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Fairness and unequal productive skills among other-regarding individuals

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Fairness and unequal productive skills among other-regarding individuals*

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Abstract

This paper deals with the fair ranking of allocations when individuals endowed with heterogeneous skills have other-regarding preferences over the average consumption in society. By assuming that such preferences matter for equality, we construct a social ordering function that aims to reduce differences which originate in unequal productivities.

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1 Introduction

Lately, many papers have analysed the problem of fair redistribution with heterogeneous marginal productivities. The aim of this literature is to construct social preferences in order to deal with the existing conflict between compensating low innate abilities while at the same time respecting individual preferences. More recently, some authors have drawn attention to the importance of including other-regarding preferences (ORPs) in the assessment of individual well-being. Opposite to the

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standard self-centered preferences, individuals who exhibit ORPs care about others' situation as well as their own.

By assuming a model with ORPs, the objective of the present paper is to contribute to the fairness literature by characterising social preferences that compensate agents for their unequal skills. These agents have standard preferences over labour and individual consumption, as well as ORPs over the average consumption in society. We take such other-regarding views into account when designing both efficiency and fairness principles.

As regards the issue of fair redistribution, some of the most prominent theories of fairness and responsibility defend that society should only reduce the outcome differences that originate from elements for which individuals should not be deemed responsible (see Roemer, 1998). As a result of the contributions made by Fleurbaey and Maniquet (2018), a new branch of this fairness literature which focuses on the case of unequal production skills has emerged. By using specific reference values, the aim of this branch is to construct social preferences that allow the planner to deal with the conflict between compensating low innate abilities and respecting individual preferences over consumption and labour.

Besides this problem of compensating agents for their unequal production skills, we also consider that individuals have heterogenous ORPs. Although the standard economic analysis is grounded on the assumption that agents act in a self-regarding manner, both studies of subjective well-being (see Luttmer, 2005; Clark et al., 2008) and experimental research (e.g., Fehr and Schmidt, 2006) have drawn attention to the importance of the ORPs in the evaluation of individual well-being. As a consequence of these findings, the literature on ORPs has rapidly expanded by including such relative views into the standard economic modelling (e.g., Dufwenberg et al., 2011). Even so, the inclusion of ORPs in the formal analysis of redistributive results under normative criteria has been barely studied.

Whether individual relative views should or should not be taken into account by normative evaluations is a debatable question. Apart from the analytical complexity of these evaluations, the main reason that some use to reject ORPs is that they may reward extreme versions of antisocial behaviours (e.g., Harsanyi, 1982). Nevertheless, other authors have comprehensively challenged this argument, and defend that the other-regarding views should be incorporated into the definition of normative criteria, at least partially, to provide a better assessment of social welfare (see Frank, 2005).

Decerf and Van der Linden (2016) follow this discussion up, and show that any resulting social ranking will critically depend on the extent of the ORPs that the planner is willing to use. Although different scenarios are analysed, they finally argue that to avoid rewarding those with extremely antisocial behaviours only efficiency principles should use information on the ORPs. However, these authors also acknowledge that there are some applications in which fairness compensations grounded on differences in the other-regarding views are pertinent for social evaluations. This is probably the case when social norms and socio-economic backgrounds unfairly determine the formation of heterogeneous ORPs (e.g., Bauer et al., 2014). One can more easily defend social compensations for heterogenous ORPs, for instance, when women, but not men, suffer important well-being losses from partner's unemployment, as Braakmann (2014) finds.

Furthermore, Fleurbaey (2012) defends that being at a certain position in the social ranking may be part of a personal life plan. This interpretation of the ORPs over a relative social position easies the controversy of the approach that we adopt, as it excludes situations in which an agent desires the failure of some specific groups independently of her own position. Additionally, it has been documented that the people's relative income shapes both their well-being (e.g., Easterlin, 2001) and their fairness views (see Hvidberg et al., 2021). Consequently, other-regarding views should be incorporated, at least to some extent, to provide a more accurate evaluation of social welfare. Following this viewpoint, Treibich (2019) and Calo-Blanco (2020) assume that ORPs matter for equality and construct social preferences when individuals care, respectively, about the average consumption and the social health state.

