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Altruism and the Transfer Paradox*

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Abstract

This paper examines whether altruism causes the transfer paradox in the model with two countries and two goods when the consumers of the donor and recipient countries have altruistic utility. We demonstrate that if the Walrasian stability condition is satisfied in the general equilibrium, the transfer paradox can never take place irrespective of the definition of utility. The result suggests that the motivation for transfer cannot be explained by the donor's enrichment because it is not caused by the introduction of altruism into the model.
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1. Introduction

Since Keynes vs. Ohlin debated over the German war reparations after World War I—a well-known classical example of debates on international transfers of income—the transfer problem has sparked a lot of public interest and has raised various economic issues in the international trade theory. [1)]

An income transfer may improve or worsen the terms of trade of both the transferer and transferee. If the secondary effect of the income transfer on the terms of trade exceeds its direct effect, the welfare of the transferer may improve and/or the welfare of the transferee may worsen against the will of the former. Such a situation is called the "transfer paradox." Leontief (1936) presented an example of the fact that the change of terms of trade resulting from a transfer causes the transfer paradox for the donor through one of the classical articles that dealt with the transfer paradox in a two-commodity world involving two countries. On the contrary, using the notion of Walrasian stability, Samuelson (1952, 1954) showed that if

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1) Regarding the Keynes vs. Ohlin controversy, see Keynes (1929) and Ohlin (1929). As an example of a concise survey on the transfer problem, see Brakman and Marrewijk (1998, Ch. 2).

the general equilibrium is stable, the transfer paradox cannot arise under free trade and as a result, the example of Leontief (1936) is excluded under the stability assumption.

In order for the transfer paradox to take place in a stable equilibrium, some presumptions of Samuelson (1952) need to be modified. The existing literature on the subject has explained why the transfer paradox takes place by mainly extending Samuelson's model in the following two directions. The first extension is the introduction of the third country into the model. In the model with three countries and two goods, Bhagwati et al. (1983) show that there is a possibility of the paradoxes of enriched donor and immiserized recipient arising when there is an outside country in a multilateral world. Second, when free trade is hindered by distortions such as trade barriers, the transfer paradox takes place in a two-country model. Bhagwati et al. (1985) demonstrate that when there is exogenous distortion by trade barriers such as tariff and subsidy, a transfer may paradoxically enrich the donor and immiserize the recipient. They also show that if the transfer induces endogenous distortion such as lobbying and rent-seeking, there exists the possibility of paradoxes of donor and recipient arising. The existing literature has analyzed a variety of distortions. For example, the restriction of the recipient country's behavior in exchange of aid effectively constitutes a distortion (see Kemp and Kojima, 1985; Schweinberger, 1990; Lahiri and Raimondos, 1995). Administrative cost of transfer, sticky wage and unemployment, and transfer of production factors are other examples.[2)]

In recent years, several articles have attempted to explain the transfer paradox by introducing altruism into the donor's utility in the model. If a donor has altruistic utility, the transfer raises the recipient's utility and the increase in the recipient's utility may in turn raise the donor's utility. If this result is correct, the introduction of altruism into the donor's utility explains the donor's enrichment. As a result, altruism presents the reason behind the donor's voluntary contribution of foreign aid. Kemp and Shimomura (2002) explore the model of voluntary unrequited transfer and show that altruism might be the motivating factor behind the donor's transfer. Contrary to altruism, in the setting in which the welfare of each country is negatively influenced, Kemp and Shimomura (2003) demonstrate that the donor might benefit at the expense of the recipient. Lahiri and Raimondos-Møller (1999) develop a model wherein altruism is the motive for the donor giving aid and trade is distorted by tariffs or quotas. They show that if the donor is sufficiently altruistic, transfer is strictly Pareto improving. In other words, they conclude that the donor's altruism enriches the donor itself. Takarada and Tawada (2003) explore the model wherein the donor has altruistic utility and the donor's government gives aid for attaining political objectives. They demonstrate that it is always optimal for the recipient to accept the transfer and if the donor takes care of the recipient's welfare sufficiently, the donor's enrichment takes place.

However, most of the existing literature has explained the transfer paradox by combining altruism with other distortions such as tariffs or political motives into the model. In the present article, we examine whether altruism itself causes the transfer paradox in a simple two-commodity world with two countries when there is no other distortion. By applying the traditional argument on the stability of the general equilibrium, we demonstrate that even if the donor and/or recipient has or have altruistic utility, the transfer paradox can never take

2) The distortions that cause the transfer paradox have been comprehensively analyzed by Brakman and Marrewijk (1998).

place irrespective of whether utility is defined to include altruism. Altruism does not cause the donor's enrichment. Therefore, our result assures that the benevolent assumption that the donor country has altruistic intentions toward the recipient country cannot elucidate the reason why the donor gives aid voluntarily. As the existing literature has theorized, the distortion that hinders free trade is necessary for the transfer paradox to take place in the model with two countries and two goods.

The remainder of this paper is organized as follows. Section 2 describes the model wherein the donor and/or recipient has or have altruistic utility in the model with two countries and two goods. Section 3 analyzes the transfer paradox with regard to the self-utility that excludes altruism and that with regard to the total utility that includes altruism, respectively. We present the main result that the transfer paradox can never take place irrespective of the definition of utility. Section 4 concludes the paper with some remarks.

2. Model

Consider a general equilibrium model of international trade in a two-commodity world involving two countries. There are two countries—a donor country (indexed by α) and a recipient country (indexed by β). They trade in two goods—the non-numeraire good (x_1) and the numeraire good (x_2). Suppose that the donor (recipient) is an exporter (resp. importer) of the non-numeraire good. It is assumed that foreign aid is distributed in lump-sum among consumers. There is no import tariff or export subsidy. $T \geq 0$ denotes the transfer as foreign aid. The donor provides foreign aid of the amount T in terms of the numeraire good to the recipient. p represents the international price of the non-numeraire good, which could be interpreted as a relative price because unity constitutes the domestic price of the numeraire good.

The consumption pair of the representative consumer in country $i = \alpha, \beta$ (hereafter consumer i) is denoted by $(x^i{}_1, x^i{}_2)$, where $x^i{}_1$ is the non-numeraire good and $x^i{}_2$ is the numeraire good. Define the utility that consumer i obtains directly from the consumption of goods by $u^i \equiv u^i\,(x^i{}_1, x^i{}_2)$. We denote u^i as "self-utility." Self-utility does not include any altruistic part of utility. Consumer α (β) obtains the utility $u^\alpha = u^\alpha(x^\alpha{}_1, x^\alpha{}_2)$ (resp., $u^\beta = u^\beta(x^\beta{}_1, x^\beta{}_2)$) by consuming goods. In order to describe altruism for the people in both countries, we define the "total utility" of consumer i by $U^i \equiv U^i(u^i, u^j) = U^i(u^i(x^i{}_1, x^i{}_2), u^j(x^j{}_1, x^j{}_2)), i, j = \alpha, \beta$, $j \neq i$. It should be noted that the total utility of consumer i includes the altruistic utility that is raised by the increase in u^j. For simplification of analysis, we assume that self-utility and total utility are continuously differentiable. We define $U^i_j \equiv \dfrac{\partial U^i}{\partial u^j}$, $i, j = \alpha, \beta$ and assume, as usual, $U^i_i > 0$. Under differentiability, altruism implies $U^i_j \geq 0, j \neq i$.

Denote trade expenditure function by E^i, which is defined as the difference between the expenditure function e^i and revenue function r^i. Thus, the following equations are satisfied:

$$E^\alpha(p,U^\alpha) \equiv e^\alpha(p,U^\alpha) - r^\alpha(p), \tag{1}$$

$$E^{\beta}(p,U^{\beta}) \equiv e^{\beta}(p,U^{\beta}) - r^{\beta}(p). \tag{2}$$

We denote the import demand function of the non-numeraire good in country i by m^i. Without loss of generality, we assume that $m^{\alpha} < 0$ and $m^{\beta} > 0$. Thus, the recipient imports the non-numeraire good by m^{β} (> 0).

