015)	0.059 (0.027)	0.077 (0.018)
Constant	0.063 (0.026)	0.080 (0.035)	0.048 (0.017)	0.090 (0.029)	0.032 (0.024)	0.133 (0.029)	0.028 (0.015)	0.023 (0.006)	0.100 (0.044)
Test for equality (p- and q-values)		0.558 (1.000)		0.143 (1.000)		0.143 (1.000)		0.352 (1.000)	
Observations	1,070	530	540	510	560	335	735	520	550
R-squared	0.072	0.101	0.047	0.148	0.026	0.123	0.065	0.122	0.048

Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Table 14: Regression analysis of making zero offers: subsample analysis (NK)

Dependent variable = 1 if a subject gives nothing; 0 otherwise

Variables	(1) All	(2) Male	(3) Female	(4) Age < 40	(5) Age ≥ 40	(6) Not married	(7) Married	(8) H.I. < 128	(9) H.I. ≥ 128
Earned	-0.026 (0.046)	-0.083 (0.045)	-0.001 (0.034)	-0.058 (0.052)	-0.001 (0.038)	-0.034 (0.099)	-0.012 (0.075)	0.013 (0.070)	-0.100 (0.036)
Pooled	-0.090 (0.030)	0.000 (0.113)	-0.125 (0.029)	-0.047 (0.055)	-0.132 (0.033)	-0.086 (0.081)	-0.096 (0.075)	-0.050 (0.048)	-0.168 (0.032)
log(Relative price)	0.017 (0.007)	0.012 (0.013)	0.019 (0.010)	0.026 (0.009)	0.009 (0.011)	0.022 (0.009)	0.009 (0.011)	0.031 (0.017)	0.001 (0.013)
Constant	0.138 (0.015)	0.107 (0.035)	0.151 (0.028)	0.120 (0.005)	0.156 (0.032)	0.145 (0.068)	0.126 (0.075)	0.091 (0.042)	0.221 (0.017)
Test for equality (p- and q-values)		0.222 (1.000)		0.168 (1.000)		0.482 (1.000)		0.033 (0.525)	
Observations	1,065	300	765	515	550	665	400	530	535
R-squared	0.018	0.024	0.038	0.014	0.037	0.016	0.023	0.017	0.040

