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Foreign aid, leisure–effort choice, and economic growth ☆

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ABSTRACT

Using an endogenous growth model, this paper examines the growth and welfare effects of foreign aid in the recipient economy. The emphasis is on the incentive factor of the effort–leisure choice. Besides financing public services, part of the aid is transferred to the public. This increases individual wealth, thereby providing less incentives to individuals for human capital acquisition, but with more leisure. Thus, foreign aid may not always help the growth and welfare of the economy. Taking this incentive factor into account, we further study the issue on aid allocation in achieving the highest levels of growth and welfare. Along the balanced growth path, aid allocation for welfare maximization is different from that under growth maximization.

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1. Introduction

The relationship between foreign aid and real income to both the donor and recipient countries has been a subject of considerable interest ever since the famous discussion between Keynes and Ohlin in 1929. Keynes (1929) claimed that the German reparation payments after WWI had caused a decrease in her terms of trade, while Ohlin (1929) had a different view on it. Since then, studies have moved to the welfare effects of foreign aid and paid in particular attention on the possibility for the so-called transfer paradox, in which the donor enriches and the recipient impoverishes (c.f., Leontief, 1936). Following this line of research, later studies have showed that the transfer paradox can occur when exogenous distortions are present in the goods or factor markets of the economy. For instance, Jones (1970) showed that aid can aggregate the tariff distortion and Beladi (1990) argued that aid can worsen economy-wide unemployment. In both cases, the welfare of the recipient country declines.

Another line of research has focused on the aid-induced endogenous distortions. Tied aid is a fruitful example: Lahiri and Raimondos-Moller (1997) discuss foreign aid tied to import tariffs, Kemp (2005) discusses the tying of aid to exports, while Hatzipanayotou and Michael (1995) assume the aid for provision of public goods and Chao and Yu (1999) consider foreign aid used for environmental cleanup. These cases can also yield the transfer paradox with donor enrichment and recipient impoverishment. Recently, the growth effect of foreign aid has attracted attention in the literature. Chatterjee et al. (2003) indicate that foreign aid can contribute to economic growth if it is used to finance public productive services.

In the above mentioned literature, foreign aid affects the recipient economy through the changes in its aggregate variables, such as the price level, employment, trade volume, income, welfare, growth and the environment. Nonetheless, foreign aid can influence the behavior of individuals. Economides et al. (2008) argue that aid can distort individual incentives by encouraging rent-seeking behavior. This non-productive activity could mitigate the direct positive effect of foreign aid to the economy. In this paper, we provide another channel where aid distorts individual behavior. Besides financing public productive services, part of the foreign aid is transferred to the public in a lump-sum fashion. This increases individual wealth, thereby providing less incentives to individuals for learning and working, but with more leisure. By incorporating this aid-induced disincentive effect into an endogenous growth model, we find that foreign aid can lower growth and hence the welfare of the recipient country if the negative disincentive effect outweighs the positive productive effect of aid. Taking this additional effect into account, we further study the issue of how foreign aid should be allocated to achieve the highest levels of growth and welfare. We find that, along the balanced growth path, aid allocation for welfare maximization is different from that under growth maximization.

The remainder of the paper is organized as follows: Section 2 develops a standard endogenous growth model to examine the growth effect of foreign aid in Section 3, while its welfare effect is discussed in Section 4. Section 5 concludes.

2. The model

We consider an economy that consists of a large number of identical and infinitely-lived households and a government. For simplicity,

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population is normalized to unity. The representative household derives utility from consumption c_t and leisure l_t, and the lifetime utility is given by

$$U = \sum_{t=0}^{\infty}\beta^t(lnc_t + \theta lnl_t),\ \ \beta > 0, \theta > 0, \tag{1}$$

where β denotes the discount factor and θ is a preference parameter. The representative household is endowed with one unit of time in each period that is allocated between leisure l_t and effort e_t. The effort spent is necessary for acquiring human capital. Therefore, we have: $e_t + l_t = 1$.

The production of good y_t is assumed to take the following Cobb–Douglas form:

$$y_t = (uh_t)^{\alpha_1}k_t^{\alpha_2}G_{1t}^{1-\alpha_1-\alpha_2}, u, \alpha_1, \alpha_2 \in (0,1). \tag{2}$$

The output is produced by using human capital h_t, physical capital k_t, and government inputs G_{1t}. Note that u is the fraction of human capital for supporting the production in Eq. (2), while the rest $(1-u)$ is used for the acquisition of human capital:

$$h_{t+1} = [(1-u)e_th_t]^{\gamma}G_{2t}^{1-\gamma}, \gamma \in (0,1), \tag{3}$$

where G_{2t} is the associated government services for facilitating human capital acquisition.

In each period, the household's budget constraint is given by:

$$c_t + k_{t+1} - (1-\delta)k_t = y_t + T_t, \tag{4}$$

where T_t represents government transfers.