As a result of the previous discussion, the aim of the present paper is to derive social preferences that rank all consumption-labour allocations when individuals are endowed with unequal production skills and have ORPs over the average consumption in society. We do so by assuming that the planner takes the other-regarding views into account at the time of designing both efficiency and fairness axioms. We obtain that society should prioritise that agent with the minimum value of a comparable measure of individual well-being. This measure is the smallest skill that would allow any individual to remain indifferent between the actual allocation and a hypothetical situation in which her consumption would coincide with the average value.

The rest of the paper is organised as follows. Section 2 introduces the general framework. Section 3 presents the ethical requirements that society wants to fulfil when agents are not held responsible for their ORPs. Section 4 characterises the social preferences that result from these requirements. Section 5 offers the conclusions of this study.

2 Framework

Let us consider an economy with a finite set of individuals $N = \{1, \dots, n\}$ and two goods, consumption, $c \in \mathbb{R}_+$, and labour, $\ell \in [0, 1]$. Every agent $i \in N$ has a *consumption-labour* bundle $z_i = (c_i, \ell_i) \in Z = \mathbb{R}_+ \times [0, 1]$. An allocation $z_N = (z_1, \dots, z_n) = (z_i)_{i\in N} \in Z^n$ lists all the individuals' bundles.

Every agent $i \in N$ is characterised by two traits. First, she is endowed with a production skill $s_i \in \mathbb{R}_{++}$ that transforms labour time ℓ into consumption good $s_i\ell \in \mathbb{R}_+$. Let S be the set of all the feasible skills, where the maximal value is denoted as $s_{\max}$. The population's profile of skills is described by $s_N = (s_i)_{i\in N} \in S^n$. An allocation is attainable if $\sum_{i\in N} c_i \leq \sum_{i\in N} s_i\ell_i$. Second, individual $i \in N$ has well-defined preferences R_i over the space Z^n. They are continuous, strictly convex, and strictly monotonic when the others' situation remain constant. $z_N R_i z'_N$ means that agent i weakly prefers z_N to allocation z'_N. Strict preference and indifference are denoted P_i and I_i. The profile of ORPs is $R_N = (R_i)_{i\in N}$.

Let us now make some assumptions about the domain of preferences. First, similar to Treibich (2019) we consider that individuals have ORPs only over the average consumption in the economy, which is denoted as $\overline{c}_z = \sum_{i\in N} c_i/n$.

ORPs Axiom 1 *Preferences R_i satisfy Average Consumption Externalities if there exists R^*_i over $Z \times \mathbb{R}_+$ such that for any $z_N, z'_N \in Z^n$:*

$$z_N R_i z'_N \Leftrightarrow (z_i, \overline{c}_z) R^*_i (z'_i, \overline{c}_{z'}).$$

In what follows, we slightly abuse notation and write $(z_i, \overline{c}_z) R_i (z'_i, \overline{c}_{z'})$ to denote $(z_i, \overline{c}_z) R^*_i (z'_i, \overline{c}_{z'})$.

Second, we limit the negative externalities that anyone may experience. Specifically, we consider that it is always possible to find another allocation in which an individual obtains the same utility when the rest of the agents have the highest consumption.

ORPs Axiom 2 *Preferences R_i satisfy Limited Envy if for any $z_N \in Z^n$ there exist $z'_i \in Z$ and $z'_{N\setminus\{i\}} = (z'_1, \dots, z'_{i-1}, z'_{i+1}, \dots, z'_n) \in Z^{n-1}$ with $\overline{c}_{z'_{N\setminus\{i\}}} = s_{\max}$ such that:*

$$\left(z'_i, z'_{N\setminus\{i\}}\right) R_i z_N.$$

Moreover, let us assume that the individual ordinal evaluation of one's own choice does not depend on the other agents' choices (see Dufwenberg et al., 2011).

ORPs Axiom 3 *Preferences R_i satisfy Separability if for all $i \in N$ and $z_N, z'_N \in Z^n$:*

$$(z_i, z_{N\setminus\{i\}})R_i(z'_i, z_{N\setminus\{i\}}) \Leftrightarrow (z_i, z'_{N\setminus\{i\}})R_i(z'_i, z'_{N\setminus\{i\}}).$$

This axiom implies that for any $i \in N$ it is possible to define a well-defined ordering over the set of bundles Z, regardless of the utility level that the value of $\bar{c}_z$ characterises.

Finally, we consider that every agent prefers the actual allocation to any situation that entails either no consumption or full labour time.

ORPs Axiom 4 *Preferences R_i satisfy Boundedness if for any $z_N, z'_N \in Z^n$ we have that $c_i > 0$, $\ell_i < 1$ and either $c'_i = 0$ or $\ell'_i = 1$ imply:*

$$z_N P_i z'_N.$$

Let $\mathcal{R}$ denote the domain of ORPs that satisfy these properties, and hence $R_N \in \mathcal{R}^n$. For any $z_N \in Z^n$, the individual i's environment is described by a triple $((c_i, \ell_i), \bar{c}_z) \in Z \times \mathbb{R}_+$, and a three-dimensional indifference surface (see Figure 1). Her utility increases right-downwards, and the situation is feasible if both $c_i \leq n\bar{c}_z$ and $\bar{c}_z \leq \frac{c_i+(n-1)s_{\max}}{n}$ are satisfied (see the shaded areas). As the number of agents in society decreases, this feasible environment shrinks to the plane in which $c = \bar{c}$.

An *economy* is described by a list $e = (s_N, R_N)$, where $\mathcal{E}$ is the domain of all such economies. A *social ordering function* (SOF) $\mathbf{R}$ maps every $e \in \mathcal{E}$ into a complete *social ordering* over Z^n. Formally, for any $z_N, z'_N \in Z^n$, let $z_N\mathbf{R}(e)z'_N$ denote that allocation z_N is at least as good as z'_N. Strict preference and indifference are denoted $\mathbf{P}(e)$ and $\mathbf{I}(e)$.

Let us now present our measure of individual well-being, which is based on the concept of egalitarian-equivalence (see Pazner and Schmeidler, 1978). To do so, we need to introduce first two different subsets of the space Z^n. First, for any $i \in N$ let the indifference set at $z_N \in Z^n$ be defined as $I_i(z_N) = \{z'_N \in Z^n \mid z'_N I_i z_N\}$. Second, we denote by $\overline{Z}_i^n = \{z_N \in Z^n \mid c_i = \bar{c}_z\}$ the set of allocations that, for any agent $i \in N$, are egalitarian in terms of consumption. Given these two subsets, an agent's well-being is defined as the minimum value which allows her to remain indifferent between the actual allocation and another environment in which her consumption coincides with the average level.

Definition 1 *For all $i \in N$, $R_i \in \mathcal{R}$ and $z_N \in Z^n$, the individual i's egalitarian-equivalent $u_e(z_N, R_i)$ is the smallest $u \in \mathbb{R}_+$:*

