# Local Inequality and Own Rank Preferences*

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July 26, 2023

**Abstract**

Support for redistributive policies may depend on individuals' location in the income distribution, and relative performance evaluation is common in many organizations. We report a lab experiment to study subjects' preferences over their ordinal rank in an earnings distribution. Following an assignment of unequal earnings, subjects can select a monetary transfer from exactly one individual to another, not including themselves. This can change their own position in the distribution, as well as influence overall inequality. The experiment varies whether the initial earnings assignment is random or is affected by preliminary competition. It also varies the reference group from a complete to a partial network. A majority of transfers reduce inequality by moving earnings from those with the highest rank to the lowest rank in the distribution. Rank-improving transfers are substantially more common for preliminary competition losers than winners. Transfers to individuals outside of the reference group are not uncommon, and they usually target as the source the individuals high in the income distribution. While generally weak overall, own rank preferences appear to be more common among men than women.

**Keywords**: Inequality aversion; relative earnings; distributive preferences; social preferences

**JEL Codes**: C90; D31; D91

*We thank audiences at SABE, ESA and the Ostrom-Smith conferences for valuable feedback, as well as Muriel Niederle and Xiaogeng Xu for helpful suggestions. Funding for experimental subject payments was provided by Purdue University.

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# 1 Introduction

People derive utility from consumption, but utility for many individuals may depend also on how their own status compares with others'. That is, well-being may depend on an individual's relative position within a reference group, in addition to absolute consumption, income or wealth. While such relative, social preferences have been well documented, both through representative surveys and controlled experiments, it is unclear whether people care mostly about how their position compares to a reference point (such as mean income) or rather their position in a relative ranking. To provide direct evidence on rank preferences, this paper presents a laboratory experiment in which individuals can transfer earnings between others to change their own ranking in the earnings distribution.

One challenge of distinguishing rank preferences from relative preferences in the field is that the ranked position of an individual's income or wealth in a distribution is naturally correlated with that position compared to a mean or some other reference. Boyce et al. (2010) provide survey evidence that life satisfaction is influenced more by income ranking than by absolute income when both were included as explanatory variables. Other survey studies, such as Clark et al. (2009), Hvidberg et al. (2023) and Xu et al. (2023), also document the importance of perceived ranking in determining well-being. While such surveys are valuable, they rely on self-reported and subjective measures of well-being; moreover, it is difficult to draw clear conclusions regarding relative satisfaction using ordinal responses (Bond and Lang, 2019). The revealed preference approach used in the experiment reported here provides a direct measurement of rank preferences. Our experiment also holds constant the decision-maker's own earnings and the mean earnings of the group, to fix their relative earnings and isolate the expression of rank preferences.

In observational data it would be unusual to find a situation where people have the capability to transfer resources among others directly and potentially change their own ranking in a distribution. This is a particularly valuable characteristic of controlled experiments–the ability to create an artificial counterfactual. This allows us to measure how importantly people value ordinal rank, and how this depends on their position in the distribution. We find that subjects transfer money between others very frequently (about 90 percent of the time), and most transfers are large enough to change the overall earnings ranking when possible. A large fraction of transfers focus on reducing the earnings inequality of the group, however, rather than being targeted to improve a subject's own position in the earnings distribution. This is especially common when the initial earnings distribution is completely random. Rank preferences can apparently be primed by some preliminary competition, as pairwise play of a zero-sum game before earnings are distributed raises the frequency of own rank-improving

transfers by about 50 percent.

It is important to understand distinct preferences over ranking, rather than simply preferences about relative income with respect to some reference point, since this can affect political support for certain types of redistributive policies (Kuziemko et al., 2014; Karadja et al., 2017; Balietti et al., 2023). For example, individuals who occupy low positions in the income distribution, but not the very lowest, may not favor redistribution to the poorest if that reduces their own position in the income ranking. Kuziemko et al. (2014) provide survey evidence that low (but above minimum) wage workers are more likely to oppose minimum wage increases. They interpret this as evidence for a particular type of rank preference–last place aversion–since increases in the minimum wage might worsen these low-wage individuals' ranking in the distribution. Understanding rank preferences is also important because relative performance evalution is common in business, so it is important to understand how this motivates performance (Gill et al., 2019). Note that rank preferences may also be natural from an evolutionary perspective. Animals may care about rank indirectly because it influences outcomes of direct concern, such as access to food and good mates.

The theoretical framework presented in Section 2 extends the seminal Fehr-Schmidt model of inequality aversion to include a potential rank-based disutility (Fehr and Schmidt (1999); see also Bolton and Ockenfels (2000) for an alternative functional form). In the model, some individuals may suffer disutility from being in a lower position in the distribution, in addition to the standard disutility they may experience from earnings inequality.[1] We also posit that this additional rank-based disutility may be greater for those in lower ranked positions in the earnings distribution, but the pattern of transfers observed in the experiment are inconsistent with this assumption.

The experimental design is detailed in Section 3. After learning a (randomly-determined) distribution of experimental earnings, ranging from $6 to $20, subjects have an opportunity to transfer from one individual to another. They cannot change their own earnings. They make this transfer decision across many rounds, with stationary repetition except for new random variation in the earnings distribution across rounds. At the end of their session one individual's choice is randomly selected for one round and implemented for payment. In half the rounds the (discrete) set of available transfers includes amounts large enough to change the ranking of individual earnings. Besides introducing the pre-transfer competition to determine earnings, the experiment also varies between subjects the social proximity of the reference group. This is accomplished through different network connections determining whose earnings subjects observe before they determine transfers. Previous studies, including

[1]We include the usual assumption that people dislike disadvantageous inequality more than they dislike advantageous inequality, and the vast majority of transfers observed in the experiment are consistent with this assumption.

Hvidberg et al. (2023) and Xu et al. (2023), have found that inequalities are considered more unfair and relative income has a greater impact on income-related satisfaction within narrower groups (age, education, occupation) than broader, national comparisons.

A large literature has documented the importance of income inequality on perceived well-being, especially using survey methods; Clark and D'Ambrosio (2015) provides a review. Some experiments have allowed outsiders to redistribute earnings among others, such as Fischbacher et al. (2023) who find that individuals favor natural in-groups defined by political orientation or nationality, and Almas et al. (2020) who find Americans are more accepting of inequality than Norwegians. These studies do not consider redistribution that can change the decision-maker's own ranking in the distribution. Previous experimental studies investigating rank preferences include Gill et al. (2019), which reports a real effort competition and documents a strong aversion to the lowest rank and preference to achieve the highest rank. Clark et al. (2010) finds that an individuals' rank in the income distribution has a greater influence on (chosen, not real) effort than does others' average income. Kuziemko et al. (2014) also included a laboratory experiment to document individuals' aversion to ranking lowest in the earnings distribution. They find that the individual in the second-lowest rank is less likely to transfer earnings to the individual below themselves to avoid moving to the lowest rank. This result fails to replicate, however (Martinangeli and Windsteiger, 2021; Camerer and et al., 2016). Martinangeli and Windsteiger (2021) document a general dislike for rank reversals, affecting most ranks, which is also seen in the lab experiment of Xie et al. (2017). By contrast, our subjects are not reluctant to change others' ranks when possible, and the pattern of their chosen monetary transfers usually reduces income inequality within their group.

## 2 Theoretical Framework

We consider an environment with $n$ agents, indexed by $i \in \{1, 2, \ldots, n\}$, and a set of initial monetary holdings $\mathbf{x} = \{x_1, x_2, \ldots, x_n\}$, with $x_1 \leq x_2 \leq \cdots \leq x_n$ so that an agent's index corresponds with their relative position in the monetary distribution. Further, we assume that individuals are connected by a network, which we denote by its corresponding adjacency matrix $\mathbf{g}$, that is binary and symmetric with $g_{ij} = g_{ji} = 1$ if distinct agents $i$ and $j$ are linked; $g_{ij} = g_{ji} = 0$ otherwise. The neighborhood of each individual $i$ is defined as $N_i(\mathbf{g}) = \{j \mid g_{ij} = 1\}$ and describes the set of individuals with whom $i$ shares a link in the network. We use the neighborhood of individual $i$ to describe their reference group (i.e., the set of individuals whose monetary payoffs enter their utility function), and their degree,

denoted by $d_i(\mathbf{g}) = |N_i(\mathbf{g})|$, to capture the size of this group.[2]

Following Fehr and Schmidt (1999), we consider inequality averse individuals, but we extend their framework in two ways. First, Fehr and Schmidt (1999, p. 821) state that "the determination of the relevant reference group and the relevant reference outcome for a given class of individuals is ultimately an empirical question. The social context, the saliency of particular agents, and the social proximity among individuals are all likely to influence reference groups and outcomes." In our framework, the social proximity (or saliency) of others is explicitly defined by the network structure.[3] Second, in addition to own monetary payoffs and inequality, we posit that individuals' utility may be affected by their relative monetary ranking within their reference group. We define $\mathbf{x}_i = \{x_i\} \cup \{x_j \mid j \in N_i(\mathbf{g})\}$ to be the set of monetary holdings of agent $i$ and each of their network neighbors and let $r(x_i, \mathbf{x}_i) \in \{1, \ldots, d_i + 1\}$ denote the rank of individual $i$ within their reference group.

Then, the utility function of agent $i \in \{1, 2, \ldots, n\}$ is given by

$$U_i(\mathbf{x}; \mathbf{g}) = x_i - \frac{\alpha_i}{d_i} \sum_{j \neq i} g_{ij} \max\{x_j - x_i, 0\} - \frac{\beta_i}{d_i} \sum_{j \neq i} g_{ij} \max\{x_i - x_j, 0\} - \gamma_i f(r(x_i, \mathbf{x}_i)),$$

where we assume that $\beta_i \leq \alpha_i$, $0 \leq \beta_i < 1$, and $\gamma_i \geq 0$. In this specification, the second (third) term measures utility loss from disadvantageous (advantageous) inequality.[4] The fourth term captures potential rank-based disutility, with $f : \{1, \ldots, d_i + 1\} \to \mathbb{R}$ describing the magnitude of disutility associated with each possible rank and $\gamma_i$ represents the individual's sensitivity to rank-based utility loss.

We assume that the function $f$ satisfies $f(d_i + 1) = 0$ and $f(r(x_i, \mathbf{x}_i)) > f(r(x_i, \mathbf{x}_i) + 1)$. This implies that an individual who is better off than all others in their reference group incurs no rank-based disutility, for any value of $\gamma_i$, while those in lower ranks incur an increasing penalty for occupying a lower rank in the payoff distribution. However, these increasing penalties are only felt if the individual is sensitive to rank based disutility (i.e., if $\gamma_i > 0$). Beyond this, we make no specific assumptions about what form the function $f$ may take. As such, this specification is general enough to allow for phenomena demonstrated in existing experimental work, such as last-place aversion (Kuziemko et al., 2014), first-place loving and last-place loathing (Gill et al., 2019), and a dislike of disadvantageous rank reversals (Martinangeli and Windsteiger, 2021).

[2]Throughout, we assume that $d_i(\mathbf{g}) \geq 1$ for all $i$ so that each agent has a non-empty reference group.

[3]We maintain their assumption that the reference (equitable) outcome is the egalitarian one, over the subset of agents that form an individual's reference group.