The budget constraints in the countries are as follows:

$$E^{\alpha}(p,U^{\alpha}) = -T, \tag{3}$$

$$E^{\beta}(p,U^{\beta}) = T. \tag{4}$$

The product market-clearing condition is as follows:[3)]

$$m^{\alpha}(p,U^{\alpha}) + m^{\beta}(p,U^{\beta}) = 0. \tag{5}$$

Using McKenzie's lemma, the following equation is satisfied:[4)]

$$m^i = E^i_p. \tag{6}$$

3. Results

In this section, we examine whether the transfer paradox takes place with regard to the self-utility and total utility by applying the argument of Walrasian stability. First, let us investigate the impact of an increase in the unfettered transfer T upon the self-utility (u^{α},u^{β}). By totally differentiating eqs. (3)–(5) with respect to $(U^{\alpha},U^{\beta}, p)$, which are variables of the model described above, the following equation is obtained:

$$\begin{bmatrix} E^{\alpha}_U & 0 & m^{\alpha} \\ 0 & E^{\beta}_U & m^{\beta} \\ m^{\alpha}_U & m^{\beta}_U & M_p \end{bmatrix} \begin{bmatrix} \mathrm{d}U^{\alpha} \\ \mathrm{d}U^{\beta} \\ \mathrm{d}p \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix} \mathrm{d}T, \tag{7}$$

where $M_p \equiv m^{\alpha}_p + m^{\beta}_p < 0$. Totally differentiating the total utility $U^i \equiv U^i(u^i, u^j)$, $i, j = \alpha, \beta$, $j \neq i$ with respect to the self-utility (u^i,u^j), we obtain the following equations.

$$\mathrm{d}U^{\alpha} = U^{\alpha}_{\alpha}\mathrm{d}u^{\alpha} + U^{\alpha}_{\beta}\,\mathrm{d}u^{\beta}, \tag{8}$$
$$\mathrm{d}U^{\beta} = U^{\beta}_{\alpha}\mathrm{d}u^{\alpha} + U^{\beta}_{\beta}\,\mathrm{d}u^{\beta}. \tag{9}$$

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3) The world market-clearing condition for the numeraire good has been omitted due to Walras's law.
4) The subscript x represents the partial derivative of the functions with respect to x.

Substituting (8) and (9) into (7) and arranging it with respect to (du^α, du^β, dp), we obtain the following equation.

$$\begin{bmatrix} E_U^\alpha U_\alpha^\alpha & E_U^\alpha U_\beta^\alpha & m^\alpha \\ E_U^\beta U_\alpha^\beta & E_U^\beta U_\beta^\beta & m^\beta \\ m_U^\alpha U_\alpha^\alpha + m_U^\beta U_\alpha^\beta & m_U^\alpha U_\beta^\alpha + m_U^\beta U_\beta^\beta & M_p \end{bmatrix} \begin{bmatrix} \mathrm{d}u^\alpha \\ \mathrm{d}u^\beta \\ \mathrm{d}p \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ 0 \end{bmatrix} dT. \tag{10}$$

Applying Cramer's rule to (10), we obtain the following equation.

$$\begin{aligned} \frac{\mathrm{d}u^\alpha}{\mathrm{d}T} &= \frac{1}{\Gamma} \begin{vmatrix} -1 & E_U^\alpha U_\beta^\alpha & m^\alpha \\ 1 & E_U^\beta U_\beta^\beta & m^\beta \\ 0 & m_U^\alpha U_\beta^\alpha + m_U^\beta U_\beta^\beta & M_p \end{vmatrix} \\ &= \frac{1}{\Gamma}\left\{\left[-E_U^\beta U_\beta^\beta M_p + (m_U^\alpha U_\beta^\alpha + m_U^\beta U_\beta^\beta) m^\alpha\right] + \left[-E_U^\alpha U_\beta^\alpha M_p + (m_U^\alpha U_\beta^\alpha + m_U^\beta U_\beta^\beta) m^\beta\right]\right\} \\ &= \frac{1}{\Gamma}\left\{-\left(E_U^\alpha U_\beta^\alpha + E_U^\beta U_\beta^\beta\right) M_p + \left(m_U^\alpha U_\beta^\alpha + m_U^\beta U_\beta^\beta\right)\left(m^\alpha + m^\beta\right)\right\} \\ &= -\frac{M_p (E_U^\alpha U_\beta^\alpha + E_U^\beta U_\beta^\beta)}{\Gamma}, \end{aligned} \tag{11}$$

where $\Gamma \equiv -E_U^\alpha E_U^\beta \left(U_\alpha^\alpha U_\beta^\beta - U_\beta^\alpha U_\alpha^\beta\right)\Delta$ and $\Delta \equiv -M_p + m^\alpha m_U^\alpha \left(E_U^\alpha\right)^{-1} + m^\beta m_U^\beta \left(E_U^\beta\right)^{-1}$. Using a similar procedure, we obtain the impact on the self-utility for recipient β as follows:

$$\frac{\mathrm{d}u^\beta}{\mathrm{d}T} = \frac{M_p (E_U^\alpha U_\alpha^\alpha + E_U^\beta U_\alpha^\beta)}{\Gamma} = \frac{M_p \left(E_U^\alpha U_\alpha^\alpha + E_U^\beta U_\alpha^\beta\right)}{E_U^\alpha E_U^\beta \left(U_\alpha^\alpha U_\beta^\beta - U_\beta^\alpha U_\alpha^\beta\right)\Delta}. \tag{12}$$

Samuelson (1952) shows that if the general equilibrium satisfies the Walrasian stability condition, it is not possible for any transfer paradox to occur in the model with two countries and two goods. Now, in our model in which there is altruism, we examine whether the transfer paradox occurs with regard to the self-utility when the Walrasian stability condition is guaranteed. The Walrasian stability condition in the model is summarized in the following lemma.

Lemma 1. *The Walrasian stability condition is as follows:*

$$\Delta \equiv -M_p + m^\alpha m_U^\alpha (E_U^\alpha)^{-1} + m^\beta m_U^\beta (E_U^\beta)^{-1} > 0. \tag{13}$$

Proof. Denote $\dot{p}$ as the change in the price of the non-numeraire good x_1 over time as a result of an imbalance in the demand and supply of good x_1. In order to analyze the Walrasian price adjustment process, we consider the budget constraint of each country, (3) and (4), and the following dynamic adjustment equation:

$$\dot{p} = \Pi(m^{\alpha}(p,U^{\alpha}(u^{\alpha}, u^{\beta}))+m^{\beta}(p,U^{\beta}(u^{\alpha}, u^{\beta}))). \tag{14}$$

Since the function $\Pi(\cdot)$ in (14), which is assumed to be continuously differentiable, depends on the world excess demand of good x_1, we assume that the price of good x_1 is rising if and only if the world excess demand for good x_1 is positive, such that $\Pi(0) = 0$ and $\Pi'(0) > 0$. If we linearize systems (3), (4), and (14) around equilibrium values of price and utility, say $(\overline{p}, \overline{u}^{\alpha}, \overline{u}^{\beta})$, and use the normalization above, we obtain:

$$m^{\alpha}\left(p-\overline{p}\right)+E_U^{\alpha}\left\{U_{\alpha}^{\alpha}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\alpha}\left(u^{\beta}-\overline{u}^{\beta}\right)\right\}=0, \tag{15}$$

$$m^{\beta}\left(p-\overline{p}\right)+E_U^{\beta}\left\{U_{\alpha}^{\beta}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\beta}\left(u^{\beta}-\overline{u}^{\beta}\right)\right\}=0, \tag{16}$$

$$\begin{aligned}\dot{p}=\Pi(0)+\Pi'(0)\Big[&m_p^{\alpha}\left(p-\overline{p}\right)+m_U^{\alpha}\left\{U_{\alpha}^{\alpha}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\alpha}\left(u^{\beta}-\overline{u}^{\beta}\right)\right\}\\ &+m_p^{\beta}\left(p-\overline{p}\right)+m_U^{\beta}\left\{U_{\alpha}^{\beta}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\beta}\left(u^{\beta}-\overline{u}^{\beta}\right)\right\}\Big].\end{aligned} \tag{17}$$

By (15) and (16), $U_{\alpha}^{\alpha}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\alpha}\left(u^{\beta}-\overline{u}^{\beta}\right)=-\frac{m^{\alpha}}{E_U^{\alpha}}\left(p-\overline{p}\right)$ and $U_{\alpha}^{\beta}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\beta}\left(u^{\beta}-\overline{u}^{\beta}\right)$ $=-\frac{m^{\beta}}{E_U^{\beta}}\left(p-\overline{p}\right)$ are obtained. Substituting them into (17) and using $\Pi(0) = 0$ gives

$$\dot{p}=\Pi'(0)\left[\left(m_p^{\alpha}-\frac{m^{\alpha}m_U^{\alpha}}{E_U^{\alpha}}\right)+\left(m_p^{\beta}-\frac{m^{\beta}m_U^{\beta}}{E_U^{\beta}}\right)\right](p-\overline{p})=-\Pi'(0)\Delta(p-\overline{p}), \tag{18}$$

where $\Delta \equiv -M_p+m^{\alpha}m_U^{\alpha}(E_U^{\alpha})^{-1}+m^{\beta}m_U^{\beta}(E_U^{\beta})^{-1}$. For Walrasian stability, we want the price change of good x_1 to be negative if p exceeds the equilibrium price $\overline{p}$ and to be positive if p falls short of the equilibrium price $\overline{p}$. Walrasian stability thus requires that $\Delta > 0$. □

By Lemma 1, the Walrasian stability condition is represented by the impact of price and total utility on trade expenditure function E^i and it does not depend on self-utility. It should be noted that total utility itself prescribes the stability condition, while self-utility, which affects total utility, have nothing to do with it. As shown in the proof of Lemma 1, when substituting (15) and (16) into (17), total differentiation with respect to the self-utility is completely removed. In other words, the change of total utility includes all the change of self-utility of both countries, as evidently shown in $\mathrm{d}U^{\alpha}=U_{\alpha}^{\alpha}\left(u^{\alpha}-\overline{u}^{\alpha}\right)+U_{\beta}^{\alpha}\left(u^{\beta}-\overline{u}^{\beta}\right)$

and $\mathrm{d}U^{\alpha} = U^{\beta}_{\alpha}\left(u^{\alpha} - \bar{u}^{\alpha}\right) + U^{\beta}_{\beta}\left(u^{\beta} - \bar{u}^{\beta}\right)$.

By Lemma 1, under the Walrasian stability condition, we obtain the following proposition with regard to the transfer paradox of self-utility.

Proposition 1. *Suppose that Walrasian stability and* $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$ *are satisfied. As regarding self-utility, even if the donor and/or the recipient has or have altruistic utility, no transfer paradox occurs in the model with two countries and two goods. That is, if* $\Delta > 0$ *and* $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$*, then* $\frac{\partial u^{\alpha}}{\partial T} < 0$ *and* $\frac{\partial u^{\beta}}{\partial T} > 0$ *are satisfied.*

Proof. Note that $M_p < 0, E^{\alpha}_{U} > 0, E^{\beta}_{U} > 0, U^{i}_{i} > 0, U^{i}_{j} \geq 0.$ By Lemma 1, the Walrasian stability condition is $\Delta > 0$. If $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$, by (11) and (12), the following inequalities are immediately obtained:

$$\frac{\mathrm{d}u^{\alpha}}{\mathrm{d}T} = \frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\beta} + E^{\beta}_{U}U^{\beta}_{\beta}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta} - U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} < 0, \quad \frac{\mathrm{d}u^{\beta}}{\mathrm{d}T} = -\frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\alpha} + E^{\beta}_{U}U^{\beta}_{\alpha}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta} - U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} > 0. \tag{19}$$

□

Proposition 1 clarifies the condition in which no transfer paradox takes place with regard to self-utility. If the Walrasian stability condition $\Delta > 0$ is satisfied under the assumption $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$, any transfer paradox with regard to self-utility does not occur. Under this assumption, even if there is altruism for the donor and/or recipient, the donor does not raise its self-utility by giving aid and the recipient's self-utility does not fall.

This assumption is not restrictive at all because it seems to be always satisfied in real situations. If, as expected, the impact on the total utility of the self-utility exceeds that of the altruistic part in both countries ($U^{\alpha}_{\alpha} > U^{\alpha}_{\beta}$ and $U^{\beta}_{\beta} > U^{\beta}_{\alpha}$), the assumption $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$ is necessarily satisfied and any transfer paradox does not occur. Even if the donor takes care of the recipient more than oneself ($U^{\alpha}_{\alpha} > U^{\alpha}_{\beta}$), transfer paradox does not always occur. As often found, if the recipient takes care of oneself more than the donor, for example, if the recipient is not at all interested in the welfare of the other ($U^{\beta}_{\alpha} = 0$), both the donor's enrichment and the recipient's immiserization are not possible to occur. Although the sufficient condition in which transfer paradox occurs is that both countries take care of others more than themselves, such a situation is quite unrealistic. Therefore, $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$ is satisfied in most real situations and if the stability of the equilibrium is guaranteed, no transfer paradox takes place with regard to self-utility.

