



# Inequity-averse preferences in general equilibrium



Rodrigo A. Velez

Department of Economics, Texas A&M University, College Station, TX 77843, USA

## ARTICLE INFO

### Article history:

Received 21 January 2016

Received in revised form

11 January 2017

Accepted 27 February 2017

Available online 22 March 2017

### Keywords:

Inequity aversion

General equilibrium

## ABSTRACT

We study the stability with respect to the introduction of opportunity-based inequity aversion à la Dufwenberg et al. (2011) of three welfare properties satisfied by competitive equilibria in self-regarding economies: (i) Pareto efficiency may not be a stable property; (ii) undomination with respect to income redistribution is a stable property whenever the marginal indirect utility of income has no extreme variations; and (iii) generically (endowment-wise) market-constrained efficiency is a stable property.

© 2017 Elsevier B.V. All rights reserved.

## 1. Introduction

We study welfare properties of competitive equilibria in economies populated by agents who exhibit a form of inequity aversion introduced in a general equilibrium environment by Dufwenberg et al. (2011)—henceforth DHKRS. Ceteris paribus, an agent's ideal is equality of opportunity.<sup>1</sup> She loses welfare when her perception of the opportunities offered to others by the market deviates from those offered to her. The agent's preferences are parameterized, à la Fehr and Schmidt (1999), by the agent's internal utility function, which represents her subjective assessment of consumption bundles; a coefficient that captures the agent's aversion to inequity of opportunities against herself; and a coefficient that captures aversion to inequity of opportunities against others. When these two coefficients are zero, the agent exhibits no other-regarding behavior. As these coefficients grow, the agent's concern for the overall distribution of resources becomes more important compared to her private consumption. Remarkably, the set of competitive equilibria of an opportunity-based inequity-averse economy is exactly the set of competitive equilibria of the corresponding self-regarding economy (DHKRS).

Each equal-income competitive equilibrium in an opportunity-based inequity-averse economy is Pareto efficient (Proposition 1).

Equal-income competitive equilibria were proposed by Foley (1967) in order to achieve no-envy, i.e., the requirement that no agent should prefer the consumption of another agent to her own consumption. Proposition 1 adds to the inventory of normative considerations that points to these allocations as being central in the problem of equitably allocating resources (see Thomson, 2010, for a survey).

Pareto efficiency of a competitive equilibrium with unequal incomes crucially depends on the absence of opportunity-based inequity aversion.<sup>2</sup> For any two-agent economy in which at least one agent's inequity aversion coefficients are positive, each competitive equilibrium with different incomes and whose outcomes are not ordered (with respect to the usual order in a Euclidean space) is not Pareto efficient. Moreover, given any two internal preferences whose maximizers differ at some positive prices and income level, one can find endowments such that the corresponding economy and all of its replicas possess a competitive equilibrium that is not Pareto efficient for economies with these internal preferences, endowments, and non-zero inequity aversion coefficients (Example 1).<sup>3</sup>

<sup>2</sup> It is well known that the First Welfare Theorem (Arrow, 1951; Debreu, 1951) fails if there are externalities. Indeed, for almost all economies satisfying a separability condition, every competitive equilibrium is Pareto dominated by another competitive allocation for a suitably selected anonymous tax scheme (Geanakoplos and Polemarchakis, 2008). Opportunity-based inequity-aversion externalities do not belong in this domain.

<sup>3</sup> Indeed, the competitive equilibrium in Example 1 is Pareto dominated by a change in price without modifying consumption or endowment of the agents. Thus, even the weaker notion of efficiency that requires an allocation is not Pareto dominated by a change in price while keeping the initial endowments constant crucially depends on the self-regarding assumption for market outcomes.

E-mail address: [rvelezca@tamu.edu](mailto:rvelezca@tamu.edu).

URL: <https://sites.google.com/site/rodrigoavelezswebpage/home>.