[4]Fehr and Schmidt (1999) impose these same restrictions on $\alpha_i$ and $\beta_i$, which have empirical support in a wide range of decision environments.

## 2.1 Monetary Transfers

Suppose that some individual $k$ is given the opportunity to enforce a monetary transfer, $t_{\ell,m}$, from some individual $\ell$ to another individual $m$, such that $k \notin \{\ell, m\}$, where the transfer amount is selected from a set of available options, $T \subseteq \mathbb{R}_+$. Any such transfer will leave the monetary holdings of individual $k$ unchanged. However, depending on the identities of the individuals involved in the transfer and the amount transferred, it may affect the levels of advantageous and disadvantageous inequality they experience and their relative ranking within their reference group. The optimal transfer for an individual will depend on their degree of inequality aversion and sensitivity to rank-based disutility.

The types of transfers an individual can implement are determined by the structure of the network, and in particular, the size of their reference group. Individuals with a complete reference group ($d_i(\mathbf{g}) = n-1$) can only impose transfers where both the source and recipient are members of their reference group; we refer to these as In-to-In transfers. However, an individual with a non-complete reference group ($d_i(\mathbf{g}) < n-1$) may also implement transfers involving those outside of their reference group. There are three such types of transfers to consider: Out-to-In (source outside, recipient inside), In-to-Out (source inside, recipient outside), or Out-to-Out (source and recipient both outside).

## 2.2 Hypotheses

This section presents several hypotheses about the types of transfers that individuals will implement, based on their preferences. We first consider, as a baseline, a purely self-interested individual who cares only about their own monetary payoffs (i.e., $\alpha_i = \beta_i = \gamma_i = 0$). Such an individual is indifferent towards any amount of inequality, both advantageous and disadvantageous, and is also unconcerned with their relative rank within their reference group. Therefore, they should be indifferent between all possible transfers, since none have an effect on the only component of their utility–their own monetary payoff.

**Hypothesis 0** (Non-social preferences: $\alpha_i = \beta_i = \gamma_i = 0$)**.** *Individuals are indifferent between all transfers, including transfers of zero, so chosen transfers will not display any discernible pattern.*

We next consider an individual who is inequality averse ($\alpha_i \geq \beta_i > 0$) but not sensitive to rank-based utility ($\gamma_i = 0$). While purely self-interested individuals are indifferent between all possible transfers, inequality averse individuals will impose transfers that adhere to a pattern summarized in the following hypothesis. In general, they will choose transfers that

reduce disadvantageous inequality, advantageous inequality, or both simultaneously. Specifically, In-to-In transfers should involve a source in a higher rank and a recipient in a lower rank, Out-to-In transfers should select a lower ranked individual in the reference group as the recipient of the transfer, and In-to-Out transfers should select a higher ranked individual in the reference group as the source of the transfer. These patterns all follow directly from the stronger dislike of disadvantageous than advantageous inequality, $\alpha_i \geq \beta_i$. Finally, we note that any Out-to-Out transfer will leave utility unchanged, and therefore, should not be implemented.

**Hypothesis 1** (Inequality aversion only: $\alpha_i \geq \beta_i > 0$, $\gamma_i = 0$)**.**

*(a) Individuals choosing In-to-In transfers will transfer from those above themselves in the earnings distribution to those below themselves (whenever possible).*

*(b) Individuals choosing Out-to-In transfers are more likely to choose as the recipient of their transfer someone below themselves in the earnings distribution than those above.*

*(c) Individuals choosing In-to-Out transfers are more likely to choose as the source of their transfer someone above themselves in the earnings distribution than those below.*

*(d) Individuals will not implement Out-to-Out transfers.*

This hypothesis indicates that inequality aversion alone will lead individuals who have a stronger disutility from disadvantageous inequality to target those in higher (lower) ranks as the source (recipient) of their transfers. Due to the linear functional form of the utility function, individuals are indifferent regarding the source and recipient of the transfer, as long as the source is in a higher rank and the recipient in a lower rank than themselves. Since the amount of inequality they experience only depends on the absolute value of the difference in current monetary holdings, following a transfer from a higher ranked individual to someone in a lower rank, their utility increases by an amount proportional to the amount of the transfer regardless of the values of the initial monetary holdings (i.e., ranks) of the source and recipient.

In general, many source and recipient combinations could result in a decrease in aggregate inequality. However, if in addition to being inequality averse, individuals have preferences over their relative ranking ($\gamma_i > 0$), then they may be more particular about which others to target as the source and recipient of their transfer. For example, if possible transfers are large enough, an individual may elect to target the individual ranked just ahead of themselves as

the source and change their relative ranking.[5] Individuals with very strong rank preferences may implement this type of rank-improving transfer even when doing so decreases inequality by a lesser amount than some alternative transfer, or in extreme cases, at the expense of increasing inequality.

**Hypothesis 2** (Inequality aversion and rank disutility: $\alpha_i \geq \beta_i > 0$, $\gamma_i > 0$)**.** *When individuals choose transfers large enough to change ranks, they are more likely to target as the transfer source the individual one rank above themselves than other ranks.*

We conclude this section with an hypothesis regarding the propensity for individuals to target the individual one rank above themselves as the source of their transfer. We have postulated that individuals incur increasing levels of disutility for occupying lower ranks in the monetary distribution. If this is the case, individuals who are sensitive to rank-based disutility will more often impose rank-improving transfers, when possible, if they occupy a lower rank in the monetary distribution.

**Hypothesis 3** (Increasing rank disutility)**.** *The propensity to target the individual one rank above as the transfer source is stronger for those lower in the earnings distribution.*

We also conjecture that rank-improving transfers will be more common following a pre-transfer competition stage that may prime rank preferences. We discuss this after presenting that feature of the experimental design.

# 3 Experimental Design

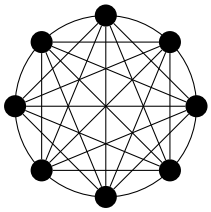
Subjects were placed into fixed groups of size $n = 8$, generally with two or three groups simultaneously in the lab (16 or 24 subjects). After learning their own exogenously-determined ranking in an earning distribution each round, all subjects could choose an earnings reallocation among others in their group. This reallocation was restricted to a single transfer of an amount from a limited set, and subjects could not transfer funds to or from themselves. One of the eight subject's transfers was selected at random to be implemented. A transfer of zero, to leave the earnings distribution unchanged, was always in the choice set.

Table 1 displays the pre-transfer earnings distribution $\mathbf{x}$. The experiment varied the set of possible transfers $T$ within subjects, with 30 rounds of $T_1$ followed by 30 rounds of $T_2$ in half the sessions; the other half reversed this ordering. Only the transfer set $T_2$ includes

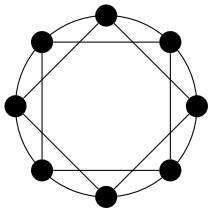
[5]Depending on the initial monetary distribution and set of available transfers, own rank improving transfers could involve individuals more than one rank higher in the distribution. The experiment, however, limited the maximum transfer to allow only changes by one rank position to focus on local own rank preferences.

Table 1: Experimental Design

| Earnings distribution $\mathbf{x} = \{\$6, 8, 10, 12, 14, 16, 18, 20\}$ | Pre-competition distribution $\mathbf{x_0} = \{\$7, 7, 11, 11, 15, 15, 19, 19\}$ |
|---|---|
| Possible Transfer Sets | |
| $T_1 = \{\$0, 0.45, 0.90, 1.35, 1.80\}$ | $T_2 = \{\$0, 0.45, 0.90, 1.35, 1.80, 2.25, 2.70, 3.15, 3.60\}$ |
| Treatments | Subjects (Groups) |
| Global | 64 (8) |
| Local | 64 (8) |
| Competition | 64 (8) |



COMPLETE ($d_i = 7$) - 'Global'



LOCAL INTERACTION ($d_i = 4$) - 'Local'

Figure 1: Network Connections

amounts greater than \$2 to allow subjects to change the ranking of the earnings distribution. Although subjects' transfers could not affect their own *earnings*, with transfer set $T_2$ subjects could change their own *ranking* in the earnings distribution.

The experiment varied the reference group (network structure) between sessions. In the **Global** treatment the network was complete ($d_i = 7$) so that subjects could observe the earnings of all seven others in their group (Figure 1). The **Local** treatment reduced the reference group to $d_i = 4$ other subjects, and an "out-group" of three subjects were displayed on decision screens with no indicated earnings amount.[6] The set of connected subjects was randomly determined each round, and subjects received no information about others (other than their random initial earnings) in any treatment. Subjects could nevertheless transfer money to or from these out-group members who were not in their local network. Appendix A illustrates the transfer decision screens used in the subject instructions.

The **Competition** treatment also employed a complete, global network, but it included a pre-transfer competition stage that determined subjects' position in the earnings distribution $\mathbf{x}$. Subjects' initial earnings were randomly distributed as shown in the vector $\mathbf{x_0}$ in Table 1. They then played a zero-sum, matching pennies game with the individual who was endowed

[6]Thus, by displaying different earnings each round, the background earnings distribution changed randomly (Seidl et al., 2006). In some rounds some subjects did not view earnings of those immediately above or below themselves in the distribution, which limited their ability to make transfers to change their own rank.

with the same amount. The loser paid the winner \$1, which resulted in the same pre-transfer earnings distribution $\mathbf{x}$ used in the other treatments. Since the outcome of the competition was completely random, the pre-transfer distribution was also random as in the **Global** and **Local** treatments and so it can be regarded as exogenous.[7] In all treatments the different random initial payoffs drawn from $\mathbf{x}$ or $\mathbf{x_0}$ generate variation in individuals' ranking.

This pre-transfer competition may strengthen or prime rank preferences. In terms of the model, it could raise the level of $\gamma_i$. This has implications for the pattern of transfer choices, as summarized in the following conjecture.

**Conjecture 1** (Priming rank preferences)**.** *Individuals are more likely to target as the transfer source the individual one rank above themselves than others after engaging in preliminary competition.*

All sessions were conducted at the Vernon Smith Experimental Economics Laboratory at Purdue University, with experimental software implemented using oTree (Chen et al., 2016). The 192 subjects were undergraduate students, recruited across different disciplines at the university by email using ORSEE (Griener, 2015). No subject participated in more than one session. Subjects never received feedback about others' choices during their session, so we treat individuals as independent in the statistical analysis.

At the beginning of each session subjects read the instructions shown in Appendix A on their computers, and these were also displayed on a projector in the lab to promote common knowledge that everyone faced the exact same decision environment.[8] One round was selected at the end of the session, and one subject's transfer decision for that round was implemented for payment in each group. Subjects also completed a short Social Value Orientation task at the conclusion of the experiment, implemented with 6 allocation choices (Murphy et al., 2011), with one choice in each pair randomly drawn for payment (see Part 2 in the instructions Appendix A). Subjects earned \$21.73 on average, including a \$5 show-up fee, and sessions lasted less than 90 minutes.

[7] Thus, all of our treatments involve procedural justice, in that subjects all had equal ex ante opportunity and pre-transfer earnings were determined solely by luck. The Competition treatment, however, gives the illusion of agency since earnings were influenced by choice (Akbas et al., 2019). See also Krawczyk (2010) and Mollerstrom et al. (2015) for other experiments in which a third party can redistribute earnings between others, determined through luck compared to effort.

