A Modeling Framework for Enhancing Aid Effectiveness

Justin Yifu Lin, Khuong Vu, Kris Hartley[1]

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[1] Email: justinlin@nsd.pku.edu.cn); vuminhkhuong@nus.edu.sg); hartley@u.nus.edu.

Abstract: *The development literature lacks consensus about the link between aid effectiveness and governance improvement. A basic rational actor model is introduced to clarify how donors can influence recipient behaviors and more broadly how foreign aid can support or impede governance quality improvement. Adopting the underutilized perspective of donor behavior, this study identifies mechanisms through which aid hinders governance improvement and offers substantive recommendations about how donors can enhance aid effectiveness, including strategies for donors to raise the level of effort recipients devote to project success.*

Keywords: Foreign aid, official development assistance, corruption
JEL classification: O10; O12; D03; F35

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1. Introduction

The widening wealth gap among nations and the accompanying social and humanitarian implications have elevated the importance of international financial assistance in fostering development. The UN Millennium Project once estimated that official development assistance (ODA) would need to reach US$195 billion by 2015, up from US$79 billion in 2004, in order to meet basic development objectives (Moss et al., 2006). These objectives include the development of both hard and soft infrastructure, which Lin (2011) argues is crucial for releasing bottlenecks that prevent sustainable and inclusive industrialization in developing countries. Nevertheless, there have been persistent doubts about the effectiveness of ODA, giving rise to a diverse but often contradictory body of literature. This lack of scholarly consensus has complicated efforts to provide theoretical support for applied ODA strategies, and may cause discontinuity and inconsistency in ODA programs that need stability and longevity to be effective.

Within the empirical literature, there is continuing doubt about the ability of ODA to precipitate economic growth (Easterly et al. 2004), reduce poverty (Jayaraj 2015), promote democracy (Li 2016), improve institutional quality (Asongu 2013), stimulate good governance (Alesina and Weder 2002; Bräutigam and Knack 2004), and help countries achieve Millennium Development Goals (MDGs) (English et al. 2015). One common perception about aid programs is that they are ineffective and may reinforce dependence and institutional deterioration in recipient governments. In assessing the effectiveness of aid, many studies have attempted to identify ways for donors to improve recipient performance; however, even these findings remain inconclusive. A deeper understanding of the factors impacting effectiveness is needed, especially concerning those related to both donor and recipient governments.

This paper aims to address these uncertainties by introducing a model analyzing the equilibrium behavior of recipient governments. This contributes to the literature by bringing clarity to the persistent scholarly debate about aid effectiveness and why aid is more beneficial in some circumstances than in others. It also illustrates how insufficient efforts to

design quality ODA policies and monitor their performance can lead to deterioration of aid effectiveness. These findings can be used as a framework to guide donors in working with recipients to enhance aid effectiveness. The remainder of this paper is structured as follows. Section 2 reviews studies of aid effectiveness, including those that find positive, negative, and insignificant relationships between ODA and governance improvement. Section 3 introduces the model, and Section 4 applies the model to illustrate how donors can enhance aid effectiveness. Section 5 offers concluding remarks and outlines broader implications.

2. Literature review

Decades of literature have sought to identify the link between aid and economic growth. Doucouliagos and Paldam's (2009) meta-analysis of this literature identified 68 studies that found a positive aid-growth relationship but concluded that the link is weak, with the authors arguing "the [aid effectiveness literature] has failed to prove that the effect of development aid on growth is statistically significantly larger than zero" (p. 18). In an update (Doucouliagos and Paldam 2011), the authors found the same result, although they also uncovered a potential link between the two in disaggregated studies. Efforts to understand this link have led researchers to explore conditions within recipient countries as intervening variables, including institutions and policies. The challenges of aid effectiveness, including disparities between ODA efforts and developmental outcomes and the "trap" of aid dependence, have yielded numerous studies investigating the connection between ODA and governance quality but no apparent consensus having been reached.[2] In particular, a line of research has emerged around the impact of aid on governance quality in recipient countries, with likewise mixed findings. In a study utilizing meta-regression analysis of 44 empirical studies, Askarov and Doucouliagos (2013) find that the effect of aid on governance varies across time and governance contexts but is zero or negative on average.