<sup>1</sup> Experimental economists have documented consistent human behavior that cannot be rationalized by self-regarding preferences. In some situations this behavior can be rationalized by inequity-averse preferences (see Fehr and Schmidt, 2001, for a survey). DHKRS's opportunity-based preferences capture a form of inequity aversion that is plausible in a market, or any social system, in which agents are endowed with a set from which they can select an alternative to consume.

Inefficiency of competitive equilibria in opportunity-based inequity-averse economies has a limit. First, for a neighborhood of each self-regarding economy whose marginal indirect utility of income has no extreme changes, a social planner who is constrained to make only income transfers at market prices, cannot improve upon any competitive equilibrium. More precisely, consider an economy such that for each agent the ratio of minimal to maximal marginal indirect internal utility of income for a given price is uniformly bounded across different prices. For each such an economy there is a neighborhood of zero in the inequity aversion parameter space for which the property holds for the corresponding other-regarding economies (Theorem 2)—homogeneous of degree one internal utility functions belong to this set (Corollary 1). This constrained form of efficiency is specially meaningful when there is a numeraire good that the social planner must use in order to reallocate income and whose consumption does not affect agents' market choice for the other goods (i.e., a quasi-linear environment). Second, generically (endowment-wise) there is a neighborhood of each smooth self-regarding economy in which no market outcome is Pareto dominated by another market outcome (Section 3.3). Thus, a social planner whose role is to select among possible market outcomes, generically cannot unequivocally improve upon any given market outcome in a neighborhood of each self-regarding economy.

Undomination by income redistribution is a property of the market that is more easily satisfied by large markets with opportunity-based inequity-averse agents (Theorems 3 and 4). This is because in Fehr and Schmidt's parameterization of inequity aversion, the effect of the consumption of a single agent in the utility of the other agents decreases with the size of the market. This makes it more difficult to achieve a Pareto improvement from a given allocation by redistributing income at market prices as the market grows. Indeed, consider a finite set of opportunity-based inequity-averse preferences whose associated internal utility is homogeneous of degree one. For each economy with preferences out of this finite set and a large enough number of agents, each competitive allocation is undominated by income redistribution at market prices (Corollary 2).<sup>4</sup>

The proofs of Theorems 2–4 follow from a basic theorem that states conditions guaranteeing that in an opportunity-based inequity-averse economy a market outcome cannot be Pareto dominated by an allocation obtained by redistributing income at market prices (Theorem 1). First, the coefficient that captures the agent's aversion to inequity of opportunity against her, should satisfy a parametric restriction that depends on the bounds for the income derivative of the agent's indirect internal utility function.<sup>5</sup> This first restriction guarantees that the direct loss of at least one agent who gives up income in an income redistribution, cannot be compensated by the reduction in her perception that she is receiving more opportunities than the other agents. Second, for each agent, (i) either the indirect internal utility is a concave function of income, or (ii) her inequity aversion coefficients satisfy a joint restriction that depends on the bounds for the income derivative of the agent's indirect internal utility function. These additional requirements guarantee that for at least an agent who gives up income in an income redistribution, the part of her direct loss that cannot be compensated by the reduction in her perception that she is receiving more opportunities than the other, is not compensated by the reduction in her perception that other agents

are getting better opportunities than her. If restrictions (i) and (ii) above are violated, Theorem 1 may not hold (Example 2).

Our Theorem 1 is closely related to Theorem 5.1 in DHKRS, which states conditions on preferences guaranteeing that a market outcome is undominated by income redistribution in an opportunity-based inequity-averse economy. A careful look at these authors' work reveals a subtle error. Essentially, they overlook the role of an agent's utility loss due to the agent's perception that other agents receive better opportunities.<sup>6</sup> As a consequence they assert that there is no restriction on an agent's perception of inequity against herself in order to guarantee that a market allocation is undominated by income redistribution. This assertion is incorrect even if, ceteris paribus, one replicates agents in the economy (this is shown by Example 2). At a technical level, our work is closer to Velez (2016, Theorem 3), which states conditions guaranteeing an equal income competitive allocation is Pareto efficient in economies with indivisible goods.