[8] Instructions for the Global and Complete treatments are provided in Appendix A. Instructions for the Local treatment are nearly identical to the Global treatment instructions. The example decision screen provided in the Local treatment instructions is presented in Appendix B.

# 4 Results

We present the experiment findings with a series of five numbered results, immediately followed by their statistical support. The first result concerns the size of the chosen transfers. The next results report the sources and recipients of the transfers, and particularly how this differs when pre-transfer competition determines earnings. We then turn to comparing the frequency of transfers that increase or decrease subjects' position in the earnings distribution. The final results document the frequency of transfers to or from others outside subjects' local network, as well as heterogeneity of transfers across treatments and by gender.

The first result documents that subjects reveal a robust preference for relative earnings by frequently transferring amounts between others.

**Result 1.** *Overall, about 90 percent of transfers are non-zero, and about one-half transfer the maximum possible amount. Maximum transfers are significantly less common in the transfer set $T_2$ that has a greater maximum.*

**Support:** Figure 3 displays a histogram of selected transfer amounts, distinguished by treatment. A total of 10,360 out of 11,520 transfers (89.9 percent) were positive. The most common transfer amount was the maximum possible–56.8 percent of transfers were \$1.80 in the $T_1$ treatment, and 43.4 percent of transfers were \$3.60 in the $T_2$ treatment. The frequency of a zero transfer amount is marginally higher in the Local than Global treatment ($p$-value=0.054).[9] Maximum transfers are significantly more frequent in the low $T_1$ treatment than high $T_2$ treatment ($p$-value<0.001), and marginally significantly greater in the Global than Local treatment ($p$-value=0.052).

Having established that subjects in this environment readily transfer earnings between others, we next consider who they select as the source (or, "target") and recipient of the transfers, and how this affects inequality and the earnings ranking.

**Result 2.** *In all treatments transfers most frequently target individuals with the highest earnings as the source, moving funds to individuals with the lowest earnings as the recipient. Such transfers are significantly less frequent in the Competition than in the Global treatment.*

**Support:** Figure 4 displays the frequency distribution of transfer sources (columns) and recipients (rows) for non-zero transfers. The dark cell in the lower right for the Global treatment, for example, indicates that 42 percent of all transfers moved amounts from the "richest" individual (rank 8) to the "poorest" (rank 1). This rate is modestly lower in

[9] Unless otherwise noted, statistical results are based on logit models with standard errors clustered on subjects. All $p$-values are based on two-tailed tests.

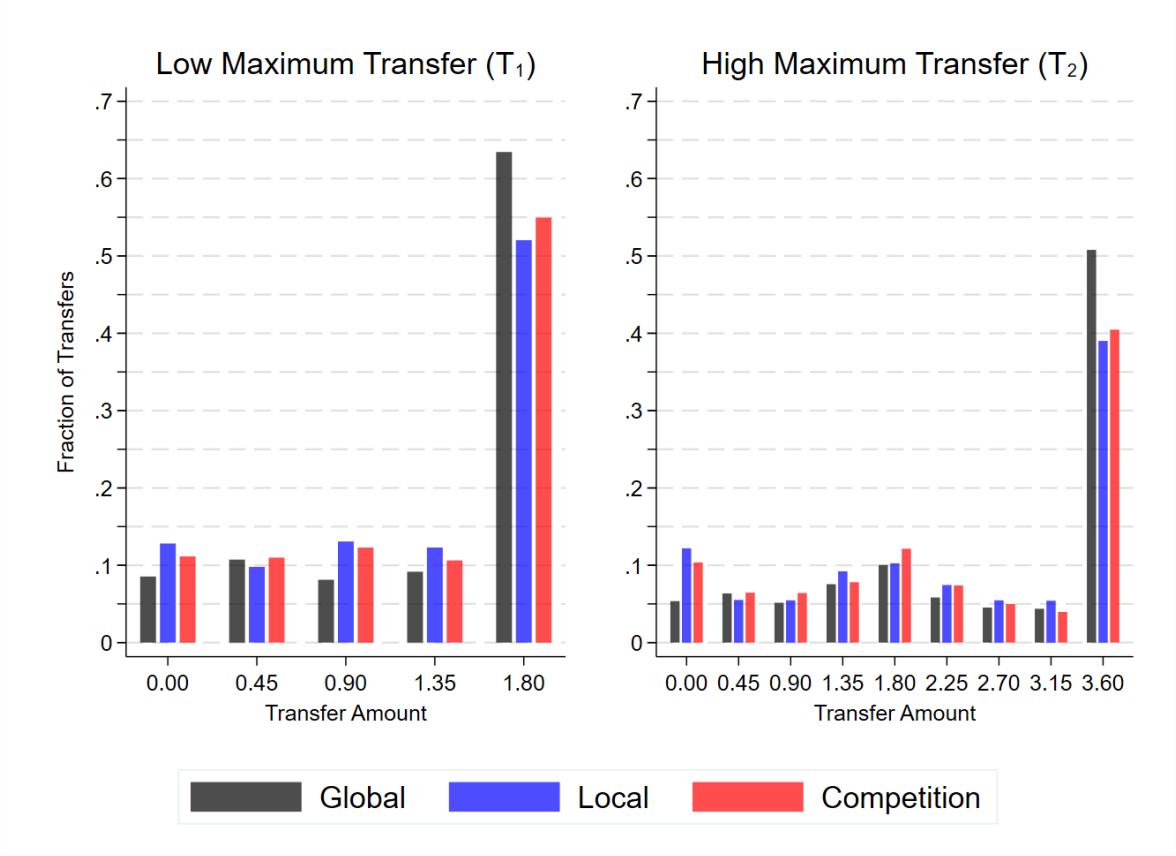



Figure 3: Frequency Distribution of Transfer Amounts

the other treatments, but it is still by far the most common type of transfer. This is evidence rejecting Hypothesis 0, which predicts non-systematic transfers. When excluding subjects in the highest and lowest ranks, who cannot make these types of transfers, the frequency of transfers from the highest to the lowest ranked individual are 54.7, 60.9 and 41.1 percent of the maximum possible frequency in the Global, Local and Competition treatments, respectively. This frequency is significantly lower in the Competition treatment ($p$-value=0.049).[10] We explain this difference in Result 4 below, by demonstrating that pre-transfer competition leads some individuals to choose systematically different sources for their transfers.

These "Robin Hood" transfers that "rob from the rich to feed the poor" (Pyle, 1883) are at least 4 times more common than any other type of transfer, and they are even more prevalent when excluding the highest- and lowest-ranked individuals who cannot make such transfers. Such transfers provide clear evidence of inequality aversion, particularly that the aversion to disadvantageous inequality is at least as strong as the aversion to advantageous

[10]Figure 10 in Appendix B shows that the frequency of these extreme transfer sources and recipients is similar in the $T_1$ and $T_2$ treatments.

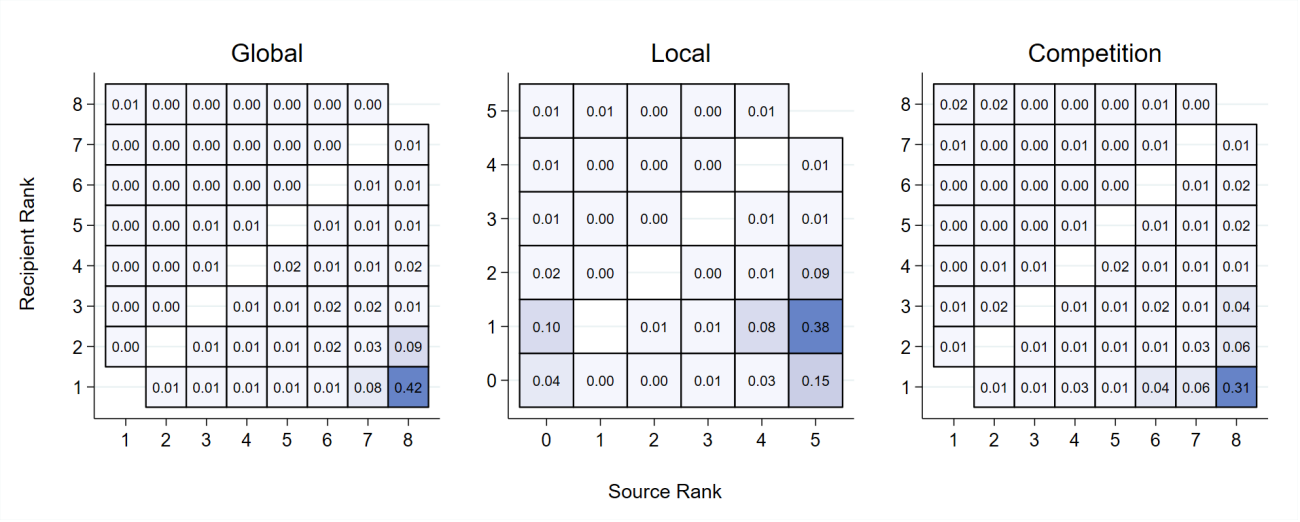



Figure 4: Frequency of Source and Recipient of Non-Zero Transfers

Note: Rank 1 has the lowest pre-transfer earnings. Rank 0 in the Local treatment refers to individuals outside a subject's local network, whose earnings are unobserved.

inequality.[11] We shall revisit this prominent–and frankly unexpected–aspect of the transfer pattern in the conclusion.

The source and recipient information in Figure 4 does not directly indicate whether transfers move earnings from someone above to someone below the decision-maker, because this depends on the decision-maker's own rank. This is considered in the next result, where we also examine whether individuals in the Local treatment choose sources and recipients within or outside their reference group.

**Result 3.** *The majority of In-to-In transfers move money from an individual ranked above to an individual ranked below the decision-maker, whenever possible, in all treatments. In the Local treatment, nearly all Out-to-In (In-to-Out) transfers involve a recipient (source) in a lower (higher) rank than the decision-maker, whenever possible. Out-to-Out transfers are uncommon.*

**Support:** Consider first In-to-In transfers, which account for all positive transfers in the Global and Competition treatments and 63.5% of positive transfers in the Local treatment. For this analysis, we consider only individuals not initially in extreme ranks of their reference group (i.e., those in ranks 2-7 in Global and Competition treatments and ranks 2-4 in the Local treatment) since the types of In-to-In transfers that can be implemented by individuals

[11] These types of transfers are also in line with the well-known Pigou-Dalton transfer principle of welfare economics which requires that, all else equal, social welfare increases following a transfer that reduces the inequality between two agents (see Moulin (2004, p. 67-68) for further discussion of this principle).

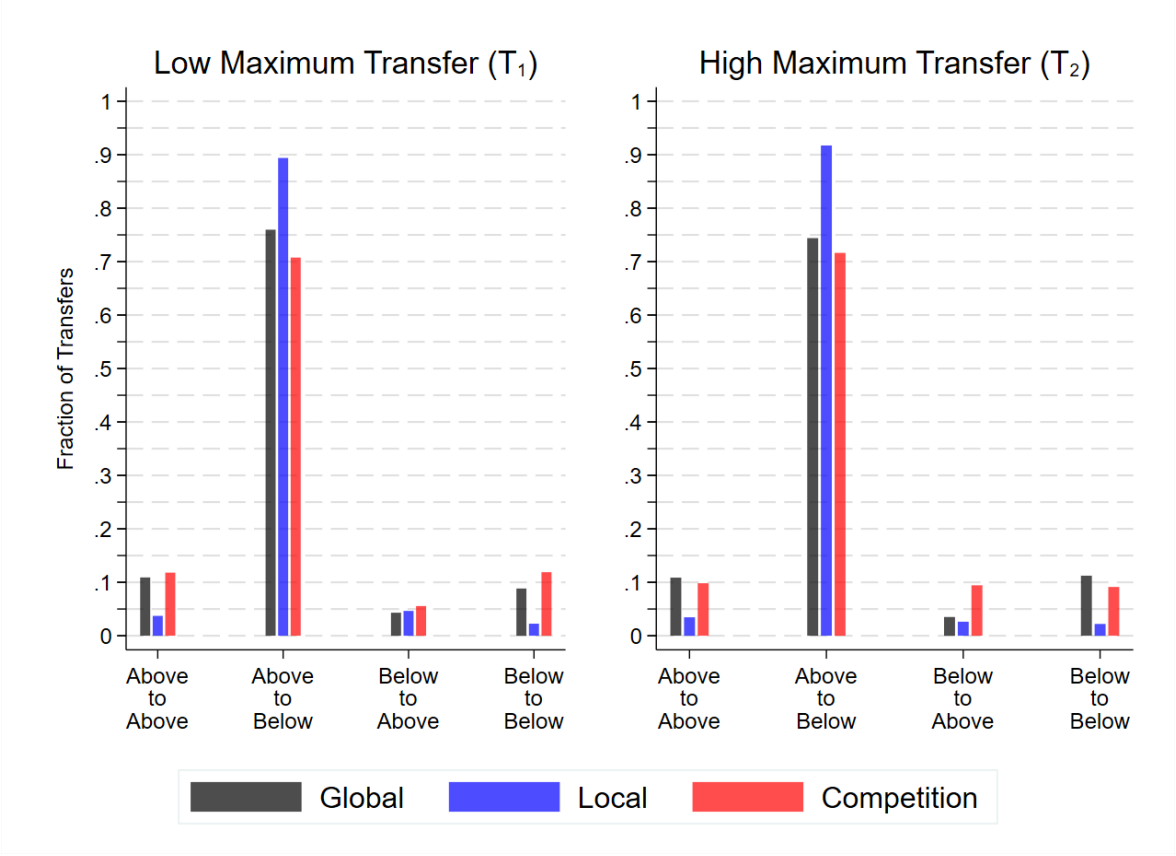



Figure 5: Frequency Distribution of In-to-In Transfer Types

Note: Restricted to positive, In-to-In transfers by individuals in ranks 2-7 in the Global and Competition treatments, and ranks 2-4 in the Local treatment.

holding the highest or lowest rank are naturally constrained when there is either no one in their reference group ranked higher or lower. Figure 5 displays histograms of In-to-In transfers, based on the rankings of the source and recipient relative to the individual implementing the transfer. The distributions are very similar in the $T_1$ and $T_2$ treatments. Overall, transfers that select a higher ranked source and lower ranked recipient account for 75.2%, 90.5%, and 71.2% of positive, In-to-In transfers in the Global, Local, and Competition treatments, respectively–providing strong support for part (a) of Hypothesis 1.

We next turn attention to the Local treatment, where individuals may also implement Out-to-In, In-to-Out, and Out-to-Out transfers. Among all positive transfers in this treatment, In-to-In are most common (64.5%), followed by In-to-Out (18.6%), Out-to-In (13.7%), and Out-to-Out (4.2%). In support of parts (b) and (c) of Hypothesis 1, we find that Out-to-In transfers most often involve a recipient in a lower rank (81.5% overall, 93.5% when excluding transfers made by individuals in rank 1), and the majority of In-to-Out transfers target an individual in a higher rank as the source of the transfer (84.0% overall, 98.1%

when excluding transfers made by individuals in rank 5). The very low rate of Out-to-Out transfers provides support for part (d) of Hypothesis 1, which indicates that these types of transfers should not be implemented by inequality averse individuals.

Finally, as further general evidence of inequality aversion in this environment, we note that individuals' initial rank in the Local treatment influences the type of transfer they choose. Individuals who do not initially hold an extreme rank in their reference group (ranks 2, 3, or 4) are significantly more likely to implement In-to-In transfers ($p$-value$< 0.001$) than those holding the highest or lowest rank. Relative to all other ranks, top ranked individuals (rank 5) more often implement Out-to-In transfers ($p$-value$< 0.001$) while those in the lowest rank (rank 1) more frequently implement In-to-Out transfers ($p$-value$< 0.001$). Since overall Out-to-In transfers are not more common than In-to-Out transfers, in-group favoritism does not seem more important than inequality aversion or rank preferences.

Having established that people frequently make earnings transfers in this environment, in a pattern reflecting inequality aversion, we next examine the specific sources of the transfers and how this could reflect preferences regarding an individual's own ranking. Result 2 already documents that transfers very frequently target the person with the highest earnings as the source. To test Hypothesis 2, and setting aside the Robin Hood transfers targeting the richest, we consider whether individuals source funds from the individual one rank above themselves. We also document how this is affected by pre-transfer competition.

**Result 4.** *Individuals in the Global treatment do not transfer from those immediately above themselves in the ranking at higher rates than others higher in the earnings distribution; those who lose the pre-transfer game in the Competition treatment, however, are more likely to transfer funds from the individual in the rank above themselves relative to those in the same ranks in the Global treatment.*

**Support:** Figure 6 shows the transfer source depending on the subjects' own rank to identify which individuals are targeted in the transfers.[12] Inequality averse subjects should select those higher in the ranking; that is, to the right of the empty diagonal. This is clearly supported by the data, as over 86 percent of non-zero transfers in the Global and Competition treatments made by individuals not in the highest rank target the higher ranks in this region (87 percent in Global and 84 percent in Competition, respectively).[13] Recall that in the Competition treatment, to determine the pre-transfer earnings distribution, subjects first

[12]Figure 11 in Appendix B demonstrates similar patterns for the $T_1$ and $T_2$ treatments separately, as well as for the subset of transfers greater than \$2 that change rankings.

[13]Figure 12 in Appendix B shows that the recipient of these transfers is almost always in a lower rank than the decision-maker, which is also implied by inequality aversion. Over 85 percent of non-zero transfers in the Global and Competition treatments made by individuals not in the lowest rank choose a recipient in a lower rank (87 percent in Global and 84 percent in Competition, respectively).

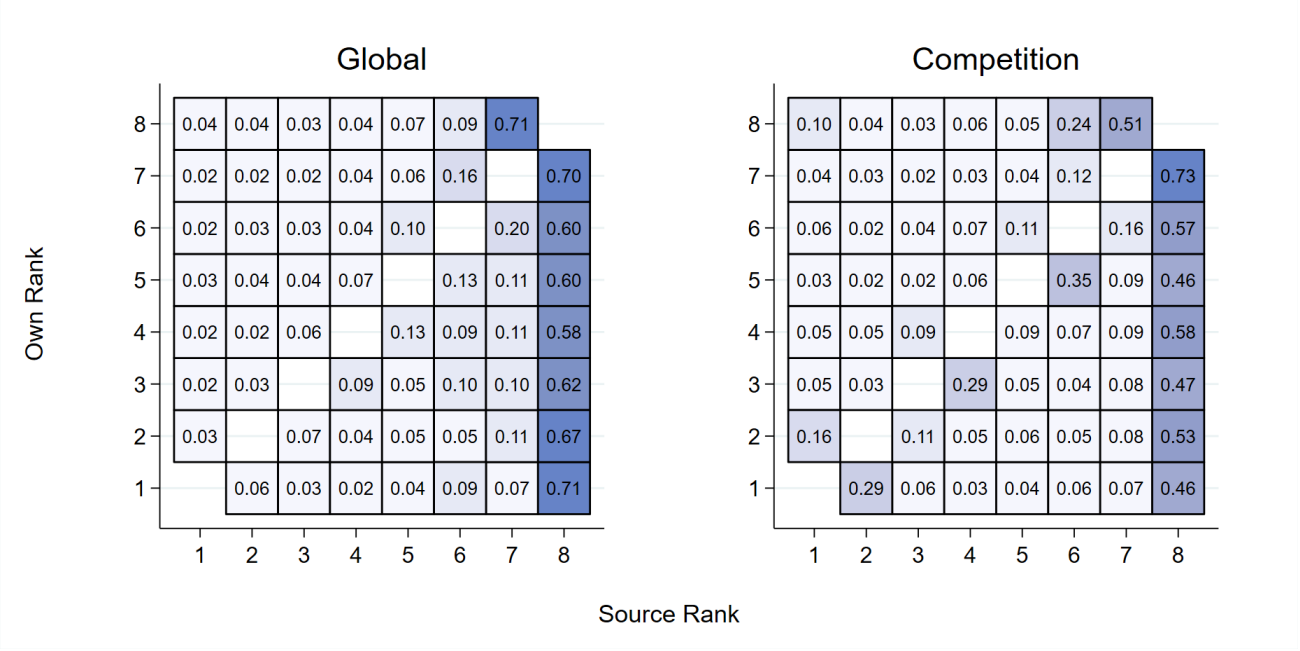



Figure 6: Frequency of Source of Non-Zero Transfers

Note: Rank 1 has the lowest pre-transfer earnings. In the Competition treatment, individuals in ranks 1, 3, 5, and 7 lost the pre-transfer competition, while those in ranks 2, 4, 6, and 8 were the competition winners.

played a zero-sum, matching pennies game with the individual who was endowed with the same amount. After this competition, those in ranks 1, 3, 5 and 7 were competition losers, and they knew that they lost to the individuals in ranks 2, 4, 6 and 8, respectively. The figure shows that these individuals one rank higher are the most common target for the competition losers in these odd-numbered ranks, other than the richest (rank 8) individuals. The winners in ranks 2, 4 and 6 are targeted about 30 percent of the time. This pattern is completely absent in the Global treatment, which did not include this pre-transfer competition stage.

Hypothesis 2 states that when subjects chose transfers large enough to change ranks, they are more likely to target as the source the individual above themselves in the ranking. A logit model (clustering on individuals) indicates a pattern consistent with this prediction, as the likelihood of choosing a rank-changing transfer is significantly greater when targeting the individual directly higher in the distribution ($p$-value=0.012).[14] Considering the treatments separately, however, this effect is only statistically significant in the Competition treatment ($p$-value=0.048) and not in the Global ($p$-value=0.086) or Local ($p$-value=0.284)

[14]We consider only cases where rank-improving transfers are (intentionally) possible; i.e., excluding all observations where the individual holds the highest rank in their reference group, and in the Local treatment, omitting cases where the individual one rank higher (globally) is not in the participant's reference group.

treatments.[15] An interpretation of this result is that competition apparently primes rank preferences; in terms of the model presented in Section 2, competition raises $\gamma_i$.