There has emerged a prevailing view that countries in need of ODA are often deficient on measures of governance, and recipient characteristics are seen to associate with aid

[2] Governance quality is a fundamental determinant of long-term economic development. See Rodrik et al. (2004) for a related analysis.

effectiveness. For example, Boone (1996) examines the role of political regime types in determining ODA effectiveness, finding that the lack of aid conditionality diminished the impact of ODA on selected human and economic development objectives, with underperformance linked to limited political and social liberties. Extending the argument about endogenous determinants of growth, Lin and Wang (2016) argue that a country's quality of governance is a result of its particular stage of development, with lower quality associated with lower levels of development. This argument implies two strategies for developing countries: improve governance and stimulate economic growth. Given these options, Lin and Wang propose that economic progress is more immediately urgent and should be the primary concern, while governance improvement is a more extended process that can be addressed after development is underway. This proposition rests on the assumption that "good governance is not a precondition for dynamic growth" (p. 18). In many cases, good governance is also shown to be neither a precondition for receiving aid nor an outcome of it. The literature is mixed on the impacts of aid on governance. This review examines studies that find positive, negative, and mixed or no impacts (see Table 1 at end of this section for an overview). The review concludes with a discussion of modeling approaches.

2.1 Positive impacts

The literature is mixed in its findings about the impacts of aid on governance quality, with many studies finding beneficial effects. Utilizing an instrument variable approach, both Aronow et al. (2012) and Tavares (2003) find positive links between aid and measures of governance, the former for human rights and the latter for control of corruption (instrumenting for aid flows using geographical and cultural proximity between donors and recipients). Quantile regression is also common, having been used by Mohamed et al. (2015) and Okada and Samreth (2012) to identify a positive link. Mohamed et al. (2015) scale a corruption variable to Transparency International's CPI (Corruption Perceptions Index) scores to examine the link between ODA and corruption in a study of Sub-Saharan Africa, finding that ODA reduces corruption, particularly in the most corrupt countries. The study also finds that the source of bi-lateral ODA influences the degree to which corruption is lowered; aid from the United States and Germany had the greatest impact among sample

countries. Okada and Samreth (2012) use quantile regression to measure the impacts of ODA on differing levels of corruption, an approach that according to the authors enables a more detailed analysis. The study finds that ODA decreases corruption, but contrasts with Mohamed et al. by finding a greater reduction in countries whose governments were already less corrupt. Other studies find positive impacts of ODA on quality of political institutions (Jones and Tarp 2016), quality of public services (Wolf 2007), public budget support and stability (Eifert and Gelb 2005), measures of democracy (Dunning 2004), measures of political economy (Dollar and Svensson 2000), and economic growth as a product if interaction between aid and policy or governance settings (Collier and Dollar 2001; Hansen and Tarp (1999).

2.2 Negative impacts

The development literature includes many studies about the negative impacts of aid, with dependent variables including democracy (Djankov et al. 2008), corruption (de la Croix and Delavallade 2013; Kangoye 2013), economic and institutional governance (Asongu and Nwachukwu 2016), societal welfare (Arellano et al. 2009), domestic government revenue trends (Bulíř and Hamann 2003), public budget support and stability (Eifert and Gelb 2005; Kharas 2008), and public service delivery (Wolf 2007). Context plays a large role in determining the findings of studies, particularly across development stages and time periods. Africa is commonly studied; Azam et al. (1999: 2) find that aid dependence has become increasingly common in Sub-Saharan African countries, where net ODA/GNP ratios rose from 3.0% in the 1960s to 7.5% in the 1970s, 11.2% in the 1980s, and 15.3% in the 1990s. In another study of African countries, Bräutigam and Knack (2004) find that ODA dependence is associated with low-quality governance and institutional weakening. The authors extend the concept of one-way dependence to interdependence, arguing that donor and recipient countries mutually benefit from an ODA system that fails to meet objectives. On a broader scale, in a study of 106 countries receiving ODA, Busse and Gröning (2009) find a negative association between aid and governance quality, developing a composite governance indicator using measures of corruption, rule of law, and bureaucratic performance. In a global cross-sectional study, Knack (2000) finds that governance quality diminishes as aid levels increase. The study also finds no association between initial

institutional conditions and the impacts of aid on governance quality. Knack argues that recipient countries undertaking reforms (e.g. budgeting, civil service, and judicial systems) would benefit more from direct budgetary aid or debt relief than from project-based aid and technical assistance. Finally, Rajan and Subramanian (2007) develop an aid effectiveness measure using donor-recipient links that consider historical and cultural factors. By addressing endogeneity in this way, the study's approach avoids attributing low growth in recipient countries to ODA rather than bad governance. The authors argue that ODA can crowd-out domestic sector growth and weaken governance quality by reducing a government's incentive to collect taxes and engage civil society in development.