## 2. Model

Consider the general equilibrium environment with opportunity-based other-regarding preferences introduced by DHKRS. There are  $L$  goods and prices are normalized so that  $\mathbf{p} \geq 0$  and  $\sum_{l=1}^L p_l = 1$ . For simplicity in the presentation we will assume an exchange economy. The set of agents is  $\mathbf{N} \equiv \{1, \dots, n\}$ . Each agent's consumption set is  $\mathbb{R}_+^L$ . Agent  $i$ 's consumption bundle is  $\mathbf{x}_i \equiv (\mathbf{x}_{i1}, \dots, \mathbf{x}_{iL})$ . The consumption profile is  $\mathbf{x} \equiv (\mathbf{x}_i)_{i \in \mathbf{N}}$ . Agent  $i$ 's endowment is  $\omega_i$  and the profile of endowments is  $\omega \equiv (\omega_i)_{i \in \mathbf{N}}$ . An agent's welfare depends not only on her consumption, but also on the profile of budget sets in the society. That is, agents make a judgment about their opportunities and those of the others. We will concentrate on studying an environment in which budget sets are determined by a vector of prices  $\mathbf{p}$  and the income profile,  $\mathbf{w} \equiv (\mathbf{w}_i)_{i \in \mathbf{N}}$ . We will consider a possible income redistribution at the market prices, so we do not assume  $w_i$  is necessarily equal to  $p \cdot \omega_i$ . We require that aggregate income be equal to the value of the aggregate endowment at market prices, however. Thus, any income redistribution at market prices can be achieved by a social planner by redistributing the aggregate endowment proportional to income.<sup>7</sup> Agent  $i$ 's budget set when her income is  $w_i$  and prices are  $\mathbf{p}$  is  $\mathbf{B}_i(\mathbf{p}, \mathbf{w}_i) \equiv \{\mathbf{x}_i \in \mathbb{R}_+^L : \mathbf{p} \cdot \mathbf{x}_i \leq w_i\}$ ; the profile of budget sets is denoted by  $\mathbf{B}(\mathbf{p}, \mathbf{w})$ .

Feasibility of an allocation in an economy with opportunity-based inequity-averse agents goes beyond the simple aggregate availability of resources. The issue here is that agents are affected by the distribution of opportunities in the society. Thus in order for these perceived opportunities to be meaningful, one needs to require not only that aggregate consumption be equal to aggregate endowment, but also that each agent consumes in her budget set (for possibly redistributed endowments).<sup>8</sup> A feasible allocation is a

<sup>6</sup> In Page 634, DHKRS claim the following in the paragraph after equation (A.5): one can take agent  $r$ , the one who loses the most income, to be, without loss of generality, the agent with highest income. This claim is based on the observation that proving equation (A.5) holds when one decreases the consumption of the agents who get income above agent  $r$ , actually proves equation (A.5). This is true. However, this does not imply the former claim. Equation (A.5) tells us about the utility of agent  $r$ , not the other agents. So when one makes the change, the agents who had higher income than agent  $r$  may lose utility. So an allocation that was better for them, necessarily becomes worse. Example 2 illustrates the issue: the agents who lose the most income are the medium-income agents.

<sup>7</sup> We keep track of income independently of endowment because this simplifies the notation given that each agent is indifferent among two situations in which her consumption and the profile of budget sets coincide.

<sup>8</sup> Note that this notion of feasibility does not require that each agent's consumption maximizes her preferences in her budget set given what is assigned to the other. Requiring this would imply that only market allocations are feasible.

<sup>4</sup> DHKRS first stated Corollary 2. However, they stated it as a consequence of a theorem that is mathematically incorrect (see last paragraph of the introduction of this paper for details). This is the first paper in which the statement is proved true.

<sup>5</sup> This was first observed by DHKRS.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات