

The Strategic Games that Donors and Bureaucrats Play: An Institutional Rational Choice Analysis

Eduardo Araral

National University of Singapore

ABSTRACT

Foreign aid plays an important role in developing countries, but little is empirically known how it affects incentives of recipient bureaucracies. I provide a model and analytic case study to understand the strategic games that donors and bureaucrats play. My findings are broadly consistent with the theoretical expectations of institutional rational choice: bureaucrats attempt to ensure bureaucratic survival, whereas donors ensure growth of loan portfolio. These findings, however, are not consistent with the Samaritan's Dilemma and the Patron's Dilemma.

INTRODUCTION

Foreign aid plays an important role in many developing countries, but little is empirically known how it affects incentives and behavior in public bureaucracies. For instance, although there is a rich theoretical literature on incentive problems in public bureaucracies—drawn largely from the public choice literature (Buchanan, Tollison, and Tullock 1980; Mueller 1989)—there has been scant empirical work on this subject particularly in developing countries. In addition, there is also a thin literature on how incentives embedded in foreign aid, particularly aid fungibility and the moral hazard problem, affect the incentives of public bureaucracies in developing countries. The literature on this subject have been limited mostly to aggregate cross-country regression studies and little empirical work has been done at the agency level.

The aim of this article is to provide a model and analytic case study to understand the games that donors and bureaucrats play. It attempts to provide evidence to bear on the hypotheses generated by theory and cross-country regressions. I use the case of a public irrigation agency in the Philippines to illustrate my model and frame my analysis using the language of institutional rational choice. Specifically, I focused my analysis at the level of the firm to shed light on how incentive problems embedded in aid—particularly the problem of moral hazard and aid fungibility—interact with incentives faced by public bureaucracies in developing countries. My findings are broadly consistent with the theoretical expectations of institutional rational choice.

Address correspondence to the author at sppaej@nus.edu.sg.

doi:10.1093/jopart/mun024

Advance Access publication on December 3, 2008

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In this model are two players, the donors and the public agency in a developing country. Consistent with the theory of institutional rational choice, I assume that the public agency's objective is to ensure bureaucratic survival, whereas the donor seeks to grow its loan portfolio. I further assume that both players are engaged in a strategic game that is hypothesized to be fraught with the double moral hazard problem compounded by the fungibility of aid. To ensure bureaucratic survival, the public irrigation agency needs a steady stream of irrigation projects. This creates strong incentives for the agency to underinvest in the maintenance of irrigation systems because this would justify new loans from donors which—because of the fungibility of aid—help ensure bureaucratic survival. This behavior by the irrigation agency is implicitly sustained by the double moral hazard problem found in aid: donors need irrigation agencies as clients to grow their loan portfolio, whereas financially struggling irrigation agencies need donors to finance their capital expenditures and subsidize their operations.

The rest of the article is organized as follows. In the next section, I review the literature on incentive problems in public bureaucracies and foreign aid and how these incentives interact. This is followed by a discussion of the framework, model, and hypotheses to be examined and a discussion of the case study on irrigation aid and bureaucracy in the Philippines. The concluding section outlines the broader implications of the article in terms of theory, methods, and practice in public policy and administration.

LITERATURE REVIEW

What are the incentive problems facing public bureaucracies in developing countries? How do incentives embedded in foreign aid, particularly the moral hazard problem and fungibility of aid, affect the incentives of public bureaucracies? In this section, I review the literature on what we know or do not know about these questions.

Incentive Problems in Public Bureaucracies

Much is known in the theoretical literature about inherent incentive problems faced by public bureaucracies, particularly from the public choice literature. For instance, public bureaucracies in general are faced with agency problems, noncredible threat of bankruptcy, weak or nonexistent competition, rigidities and performance measurement problems (Weimer and Vining 1999).

For Mookherjee (1997), the key incentive problem is that agents have very little stake in the social implications of their efforts since their compensation is divorced from their performance. For instance, these can be seen in the relationship between the salaries of most tax collectors in relation to tax collection, pollution inspectors to air quality, irrigation officials to water services delivered, forest officials to levels of deforestation, public school teachers to educational standards.

Compounding the principal agent problem is the difficulty of valuing outputs and performance and the lack of competition among public bureaus. This in turn makes it difficult to determine the optimal sizes of public bureaucracies that can lead to different kinds and degrees of inefficiencies. Public managers also face greater diversity and intensity in political influence and therefore have greater needs for political support from client groups, constituencies and formal authorities to obtain appropriations and authorization for actions (Rainey 2003). In the context of developing countries with weak and corrupted institutions

and are faced with severe resource constraints, these incentive problems become more pronounced.

Although much is known in the theoretical literature, little is known empirically how these problems are played out in developing countries. The empirical literature on incentive problems in public bureaucracies can be arrayed in a continuum. On the one hand are scholars who have extensively written on bureaucratic pathology and political economy issues in developing countries particularly predatory states in Africa, for example Bates (1988). On the other end are scholars who have written on the role of “Weberian” bureaucracies and their role in economic development in East Asia, for instance Evans and Rauch (1999). These two strands in the literature are the notable exceptions in the empirical literature on bureaucracies in developing countries, but both of them do not address the question how incentives embedded in foreign aid affect the incentives and behavior of public bureaucracies in developing countries.

Indeed, there is a paucity of literature on this subject. A meta-analysis of 94 articles devoted to the study of public bureaucracies in developing countries from 1954 to 1983 shows that only 11 articles were written during this period that empirically examines the subject of incentives in public organizations in developing countries (Kiggundu et al. 1983). The rest of the articles tend to focus on such topics as organizational tasks and technology, leadership, organizational structure, decision making and organizational goals, and environment. None of the articles focused on the question how foreign aid affects the incentives of bureaucracies and neither were there systematic attempts to ground the empirical work with a theoretical framework.

One exception to the paucity of literature is the more recent work by Gibson et al. (2005), particularly their case studies of Zambia and India. In their study, they find that, among others, aid rarely changes the underlying institutions that contribute to poor policy outcomes. In particular, they find examples of the moral hazard problem in aid such as in the electricity sectors whereby the government continues to underinvest, whereas many donors keep it going with aid. The following sections further explore the moral hazard problem and fungibility of aid.