2.3 Neutral or mixed impacts

Other studies find insignificant or mixed associations between aid and governance, testing factors such as promotion of democracy (Knack 2004), and recipient (Asongu and Nwachukwu 2016) and donor (Fleck and Kilby 2001) political dynamics. In a pooled panel analysis of 209 countries over eight years, Ear (2007) finds no association between aid and quality of governance, and finds minimal variation in dimensions of governance explained by aid dependence. The study argues that Knack's (2000) claim about the negative impact of aid dependence on governance quality is overstated. The authors make a distinction within a given governance setting between policy environment and institutional circumstances (i.e. "fundamental structural characteristics"). Brazys (2016) identifies a non-linear relationship between aid and governance, arguing that aid can both improve and diminish the quality of governance; excessive amounts are found to have diminishing returns to governance quality. Examining causality in reverse order, Zanger (2000) finds that quality of governance – as measured by human rights, democratization, and constrained military spending – does not impact the determination of aid from the EU's largest donor countries, and that the needs of donor countries often outweigh those of recipient countries in the aid process.

2.4 Recipient country characteristics

Studies focusing on recipient country characteristics have also gone beyond government behavior to explain the success of ODA programs, examining structural factors and cross-sectoral initiatives. For example, Svensson (1999) studies the ability of ODA to generate

growth, focusing on the strength of recipient countries' political and civil liberties, and on democratic restraints on government powers. The study finds that aid is most effective in countries with mature democratic systems, and that promotion of democracy is a valid developmental strategy. Acht et al. (2015) extend the concept of democracy to include non-state actors (e.g. NGOs) as an alternative aid delivery mechanism within an aid-enabled environment of corruption; the strategy of by-passing official channels is often adopted when donors lack faith in recipient government institutions. The authors note that these findings are consistent with scholarly claims that good governance should not be a condition for receiving ODA, and also argue that use of non-state actors is indicative of a donor country's genuine motivation for developmental results. Dunning (2004) finds that during eras of geopolitical uncertainty (e.g. the Cold War), donor countries are compelled to pursue their own political interests in ODA strategies, with a lesser regard for the needs of recipient countries. Extending the theme of donor interest in aid programs, Ostrom et al. (1993) analyze the provision of rural infrastructure from a transaction cost perspective, arguing that donor countries often prefer to focus on fewer large projects in order to maximize oversight and control. Finally, Anwar's (2014) random effects econometric analysis of Asian countries between 1990 and 2011 identifies mixed effects (positive for corruption and economic openness; negative for conflict and political stability), while arguing that the needs of recipient countries should be prioritized over those of donor interests in ODA programs.

2.4 Modeling considerations

The literature represents decades of scholarly work about a complex and empirically challenging topic. The goal of this paper is to build conceptual clarity around these issues by modeling the aid-corruption relationship and outlining policy implications. Although empirical studies have provided rich insights, their findings are inconclusive and lack a solid theoretical foundation. With this view, Paul (2006) conducts a comprehensive survey of theoretical studies on foreign aid and argues that they are helpful in explaining characteristics of aid relationships. Among the important results from studies using a theoretical approach, three findings are closely relevant to this paper, as outlined in the remainder of this literature review.

First, achieving aid effectiveness is a formidable task. Using the principal-agent model approach, Murshed and Sen (1995), Martens et al. (2002), Murrell (2002), and Azam and Laffont (2003), show that moral hazard and adverse selection are the main problems faced by donors in the aid relationship with recipient countries. That is, foreign aid is potentially vulnerable to misconduct, especially when the agent (recipient government) is heavily driven by self-interest and the principal (donor) is constrained by information asymmetry. Using a game-theoretical model, Svensson (2000) also exhibits that foreign aid may increase rent-seeking behavior and hence reduce productive public spending.

Second, donors can be a factor in reducing aid ineffectiveness, due in part to selfish strategic interest, bureaucratic challenges, and principal-agency problems within donor agencies. There are institutional and individual incentives that induce donors not to prioritize aid effectiveness (Mosely, 1986; Wane, 2004). Modeling rivalries among major donors, Lundborg (1998) provides both theoretical and empirical evidence that in this context aid is driven by a "gift exchange" mechanism; aid is given to a country in exchange for political support. Azam and Laffont (2003) also argue that agency problems within multilateral aid institutions can be a factor in reducing aid effectiveness. Mattesini and Isopi (2008) examine the aid-corruption challenge from a principal-agent perspective, arguing that corruption can be endemic (recipient country conditions) or project-related (moral hazard). The study identifies several types of motives behind ODA, including altruistic, strategic, and efficiency-driven.

Third, the literature has argued that donors can enhance aid effectiveness with appropriate measures and efforts. Azam and Laffont (2003), applying contract theory, find that donors can improve aid outcomes by imposing conditionality and full observability. Lahiri and Raimondos-Møller (2004) argue that donors can affect the equilibrium degree of aid fungibility by choosing the amount and timing of aid. Svensson (2003) argues that creating competition among a group of recipient countries and raising the opportunity cost of disbursing aid improve aid effectiveness, while Cordella and Dell'Ariccia (2007) suggest that donors can improve aid effectiveness by accounting for the type of recipients and the scale of assistance in designing aid programs. The latter authors argue that budget support is

more effective than project aid when the preferences of donors and recipients are aligned, and when assistance is small relative to recipients' own resources.

This paper addresses aid effectiveness by examining the equilibrium level of effort exerted by the recipient government in the aid supply-demand relationship with donors.[3] The paper deepens scholarly understanding of the three aforementioned findings by providing robust insights into the problems of aid dependence, aid deficiency, and the role of donors in contributing to these challenges, even when motivated by generous or altruistic objectives.

Table 1: Studies linking aid with aspects of governance

Positive impacts			
Author	Link with aid	Context	Methods
Jones and Tarp 2016	Political institution quality (+)	103 recipient countries, 1983-2010	Cross-section, dynamic panel analysis, system GMM, bias corrected fixed effects
Masoud et al. 2015	Corruption (-)	42 SSA countries, 2000-2010	Quantile regression
Aronow et al. 2012	Governance quality (+)	115 recipient countries, 20 years	Instrument variables 2SLS; fixed effects
Okada and Samreth 2011	Corruption (-)	120 developing countries, 1995-2009	Quantile regression
Wolf 2007	Quality of selected public services (+)	Developing countries in Africa, 2002	OLS regression
Eifert and Gelb 2005	Public budget support and stability (+)	World Bank CPIA countries, 1999-2003	Bi-variate modeling simulation of optimal aid allocations across CPIA quintiles
Dunning 2004	Democracy (+)	SSA countries, 1975-1997	Instrument variable 2SLS
Collier and Dollar 2001	Economic growth in a "good" policy environment (+)	African countries, 1990-1996	Overlapping generations framework; OLS and 2SLS
Tavares 2003	Corruption (-)	Recipient non-OECD countries	OLS and instrument variable
Dollar and Svensson 2000	Donor behavior (+); recipient political economy variables (+)	282 World Bank adjustment loans	Probit regression

[3] The approach is inspired by the model developed by Basu and Pham (1998).