$$I_i(z_N) \cap \overline{Z}_i^n \cap \vec{v}_i \neq \emptyset,$$

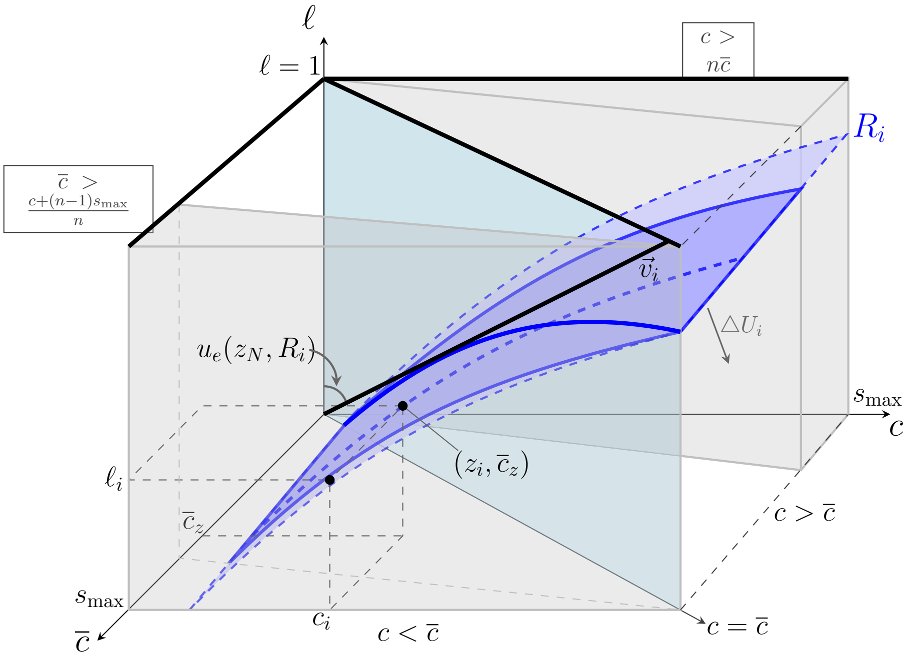

Figure 1: The domain of ORPs

where $\vec{v}_i$ *is the line that passes through the point* $(0, 0, 0)$ *and has a direction vector* $\langle u, 1, u \rangle$.

Figure 1 also illustrates this concept. The individual i's egalitarian-equivalent in z_N is characterised by the slope of the straight ray that is tangent to the curve that represents the intersection between $I_i(z_N)$ and the $c_i = \bar{c}$ plane (see the thick blue curve). Since this plane is the feasible space when the number of agents in society converges to 1, $u_e(z_N, R_i)$ can be understood as the smallest production skill that, in the absence of externalities, allows i to obtain the same utility. In the domain $\mathcal{R}$ this egalitarian-equivalent is always well-defined, and its value is shaped by the individual traits. For instance, if agent i becomes more altruistic her indifference set will pivot downwards around the initial bundle as the others' income decreases. Since her consumption is smaller than the average value (see Figure 1), this change will increase i's utility. Regarding her skills, with a higher productivity this individual can obtain the same income with less labour time, and hence her equivalent utility will increase.

3 Ethical principles

Let us now present the ethical principles that are desirable for our social preferences. As we have previously stated, these principles take the individuals' ORPs into account. The first one ensures a minimum degree of efficiency.

SO Axiom 1 Strong Pareto
For all $e \in \mathcal{E}$ *and* $z_N, z'_N \in Z^n$, *if* $z_N R_i z'_N$ *for all* $i \in N$*; then* $z_N \mathbf{R}(e) z'_N$*. If moreover,* $z_N P_j z'_N$ *for some* $j \in N$*; then* $z_N \mathbf{P}(e) z'_N$*.*

The second principle demands that adding or removing agents who receive the same bundle in two different allocations does not affect social preferences (e.g., D'Aspremont and Gevers, 1977). Since this change may affect the social environment, we restrict the axiom to groups of agents whose consumption coincides with the average value.

SO Axiom 2 Consistency
For all $e \in \mathcal{E}$ *and* $z_N, z'_N \in Z^n$, *if there exists* $G \subset N$ *such that* $z_i = z'_i$ *for all* $i \in G$ *and moreover* $\overline{c}_z = \overline{c}_{z'} = \overline{c}_G$*, then:*

$$z_N \mathbf{R}(e) z'_N \Leftrightarrow z_{N \setminus G} \mathbf{R}(e_{-G}) z'_{N \setminus G},$$

where $e_{-G} = (s_{N \setminus G}, R_{N \setminus G})$*.*

We now introduce two redistributive principles that characterise improvements in social welfare. The first one establishes that a reduction in the well-being inequality between two agents with the same preferences increases welfare. Moreover, those not involved in this reduction must remain indifferent.