Before turning to our final result, which provides further evidence supporting Conjecture 1, consider briefly Hypothesis 3. This hypothesis follows directly from the assumption that individuals' rank disutility increases when they are further down in the earnings distribution. If this were the case, they would be more likely to target the individual directly above themselves as the source of the transfer if they are lower in the earnings distribution. Figure 14 in Appendix B indicates that this hypothesis is not supported by the data. In all treatments, the most prominent pattern is the targeting of the highest-ranked by the second-highest ranked individual, which we already documented in Result 2. Excluding this person in the earnings distribution, the rates of targeting the individual directly above in the distribution decline or tend to be flat when moving down the distribution. The trend is significantly negative, contrary to Hypothesis 3, in the Global treatment according to logit regressions ($p$-values$<0.01$) and insignificant in the other treatments ($p$-values$>0.167$). Results are similar, although less statistically significant, in the Global treatment when considering only rank-increasing transfers ($p$-value$=0.056$).

**Result 5.** *Rank-improving transfers are significantly more frequent in the Competition treatment than in the Global or Local treatments, and they are concentrated among pre-transfer game losers. Rank-worsening transfers occur most frequently when individuals transfer to the lowest-ranked in the distribution, and their rate does not vary significantly across treatments.*

**Support:** Table 2 displays the frequency that subjects choose to transfer more than \$2.00 from the individual ranked immediately above themselves to an individual not immediately below, thus increasing their position in the earnings distribution. For the Global and Local treatments without pre-transfer competition, this rate is about 12% and is not significantly different across these treatments ($p$-value$=0.745$). This rate increases by about 50% in the Competition treatment, to over 18% overall. This increase is statistically significant ($p$-value$=0.045$). Large transfers to the individual ranked immediately below that worsen a subjects' rank occur 8-11% of the time, and these rates are not significantly different across treatments.

Figure 6 and Result 4 already document that pre-transfer game losers (i.e., those initially in odd-numbered ranks) more frequently target the individual they lost to (immediately

[15] It is also notable that in the Competition treatment, 50 of the 134 rank-changing transfers (37%) made by the poorest individual in rank 1 targeted the person directly above themselves (in rank 2), even though this rank improvement increased inequality by transferring to a higher-ranked individual. By contrast, only 15 of the 166 rank-changing transfers (9%) made by the poorest individual in the Global treatment targeted rank 2 to raise their own ranking.

Table 2: Frequency of Rank-Improving and Rank-Worsening Transfers

| | Session Type | | |
|---|---|---|---|
| | Global | Local | Competition |
| Rank-Improving | 0.126 | 0.118 | 0.183 |
| Rank-Worsening | 0.101 | 0.111 | 0.083 |
| Observations | 1,680 | 931 | 1,680 |

Note: Frequency of transfer types are calculated only for the cases where such types are feasible.

above them in the ranking) as the source of their transfer. Figure 7 shows that the same holds for rank-improving transfers. With the exception of rank 7, which has the highest number of such transfers–due largely to the high frequency of Robin Hood transfers–those in the odd-numbered ranks select rank-improving transfers at least 2.5 times more frequently in the Competition than the Global treatment. This difference is statistically significant ($p$-value$<$0.001). Rank-worsening transfers are most common for those in rank 2, again due to the common Robin Hood transfers documented in Result 2.

We conclude by documenting subject-level heterogeneity in the rates at which individuals implement rank-improving and rank-worsening transfers. Figure 8 shows the empirical CDF of transfer type frequencies, disaggregated by gender. First, note the considerable heterogeneity across subjects. A nontrivial portion never implement transfers that change ranks, while others do so frequently–particularly for rank-improving transfers. Second, note that men more frequently implement both types of rank-changing transfers.[16] The gender difference in the rates of rank-worsening transfers is significant ($p$-value=0.014) according to a Kolmogorov-Smirnov test, while the difference in the rates of rank-improving transfers is marginally significant (K-S $p$-value = 0.073). Examining each treatment independently, we find a significant difference in the rates of rank-improving transfers only in the Competition treatment (K-S $p$-value=0.039), while the difference in rank-worsening transfers is significant in both the Local (K-S $p$-value=0.032) and Competition (K-S $p$-value=0.013) treatments. Figure 13 in Appendix B shows a similar figure disaggregating the kinds of transfers according to the preference type measured in the social value orientation task.[17] This reveals a smaller and significant (K-S $p$-value=0.047) lower rate of rank-improving transfers among

[16]Four of the 192 subjects chose "other" or "prefer not to say" as responses to the gender question and are thus not included in the figure.

[17]This figure only shows CDFs for Individualistic and Prosocial types, which account for nearly all (190 of 192) of the participants in our experiment.

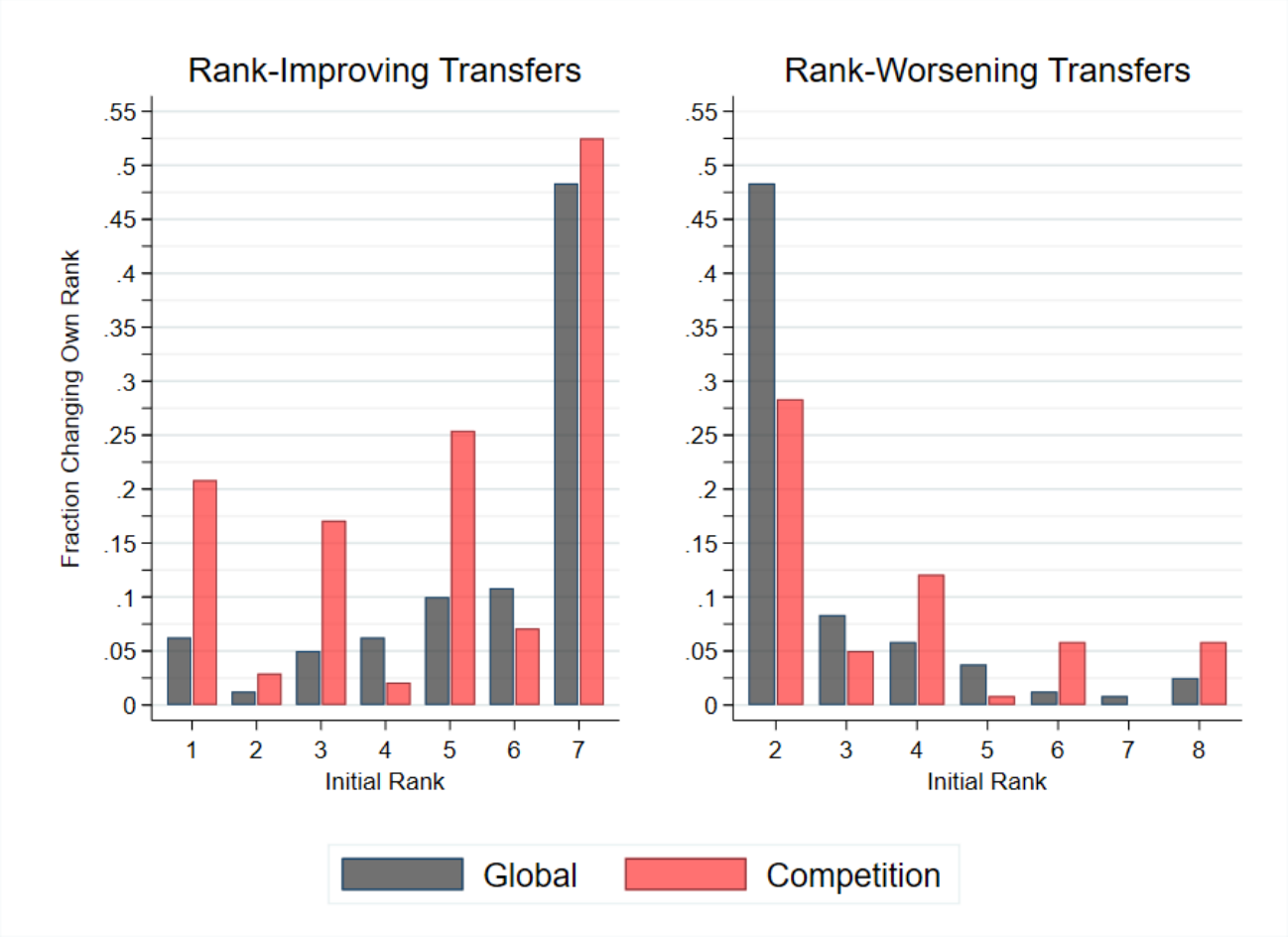



Figure 7: Frequency of Rank-Improving and Rank-Worsening Transfers, by Rank

Note: Results are based on Global and Competition treatments where all ranks are observable. Rank 1 has the lowest pre-transfer earnings. In the Competition treatment, individuals in ranks 1, 3, 5, and 7 lost the pre-transfer competition, while those in ranks 2, 4, 6, and 8 were the competition winners.

prosocial (relative to individualistic) types.[18] These findings suggest that women, and to a lesser extent prosocial types, may have weaker rank preferences.

# 5 Concluding Remarks

This paper presents a novel experimental design to measure individuals' preferences over their ranking in an exogenous distribution of earnings. Subjects could transfer money between

[18]This appears to be driven by differences in the Global treatment (K-S $p$-value=0.017), while there is no significant difference in the Local (K-S $p$-value=0.0999) or Competition (K-S $p$-value=0.274) treatments. Rates of rank-worsening transfers are not significantly different overall (K-S $p$-value=0.161) or in any individual treatment: Global (K-S $p$-value=0.953), Local (K-S $p$-value=0.273), Competition (K-S $p$-value=0.390).


Figure 8: Rank-Improving and Rank-Worsening Transfers, by Subject split by Gender

Note: Rates are calculated based only on cases where rank-improving or rank-worsening transfers are feasible.

others, but not change their own earnings. Therefore, their decisions are determined only by their social preferences. The experiment varied the size of the reference group and whether "outsiders" existed beyond the subjects' own network, who could still be sources or recipients of transfers.

Although they always had the option to make small or even zero transfers, subjects generally preferred to make large transfers–large enough, even, to change the initial ranking hierarchy. This contrasts directly with the findings of Xie et al. (2017), who employ a very different experimental design and report an aversion to change others' earnings ranking. Subjects' modal choice in our experiment was to transfer the maximum possible amount from the richest to the poorest individual in the distribution. These "Robin Hood" transfers were even very common for those in the second-to-last position in the distribution, despite the fact that this lowered their own rank. Such transfers were much more common than any

other type of transfer, and they are consistent with inequality aversion–particularly that the aversion to disadvantageous inequality is at least as strong as the aversion to advantageous inequality (i.e., the usual assumption of $\alpha \geq \beta$ in the Fehr and Schmidt (1999) model, which is the basis of Hypothesis 1). But the high frequency of these transfers also indicates that the linear functional form for the utility function of this model is not a good approximation in this setting, as also found in Bellemare et al. (2008), since it implies that subjects would be indifferent between any transfer that moves earnings from an arbitrary individual above themselves to anyone below themselves in the ranking. Instead, this transfer pattern indicates that disadvantageous inequality aversion is an increasing and concave function of the payoff difference.