Hansen and Tarp 1999	Economic growth despite the quality of governance (+)	Various	Harrod-Domar models; reduced form aid-growth model; new growth theory reduced form
Negative impacts			
Author	Link with aid	Context	Methods
de la Croix and Delavallade 2013	Corruption (+)	159 aid-recipient countries, 1996-2005	Instrumented 3SLS
Kangoye 2011	Public sector corruption (+)	80 developing countries across Asia, Africa, Europe, and Latin America, 1984-2004	Cross-section and panel regressions; IV regressions, instrumenting for aid unpredictability
Busse and Gröning 2009	Governance quality (-)	106 recipient countries, 1984-2004	System-GMM dynamic panel estimator
Arellano et al. 2008	Societal welfare (-)	Aid-dependent countries in Africa, 1990-2004	Intertemporal two-sector general equilibrium model
Djankov et al. 2008	Democracy (-)	108 donor recipient countries, 1960-1999	Instrument variable regression; GMM estimation; OLS and ordered probit
Kharas 2008	Deadweight losses (+)	177 countries, 1970-2005	Capital asset pricing model (CAPM)
Ear 2007	Rule of law (-)	140+ countries receiving aid, 1996-2004	Cross-sectional 2SLS; pooled cross-sectional time series fixed effects
Rajan and Subramanian 2007	Governance quality (-)	All developing countries in UNIDO database, 1981-1990	OLS, instrumental variable
Knack 2004	Democracy (-)	105 countries, 1975-2000	Multivariate analysis
Bräutigam and Knack 2004	Governance quality; tax share of GDP (-)	32 recipient countries in Africa, 1982-1997	Ordered logit; instrument variable 2SLS
Bulíř and Hamann 2003	Volatility in fiscal revenues (+)	72 countries, 1975-1997	First differences estimation
Knack 2000	Bureaucratic quality, rule-of-law, corruption severity (-)	80 recipient countries, 1982-1995	OLS, instrument variable 2SLS
Neutral or mixed impacts			

Author	Link with aid	Context	Methods
Asongu and Nwachukwu 2016	Economic and institutional governance (-); political governance (0)	52 African countries, 1996-2010	Endogeneity robust instrument variable 2SLS
Asongu and Nwachukwu 2016	Regulation quality, government effectiveness, corruption control, and rule of law (-); political stability, voice and accountability (0)	52 African countries, 1996-2010	Endogeneity robust instrument variable 2SLS
Brazys 2016	Governance (+/-); Laffer curve effect	122 developing countries, 1995-2008	Quadratic regression
Anwar 2014	Corruption, economic openness (+); conflict, political stability (-)	Recipient countries in Asia, 1990-2011	Random effects
Coviello and Islam 2006	Economic institutions (0)	Recipient countries, 1970-2000	Dynamic Panel GMM Estimation
Fleck and Kilby 2001	Domestic political voting patterns (0)	USAID: 1,000 contractors and 3,000 contracts	Multivariate analysis
Zanger 2000	Quality of recipient governance as determinant of allocation (0)	Recipients of aid from EU countries, 1980-1995	OLS regressions

3. Modelling recipient government behavior at equilibrium

The World Bank (2005: 53) proposes that "success or failure of reform depends largely on a country's own efforts." This means that aid is effective only when it induces the recipient country to undertake development efforts. Further, the imposition of aid conditions and associated expectations for short-term achievements often fail to generate material outcomes without concurrent improvement in the recipient's effort level. Nevertheless, factors driving ODA ineffectiveness can be contextually embedded and therefore complicated to analyze, particularly when donors and recipients are stuck in strategic and often implicit games. In some cases, the donor is motivated to sustain aid flow despite the poor performance of the recipient, while the recipient expects aid knowing that donor expectations are lax. In addressing this issue, this section presents a model and articulates how it can be used to understand donor and recipient government behaviors at equilibrium.

3.1. The model

The model presented in this subsection is focused on the aid that helps recipient countries finance major development projects such as roads, ports, airports, power plants, and e-government platforms. This focus is justified because donors typically allocate a large share of ODA to assist recipient countries in upgrading infrastructure.[4] The model assumes two actors in a long-term project funded by ODA: the donor, such as a country or an international organization, and the recipient country government (hereafter "government").

The project's success as a measure of aid effectiveness is assumed to depend on the effort level of the government. The project would obtain expected success if the government exerts a high level of effort; no success would result from inadequate government effort. The effort made by the government involves a variety of mechanisms including institutional design, organizational reform, human resource development, and domestic resource mobilization. The government effort level is conceptualized as a spectrum from a low to high. For illustration, a high effort level implies complete commitment to project success, as in the case of South Korea using Japanese aid to build the Pohang steel complex. A low level of effort implies that the government's motivation for aid is driven entirely by personal gain among individuals in power.

For the sake of simplicity, the government's utility's function U_G is assumed to take the following form:

$$U_G(q, M, A) = \begin{cases} \dfrac{m(M)}{g(q)} & \text{if e} = e_H \\ \dfrac{a(A)}{(1+F)} & \text{if e} = e_L \end{cases} \qquad (1)$$

where

[4]For example, infrastructure projects accounted for more than 67% of Japan's ODA in 2015 (source: OECD data on ODA by sector; available at https://data.oecd.org/oda/oda-by-sector.htm).