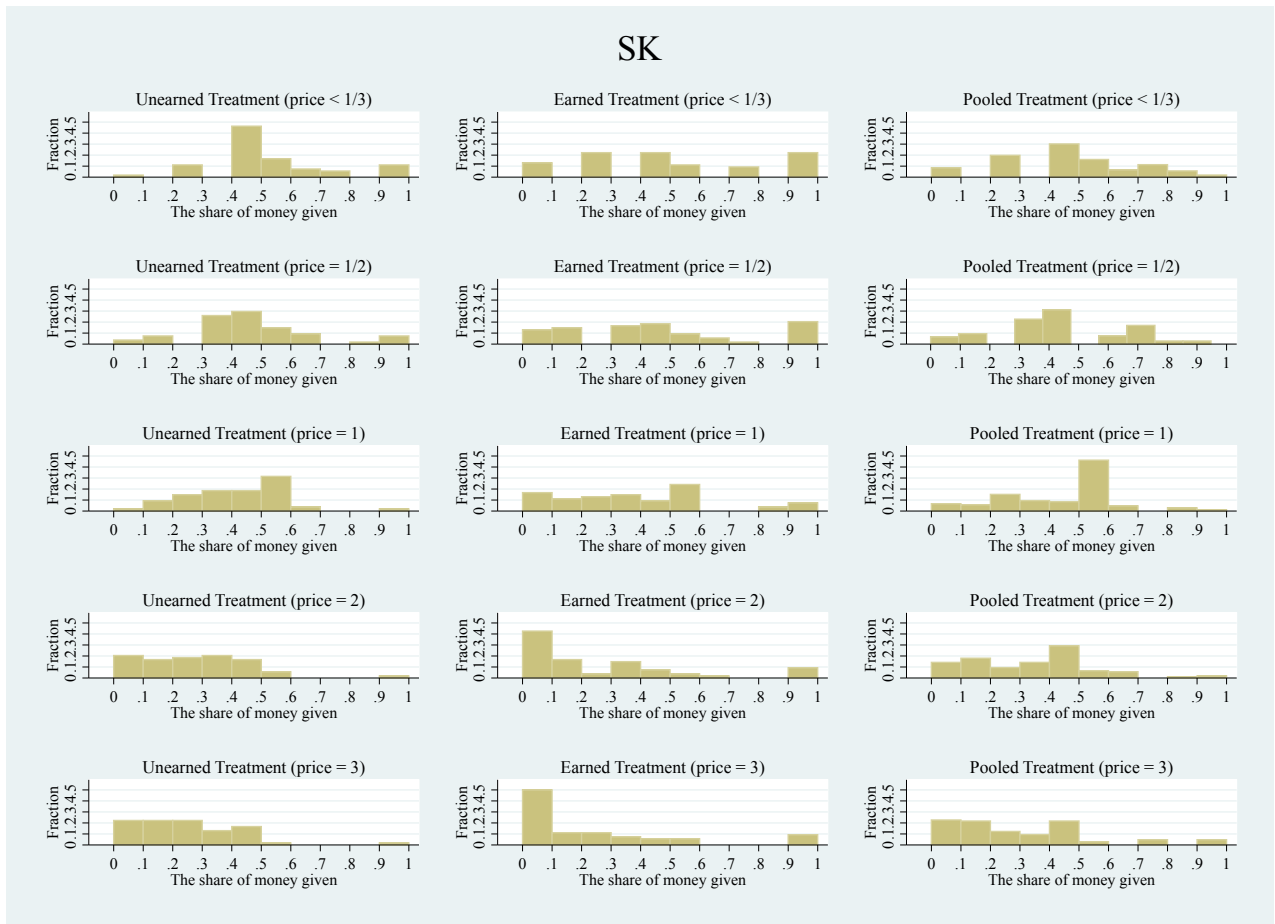
Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Table 15: Regression analysis of making zero offers: subsample analysis continued (NK)

		<i>Dependent variable = 1 if a subject gives nothing; 0 otherwise</i>							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	All	Years in SK < 7	Years in SK ≥ 7	Age at arrival < 34	Age at arrival ≥ 34	Second job experience in NK no	Second job experience in NK yes	Workers' Party non-member	Workers' Party member
Earned	-0.026 (0.046)	-0.099 (0.066)	0.049 (0.026)	-0.026 (0.072)	-0.026 (0.028)	0.032 (0.065)	-0.105 (0.050)	-0.034 (0.050)	0.019 (0.030)
Pooled	-0.090 (0.030)	-0.144 (0.035)	-0.035 (0.057)	-0.033 (0.062)	-0.141 (0.028)	-0.050 (0.039)	-0.145 (0.049)	-0.098 (0.035)	-0.025 (0.020)
log(Relative price)	0.017 (0.007)	0.014 (0.010)	0.020 (0.011)	0.026 (0.009)	0.009 (0.011)	0.005 (0.007)	0.034 (0.021)	0.021 (0.009)	-0.000 (0.011)
Constant	0.138 (0.015)	0.178 (0.033)	0.096 (0.009)	0.115 (0.001)	0.162 (0.027)	0.087 (0.014)	0.209 (0.048)	0.159 (0.011)	0.025 (0.020)
Test for equality (p- and q-values)		0.030 (0.518)		0.245 (1.000)		0.396 (1.000)		0.047 (0.706)	
Observations	1,065	515	550	505	560	610	455	870	195
R-squared	0.018	0.042	0.017	0.007	0.041	0.016	0.040	0.018	0.017

