

Aid Unpredictability and Economic Growth

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Summary. — In this paper, we examine the influence of unpredictable aid on a recipient's economic growth. If aid amounts vary by year and the changes are unpredictable, we expect that this "unpredictability" decreases aid's growth-enhancing effect. This naturally raises the questions: How large is the influence of aid "unpredictability" on a recipient's economic growth? Does "unpredictability" significantly damage aid's growth-enhancing effect? Our research shows that the impact is significant; in a typical case, one fifth of aid is wasted due to "unpredictability." Further, it is possible that in some cases, the aid may be wasted by as much as one third.

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1. INTRODUCTION

In this paper, we examine how strongly aid "unpredictability" affects a recipient's economic growth. If aid amounts vary by year and the changes are unpredictable, we expect that this "unpredictability" might have an impact on aid's growth-enhancing effect. This naturally raises the questions: How large is the influence of aid "unpredictability" on a recipient's economic growth? Does "unpredictability" significantly damage aid's growth-enhancing effect? Which factors strongly affect this impact? Can a donor improve aid efficiency?

Our research shows that the impact is significant; in a typical case, one fifth of aid is wasted due to "unpredictability." Further, it is possible that in some cases, the effect of aid may be wasted by as much as one third. The "unpredictability" examined in this research arises from the violation of aid donors' commitments. This suggests that donors can make aid much more efficient by meeting their commitments. Even if it is difficult for donors to meet their commitments, we point out that the loss may be reduced by changing the timing of disbursement.

This research contributes to the literature in three major aspects. First, previous studies investigate the relationship between aid volatility and its short-term effects on a recipient country. By contrast, this study examines one aspect of the relationship between aid volatility and its long-term effect—effect on economic growth. Second, we numerically measure the magnitude of the impact. Intuitively, "unpredictability" is expected to have a negative impact on aid's growth-enhancing effect. The magnitude of this negative impact is unclear, however. We examine the magnitude of the impact using a dynamic stochastic general equilibrium model. Third, we propose an original approach of model-building; we introduce a capital formation mechanism in which a pre-designed investment plan affects the level of new investments.

The remainder of the paper is organized as follows. In Section 2, we briefly examine the previous literature on short-term aid behavior. In Section 3, we outline investments' responses to unpredictable aid changes. Section 4 introduces our economic model. In Section 5, we choose parameter values for simulations. In Section 6, we numerically examine how strongly aid "unpredictability" affects a recipient's economic growth. Section 7 concludes our discussion.

2. LITERATURE REVIEW

In recent years, the literature on aid's short-term characteristics has expanded. Recent studies have revealed interesting facts (Pallage & Robe, 2001; Bulir & Hamann, 2008; Celasun & Walliser, 2008). First, aid volatility is very large and is substantially larger than the volatility of GDP.¹ Second, aid is often disbursed procyclically. This finding is counterintuitive, given that if aid is disbursed at the time of a recession, the aid covers the loss from the recession and dampens the damages experienced by economic agents. Third, the disbursed amount is unpredictable. Even donors' commitments often differ from the actual amount of disbursed. Further, a donor commitment is not an upper limit of the disbursement. It is not rare for the disbursement to be smaller than the commitment, and it is also not rare for it to be larger than the commitment. Further, OECD releases reports on the unpredictable volatile aid (OECD, 2009, 2010).

On the basis of these studies on the characteristics of aid, scholars also examine the influence of short-term changes in aid on macroeconomies. For example, one research topic is the timing of aid. If aid is disbursed counter cyclically, the economic welfare of the recipient country is improved by suppressing short-term fluctuations in total consumption. Scholars attempt to discover the magnitude of countercyclical aid's consumption-smoothing effect (Pallage, Robe, & Berube, 2007). Another interesting research topic is the effects of aid's substantial volatility. If aid is considerably volatile, this volatility might affect the short-run fluctuations of the recipient economy. A study examines whether the influence of aid volatility is sufficiently strong (Arellano, Bulir, Lane, & Lipschitz, 2009).

The studies mentioned above mainly focus on the impact of short-term aid changes on the recipient's short-term economic outcomes. However, it is also important to examine the impact of short-term aid changes on the recipient's long-term economic outcomes, such as economic growth.

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The short-term aid change and economic growth are linked through the aid's influence on production factors. We often regard capital and labor as two main production factors in a production process. Focusing on labor, Agenor and Aizenman (2010) study the links in the chain of aid volatility—labor—economic growth. They ask whether aid volatility has an influence on a recipient's economic growth through its influence on labor. The authors find that volatile aid prevents agents from working in the industrialized sector. As a result, they find that, through the chain of aid volatility—labor—economic growth, a high level of aid volatility harms economic growth.

