Notes on Foreign Aid Selectivity Based on Human Capital

Atsuko Tanaka[*]

University of Calgary

August 7, 2015

Abstract

In order to achieve developmental goals more effectively, international communities have paid increasing attention to the pros and cons of "Aid Selectivity." However, the empirical results on the effects of international aid on economic growth in the recipient countries are mixed. This note proposes a theoretical framework to reconcile those mixed findings on aid effectiveness. In particular, I focus on the growth consequences of a poverty-efficient aid allocation in the recipient's economy, and theoretically illustrate that an important determinant of aid efficacy is the achieved growth of human capital accumulation in recipient countries.

Keywords: international aid, aid selectivity, poverty bias, economic growth, growth volatility, human capital

1 Introduction

International aid (hereafter denoted as aid) is an issue of long-standing interest to global society. As globalization takes place, there has been a surge in the amount of monetary inflow and the number of donors and recipients. Aid is said to be the primary source of external finance. While neoclassical economic theories consider aid an economic growth enhancing instrument, numerous objections to this idea have been raised, mainly because aid is perceived to have failed to foster economic growth and may have even adversely affected the economies of recipient countries.[1] In fact, despite a substantial amount of money transfer into developing countries over the past half century, few countries have grown out from less developed economies and many are still suffering from severe economic stagnation. Such a situation casts doubts on the reliability of economic theories that bolster aid effectiveness based on economic growth of recipients, and may support the belief that aid is not effective in spurring growth or is, at least, less effective than expected (Radelet (2003); Clemens et al. (2012)). In fact, the empirical results on the effects of aid on economic growth in the recipient countries are mixed at best.[2]

This note contributes to the strand of recent studies that attribute the inefficacy of aid to the donor's allocation rather than suggesting that the concept of aid itself is flawed. To be specific, I present a theory of endogenous growth in the presence of a poverty bias in the aid allocation and examines the impact of poverty-focused aid allocation on the recipient's economy. Allocation inefficacy is especially interesting in discussions of aid because donors are in charge. Donors make the most influential decisions in aid packages, and thus changes to aid approaches from their perspective can be expected to bring dynamic renovation to aid systems, if implemented.[3]

While there are many empirical studies on efficient aid allocation, the theoretical literature on aid allocation is relatively sparse.[4] In fact, the effects of poverty-oriented aid allocation have not been theoretically analyzed, with the exception of Dalgaard (2008) and Scholl (2009). They analyze the interaction of foreign aid and capital accumulation and point out that if poverty-focused aid policies are applied this could cause fluctuations in economic growth. While their analysis is useful in understanding the volatility of revenues in emerging economies, their framework lacks an important factor in analyzing economic growth: endogenous growth, such as the accumulation of human capital. This paper incorporates human capital accumulation into the framework of Dalgaard (2008) and illustrate that the impact of a poverty bias in an aid package on long term growth depends on the education efficiency and production efficiency of a recipient country.

Furthermore, the debate on aid selectivity have mostly focused on "institutional traps" (Birdsall (2007)), and the relevance of human capital vis-a-vis institutional traps is not discussed. The model in this paper considers human capital as the key to get out of poverty traps, the same theoretical implication is derived when there are physical capital, cultural, or institutional traps.

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[1] There are several papers that analyze the interaction of foreign aid and economic growth: for example, Boone (1996), Chatterjee et al. (2003), Chatterjee and Turnovsky (2007), Mourmouras and Rangazas (2007), and Azarnert (2008).

[2] For example, Svensson (1999) shows that it is the political regimes of recipient countries that keep aid from promoting growth. This is also empirically supported by Kosack (2003), whose study was conducted in the context of the impact of aid on the quality of life as measured by the Human Development Index. Others argue that aid is contingent on structural vulnerability (Guillaumont and Chauvet (2001)); the presence of trade shocks (Collier and Dehn (2001)); climatic conditions (Hansen and Tarp (2000)); the existence of post-conflict situations (Collier and Hoeffler (2002, 2004)); the presence of totalitarian governments (Islam (2003)); the degree to which aid is fungible across sectors (Pettersson (2007)); and the quality of institutions (Dalgaard et al. (2004)). More recently, Rajan (2008) find no evidence that aid effectiveness is conditional on policies or geographical environment.

[3] By and large, it is said that donor countries make the definitive decisions on allocation (Hjertholm and Whilte (2000)).

[4] The representative empirical analyses are Burnside and Dollar (2000) and Alesina and Dollar (2000). They believe that aid has not functioned well primarily because donors have allocated aid in the wrong way: to "inappropriate" recipients or to "wrong" sectors.