The Moral Hazard Problem in Aid

Gibson et al. (2005) and Martens et al. (2002) suggest that failures in foreign aid have to do with the set of institutions and incentives facing diverse actors in the chain of aid delivery. Drawing insights from new institutional economics, these scholars suggest that institutions govern the complex relationships between the main actors in the aid delivery system and often generate a series of perverse incentives that promote inefficient and unsustainable outcomes. One such perverse incentive is the moral hazard problem embedded in foreign aid.

Much is known theoretically about the problem of moral hazard in aid. For instance, Collier (2000) and Kanbur (2000) describe the repeated interaction between donors and recipients in the form of a moral hazard problem. In Kanbur’s model, the injection of aid alleviates the immediate fiscal crisis of the recipient government and hence alleviates the urgency for change. Because of this, aid can delay reform particularly in poor policy environments.

In addition, given that aid is faced with a time consistency problem, Collier suggests that there is no incentive to maintain a promise for reform unless the recipient government itself is interested in reform. However, there is often no cost to defaulting on promises of

policy reform because of the moral hazard problem embedded in aid. According to Collier, donor agencies that should enforce the terms of the contract also have an interest in realizing some form of success. Thus, the enforcement of the terms of the aid contract is often relaxed when the recipient shows some signs of promise, but these are sometimes withdrawn by the recipient after the aid has been disbursed.

This relationship between donors and recipients has been succinctly described by *The Economist* (1995) as “the Kenya-Fund dance,” the dynamics of which is played out as follows:

Over the past few years, Kenya has performed a curious mating ritual with its aid donors. The steps are: one, Kenya wins its yearly pledges of foreign aid. Two, the government misbehaves, backtracking on reform and behaving in an authoritarian manner. Three, a new meeting of donor countries looms with exasperated foreign governments preparing sharp rebukes. Four, Kenya pulls a placatory rabbit out of the hat. Five, the donors are mollified and the aid is pledged. The whole dance starts again. (*The Economist*, 19 August 1995).

There are three possible reasons for this sort of strategic dynamics. The first is the Samaritan’s Dilemma (Gibson et al. 2005): donors are in a dilemma of stopping aid, particularly when there is so much dependency on aid since stopping them sharply would cause a major chaos in the recipient country’s economy and only hurt the poor. If the recipient government did not spend enough on the poor and thus violated aid conditionality, donors are in a dilemma since imposing sanctions might well mean a double whammy for the poor.

Second is the Patron’s Dilemma which suggests that it is not in the donor’s interest to impose the sanction of aid withdrawal even when aid conditionality is violated for reasons of political clientelism (Kanbur 2000). When heavily indebted countries are involved, donors (the patron) are understandably reluctant to cut aid inflows as this would mean interrupting debt servicing for their clients. The notion of the patron’s dilemma is also akin to the Samaritan’s Dilemma as explained by Gibson et al. (2005).

Finally, there is the Career Dilemma. Agents within aid agencies have strong incentives to keep aid flows going because their careers as well as the image of the agency in the eyes of its political masters depend on the continued flow of aid (Kanbur 2000). It is not in the interest of agents of aid agencies, therefore, to impose sanctions that will stop these aid flows.

Although much is known theoretically about these dilemmas spawned by the moral hazard problem, there is scant empirical literature on this subject. Most of the available evidence is anecdotal, for instance Kanbur (2000). Much less is known, both theoretically and empirically, on the dynamics of the double moral hazard problem in aid, that is, that donors need the borrowers as clients to grow their loan portfolio, whereas the borrowers need donors to finance their capital and maintenance expenditures. This article illustrates the dynamics of these dilemmas associated with the moral hazard problem.

Furthermore, although there is a segment in the literature that analytically discusses incentive problems in various types of aid including the moral hazard problem, there are few empirical studies that systematically document the dynamics of this problem. One exception is Gibson et al. (2005) who argue that different types of aid generate different incentives. They argue, for instance, that different modalities of aid (i.e., project aid, program aid, structural adjustment), means, and conditions of aid (credits, grants, guarantees, multilateral, bilateral) can produce different kinds of incentives and engender a variety of outcomes. Gibson et al., however, do not focus on how incentives embedded in aid such as how the double moral hazard problem and aid fungibility shape the behavior of public

bureaucracies in developing countries. This article will provide an analytic case study and a model to illustrate the dynamics suggested by the theory of institutional rational choice.

Fungibility of Aid

Fungibility occurs when a borrower uses aid to replace internal budgets that should have otherwise been programmed for that purpose (Auer 2005). The fungibility of aid is well known theoretically and empirically in the literature, for instance, cross country regressions by Devarajan and Swaroop (1998), Feyzioglu, Swaroop, and Min (1998), H. Pack and J. R. Pack (1983), and Remmer (2004).

The problem of aid fungibility is not unique to project based aid such as irrigation. They can also be found in other forms of aid such as sector-based aid, which is usually intended to provide budgetary support for specific sectors such as health, education, and environment and not just on individual projects. Scholars of public finance, for example, have sought to examine the fungibility of program and sector loans using aggregate, panel, and cross-country and find that aid fungibility indeed creates certain incentive problems and unintended consequences.

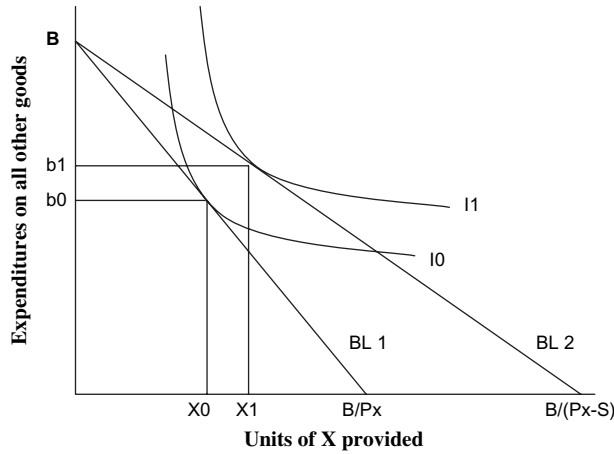
For instance, Feyzioglu, Swaroop, and Min (1998) empirically examined the impact of program and sector-based aid on the recipient's public expenditures using cross-country samples of annual observations for 1971–90. They find that for the base sample of 14 developing countries, aid is not fungible at the aggregate level and there is no associated tax relief. However, they find that aid is fungible in three out of five sectors: developing-country governments receiving earmarked concessionary sector loans for agriculture, education, and energy tend to reduce their own resources going to these sectors and use them elsewhere. On the other hand, loans to the transport and communication sector are fully spent on the purposes intended by donors.

Devarajan and Swaroop (1998) also find that a foreign aid or foreign lending policy that focuses exclusively on project financing may have unintended consequences. They argue that aid intended for crucial social and economic sectors often merely substitutes for spending that recipient governments would have undertaken anyway and the funds that are thereby freed up are spent for other purposes. In the case of the Dominican Republic, Pack and Pack (1993) has also shown that the fungibility of aid has resulted in a thwarting of the intentions of donors and a reduction in tax efforts.

A similar theme is suggested by Remmer (2004) who hypothesized that foreign aid operates in accordance with the “flypaper effect,” systematically generating incentives and opportunities for the expansion of government spending. Using time-series cross-sectional regression analysis of growth in government spending over the 1970–99 time period, Remmer finds evidence consistent with the hypothesis. For middle- and lower-income nations, aid represents an important determinant of government expansion. The tax and revenue side of the equation, however, reveals a more perverse pattern of response: aid promotes not only increased spending but also reduced revenue generation.

However, although these regression studies are useful in highlighting the fiscal effects of aid fungibility, they do not shed light on the dynamics of how it affects incentives of public bureaucracies in developing countries. Figure 1 illustrates the dynamics of the fungibility of project aid and how it affects incentives and behavior of the borrowing agency. I use the example of irrigation aid because it is a common representation of project based aid and the model more broadly illustrates the theoretical dynamics of the problem of aid fungibility.

Figure 1
The Fungibility of Project Aid and its Effect on Incentives of Borrowing Agency



In figure 1, the horizontal axis shows the quantity of a good or service that the irrigation agency provides—for example, irrigation operation and maintenance (O&M) denoted by the variable X . The vertical axis shows the agency’s expenditure on all goods other than X . The line that connects B/Px and B (i.e., $BL1$) represents the agency’s initial budget line without a subsidy. Given a total budget of B , the irrigation agency could do three things. First, it can spend nothing on X (irrigation O&M) and instead spend its entire budget on all services other than X . Second, it could spend everything on X and nothing on other services. Third, and more realistically, it could choose a budget allocation at any point in the budget line $BL1$ between these extremes.

Given this budget line, assume that the irrigation agency decides to provide X_0 units of irrigation O&M denoted by X . The indifference curve labeled I_0 gives all the combinations of X and expenditures on other goods that would be as equally satisfying to the irrigation agency as X_0 and b_0 spending on other goods and services. Suppose the national government borrows from donors to subsidize the irrigation agency the amount S for each unit of X (irrigation O&M) it will provide. Suppose this is matching grant because it matches the irrigation agency’s expenditures for O&M at some fixed percentage. It is open ended because there is no ceiling on the total subsidy that the irrigation agency can receive from the national government. This form of subsidy is particularly common in many developing countries where agriculture is a major sector of the economy.

With this subsidy, the irrigation agency’s new budget line now shifts to the right from $BL1$ to $BL2$. The effective price that the irrigation agency sees for X (irrigation O&M) falls from Px to $Px-S$ because of this subsidy. With this new budget line, the irrigation agency now procures X_1 units of X reaching a higher level of satisfaction indicated by indifference curve I_1 . However, as a result of this subsidy, the irrigation agency spends more on other goods and services unrelated to X (irrigation O&M) as some of the subsidy for X spills over to goods and services other than X .

The subsidy therefore becomes fungible or decategorized, and the area bounded by the horizontal lines from points b_0 and b_1 shows the extent to which the subsidy to X spills over to goods and services other than X . For public bureaucracies struggling to survive because

of persistent budget difficulties, the fungibility of aid then helps keep these bureaucracies to survive, which gives them a strong incentive to ensure the steady flow of foreign aid. One way to do this is to ensure that there is a pipeline of projects that needs rehabilitation, which would then qualify for aid. This then gives struggling agencies a strong incentive to underinvest in the maintenance of the infrastructure because this helps ensure the pipeline of rehabilitation projects.

Chronic underinvestment in irrigation maintenance is what drives the vicious cycle problem commonly found in irrigation (Araral 2005). For instance, underinvestment in maintenance leads to unabated deterioration of facilities, which in turn leads to poor water service, lower cropping intensities, and thus lower productivity and income for farmers. Low income among farmers in turn leads persistently low collection of irrigation fees, which further aggravate the problem of chronic underinvestment in irrigation maintenance.

In summary, the preceding review of literature on incentives in bureaucracies and foreign aid suggests three gaps, which this article aims to address. First, although there is a rich theoretical literature on incentive problems in public bureaucracies—drawn largely from the public choice literature—there has been scant empirical work on this subject. Second, the literature on aid fungibility—mostly cross-country regression studies—is focused mainly on their fiscal effects but do not examine how fungibility affects incentives of public bureaucracies in developing countries. Finally, although much is known in game theory about the moral hazard problem in aid, there has been little empirical work on this subject. This article will build on the literature by proposing a firm level model of the effects of the problem of moral hazard and fungibility of project based aid on the incentives of bureaucrats in developing countries.

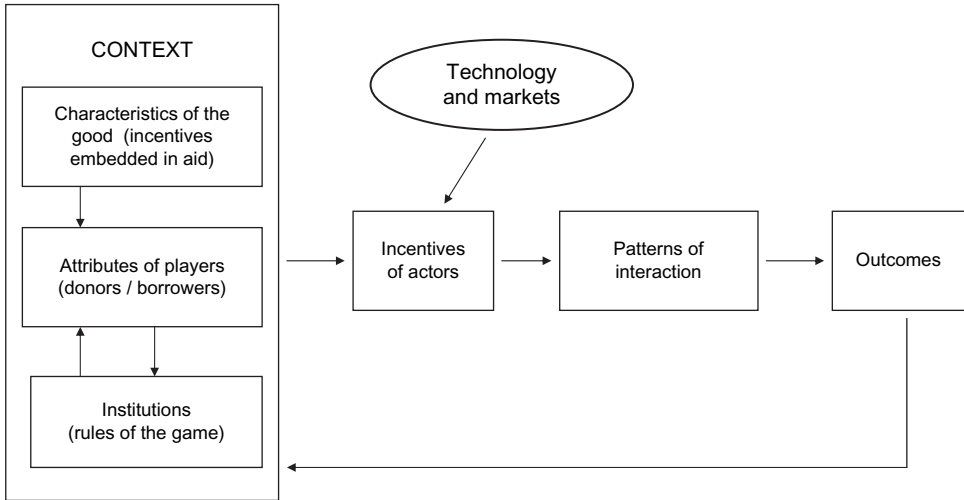
FRAMEWORK, MODEL, AND HYPOTHESES

To frame my analysis, I employ the institutional analysis and development framework (figure 2) as a starting point for building my model. The framework is useful in highlighting the importance of three parameters in my model. For instance, it suggests that outcomes arising from the interaction of rational actors depend on the patterns of interaction (or the types of games being played out by rational actors), which in turn depend on the incentive structure. The incentive structure, in turn, is shaped by the context which is defined by—among others—the characteristics of the good (or the incentives embedded in particular types of foreign aid), the attributes of the players themselves, and the institutions or rules of the game which structure the relationships among the actors. For an elaboration of the framework, see Sabatier (1999, 263) and Ostrom (1999, 1998).

In my model there are two actors: the donors and the irrigation agency. Donors are presumed to be rational in terms of maximizing the size of their loan portfolio. In addition and as earlier discussed, donors also face three kinds of dilemmas: the Samaritan's Dilemma, the Patron's Dilemma, and the Career Dilemma. The other actor—the irrigation agency faced with a persistent budget deficit—is also presumed to be rational in terms of ensuring its own organizational survival. Both actors interact in a repeated game overtime. The behavior of both actors depends on their objective functions, as discussed above, as well as the configuration of the context that they face. This context is what structures, constrains, guides and influences the actions taken by the actors.

In addition, both actors are in a strategic game, that is, the behavior of one depends on the behavior of the other. The model assumes that the relationship between donors and

Figure 2
The Institutional Analysis and Development Framework



Adapted from Ostrom, Walker and Gardner, 1994

public irrigation bureaucracies is embedded in a double moral hazard problem. Irrigation agencies need donors to finance their capital expenditures, whereas donors also need irrigation agencies as clients to grow their loan portfolio.

Irrigation agencies from developing countries—which are often struggling financially—have strong incentives to underinvest in the maintenance of irrigation systems because this helps justify new loans from donors for capital-intensive investments in rehabilitation. Borrowers routinely promise to provide adequate funding for O&M but are faced with a negligible cost for noncompliance.

Donors also do not have strong incentives to effectively enforce loan provisions requiring borrowing countries to adequately invest in O&M. Regardless of their compliance record, irrigation agencies can correctly expect donors to continue financing rehabilitation projects because it is in the donor’s interest to do so, that is, grow its loan portfolio. Absent credible enforcement from donors and the negligible costs of noncompliance, the irrigation agency’s dominant incentive then is to default on its responsibilities toward O&M.

Finally, another assumption in the model has to do with the fungible characteristics of project-based irrigation aid. As discussed in figure 1, aid fungibility encourages irrigation agencies to underinvest in the O&M of irrigation infrastructure because this ensures a steady stream of irrigation projects that help ensure the survival of the financially struggling agency. The double moral hazard problem embedded in aid and the irrigation agency implicitly helps sustain the incentive to underinvest.

EVIDENCE FROM THE PHILIPPINES

In this section, the empirical case of irrigation aid and bureaucracy in the Philippines is used to illustrate the model and hypotheses discussed in the previous section. This will be done by providing an overview of irrigation aid in the Philippines and illustrating how incentives

embedded in aid—particularly fungibility of aid and the moral hazard problem—affects the incentives and behavior of the irrigation agency. Data for these analyses were taken from archival, and official records and various studies including those were done by Araral (2005, 2006) and Japan International Cooperation Agency (JICA 2003).

Irrigation and Foreign Aid in the Philippines

Agriculture contributes about a quarter of the gross domestic product of the Philippines, and irrigation plays a key role in this. The National Irrigation Administration (NIA) is the main agency responsible for public irrigation in the Philippines. It was created in 1964 as a semiautonomous, government-owned and controlled corporation. Subsequent amendments to NIA's charter granted it with the authority to incur foreign loans, substantially increased its capitalization and provided for an implicit subsidy through the grant of annual appropriations for general administration, O&M of national irrigation systems, and studies of new irrigation projects. The revised charter also allowed NIA to keep whatever it collected as irrigation fees as well as funds recovered from equipment rental and administrative charges collected from foreign projects. A detailed historical account on NIA is more fully discussed in Korten and Siy (1987) and NIA (1990).

Aid plays an important role in irrigation development in the Philippines. From 1969 to 2002, NIA has contracted some \$2.2 billion in foreign loans to finance capital expenditure and support for O&M and institutional development projects. From 1975 to 1983, most irrigation loans were spent for new construction projects, which then conspicuously dropped from 1984 to 1989 when no substantial loans were made because of the economic crisis faced by the Philippines. From 1990 onwards, new irrigation loans were made available, but these were mostly to subsidize the O&M of previously constructed projects as well as to provide funding for rehabilitation projects.

The capital-intensive nature of irrigation, the high costs of capital in developing countries plus the importance of agriculture, poverty alleviation, and food security in many developing countries enable donors to play a sustained and substantial role in the irrigation aid business. Indeed, the key feature of the Philippine case that seems to differentiate it from other noninfrastructure type of aid is the capital-intensive nature of irrigation. This characteristic creates strong incentives for bureaucrats to underinvest in maintenance as this would help justify aid flows, which then help the irrigation agency to survive persistent budget deficits.

Practically all capital investment projects in irrigation in the Philippines were financed with project irrigation aid, particularly from the World Bank, Asian Development Bank (ADB), and the Japan Bank for International Cooperation (JBIC). The dominant modality of irrigation aid in the Philippines—as in most other developing countries—comes in the form of project aid. Project aid refers to a modality where support is provided by the donor for capital investment and recurrent costs of the recipient country within short- to medium-term interventions (Gibson et al. 2005).

From 1969 to 1983, the size of irrigated areas in the Philippines doubled to 1.4 million hectares, representing an annual average growth rate of 7.2% for the period, which is 3.5 times faster than the international annual growth rate of 2% for the same period (NIA 1990). Of this, about half fall under public irrigation systems.

Effects of Foreign Aid on Bureaucratic Incentives

In this section, I present data to illustrate the dynamics of institutional rational choice implied in my model. Consistent with the theory of institutional rational choice, I assume that

the irrigation agency's objective is to ensure bureaucratic survival, whereas the donor seeks to grow its irrigation loan portfolio. I further assume that both players are engaged in a strategic game hypothesized to be fraught with the double moral hazard problem compounded by the fungibility of aid.

I have argued that to ensure bureaucratic survival, NIA needs a steady stream of irrigation projects, and the pressure for bureaucratic survival is clearly evident when one examines the ratio of NIA's operating budget and income. For instance, from 1990 to 2000, NIA's operating expenses has always exceeded its operating income, and on average, only 73% of operational expenditures were covered by operating incomes for the 10-year period.

This persistent budget deficit creates a strong incentive for NIA to underinvest in the maintenance of irrigation systems because this would justify new loans from donors, which—because of the fungibility of aid—help NIA overcome its budget deficits. This behavior by NIA is then implicitly sustained by the double moral hazard problem found in irrigation aid: donors need irrigation agencies as clients to grow their loan portfolio, whereas financially struggling irrigation agencies need donors to finance their capital expenditures and subsidize their operations. The rest of my analysis begins with a discussion of the problem of chronic underinvestment in maintenance and its consequences. In the next section, I attempt to explain this behavior from the standpoint of institutional rational choice.

In the case of NIA, the dominant incentive to default on its O&M responsibilities becomes apparent when one considers the following empirical findings (Araral 2005). First, chronic underinvestment in maintenance can be gleaned from the level of NIA's actual spending: for instance, for the period 1990–2002, on average, the spending for water delivery operations was 21% below recommended levels; for canal clearing it was 38% and for gate maintenance, it was below by 75%. Recommended levels here refer to internationally established standards for irrigation maintenance in developing countries. Major donors such as the World Bank, ADB, and JBIC have set these standards on what is technically regarded as acceptable levels from the standpoint of irrigation engineering.

In practice, adequate budget for O&M means anywhere from 5% to 20% of capital expenditures, depending on the life cycle of the infrastructure. Older infrastructure requires higher levels of O&M. However, there is not enough data to show the counterfactual, that is, that recommended levels of irrigation O&M is actually achieved in other irrigation agencies that are less dependent on aid. A review of irrigation aid loan agreements in the Philippines shows that NIA regularly commits itself to provide for adequate levels of budget for the O&M of irrigation facilities constructed from aid loans, but actual investments often fall short of these commitments.

Second, this pattern of chronic underinvestment in irrigation O&M has the effect of further increasing the unit cost of O&M in subsequent years as minor repairs left unattended leads to major rehabilitation and to bigger problem in terms of the unabated deterioration of facilities. Thus, because of chronic underinvestment in maintenance, approximately 80% of the 196 national irrigation systems are in need of rehabilitation and/or improvement. In particular, more than 50% of control structures for both lateral and main canals and more than 60% of main and lateral canals are in need of rehabilitation such as desilting, reshaping, and heightening of embankment. In addition, some 74% of the 13,967 km of irrigation service roads are in need of rehabilitation. These figures—which materialized over a period of years—indeed suggest a pattern of chronic underinvestment in irrigation maintenance.

Third, the unabated deterioration of irrigation facilities eventually leads to the problem of persistently poor water service—particularly at the tail ends of the system—as indicated by reduction in irrigation service areas. On a 10-year average from 1990 to 2000, actual irrigated area was only 71% of the designed area, suggesting a problem of poor water delivery. Poor water service, particularly at the tail end of systems, eventually has an adverse impact on productivity in terms of cropping intensities, yield, and farm incomes.

Fourth, and not surprisingly, farmers are reluctant to pay irrigation fees. Only 44% of all farmers, on a 10-year average, are paying their irrigation fees. Farmers are also reluctant to pay their back accounts with less than 2% of farmers in 2004 availing themselves of the compromise agreement launched by NIA in 2003. Furthermore, less than 25% of irrigation associations take responsibility for the maintenance of their systems even after 20 years of effort at irrigation decentralization.

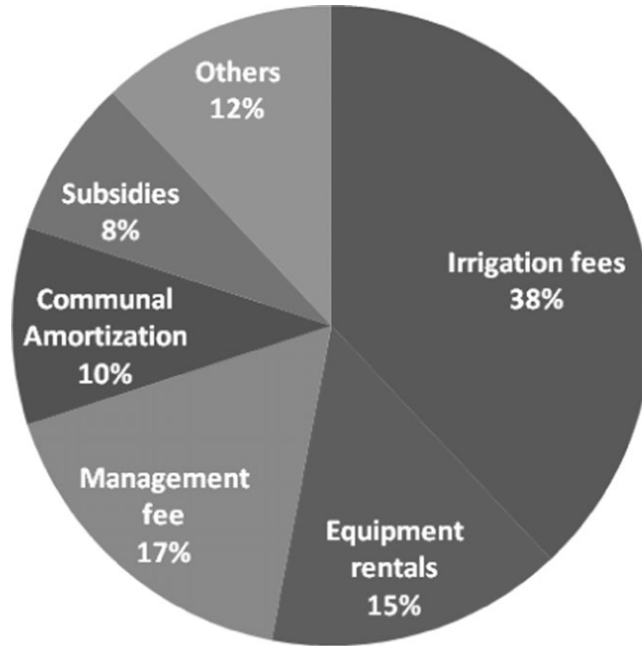
Fifth, because of persistently poor collection of irrigation fees, NIA's financial condition is substantially affected. On a 10-year period (1990–2000), the ratio of NIA's operating income to operating expenses averaged 73%—that is, its collection of irrigation and other fees were not able to cover its operating expenses which were instead subsidized from other sources. A World Bank report notes that in theory, NIA by design is expected to provide for O&M and routine rehabilitation of public irrigation systems from its own resources, whereas government budgetary allocation—about USD100M in 2006 dollars—is for construction of new systems or major improvement. However, in reality, NIA's income from irrigation service fees is unable to meet its staff salary, operating costs, and the O&M of infrastructure. The World Bank notes that this gap has been met through indirect government subsidies of about USD8M per year.

What Explains NIA's Behavior?

In this section, I suggest that NIA's behavior—consistent with public choice models of bureaucratic behavior—can be regarded as rational from the standpoint of bureaucratic survival. As the preceding discussion has shown, NIA has been struggling for survival, and this condition is nicely summed up in a slogan posted in its offices nationwide “Service for Survival: Do Our Best for NIA's Best.” Indeed, bureaucratic survival has become a predominant preoccupation for NIA. For instance, every time an irrigation loan is undertaken—a decision made at its central office along with decisions how it is allocated—NIA uses part of that loan to subsidize the O&M of its headquarters and regional operations. A portion of the loan for irrigation rehabilitation, for example, spills over to other services not directly related to the actual O&M of irrigation systems. For instance, 17% of NIA's total income over a 10-year period (1993–2002) came from management fees it charges foreign-funded irrigation projects.

Second, foreign-funded projects also provide equipment assets to NIA, which in turn generate equipment rental fees that are used to subsidize the operation of its regional offices. Equipment rental fees are fees collected by NIA when it rents out these loan-funded equipments to contractors of irrigation projects or to other contractors in the construction industry. Although proceeds of irrigation loans are categorically intended for specific projects, part of the loan again spills over to other categories or they become decategorized. In the case of subsidies for equipment assets, NIA rents out these equipments to private contractors—not necessarily to be used in projects where they were originally intended

Figure 3
NIA's Sources of Income from 1993 to 2002, in Percentage, by Source



to be used—in order to generate additional revenues to subsidize the salaries and O&M of its regional offices. From 1993 to 2002, such fees accounted for 15% of its total income.

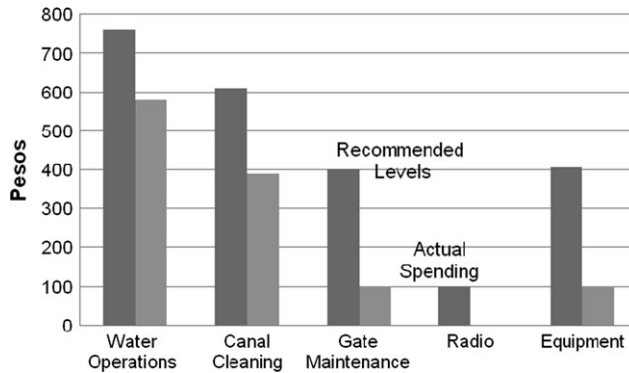
Third, rehabilitation projects bring in additional income from irrigation service fees to support the operations of NIA's Irrigation System Offices. These fees are collected from farmers as payment for irrigation services. Newly rehabilitated irrigation systems bring in additional sources of revenues for NIA, which would not have materialized when irrigation systems are nonfunctioning. Between 1993 and 2002, irrigation fees generated 38% of NIA's total income. Ideally, the revenue from irrigation fees should be plowed back from where they were originally collected. However, these irrigation fees revert to NIA's General Fund, which is then used to subsidize services other than actual O&M of irrigation systems.

Altogether, the fungible portion of capital expenditures provides at least 40% of NIA's operating budget (figure 3). This in turn has created and sustained a strong incentive for NIA to underinvest or postpone investments in irrigation maintenance since irrigation systems that are poorly maintained soon deteriorate and become candidates for rehabilitation which are then used to justify capital expenditure from donors. Chronic underinvestment in irrigation O&M is indeed rationale from the standpoint of bureaucratic survival.

On the other hand, donors have little incentive to alter this incentive structure because this is what motivates NIA to continue borrowing for irrigation aid, which in turn is important for the growth of the donor's irrigation loan portfolio. Donors are fully aware of the magnitude of NIA's underinvestment in O&M but essentially ignored this.

For instance, a report by the Asian Development Bank (ADB) (2002) indicates its awareness of NIA's underinvestment in water operations, canal cleaning, gate

Figure 4
Magnitude of Underinvestment in O&M per Hectare (2002)



maintenance, communication, and equipment (figure 4). ADB also reports that while maintenance costs increased by 87% from 1990 to 2001, the budget for O&M declined steadily, dropping 27% from 1997 to 2002.

Second, a report by the Japan International Cooperation Agency (JICA) (2001)—a major aid player in the Philippines—notes the extent of the problem of underinvestment by NIA as reflected in the extent of irrigation infrastructure needing rehabilitation. As table 1 shows, 61% of main canals needed rehabilitation, 56% for control structures, and 74% for access roads. All these clearly indicate the problem of underinvestment in maintenance.

Third, a document analysis of irrigation loan agreements between NIA and its donors always require NIA to provide for adequate investment in O&M as a condition for the loan. Yet, time and again, this provision is routinely ignored by NIA and reluctantly enforced by donors as evidenced by the heightened lending for irrigation rehabilitation projects. From 1990 to 2002, these type of projects—that is, rehabilitation projects—comprised 90% of all irrigation aid-funded projects. These projects were designed to provide direct subsidies to NIA for the O&M and rehabilitation of irrigation systems (JICA 2001) and thus help sustain the set of perverse incentives faced by NIA.

This finding on the fungibility of aid at the level of the firm is broadly consistent with findings in the sector level in the public finance literature. For example, as earlier noted, Feyzioglu, Swaroop, and Min (1998) find that developing country governments receiving

Table 1
Underinvestment in Irrigation O&M as Indicated by Need for Rehabilitation

Type of Facility	Total	Percent Needing Rehabilitation (%)
1. Head works	145 units	34
2. Main canal	3,917 km	61
3. Control structures main canal	11,423 units	53
4. Lateral canal	10,299 km	63
5. Control structures lateral canal	39,949 units	56
6. Service/access roads	13,967 km	74

Source: JICA (2001).

earmarked concessionary loans for agriculture reduced their own resources going to these sectors and use them elsewhere. Similarly, the findings from this article reinforce the findings of other scholars, for instance, Devarajan and Swaroop (1998), who suggest that foreign aid or foreign lending policy that focuses exclusively on project financing may have unintended consequences.

Fourth, most of the rehabilitation projects supported by donors are actually premature rehabilitation projects, that is, these projects are not yet scheduled for rehabilitation as most of them are only halfway through their intended life cycle—usually 25 years. However, because of persistent underinvestment in maintenance, these systems rapidly deteriorate and thus require premature rehabilitation. Rehabilitation projects in turn bring in more aid business to NIA, which keep it afloat as a bureaucracy. Aid officers prefer these types of rehabilitation projects as they tend to involve straightforward engineering design with familiar contracting and construction supervision mechanisms. Moreover, these projects tend to disburse quickly and are relatively easily monitored, all of which favorably impacts the performance and careers of aid officers.

In summary, the case irrigation in the Philippines suggests that the incentive by the irrigation agency to underinvest is implicitly sustained by the double moral hazard problem found in irrigation aid: donors need irrigation agencies as clients to grow their loan portfolio, whereas financially struggling irrigation agencies need donors to finance their capital expenditures and subsidize their operations. The behavior by donors is fairly consistent with theoretical expectations about the Career Dilemma.

As argued in this article, the Career Dilemma creates a strong motivation for the moral hazard problem faced by donors. The dilemma suggests that the incentive of agents within aid agencies is to keep aid flows going because their careers as well as the image of the agency in the eyes of its political masters depends on the continued flow of aid. As this article has argued, donors have little incentive to alter the incentive structure faced by NIA (i.e., underinvestment in maintenance) because this is what motivates NIA to continue borrowing for irrigation aid, which in turn is important for the growth of the donor's irrigation loan portfolio. Vermillion (2002)—a noted irrigation scholar—makes a similar point in the case of Sri Lanka when he suggests that donors have tolerated these incentive problems found in irrigation agencies.

Alternative Hypotheses

What I have discussed so far is a static analysis of the incentive structure of NIA and how this is affected by incentives embedded in aid. In this section, I briefly explore the possible role of history to explain the evolution of the incentive structure of NIA.

Like most developing countries, modern irrigation in the Philippines went through several phases. The first phase can be characterized as a capital intensive, government-sponsored expansion phase that occurred during the period of the “green revolution” and during the Marcos martial law years in the mid-1970s to the mid-1980s. During this period, NIA's charter was amended, its capitalization increased by more than 33 times and its staff by 9 times, the role of IAs was recognized, and water rights defined. During this period, irrigated areas grew from 742,447 ha to 1,436,880 ha, an increase of 93% or an annual average growth rate of 7.19%.

The second phase of modern irrigation in the Philippines was the incremental improvement phase during the mid-1980s to the present. During this period, the role of

NIA in irrigation development was largely accepted and uncritically questioned both by donors and national governments. The type of irrigation projects during this period took the existing incentive structure and modus operandi of NIA as given and did not adequately examine alternative governance modes of providing irrigation to farmers (Briscoe 2000). During this period, the role of NIA was reinforced by the national government and donors alike by building its capabilities through staff training, new irrigation technologies, equipment outlays, information and decision support systems, and other managerial and technical improvements (Araral 2005). These capabilities were further augmented by organizing farmers to serve as NIA's contractors in the collection of irrigation fees and the O&M of irrigation systems (Vermillion 2002). It is very likely therefore that NIA's current incentive structure was shaped, reinforced, and institutionalized during this phase of irrigation development in the Philippines.

Another possible explanation to the poor performance of irrigation aid in the Philippines is the moral hazard problem arising from the Samaritan's Dilemma. Donors are in a dilemma of stopping aid particularly when there is so much aid dependency since doing so sharply would cause a major chaos in the recipient country's economy and only hurt the poor. If the recipient government did not spend enough on the poor and thus violated aid conditionality, donors are in a dilemma since imposing sanctions might well mean a double whammy for the poor.

However, the story of irrigation aid in the Philippines does not appear to be consistent with the altruistic proposition of the Samaritan's Dilemma. As I have argued, the moral hazard problem found in irrigation aid in the Philippines has its origins in institutional rational choice—that is, it is in the interest of the donor's agents to increase their irrigation loan portfolio because this is key to their career objectives.

Likewise, the story of irrigation aid in the Philippines does not appear to support the Patron's Dilemma. In this dilemma, it is not in the donor's interest to impose the sanction of aid withdrawal even when aid conditionality is violated for reasons of political clientelism, that is, this would mean interrupting debt servicing. This dilemma is not applicable in the case of irrigation aid in the Philippines since these loans are covered with sovereign guarantees by the national government and thus do not motivate the moral hazard problem. Furthermore, imposing sanctions for none compliance with irrigation loan covenants has little effect on overall debt servicing.

CONCLUSIONS

Foreign aid plays an important role in many developing countries but little is empirically known how it affects incentives and behavior in public bureaucracies. For instance, although there is a rich theoretical literature on incentive problems in public bureaucracies—drawn largely from the public choice literature—there has been scant empirical work on this subject in the context of developing countries. Second, the literature on aid fungibility and moral hazard—mostly cross-country regression studies—are focused mainly on their fiscal effects and do not examine how they affect micro-level incentives of public bureaucracies in developing countries.

This article sought to provide a model and an analytic case study to shed light on how incentive problems embedded in aid—particularly the problem of moral hazard and aid fungibility—interact with incentives faced by public bureaucracies in developing countries. In this model there are two players, the donors and the public irrigation agency.

I assumed that the irrigation agency's objective is to ensure bureaucratic survival, whereas the donor seeks to grow its irrigation loan portfolio. I further assumed that both players are engaged in a strategic game hypothesized to be fraught with the double moral hazard problem compounded by the fungibility of aid.