SO Axiom 3 Priority Among Equals
For all $e \in \mathcal{E}$ *and* $z_N, z'_N \in Z^n$, *if there exist* $j, k \in N$ *such that* $R_j = R_k = R$,

$$\left(z'_j, z'_{N\setminus\{j\}}\right) P \left(z_j, z_{N\setminus\{j\}}\right) P \left(z_k, z_{N\setminus\{k\}}\right) P \left(z'_k, z'_{N\setminus\{k\}}\right),$$

and $z_N I_i z'_N$ *for all* $i \neq j, k$*; then* $z_N \mathbf{R}(e) z'_N$*.*

The second redistributive principle defines how to make welfare comparisons when individuals have different ORPs. Following a *laissez-faire* ideal (see Fleurbaey and Maniquet, 2006), this principle considers that there is no need for redistribution when all agents have access to the same bundles. It is important to stress that in a model with ORPs this ideal

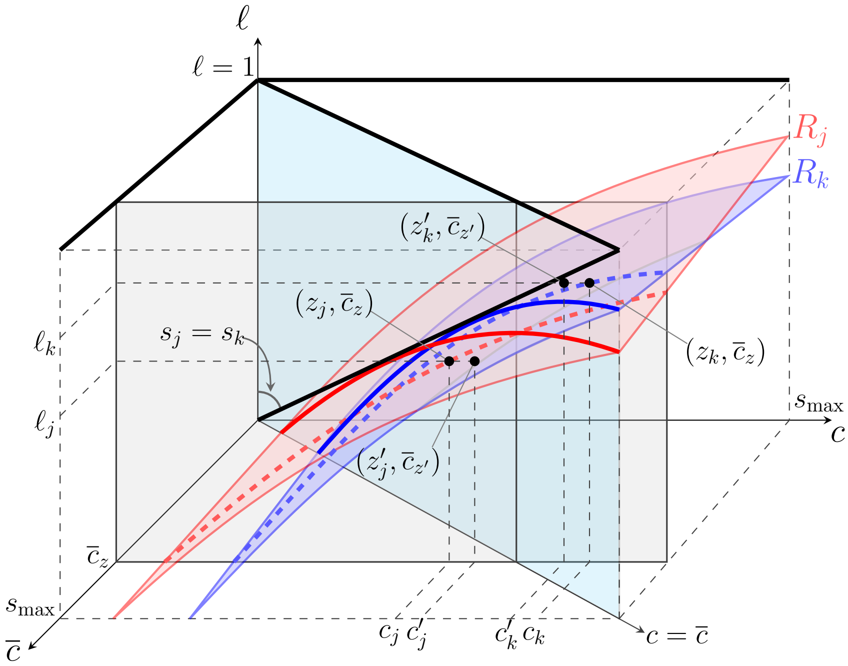

Figure 2: The Stand-Alone *Laissez-Faire* axiom

needs to be defined carefully in order to avoid incompatibility problems. To ensure that the absence of redistribution is indeed the social optimum we resort, once more, to the feasible space when the number of agents converges to 1. Specifically, we assume that in the case of uniform earning ability individuals should be allowed to freely choose their labour time in the plane $\overline{Z}^n$, when they are free of any externality. Consequently, an allocation that is equivalent to this hypothetical optimum situation cannot be socially dominated by any other allocation that entails the same average consumption.

SO Axiom 4 Stand-Alone Laissez-Faire
For all $e \in \mathcal{E}$ *where* $s_j = s_k$ *for all* $j, k \in N$, $z_N \in Z^n$ *such that* $(z_i, \overline{c}_z) I_i \max|_{R_i} \{(\widehat{z}, \widehat{c}_z) \in \overline{Z}^n_i \mid \widehat{c} \leq s_i \widehat{\ell}\}$ *for all* $i \in N$ *and* $z'_N \in Z^n$ *with* $\overline{c}_{z'} = \overline{c}_z$, *one has* $z_N \mathbf{R}(e) z'_N$.

An example of the application of the *Stand-Alone Laissez-Faire* axiom for a two-agent equal-skill economy is depicted in Figure 2, in which we have that allocation z_N is socially preferred to z'_N.

4 Social preferences

Having defined all the elements of our model, let us now characterise the social preferences that satisfy the previous four ethical principles.