The assertion of Proposition 1 seems surprising at first glance, because it implies that even if people give aid to others, they cannot raise their own welfare through this help-providing action in normal situations. Even if the donor is concerned about the rise in the utility of the recipient, the former cannot become happier by supporting the recipient through the transfer. Proposition 1 concludes that in order for the transfer paradox to take place, other distortions—which have already been analyzed in the existing literature—are required to be introduced into the model. Therefore, although Lahiri and Raimondos-Møller (1999) and

Takarada and Tawada (2003) explore the models in which altruism is introduced, the transfer paradox never occurs without the distortions such as trade barriers or political objectives which they assume in their models.

We can, of course, consider the situation in which $U^{\alpha}_{\alpha}U^{\beta}_{\beta} > U^{\alpha}_{\beta}U^{\beta}_{\alpha}$ is not assumed and there exists a possibility of the transfer paradox occurring. However, the violation of this assumption is quite unrealistic in the sense that it is based on the assumption that the people in a country emphasize the welfare of the other country more than their own. Therefore, for example, although Kemp and Shimomura (2002) show the possibility of a Pareto-improving transfer, in order for both the countries to benefit from the transfer, it is necessary that the irregular assumption about the impact of altruistic utility is satisfied. If a condition similar to the assumption $U^{i}_{i} > U^{i}_{j}$ is assumed, the possibility of a Pareto-improving transfer will be excluded. As long as the consumers of both the donor and recipient countries are predominantly concerned about the maximization of their own utility, the transfer necessarily causes a decrease in the donor's welfare and an increase in the recipient's welfare.

Next, we examine whether the transfer paradox takes place with regard to the total utility. We investigate the impact of an increase in the unfettered transfer T upon U^{α} and U^{β}. Substituting (11) and (12) into (8) and (9) and arranging them, the following equations are obtained.[5)]

$$\begin{aligned}\frac{\partial U^{\alpha}}{\partial T} &= U^{\alpha}_{\alpha}\frac{\mathrm{d}u^{\alpha}}{\mathrm{d}T} + U^{\alpha}_{\beta}\frac{\mathrm{d}u^{\beta}}{\mathrm{d}T}\\ &= U^{\alpha}_{\alpha}\frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\beta}+E^{\beta}_{U}U^{\beta}_{\beta}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} - U^{\alpha}_{\beta}\frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\alpha}+E^{\beta}_{U}U^{\beta}_{\alpha}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta}\\ &= \frac{M_p\left(U^{\alpha}_{\alpha}\left(E^{\alpha}_{U}U^{\alpha}_{\beta}+E^{\beta}_{U}U^{\beta}_{\beta}\right)-U^{\alpha}_{\beta}\left(E^{\alpha}_{U}U^{\alpha}_{\alpha}+E^{\beta}_{U}U^{\beta}_{\alpha}\right)\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} = \frac{M_p E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta}\\ &= \frac{M_p}{\Delta E^{\alpha}_{U}}\end{aligned} \tag{20}$$

$$\begin{aligned}\frac{\partial U^{\beta}}{\partial T} &= U^{\beta}_{\alpha}\frac{\mathrm{d}u^{\alpha}}{\mathrm{d}T} + U^{\beta}_{\beta}\frac{\mathrm{d}u^{\beta}}{\mathrm{d}T}\\ &= U^{\beta}_{\alpha}\frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\beta}+E^{\beta}_{U}U^{\beta}_{\beta}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} - U^{\beta}_{\beta}\frac{M_p\left(E^{\alpha}_{U}U^{\alpha}_{\alpha}+E^{\beta}_{U}U^{\beta}_{\alpha}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta}\\ &= \frac{M_p\left(U^{\beta}_{\alpha}\left(E^{\alpha}_{U}U^{\alpha}_{\beta}+E^{\beta}_{U}U^{\beta}_{\beta}\right)-U^{\beta}_{\beta}\left(E^{\alpha}_{U}U^{\alpha}_{\alpha}+E^{\beta}_{U}U^{\beta}_{\alpha}\right)\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta} = \frac{M_p E^{\alpha}_{U}\left(U^{\beta}_{\alpha}U^{\alpha}_{\beta}-U^{\beta}_{\beta}U^{\alpha}_{\alpha}\right)}{E^{\alpha}_{U}E^{\beta}_{U}\left(U^{\alpha}_{\alpha}U^{\beta}_{\beta}-U^{\alpha}_{\beta}U^{\beta}_{\alpha}\right)\Delta}\\ &= -\frac{M_p}{\Delta E^{\beta}_{U}}\end{aligned} \tag{21}$$

5) Eguations (20) and (21) can be also obtained by directly applying Cramer's rule to the equation of total differentiation (7).