My findings are broadly consistent with the theoretical expectations of institutional rational choice. For instance, to ensure bureaucratic survival, NIA has strong incentives to underinvest in the maintenance of irrigation systems because this would justify a steady stream of rehabilitation projects which—because of the fungibility of aid—help ensure its survival.

Bureaucratic survival is an inherent concern among public bureaucracies in developing countries faced with persistent budget deficits. Perverse incentives associated with bureaucratic survival would have existed anyway even without irrigation aid. However, as this article has argued, perverse incentives in irrigation aid have the effect of compounding these incentives embedded in public bureaucracies in developing countries given the capital-intensive nature of irrigation.

As this article illustrates, the incentive by the irrigation agency to underinvest is then implicitly sustained by the double moral hazard problem found in irrigation aid: donors need irrigation agencies as clients to grow their loan portfolio, whereas financially struggling irrigation agencies need donors to finance their capital expenditures and subsidize their operations. The behavior by donors is fairly consistent with theoretical expectations about the effects of the moral hazard problem arising from the Career Dilemma but not the Samaritan's Dilemma and the Patron's Dilemma.

The Career Dilemma suggests that the incentive of agents within aid agencies is to keep aid flows going because their careers as well as the image of the agency in the eyes of its political masters depend on the continued flow of aid. Because of this moral hazard problem in aid, donors do not have strong incentives to effectively enforce loan provisions requiring NIA to adequately invest in O&M. NIA routinely promises to provide adequate funding for O&M but are faced with negligible cost for noncompliance. Regardless of its compliance record, NIA can correctly expect donors to continue financing rehabilitation projects because it is in the donor's interest to do so.

In a Samaritan's Dilemma, donors are in a dilemma of stopping aid particularly when there is so much dependency aid since stopping them sharply would cause a major chaos in the recipient country's economy and only hurt the poor. If the recipient government did not spend enough on the poor and thus violated aid conditionality, donors are in a dilemma since imposing sanctions might well mean a double whammy for the poor. In the Patron's Dilemma, it is not in the donor's interest to impose the sanction of aid withdrawal even when aid conditionality is violated for reasons of political clientelism, that is, this would mean interrupting debt servicing. Both the Samaritan's Dilemma and Patron's Dilemma are not consistent with my findings.

Several mechanisms have been proposed in the aid literature on how to deal with these incentive problems. These include the use of aid conditionality with third party enforcement and the use of aid tournaments as allocation mechanism. Further work on this subject would need to explore how various solution mechanisms can address the problems of moral hazard and aid fungibility. However, as argued in this article and as also argued by Kanbur (2000), the incentives embedded in the aid-recipient relationship in the form of the moral hazard problem and aid fungibility can render aid conditionality difficult to enforce in

practice. A theoretical solution to this problem, then, is to assign enforcement to a third party intermediary with a reputation for being tough and who is not susceptible to the problems of moral hazard and fungibility.

Svensson (2000) has empirically tested this proposition and finds that, contrary to conventional wisdom in the aid literature, tied project aid and delegation of part of the aid budget to an agency with less aversion to poverty can indeed improve welfare of the poor in the recipient country. A related solution, proposed by Devarajan and Swaroop (1998), is that donors could tie assistance to an overall public spending program in the recipient country that provides adequate resources to crucial sectors instead of using project-based aid. A similar model is followed by the Millennium Challenge Account of the US government that ties aid according to performance in a number of governance indicators. Yet another possible solution—particularly in the case of aid recipients putting in low level of effort—is to introduce aid tournaments as a way to allocate aid—particularly for bilateral aid. As Gardner and Waller (2005) have shown, a donor can forestall the worst effects of the principal agent problem by conducting tournaments among target recipients for an aid project.

Although the article is limited to a single case study in one country, it has nonetheless a number of broader implications to the study of public policy and administration. For instance, it has illustrated the dynamics of institutional rational choice, particularly how incentives embedded in foreign aid such as moral hazard and fungibility can affect the behavior of public bureaucracies in developing countries.

This article has also suggested that the institutional rational choice approach, as one of the positive theories of the policy process, can make a valuable contribution to the advancement of theoretical development in public policy and administration research. This approach brings into focus—as a unit of analysis—the incentives of actors involved, the context that influences this behavior and the outcomes of strategic interaction among rational actors. Methodologically, it has attempted to illustrate the application of tools drawn from principal agent theory in repeated games to better understand the behavior of rational actors—in this case donors and irrigation agency—in strategic settings.

As Schlager (1999, 235) puts it, “theoretical development in public policy must specify the assumptions about the actors who motivate action or change” . . . as well as “the context that structures, constrains, guides and influences the actions taken by the actors.” The hope for contribution of this article is to provide a model and data to test how predictions of institutional rational choice play out in the context of public bureaucracies and foreign aid in developing countries.

This approach more generally builds on the work of scholars of public policy and administration as well scholars of political science and public choice who are associated with the approach of developing theories of how various institutional settings influence human behavior. These scholars include, among others, Axelrod (1986), Bendor, Taylor, and Van Gaalen (1987), Chubb and Moe (1990), Ostrom (1999, 1996), Ostrom, Schroeder, and Wynne (1993), Knott and Miller (1987), Miller (1992), Moe (1994), Niskanen (1971), Schlager (1999), Scharpf (1997), Sheplse (1989), Tang (1991), and V. Ostrom and E. Ostrom (1971).

There are, of course, limitations in the use of single case studies, foremost of which has to do with its external validity. However, if it is part of a comparative research and theory-building program, such as the purpose of this study, interesting case studies have an important role to play. For instance, if there are other single observations gathered by other researchers against which it can be compared, it is no longer a single observation. This is the

case when researchers examine a small number of observations within single cases and make disciplined comparisons among them.

Disciplined comparison of even a small number of comparable case studies, yielding comparable observations, can sustain causal inference (King, Keohane, and Verba 1994; Ostrom 1990). In addition, framing a case study around a model and hypothesis may lead to a more focused and relevant description and improve construct validity and parsimony even if the study does not succeed in its attempt to provide a valid causal inference.

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