Targeting the individual with the highest earnings also reduces disadvantageous inequality for the largest number of agents in the group. The modal transfer that takes from the richest and gives to the poorest reduces payoff variance and raises only the inequality suffered by the richest, while all seven others in the group experience a decrease in disadvantageous inequality. For decades behavioral economists have modeled (and explored the implications) of social preferences, focusing on concerns about the earnings or wealth of others. Transfers observed in this experiment that reduce others' disadvantageous inequality may reflect second-order preferences over others' disutility due to social preferences. At a minimum, this suggests the limits of self-centered inequality aversion, as modeled in seminal studies such as Fehr and Schmidt (1999) and Bolton and Ockenfels (2000). The policy implications of such concerns include strong support (among those possessing such preferences) for a highly progressive tax code.

The experiment also includes a treatment with pre-transfer competition. The competition outcome, determined by a matching pennies game, was random; nevertheless, it effectively primed rank preferences. Competition losers more frequently targeted the individual directly above themselves in the distribution as their transfer source, and this increased the overall frequency of rank-improving transfers by about 50 percent. Even in this treatment, however, the overall rate of transfers that raise a subjects' own position in the earnings distribution is less than 20 percent. The broad conclusion from this study is that while many subjects make choices that are indicative of preferences over rank, this effect is secondary to the stronger effect of their aversion to inequality overall. It may be that the extent to which rank preferences impact behavior is context specific, and future research should investigate the types of environments in which such preferences have a larger influence.

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# A Experiment Instructions

## A.1 General Instructions (*Shown for all treatments*)

This is an experiment in the economics of decision making. Please read the instructions carefully. They are the same for all participants. Each one of you will make decisions on your computer.

At the end of the study, you will be paid in cash according to your decisions and the decisions of the other participants. In addition, you will receive 5 dollars for arriving on time.

Throughout the study, you are prohibited from communicating with other participants. You are also prohibited from using a mobile phone or starting other programs on the computer.

Unfortunately, if you violate these rules, we must exclude you from the study, and you will only receive the show-up fee. If you have a question at any time during the experiment, please raise your hand.

This study has two parts. Each part consists of multiple rounds. Instructions for the first part will be provided now. Instructions for the second part will be provided after the first part has been completed. Your choices in one part of the study do not affect your decisions or payout in the other part.

All of your choices will be stored with an anonymous identification number. Therefore, your choices cannot be traced back to you by anyone under any circumstances.

## A.2 Part 1 Instructions (*Global Treatment, Low-High Ordering)*

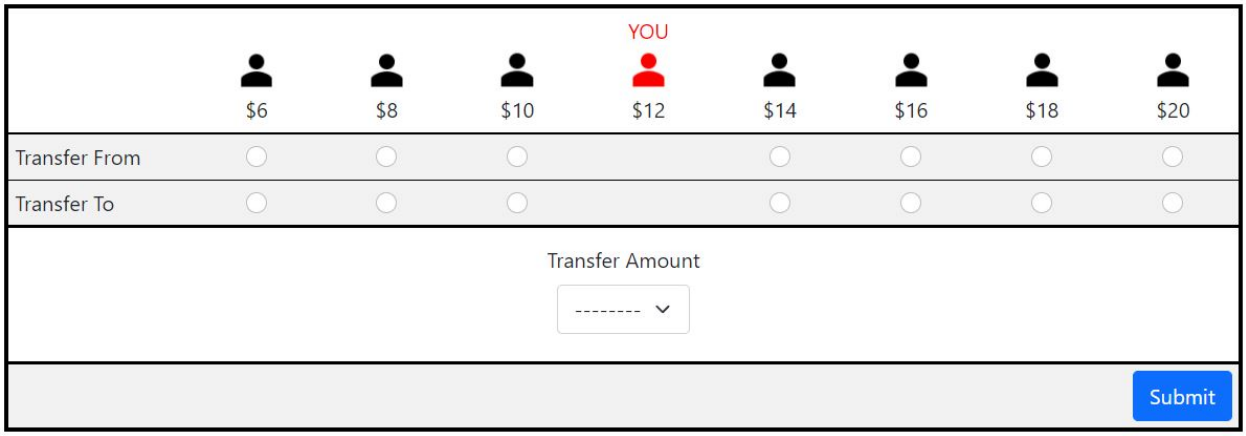
In this part of the study, you are in a group with seven other participants. At the beginning of each round, the computer will randomly hold a lottery and give you and the other participants in your group different amounts of money. The Dollar amounts initially assigned in the random lottery are drawn from the following set: $\{\$6, \$8, \$10, \$12, \$14, \$16, \$18, \$20\}$. These eight amounts are drawn without replacement; this means that each of the eight participants in your group will receive a different amount.

During each round, you will be shown the amounts randomly assigned by the computer. You will then be presented with a choice to transfer some amount of money from one person in your group to another person in your group. You can also choose not to transfer any money. You cannot change the amount of money that you receive—only the amounts that other participants receive. The choices you make are private and will not be shown to anyone here today at any time.

The amounts that you can transfer from one person to another (not including yourself) must be selected from the following set: $\{\$0.00, \$0.45, \$0.90, \$1.35, \$1.80\}$. Note that this includes 0, which you should choose if you do not wish to make any transfer. You can only make one transfer each round, from exactly one person to exactly one other person.

*Diagram: Transfer choice decision screen.* The image below shows the decision screen you will use to make your transfer choices. All participants in your group are shown, in increasing

order of the amount of money they were randomly allocated. Your position is indicated by the red person image and the word "YOU" in red font.




Once everyone in your group has made a choice, the computer will randomly select the choice of **only one** participant in your group and make the transfer that player chose. At that point, everyone's money amounts will be updated, but you will not be shown the final money earned from the round.

A total of 60 rounds will be conducted. At the beginning of each new round, the computer holds a new, random lottery to assign you and the other participants in your group different amounts of money (from the same set described above), and the transfer process repeats as just described.

**At the end of the experimental session, the computer will randomly select one round from this part of the study for payment**. Every player will receive their final money earnings from that one round, including the transfer decision made by one (randomly selected) participant. With that in mind, you should make your decisions carefully as if each of your choices is the one determining final payments.

Please raise your hand if you have any questions.

## A.3 Part 1 Instructions (*Competition Treatment, Low-High Ordering*)

In this part of the study, you are in a group with seven other participants. At the beginning of each round, the computer will randomly hold a lottery and give you and the other participants some amount of money. The Dollar amounts initially assigned in the random lottery are drawn from the following set: $\{\$7, \$7, \$11, \$11, \$15, \$15, \$19, \$19\}$.These eight amounts are drawn without replacement; this means that you and one other person will receive the same amount, while the other participants will receive some other amount.

Each round will consist of two stages. The instructions for each stage are described below.

**Stage 1 - A/B Choice**

In the first stage of each round, you will be paired with the other individual in your group who received the same amount of money from the lottery. This other individual will be referred to as "Your Pair". You and your pair will each choose one of two options: A or B.

One of you will be assigned the role of *Matcher*, while the other will be assigned the role of *Non-Matcher*.

- If you both choose A or you both choose B, you "match" and the *Non-Matcher* will pay the *Matcher* $1.
- If one of you chooses A and the other choosess B, you "don't match" and the *Matcher* will pay the *Non-Matcher* $1.

At the end of this stage, the Dollar amounts held by the members of your group will make up the following set: $\{\$6, \$8, \$10, \$12, \$14, \$16, \$18, \$20\}$. That is, each individual in your group will now have a different amount.

**Stage 2 - Transfer Decision**

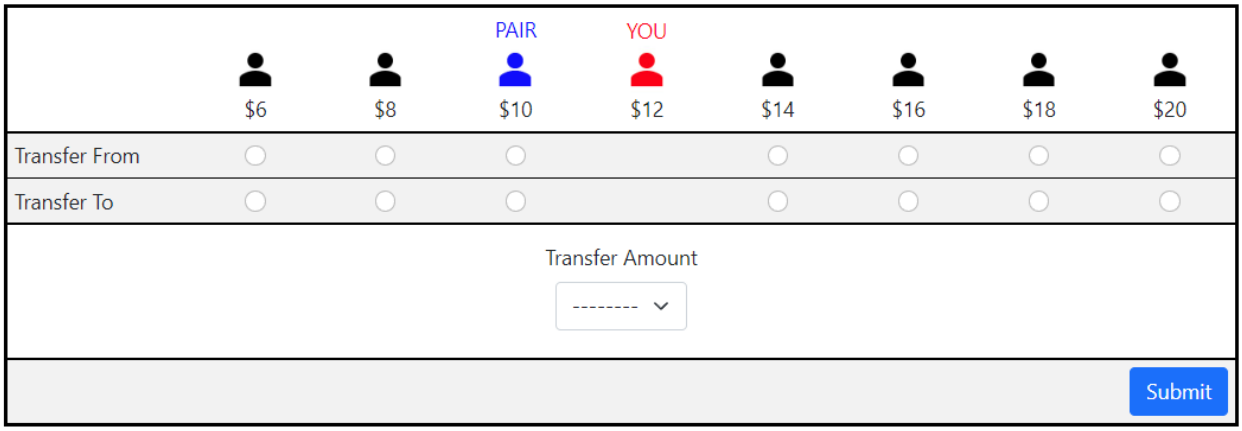
In the second stage of each round, you will be shown the amounts each individual has following the random lottery assignment and the results of Stage 1. You will then be presented with a choice to transfer some amount of money from one person in your group to another person in your group. You can also choose not to transfer any money. You cannot change the amount of money that you receive—only the amounts that other participants receive. The choices you make are private and will not be shown to anyone here today at any time.

The amounts that you can transfer from one person to another (not including yourself) must be selected from the following set: $\{\$0.00, \$0.45, \$0.90, \$1.35, \$1.80\}$. Note that this includes 0, which you should choose if you do not wish to make any transfer. You can only make one transfer each round, from exactly one person to exactly one other person.

*Diagram: Transfer choice decision screen.* The image below shows the decision screen you will use to make your transfer choices. All participants in your group are shown, in increasing order of the amount of money they were randomly allocated. Your position is indicated by the red person image and the word "YOU" in red font. Your pair's position is indicated by the blue person image and the word "PAIR" in blue font.
Once everyone in your group has made a choice, the computer will randomly select the choice of **only one** participant in your group and make the transfer that player chose. At that point, everyone's money amounts will be updated, but you will not be shown the final money earned from the round.

A total of 60 rounds will be conducted. At the beginning of each new round, the computer holds a new, random lottery to assign you and the other participants in your group different amounts of money (from the same set described above), and the transfer process repeats as just described.

**At the end of the experimental session, the computer will randomly select one round from this part of the study for payment**. Every player will receive their final




money earnings from that one round, including the transfer decision made by one (randomly selected) participant. With that in mind, you should make your decisions carefully as if each of your choices is the one determining final payments.

Please raise your hand if you have any questions.

## A.4 Part 1 Instructions (*Shown at the treatment change for all treatments in Low-High ordering*)

The remaining rounds of Part 1 are slightly different. Specifically, the amounts that you can transfer from one person to another (not including yourself) must be selected from the following set: $\{\$0.00, \$0.45, \$0.90, \$1.35, \$1.80, \$2.25, \$2.70, \$3.15, \$3.60\}$. Note that this includes 0, which you should choose if you do not wish to make any transfer. You can only make one transfer each round, from exactly one person to exactly one other person.