Theorem 1 *On the domain $\mathcal{E}$, if social preferences satisfy Strong Pareto, Consistency, Priority Among Equals and Stand-Alone Laissez-Faire, then for any $z_N, z'_N \in Z^n$:*

$$\min_{i\in N} u_e(z_N, R_i) > \min_{i\in N} u_e(z'_N, R_i) \Rightarrow z_N \mathbf{R}(e) z'_N.$$

Proof. For any $e \in \mathcal{E}$, let us consider allocations $z_N, z'_N \in Z^n$ and individuals $j, k \in N$ such that, without loss of generality, $u_e(z'_N, R_j) < u_e(z_N, R_k) < u_e(z_N, R_j) < u_e(z'_N, R_k)$, and moreover $u_e(z_N, R_i) = u_e(z'_N, R_i)$ for all $i \neq j, k$. We first prove that $z_N \mathbf{P}(e) z'_N$. Let us, on the contrary, assume that $z'_N \mathbf{R}(e) z_N$.

In the domain $\mathcal{E}$ it is always possible to define $\delta \in (0, s_{\max}]$ and $\widehat{z}_N, \widehat{z}'_N \in Z^n$ such that:[1]

$$u_e(\widehat{z}_N, R_i) = u_e(z_N, R_i) \text{ and } u_e(\widehat{z}'_N, R_i) = u_e(z'_N, R_i) \text{ for all } i \in N,$$
$$\frac{\sum_{i\neq\{j,k\}} \widehat{c}_i}{n-2} = \frac{\sum_{i\neq\{j,k\}} \widehat{c}'_i}{n-2} = \delta \text{ and } \widehat{c}_k = \widehat{c}_j = \widehat{c}'_k = \widehat{c}'_j = \delta.$$

By *Strong Pareto*, which implies *Pareto Indifference*, we conclude that $\widehat{z}'_N \mathbf{R}(e) \widehat{z}_N$.

Let us now introduce individuals a and b with $s_a = s_b = s$, $R_a = R_j$ and $R_b = R_k$. We also consider $z''_j, z_a, z_b, z^*_a, z^*_b \in Z$ such that:

$$\begin{aligned} &c''_j = c_a = c_b = c^*_a = c^*_b = \delta, \\ &u_e((z_a, z_b), R_a) < s < u_e((z_a, z_b), R_b), \\ &\widehat{\ell}_j < \ell^*_a < \ell_a < \ell''_j < \widehat{\ell}'_j, \\ &\widehat{\ell}'_k < \widehat{\ell}_k < \ell_b < \ell^*_b. \end{aligned}$$

Additionally, let (z^*_a, z^*_b) be a *laissez-faire* allocation for the two-agent economy $\{a, b\}$.

Consistency implies $(\widehat{z}'_N, z^*_a, z^*_b)\mathbf{R}(e)(\widehat{z}_N, z^*_a, z^*_b)$. By applying the *Priority Among Equals* axiom twice we obtain $(\widehat{z}'_{N\setminus\{j,k\}}, z''_j, \widehat{z}_k, z_a, z_b)\mathbf{R}(e)(\widehat{z}'_N, z^*_a, z^*_b)$, and by *Strong Pareto* $(\widehat{z}'_{N\setminus\{j,k\}}, \widehat{z}_j, \widehat{z}_k, z_a, z_b)\mathbf{P}(e)(\widehat{z}'_{N\setminus\{j,k\}}, z''_j, \widehat{z}_k, z_a, z_b)$. *Transitivity* implies

[1] These allocations exist, at least, for $\delta = s_{\max}$.

$(\widehat{z}'_{N\setminus\{j,k\}}, \widehat{z}_j, \widehat{z}_k, z_a, z_b)\mathbf{P}(e)(\widehat{z}_N, z_a^*, z_b^*)$. By *Pareto Indifference* and *Consistency* we get $(z_a, z_b)\mathbf{P}(e)(z_a^*, z_b^*)$. However, *Stand-Alone Laissez-Faire* implies $(z_a^*, z_b^*)\mathbf{R}(e)(z_a, z_b)$, which yields a contradiction.