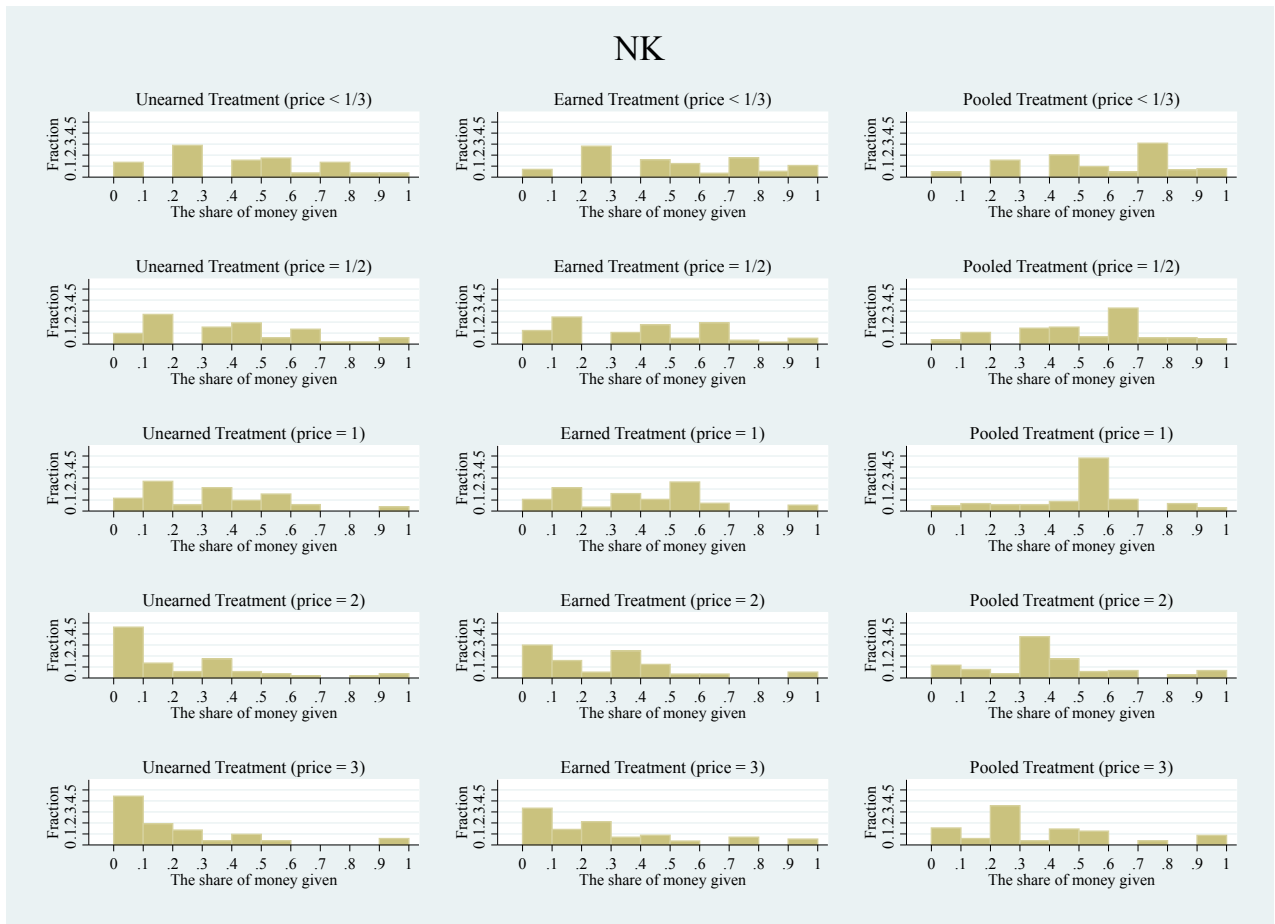
Notes: Robust standard errors, clustered by experimental session, are reported in parentheses. The omitted dummy variable is 'Unearned.' The table gives the p-value for testing the equality of the coefficients of Earned, Pooled and log(Relative price) between each pair of subsamples. The q-value is given in the parentheses, controlling the family-wise error rate with 24 individual p-values. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% levels, respectively, while controlling the family-wise error rate.

Figure 5: The Share of Money Given by Treatment (SK)



Notes: This figure shows the experimental results for the native-born South Korean sample by treatment and price.

Figure 6: The Share of Money Given by Treatment (NK)



Notes: This figure shows the experimental results for the North Korean refugee sample by treatment and price.