We examine first the decision of the household by choosing sequences $\{c_t, e_t, h_{t+1}, k_{t+1}\}_{t=0}^{\infty}$ to maximize Eq. (1) subject to Eqs. (3) and (4). Letting φ_t and λ_t be respectively the Lagrange multipliers associated with them, the optimum conditions are expressed as

$$\frac{1}{c_t} = \lambda_t, \tag{5}$$

$$\frac{\theta}{1-e_t} = \phi_t\gamma\frac{h_{t+1}}{e_t}, \tag{6}$$

$$\phi_t = \beta\left(\alpha_1\lambda_{t+1}\frac{y_{t+1}}{h_{t+1}} + \gamma\phi_{t+1}\frac{h_{t+2}}{h_{t+1}}\right), \tag{7}$$

$$\lambda_t = \beta\lambda_{t+1}\left(\alpha_2\frac{y_{t+1}}{k_{t+1}} + 1 - \delta\right). \tag{8}$$

Eq. (5) states that the household equates the marginal utility of consumption to the marginal utility of wealth, while Eqs. (6) and (7) involve equating marginal costs to marginal benefits for the effort spent on human capital acquisition and the amount acquired for human capital accumulation. Eq. (8) can be used to derive the usual Euler equation for consumption. Moreover, the transversality conditions are given by $\lim_{T\to\infty}(\beta\gamma)^T\phi_{t+T}h_{t+T+1} = 0$, and $\lim_{T\to\infty}\beta^T\lambda_{t+T}k_{t+T+1} = 0$.

We turn next to the government sector of the aid-dependent economy. Following Chatterjee et al. (2003), the government receives foreign aid by the amount proportional to the output of the economy, $A_t = ay_t$, and then allocates a portion v for productive purpose and the rest $(1-v)$ for a transfer payment to the public. Note that the portion for production is further divided into two parts: a portion m used for public inputs to produce good y_t and the rest for public services to facilitate human capital accumulation h_{t+1}. The government budget constraints can be therefore expressed as

$$G_{1t} = mvA_t, \tag{9}$$

$$G_{2t} = (1-m)vA_t, \tag{10}$$

$$T_t = (1-v)A_t. \tag{11}$$

For providing positive public inputs and services by the government, we need to impose $v > 0$ and $m > 0$ in Eqs. (9) and (10).

The aid-recipient home economy can be described by the equilibrium conditions of the household given in Eqs. (5)–(8) and the government budget constraints stated in Eqs. (9)–(11). Assuming $z_t = y_t/k_t$ and $\eta_{t+1} = k_{t+1}/k_t$, from Eqs. (4) and (11), we obtain:

$$\frac{c_t}{y_t} + \frac{\eta_{t+1} - (1-\delta)}{z_t} = 1 + (1-v)a. \tag{12}$$

From Eqs. (5) and (8) we obtain:

$$\frac{c_{t+1}}{c_t} = \beta(\alpha_2 z_{t+1} + 1 - \delta). \tag{13}$$

3. Long-run growth

We consider a balanced growth path (BGP) along which $\frac{c_{t+1}}{c_t} = \frac{k_{t+1}}{k_t} = \frac{y_{t+1}}{y_t} = \frac{h_{t+1}}{h_t} = \eta$. Therefore, z_t remains constant. Eqs. (13) and (12) become:

$$\eta = \beta(\alpha_2 z + 1 - \delta), \tag{14}$$

$$\frac{c}{y} = \frac{1}{z}[(1 + (1-v)a - \alpha_2\beta)z + (1-\beta)(1-\delta)]. \tag{15}$$

By using Eqs. (6) and (7), we can solve for the constant equilibrium effort level as

$$e_t = e = \frac{\frac{\alpha_1\beta\gamma}{\theta(1-\beta\gamma)}z}{\left[\frac{\alpha_1\beta\gamma}{\theta(1-\beta\gamma)} + 1 + (1-v)a - \alpha_2\beta\right]z + (1-\beta)(1-\delta)}. \tag{16}$$

For simplicity, we write the equilibrium effort level as:

$$e_t = e = \frac{Az}{Bz + C}, \tag{17}$$

where

$$A = \frac{\alpha_1\beta\gamma}{\theta(1-\beta\gamma)} > 0,\ B = \left[\frac{\alpha_1\beta\gamma}{\theta(1-\beta\gamma)} + 1 + (1-v)a - \alpha_2\beta\right] > 0,\ C = (1-\beta)(1-\delta) > 0$$

and

$$\frac{\partial e}{\partial z} = \frac{AC}{(Bz + C)^2} > 0, \tag{18}$$

$$\frac{\partial e}{\partial a} = -\frac{A(1-v)z^2}{(Bz + c)^2} < 0, \tag{19}$$

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