Mentioned repeatedly, Samuelson (1952) shows that if the general equilibrium satisfies the Walrasian stability condition, it is not possible for any transfer paradox to occur in the model with two countries and two goods. The following proposition is obtained by applying a similar argument to the total utility.

Proposition 2. *If the Walrasian stability condition is satisfied, it is not possible for any transfer paradox with regard to the total utility to occur in the model with two countries and two goods. That is,* $\frac{\mathrm{d}U^{\alpha}}{\mathrm{d}T} < 0$ *and* $\frac{\mathrm{d}U^{\beta}}{\mathrm{d}T} > 0$ *are satisfied.*

Proof. Walrasian stability requires $\Delta > 0$. As $M_p < 0$ and $E_U^i = e_U^i > 0$ are satisfied, by (20) and (21), $\frac{\mathrm{d}U^{\alpha}}{\mathrm{d}T} = \frac{M_p}{\Delta E_U^{\alpha}} < 0$ and $\frac{\mathrm{d}U^{\beta}}{\mathrm{d}T} = -\frac{M_p}{\Delta E_U^{\beta}} > 0$ are immediately obtained. □

Proposition 2 implies that even if the altruistic utility is introduced into the model, no transfer paradox with regard to total utility occurs in the world in which Walrasian stability is guaranteed. In other words, as regards the total utility level $U^i \equiv U^i(u^i, u^j)$, the donor can never enrich and the recipient can never immiserize by the transfer from the donor to the recipient. From this proposition, the motivation for the donor to give aid cannot be explained by its enrichment as a result of altruism. The existing literature concerning altruism has not analyzed the relationship between the total utility and the transfer paradox in an explicit manner and has been concerned about the impact that altruism has on self-utility excluding the altruistic part. By focusing on not only the self-utility but also total utility, we clarify in this proposition that the transfer paradox with regard to the total utility does not occur as long as the stability is guaranteed.

It should be noted that unlike Proposition 1, the proof of Proposition 2 does not depend on the assumption $U_{\alpha}^{\alpha} U_{\beta}^{\beta} > U_{\beta}^{\alpha} U_{\alpha}^{\beta}$. Therefore, the result of Proposition 2 is satisfied irrespective of how the total utility function $U^i(u^i, u^j)$ depends on u^i and u^j. Moreover, the above result remains to be seen in other general cases in which both utilities have other externalities than altruism. Even when the utility is not altruistic but negatively influenced—for example, when the utility is enviable—the Walrasian stability as defined in this paper guarantees that there is no transfer paradox with regard to the total utility.

4. Concluding Remarks

In the paper, we challenged the conventional wisdom that suggests that altruism motivates the donor country to give aid to the recipient. We demonstrated that in the model with two countries and two goods, even if the donor and/or recipient has or have altruistic utility, the transfer paradox can never take place with regard to both the self-utility and total utility. Although the existing literature that focuses only on selfish utility has emphasized that if Walrasian stability is guaranteed, no transfer paradox can take place, a similar result—of the impossibility of the transfer paradox—is achieved even if the extended utility is allowed to include altruism. As a result, the reason behind the donor country's transfer of economic aid to the recipient cannot be explained by the externality between the utilities of the donor and recipient, such as altruism. Irrespective of the existence of altruism, the donor country must sacrifice its own welfare for the improvement of the welfare of the other country.

The result of the paper implies that the contention that altruism can raise the welfare of the people in the donor country is just an illusion. The paper suggests that the motivation of compassionate or charity cannot justify the transfer activities by the people in developed countries as economic aid from donor countries to developing countries. Even if the people in developed countries possess a merciful disposition toward the people in poor countries—apart from having the economic abundance necessary for providing economic aid to these people—they cannot drive themselves to help toward the cause of poverty reduction in developing countries.

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