In the second, and final, part of the proof we have to show that for any $z_N, z'_N \in Z^n$ such that $\min_{i\in N} u_e(z_N, R_i) > \min_{i\in N} u_e(z'_N, R_i)$, social preferences are $z_N\mathbf{P}(e)z'_N$. This result derives from a standard procedure in the literature (see Fleurbaey and Maniquet, 2006). □

5 Discussion

We have developed a framework to make fair welfare evaluations when agents have ORPs over the average level of consumption in the economy. By adjusting standard ethical axioms of the fairness literature, we have derived a measure of individual well-being which allows us to compensate individuals for both their skills and their other-regarding views.

The framework proposed here is a solid starting point for future research. Despite the interest in the topic of fair optimal taxation, there is no study that analyses the practical implementation of social preferences with ORPs. Additionally, it would be interesting to extend the problem to a more complex setting in which individuals have ORPs over several goods at the same time.

References

Bauer, M., J. Chytilová, and B. Pertold-Gebicka (2014). Parental background and other-regarding preferences in children. Experimental Economics 17(1), 24–46.

Braakmann, N. (2014). The consequences of own and spousal disability on labor market outcomes and subjective well-being: evidence from germany. Review of Economics of the Household 12(4), 717–736.

Calo-Blanco, A. (2020). Health and fairness with other-regarding preferences. Review of Economic Design 24, 123–141.

Clark, A. E., P. Frijters, and M. A. Shields (2008). Relative income, happiness, and utility: An explanation for the easterlin paradox and other puzzles. Journal of Economic Literature 46(1), 95–144.

D'Aspremont, C. and L. Gevers (1977). Equity and the informational basis of collective choice. The Review of Economic Studies 44(2), 199–209.

Decerf, B. and M. Van der Linden (2016). Fair social orderings with other-regarding preferences. Social Choice and Welfare 46(3), 655–694.

Dufwenberg, M., P. Heidhues, G. Kirchsteiger, F. Riedel, and J. Sobel (2011). Other-regarding preferences in general equilibrium. The Review of Economic Studies 78(2), 613–639.

Easterlin, R. A. (2001). Income and happiness: Towards a unified theory. The Economic Journal 111(473), 465–484.

Fehr, E. and K. M. Schmidt (2006). The economics of fairness, reciprocity and altruism – experimental evidence and new theories. In S.-C. Kolm and J. M. Ythier (Eds.), Foundations, Volume 1 of Handbook of the Economics of Giving, Altruism and Reciprocity, Chapter 8, pp. 615–691. Elsevier.

Fleurbaey, M. (2012). The importance of what people care about. Politics, Philosophy & Economics 11(4), 415–447.

Fleurbaey, M. and F. Maniquet (2006). Fair income tax. The Review of Economic Studies 73(1), 55–83.

Fleurbaey, M. and F. Maniquet (2018). Optimal income taxation theory and principles of fairness. Journal of Economic Literature 56(3), 1029–1079.

Frank, R. H. (2005). Positional externalities cause large and preventable welfare losses. The American Economic Review 95(2), 137–141.

Harsanyi, J. C. (1982). Morality and the theory of rational behaviour. In A. Sen and B. Williams (Eds.), Utilitarianism and Beyond, pp. 39–62. Cambridge: Cambridge University Press.

Hvidberg, K. B., C. T. Kreiner, and S. Stantcheva (2021). Social position and fairness views. CESifo Working Paper 8928, 123–141.

Luttmer, E. F. P. (2005). Neighbors as negatives: Relative earnings and well-being. The Quarterly Journal of Economics 120(3), 963–1002.

Pazner, E. A. and D. Schmeidler (1978). Egalitarian equivalent allocations: A new concept of economic equity. The Quarterly Journal of Economics 92(4), 671–687.

Roemer, J. E. (1998). Equality of Opportunity. Harvard University Press, Cambridge.

Treibich, R. (2019). Welfare egalitarianism with other-regarding preferences. Social Choice and Welfare 52(1), 1–28.