2 Model

2.1 Aid, Poverty Bias and Poverty Traps

Consider an economy in which production takes place through an aggregate production function

$$Y_t = a(1+G_t)H_t^{\gamma}. \tag{1}$$

Parameter $a > 0$ denotes a Hicks neutral technological parameter and parameterizes the level of resources that enter into the production process other than human capital with $\gamma \in (0,1)$. G_t represents public investment boosting economic growth during period t. In the model, G_t augments the determinants of the resource constraint embodied in the technology parameter a. Variable H_t refers to the stock of human capital in the economy at time period t. Assuming universal competitive pricing, the wage per unit human capital w_t, is simply

$$w_t = \gamma a(1+G_t)H_t^{\gamma-1} = \gamma(1+G_t)\frac{Y_t}{H_t}. \tag{2}$$

There are measure one of identical workers with two period lives, adolescence and adulthood. Each adult worker is endowed with one unit of physical labor at time t. Depending on the level of education received while young, expressed in terms of units of output spent on education, e_t, the human capital endowment is given by (Abegaz and Chau. (2005)):

$$h_t = (1+h_0 e_{t-1})^{\varepsilon}. \tag{3}$$

As shown, h_t is increasing in e_t and concave, with $\varepsilon \leq 1$. Parameter h_o measures the effectiveness and quality of education. Parameter ε represents the productivity of the education technology in the economy. Aggregate human capital endowment in the economy at time period t is thus simply $H_t = h_t$.

The preferences of a representative adult in the economy are given by $U(c_t, h_{t+1}) = (1-\rho)\ln c_t + \rho \ln h_{t+1}, \quad \rho \in (0,1)$; that is, each adult allocates his income towards consumption c_t and human capital accumulation for the next generation, $h_{t+1} = (1+h_o e_t)^{\varepsilon}$. In other words, the budget constraint of the representative adult endowed with h_t amount of human capital is given by $w_t h_t = c_t + e_t$. From equation (2) and (3), $w_t h_t = \gamma y_t$ where y_t denotes per capita income.

I presume that public investment is only provided by aid resource as assumed in Dalgaard (2008):

$$G_t = \kappa I_t \tag{4}$$

where κ represents the fungibility of aid or inefficacy of aid.[5] Likewise, larger parameter κ can represent the quality of institutions, the extent of democracy, the stability of society, and so on.

I assume aid augments the production process but is not necessary for production. This removes an unrealistic assumption in Dalgaard (2008)'s model, which requires that the economy produces nothing when there is no aid.[6] In

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[5]Fungibility in financial relations refers to the possible appreciation of money funded specific action. If accountability of aid is weak, some portion of the amount reported as education investment can be misappropriated for other non-productive usage. That is, smaller κ in equation (4) can take a small value, less than 1. See Feyzioglu et al. (1998) and Pack and Pack (1993) for empirical evidence on aid fungibility.

[6]The model considers aid not as a driving force but as a catalyst of economic growth. This assumption does not contradict the recognition of past aid performance on growth.

addition, in my model, aid inflows are determined in part by the level of per capita income in the previous period y_{t-1} in order to introduce poverty bias.

$$I_t = I_0 + \phi(\hat{y} - y_{t-1}), \ \phi \geq 0, \tag{5}$$

subject to $y_{t-1} < \hat{y}$, where $\hat{y}$ is a per capita income cap on eligible aid recipient countries. For our purposes, I will assume that $\hat{y}$ is sufficiently large compared to incomes in recipient countries in order to focus our attention on the impact of aid and the poverty bias associated with aid. The aid package I_t is thus made up of two parts: a set of components conditional to other than income level I_o and a component conditional to income level. Parameter ϕ can be thought of as a measure of the poverty bias of the aid package.

Equations (1), (4), and (5), taken together, give the evolution of GDP per capita:

$$y_{t+1} = a \left(\frac{\rho \varepsilon}{1 - \rho(1-\varepsilon)} (\gamma h_0 y_t + 1) \right)^{\gamma \varepsilon} (1 + \kappa I_0 + \kappa \phi (\hat{y} - y_t)) \tag{6}$$

if and only if $y_t \geq \bar{y} \equiv (1-\rho)/(\rho \varepsilon \gamma h_o)$. Otherwise, the previous current generation is too poor and no human capital accumulation takes place in dynamic:

$$y_{t+1} = a \left(1 + \kappa I_0 + \kappa \phi (\hat{y} - y_t) \right). \tag{7}$$

From equation (6) and (7), aid plays two roles: it lifts up the steady state level of the output in recipients, and it also generate cycles in their economies if donors change the amount of aid based on strong poverty bias.