At this point, the question naturally arises as to whether the chain of aid volatility—capital—economic growth indeed exists. If the chain exists, the magnitude of the impact is important: Does aid volatility significantly dampen aid's growth-enhancing effect, or is the impact trivial? This question is relevant given the current state of the literature on this topic. In this paper, we attempt to answer this research question.

3. INVESTMENT RESPONSES TO UNPREDICTABLE AID

One of the key features of this research is the introduction of "asymmetry" in investment in terms of responses to fluctuations in aid. Aid volatility strongly affects capital accumulation through "asymmetry." In this section, the mechanisms of this process are explained.

Celasun and Walliser (2008), hereafter CW, examine a government investment's behaviors in response to an unpredictable change in a "budget aid." Budget aid is aid that supports the recipient government's budget. This aid does not specify its purpose. In other words, the recipient government can use the aid for any purpose. CW note that the government investment's responses to unpredictable changes in budget aid differ between an unpredictable aid increase (aid-windfall) case and an unpredictable aid decrease (aid-shortfall) case. In other words, the government investment response is "asymmetric." Even if an aid amount increases unpredictably, it is difficult to increase government investments. A plan is necessary for the government to increase its investment, and time is required to make such a plan. In contrast, if aid decreases unpredictably, investment reduces significantly. A government does not execute an investment plan funded by budget aid until the aid is received. If the aid is not disbursed, the investment is simply not executed. As a result, in the budget-aid-windfall case, the government investment does not increase, and in the budget-aid-shortfall case, it reduces considerably. These asymmetric mechanisms of an investment-plan change are applicable not only to government investments, but to private investments as well. We apply these tendencies to government and private investments in building our model in Section 4.

We then turn to a nonbudget-aid case. In this case, the aid's intended purpose is specified by the donor. However, considering so-called "fungibility" of aid, the specification of aid's intended purpose becomes less strict. When aid is fungible, the roles of nonbudget aid become rather similar to those of budget aid. For example, suppose that a recipient government receives 100 million dollars as unpredictable aid for governmental investment. Because the recipient government does not prepare a complete investment plan for the unpredicted aid, the government cannot spend the 100 million dollars. Instead, the government will save the money and use it for later investment. In this case, the recipient government may increase current bond issues. This is because it can easily repay the bond later; later on, since a part of the government's

investment will be financed by the 100 million dollars of saved aid, the government can reduce its own spending on an investment and save 100 million dollars of the government's own revenue. Then the government's saved 100 million dollars in revenue can be spent on the bonds' repayment. In this case, current unpredictable aid for government investment is indirectly diverted to current governmental consumption. This conjecture illustrates the fungibility between investment and consumption.

Boone (1996) econometrically examines fungibility and suggests that it exists. Further, with respect to the empirical relationship between government investment and the "unpredictability" of general aid (pooling both budget aid data and nonbudget aid data), CW find that budget aid "unpredictability" suppresses the recipient's government investment. These reasoning and empirical studies suggest that a nonbudget-investment-aid windfall can be indirectly spent for another purpose, such as government consumption. Meanwhile, it is obvious that a nonbudget-investment-aid shortfall is able to cause a significant drop of government investment. Considering these results, nonbudget aid is not strictly differentiated from budget aid, by its original purpose. Hence, in building a model in Section 4, we do not distinguish government investment responses to budget aid and nonbudget aid.²

4. MODEL

We presume a low-income country where a representative agent lives infinitely. The instantaneous utility of the representative agent follows a CRRA function.

$$u(C_t) = \frac{C_t^{1-\gamma} - 1}{1-\gamma} \quad (1)$$

The agent maximizes its discounted lifetime utility, V .

$$V = E_0 \left[\sum_{t=0}^{\infty} \beta^t u(C_t) \right] \quad (2)$$

The budget constraint of the consumer is given as follows.

$$C_t + I_t^P + T + b_t + B_t^P = Y_t - \Psi_t + (1 + r_{t-1})b_{t-1} + (1 + R)B_{t-1}^P \quad (3)$$

C represents consumption. I^P is one of two types of domestic investments—private investments (I^P) and government investments (I^G). T stands for a per-capita tax. Because we posit a constant population, T is a constant. Ψ expresses the adjustment cost of investment arising in the production sector. The details of the adjustment cost will be explained in the explanation of the production sector.

Two types of consumer-holding financial assets exist—a domestic bond (b) and an international bond (B^P). The domestic bond is issued by the government and its interest rate is denoted as r . The international bond is issued by a foreign institution and its interest rate is denoted as R . The international bond in this model represents all types of international asset-holding tools, such as US Treasury bill, World Bank bond, deposit in a foreign bank, and so forth. Because our target country is a small developing country, the international bond's trade is not affected by the target country. We regard R as exogenous and constant. The international bond will be discussed in greater detail later on in the paper.

The consumer supplies labor (L) to the production sector. \bar{L} expresses the labor endowment at each period.

$$L_t \leq \bar{L} \quad (4)$$

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