All other aspects of the task are the same as before.

Please raise your hand if you have any questions.

## A.5 Part 2 Instructions (*Shown for all treatments*)

In this part of the study, you will be randomly paired with another person, whom we will refer to as the **other**. You will not know who the other person is, nor will the other person be informed about your identity. You will make a series of choices among several alternative allocations of Points. These Points will be converted into Dollars at a rate of **1 Point = 0.05 Dollars**.

You will be making a series of decisions about allocating points between you and this other person. For each of the questions, please indicate the distribution you prefer most by selecting the corresponding button in the middle row. You can only make one choice for each question. There are no right or wrong answers, this is all about personal preference.

*Diagram: Example of an allocation choice.* In the example below, a person chose the allocation giving 50 Points to herself, and 40 Points to the unknown other person. In terms of

Dollars, this yields an allocation of $50 \times 0.05 = 2.5$ Dollars for the person making the choice and $40 \times 0.05 = 2$ Dollars for the unknown other.

| You Receive | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
|---|---|---|---|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ◉ | ○ | ○ | ○ | ○ |
| Other Receives | 80 | 70 | 60 | 50 | 40 | 30 | 20 | 10 | 0 |

Submit

As you can see, your choices influence both the number of Points you receive, as well as the number of Points the other person receives.

After you have made all your choices, one of the allocation choices will be randomly selected by the software. For this choice, the software will randomly assign one person from your group (you or the other) the role of "Receiver" and the other the role of the "Sender". The allocation choice made by the Sender will be enforced. This allocation will be paid in cash to both the Sender and the Receiver.

If you have any questions, please raise your hand.

# B Supplemental Figures, Tables, Results

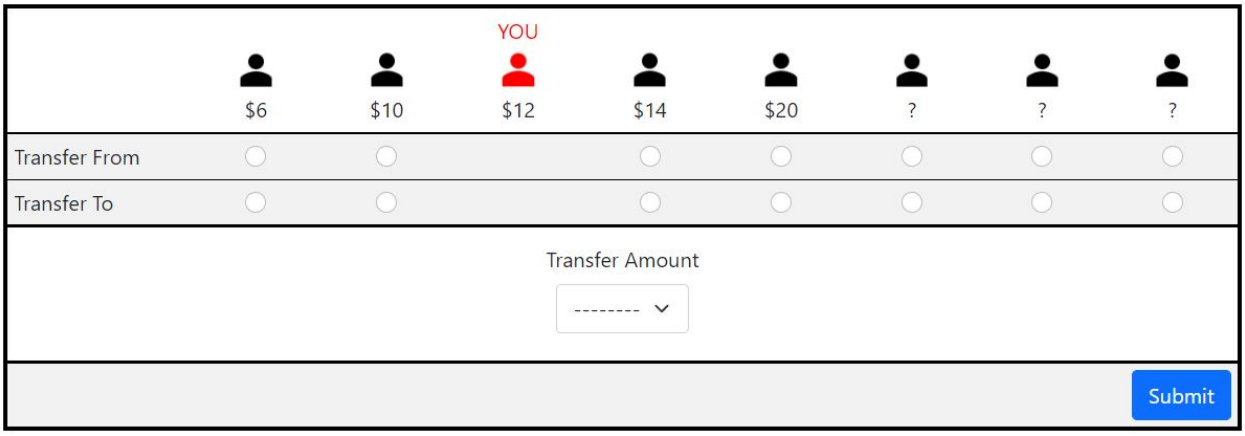



Figure 9: Transfer Decision Screen for Local Treatment

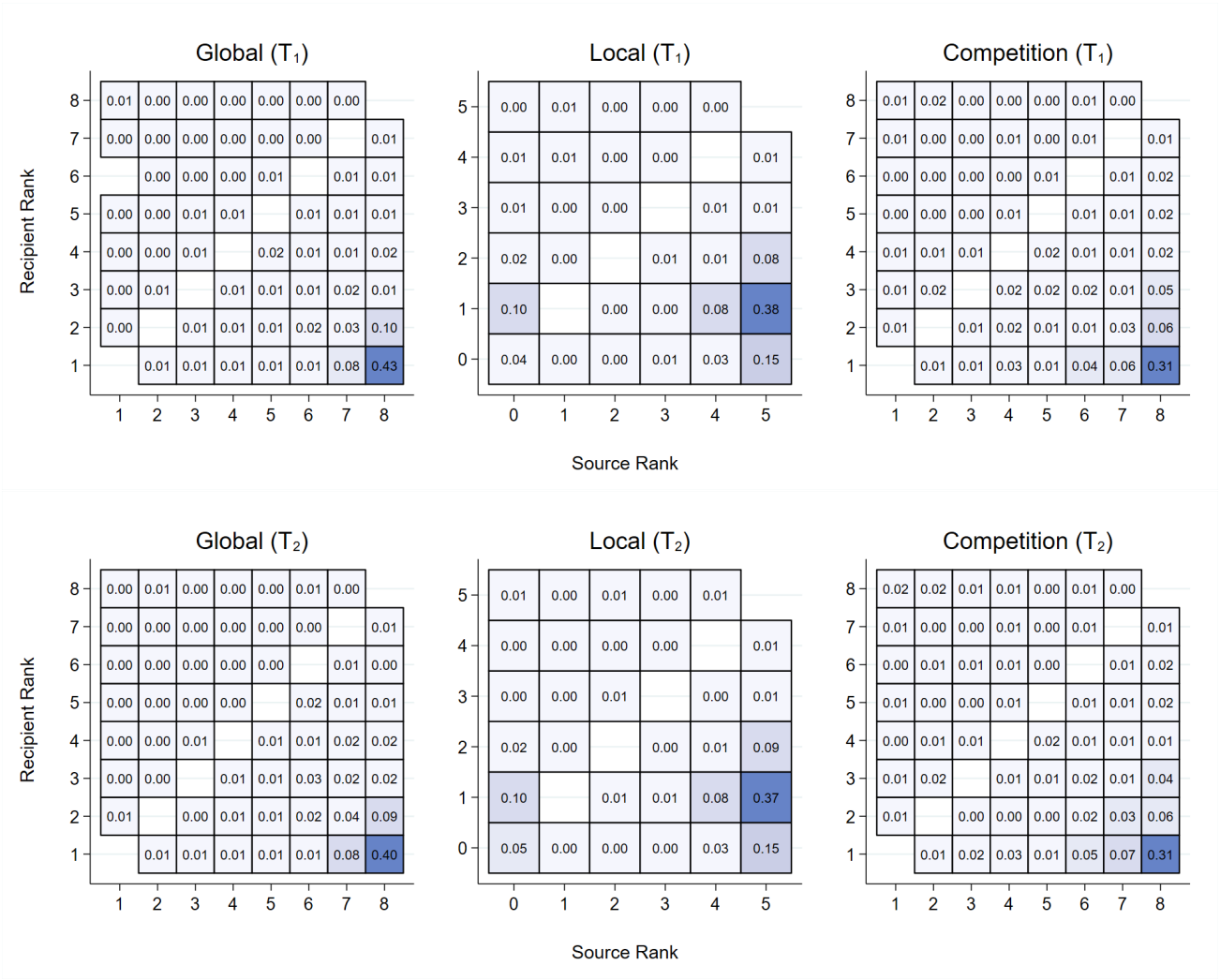



Figure 10: Frequency of Source and Recipient of Non-Zero Transfers

Note: Rank 1 has the lowest pre-transfer earnings. Rank 0 in the Local treatment refers to individuals outside a subject's local network, whose earnings are unobserved.

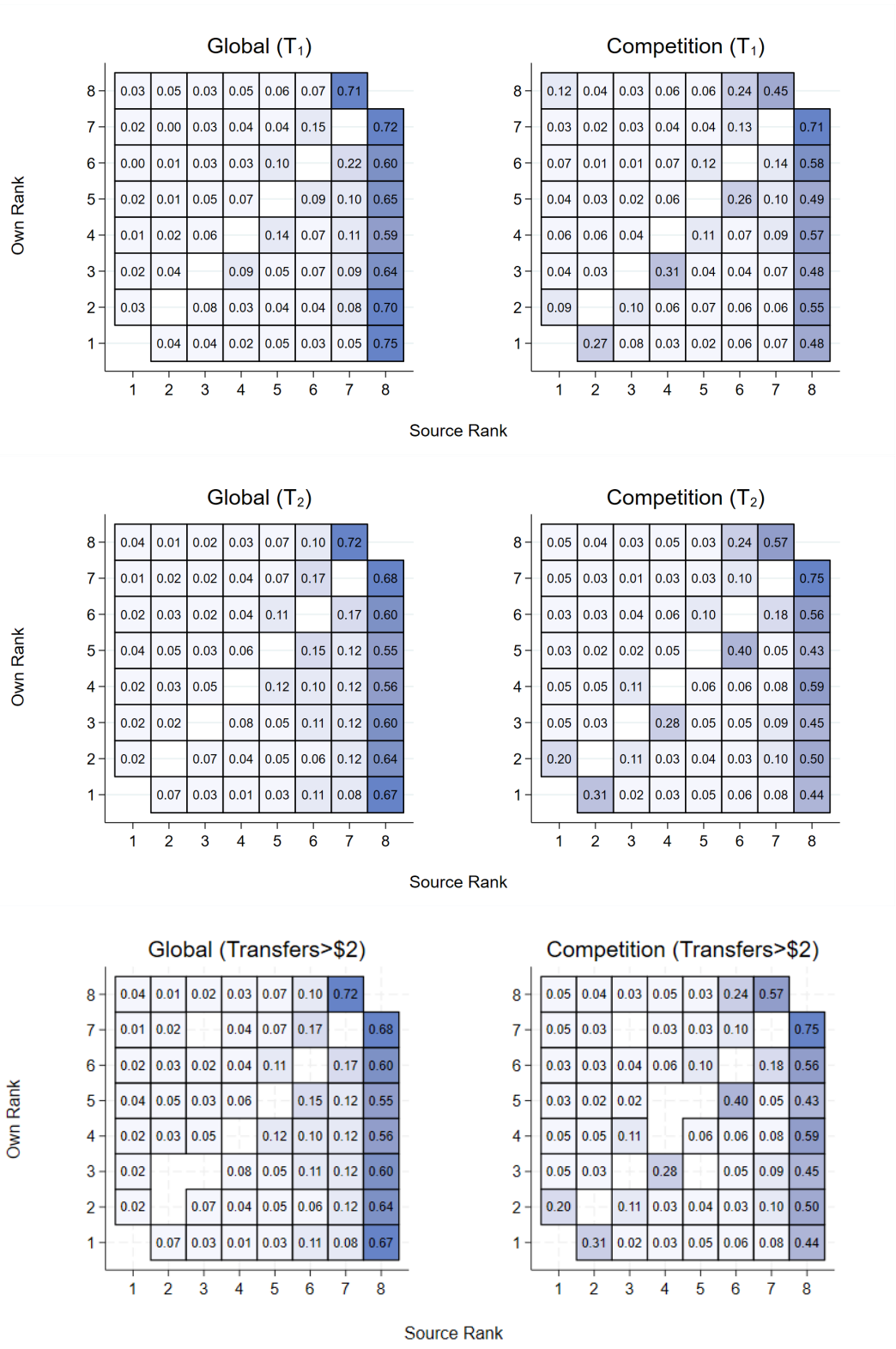



Figure 11: Frequency of Source of Non-Zero Transfers

Note: Rank 1 has the lowest pre-transfer earnings. In the Competition treatment, individuals in ranks 1, 3, 5, and 7 lost the pre-transfer competition, while those in ranks 2, 4, 6, and 8 were the competition winners.