2.2 Dynamics

To illustrate the dynamics of the model, I introduce a 45 degree line to define and look for steady states. We find two stable steady states (y^* and y^{**}) as well as an unstable steady state $\bar{y}$.

The steady state configurations can be categorized into three distinct types: unique long run equilibrium with no human capital accumulation (regime I), multiple equilibria with poverty traps (regime II), and a unique long run equilibrium with positive human capital accumulation (regime III), depicted respectively in figure 2.

Regime I is a situation where the economy will stabilize at the steady point with no human capital accumulation. Regime II has multiple equilibria, which are the conditions under which poverty traps will be in play. The level of income will reach either y^* or y^{**} in the long run, depending on the initial amount of income. If the initial income level y_0 is greater than $\tilde{y}$, the income level converges to y^{**}, where investment on education occurs. If the initial income is smaller than $\tilde{y}$, however, it converges to y^*, where people are too poor to spend money on education. Although it is possible to reach a much higher equilibrium y^{**}, an economy will then be stuck in an equilibrium with a low level of income y^* given the economy's low initial endowment. Regime III is the case where the economy stabilizes with human capital accumulation and, in our model, does not have any poverty trap.

While the steady state in Regime II can reconcile the mixed empirical results, Regimes I or III could also be relevant to empirical findings. For example, Easterly (2006) finds that the rapid growth rates in school enrollment rates points against the empirical relevance of poverty traps. His finding is consistent with the higher equilibrium in Regime II or Regime III in my model. Thus, the model explains the empirical findings the best if recipient countries are assumed to co-exist in different types of regimes.
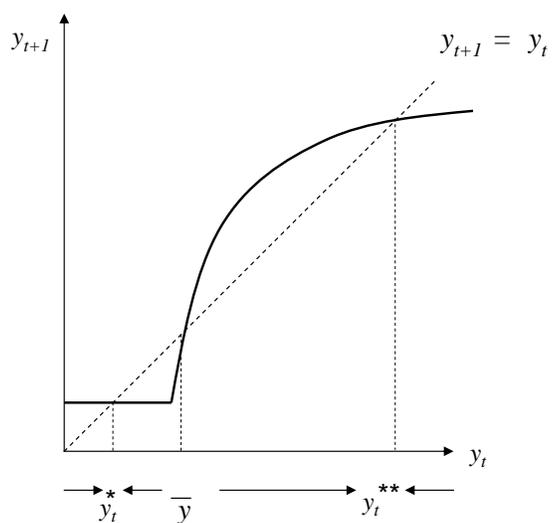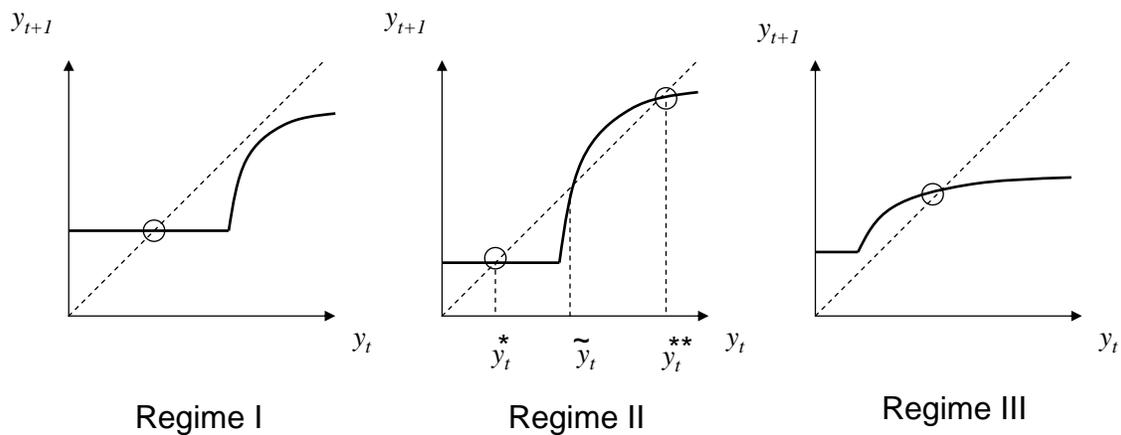
Figure 1: Output Level Dynamics

Figure 2: Three Regimes of the Steady States of Production

The model implies that the most difficult economy to achieve an equilibrium with human capital accumulation is one with small ρ, h_0, and a, (small preference for education, inefficient education technology, and low production, respectively) where people are less likely to invest in education. In this model, any poverty trap disappears only if copious amounts of aid are pumped into the economy with all other things being equal. Thus, the model implies that donors just have to be patient enough to keep increasing the amount of aid until people begin to spend money on education.

My model leads to the opposite implication from the findings of Azarnert (2008), which is a theoretical paper that studies foreign aid and economic growth. Azarnert (2008) applies an endogenous growth model and shows that foreign aid fosters population growth and adversely affects the recipients' incentives to invest in human capital.

2.3   Impact of Aid Removal

The model reveals interesting observations involving the aftermath of aid removal. While Dalgaard (2008) shows no production in economy, my model, which takes human capital accumulation into account, shows a possible change of a long run income after removing aid. Figure 3 shows that the equilibrium changes its position from lower level to upper level of aggregate income (an increase from y_t^* to y_t^{**} in figure 3).
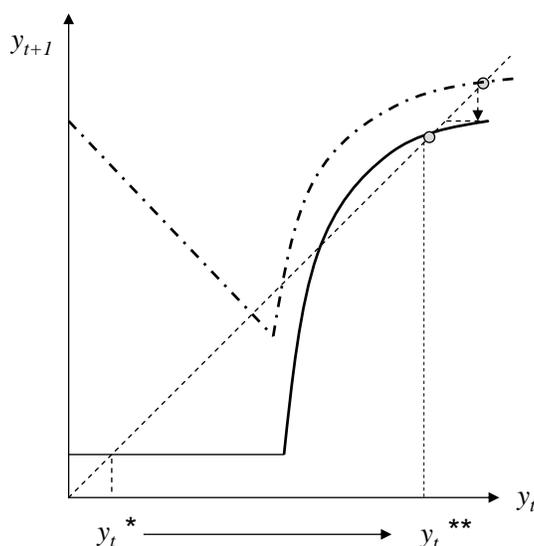

Figure 3: Legacy of Aid

Thus, aid could then raise the income level so that people come to invest in education not only temporarily but semi-permanently. The role of aid, in this case, is to let people invest in education by increasing their income exogenously and to allow people to keep investing even after removing aid within an endogenous economic system. We should be reminded, however, that this "legacy of aid" occurs only in an economy which has a possible higher income level but still remains at a lower level because of poverty traps due to low education preference and so on. Remember that only a regime II type of economy is discussed here and that Regime I or III type economies cannot expect to experience such a drastic impact from aid.

3   Conclusion

This paper presents a model of selective aid that is targeted based on income and human capital investment of aid recipient countries. The model allows us to study the effect of aid selectivity on long-run income levels. The implica-

tion of the model reconciles the mixed evidence on aid selectivity and economic performance: positive if in a poverty trap and no effect otherwise. The model introduced in this paper departs from Dalgaard's in several points. Although Dalgaard (2008) suggests that strong poverty bias can cause fluctuations in recipients' economies, our analysis also shows a case in which a strong poverty bias in allocation increases the recipient's production level. In addition, the model shows that the extent of poverty bias does not make a significant difference in the long-term income level of a recipient country if additional investment in education occurs in the recipient. Thus, one cannot say, unambiguously, that a poverty bias in an aid package is good or bad in regard to the impact on long term growth.

This is due to the introduction of human capital accumulation into the growth dynamic model. Taking human capital into account, the model captures the phenomenon of poverty traps, which occur when an economy with potential multiple long-run equilibria (regime II) is trapped at a lower production level due to a lack of resources (human capital, in my model). In such a situation, international aid may remove poverty traps from the dynamic model or may shift the recipient's production equilibrium from a lower level to a higher one. In other words, aid can help the recipient's economy get out of the poverty trap of low production. Poverty bias does not matter very much as long as aid successfully brings a higher production level with human capital accumulation. Other than human capital accumulation, the factors that provoke endogenous growth such as physical capital and technology transfer can also work in similar way.

Another remarkable feature demonstrated by this framework is the heterogeneity of aid recipients' performance. Accordingly, the most difficult economy to achieve an equilibrium with human capital accumulation is the country where people are most unlikely to invest in education.

In sum, this model shows that if a poverty trap exists in a growth dynamic model of recipients' economies, then aid effectiveness is largely influenced by the occurrence of human capital accumulation rather than the extent of poverty bias. The result adds another important criteria to existing selectivity suggestions in aid allocation—the potential occurrence of endogenous growth in the recipients' economies.

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