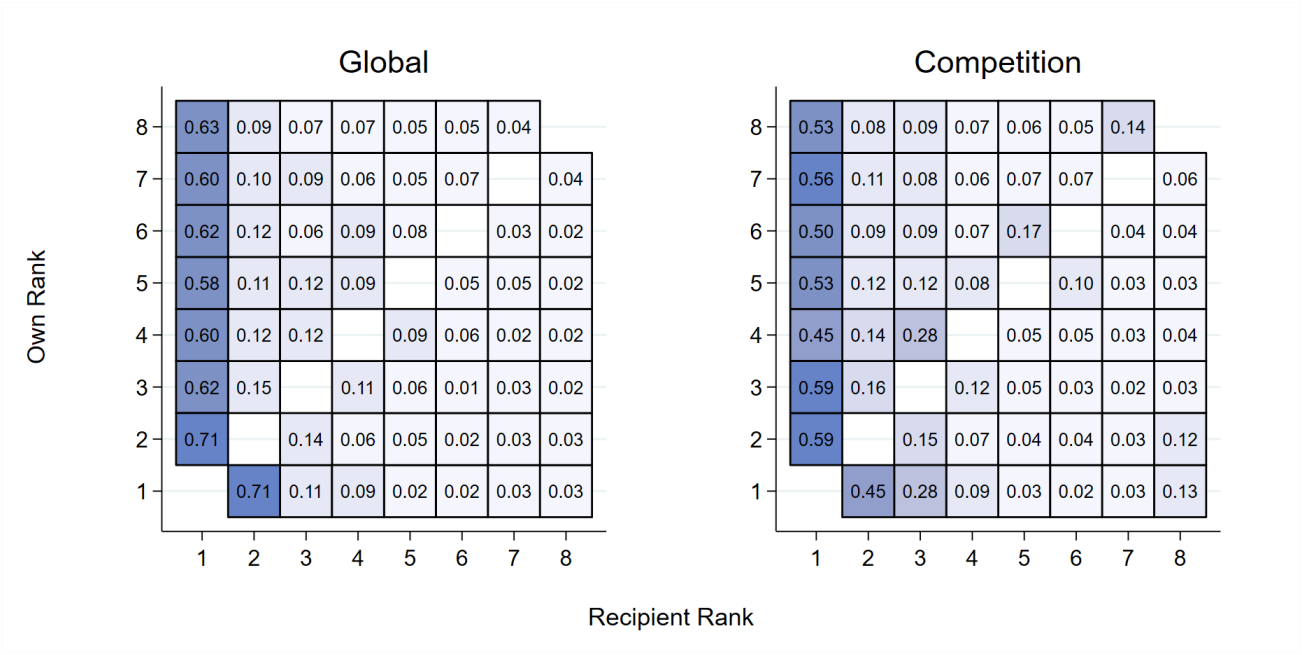



Figure 12: Frequency of Recipient of Non-Zero Transfers

Note: Rank 1 has the lowest pre-transfer earnings. In the Competition treatment, individuals in ranks 1, 3, 5, and 7 lost the pre-transfer competition, while those in ranks 2, 4, 6, and 8 were the competition winners.

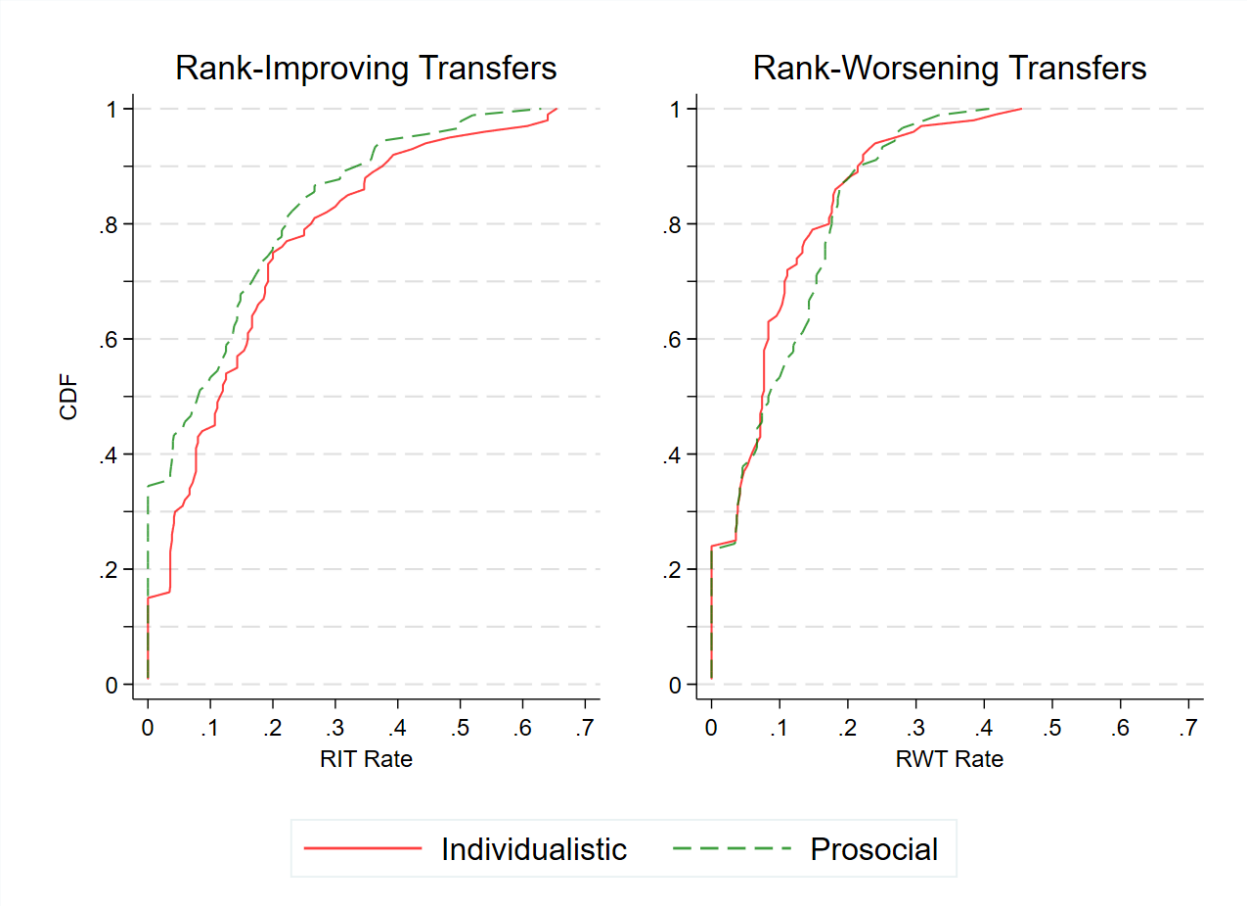



Figure 13: Rank-Improving and Rank-Worsening Transfers, by Subject split by SVO Category

Note: Rates are calculated based on only cases where rank-improving or rank-worsening transfers are feasible.

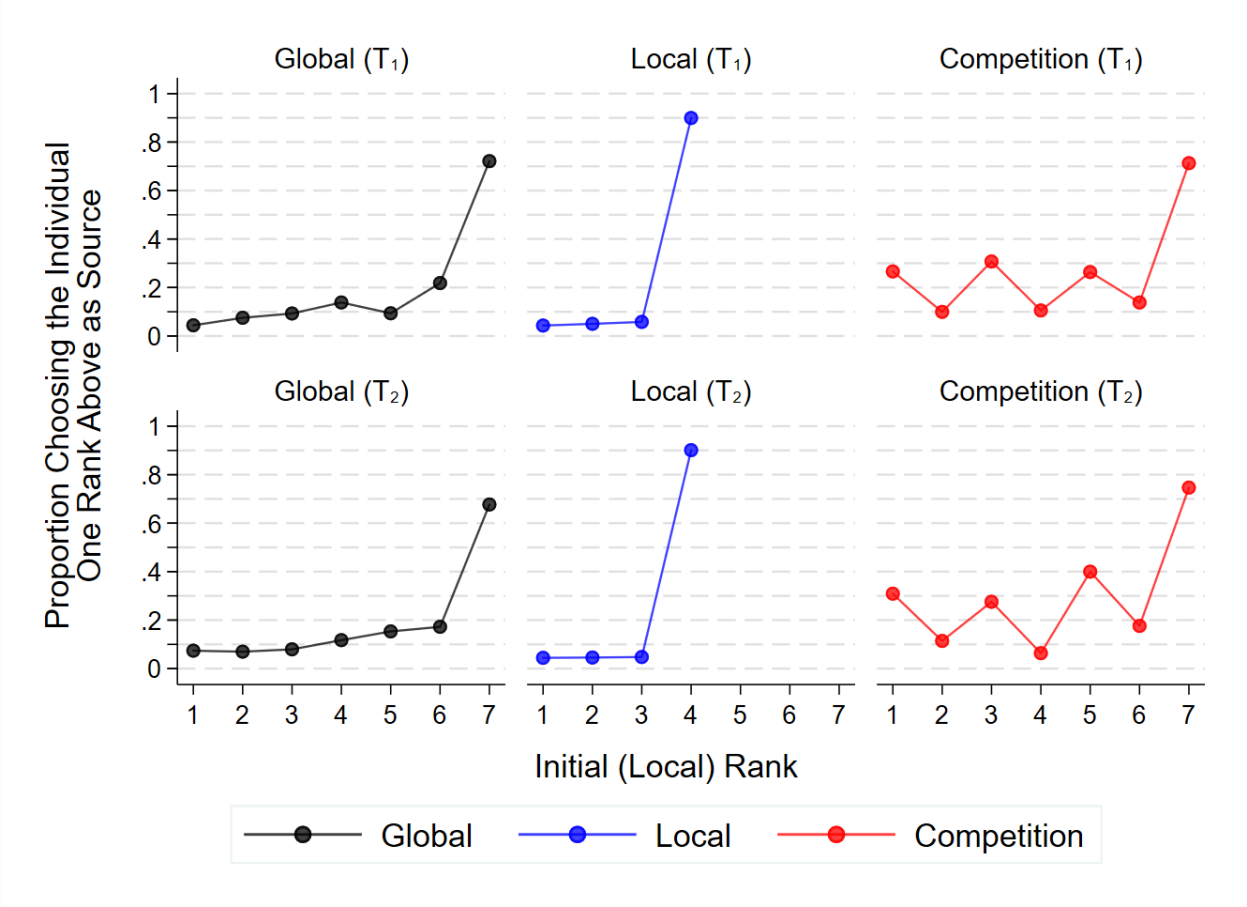



Figure 14: Frequency of Targeting Individual One Rank Above as Transfer Source

Note: Restricted to positive transfers.