- e denotes the government's effort level, which could be high ($\mathrm{e} = e_H$) or low ($\mathrm{e} = e_L$); q is the relative ratio between the high and low effort level ($q = e_H/e_L > 1$). The project is assumed to succeed if the government's effort level is high and to fail if the effort level is low. The utility the government derives from its effort is assumed to be different in each scenario, as shown in Eq (1). $g(.)$ is increasing and concave on q: $g(1) = 1$; $g' > 0$; and $g'' < 0$. This means that a higher relative effort level q will increase $g(q)$, and hence raise the government's disutility for making a high effort.

- M ($M > 0$) is the importance attributed to the project, as determined by a combination of factors including scale and potential economic contribution, especially in creating jobs, reducing poverty, improving productivity, accelerating growth, and upgrading the foundation of the country's long-term development. The importance of a project is typically considered in detail before financing by can be procured. Therefore, M can be considered as an objective measure, visible to both the government and donor despite their occasionally differing perceptions. $m(.)$ is an increasing and concave function on M: $m(0) = 0$; $m' > 0$; and $m'' < 0$. The larger the importance of the project, the higher the utility the government gains from its success.

- A (A>0) is the amount of aid provided by the donor for the project. $a(.)$ is the utility the government derives for personal gain. $a(.)$ is an increasing and concave function on A: $a(0) = 0$; $a' > 0$; and $a'' < 0$. This means that for a selfish government, the larger the aid, the higher the utility it can gain from making a low effort.

- F (F>0) is a variable that captures the cost borne by the government if the project is unsuccessful due to low effort. This cost could range from deterioration of legitimacy to weakening credibility when asking the donor to provide aid for new projects.

According to the definition above, the government's utility function is based on three variables: $q, M,$ and A:

$\frac{\partial U_G}{\partial q} < 0; \frac{\partial^2 U_G}{\partial^2 q} > 0; \frac{\partial U_G}{\partial M} > 0; \frac{\partial^2 U_G}{\partial^2 M} < 0$; and $\frac{\partial U_G}{\partial A} > 0; \frac{\partial^2 U_G}{\partial^2 A} < 0$.

For ease of exposition and to avoid losing generality, the functions $m(M)$ and $a(A)$ take the following simple forms[5]:

$$m(M) = M^{\alpha} \ (0 < \alpha < 1)$$
$$a(A) = \theta . A^{\beta} \ (0 < \beta < 1)$$

The government's utility function in Eq (1) can be rewritten as

$$U_G(q, M, A) = \begin{cases} \frac{M^{\alpha}}{g(q)} & \text{if e} = e_H \\ \frac{\theta . A^{\beta}}{(1+F)} & \text{if e} = e_L \end{cases} \quad (2)$$

Given the government's utility function in Eq (2), the government as a rational decision maker will exert a high level of effort if and only if:

$$U_G|_{e=e_H} > U_G|_{e=e_L} \quad (3)$$

$$\leftrightarrow \quad \frac{M^{\alpha}}{g(q)} > \frac{\theta . A^{\beta}}{(1+F)} \quad (4)$$

Transforming Inequality (4) shows that the government will exert high effort if and only if:

$$A < \left[\frac{(1+F)}{\theta \cdot g(q)}\right]^{1/\beta} \cdot M^{\alpha/\beta} \quad (5)$$

[5] Both functions satisfy the conditions assumed by the model ($m(0) = 0$; $m' = \alpha . M^{\alpha-1} > 0$; and $m'' = \alpha . (\alpha - 1) . M^{\alpha-2} < 0$. $a\,(0) = 0$; $a' = \beta . A^{\beta-1} > 0$; and $a'' = \beta . (\beta - 1) . A^{\beta-2} < 0$.

For simplicity, it is assumed that $\alpha = \beta$. Inequality (5) for the government's high effort can be rewritten as:

$$A < \left[\frac{(1+F)}{\theta \cdot g(q)}\right]^{1/\beta} \cdot M \quad (6)$$

The government will exert low effort if:

$$A > \left[\frac{(1+F)}{\theta \cdot g(q)}\right]^{1/\beta} \cdot M \quad (7)$$

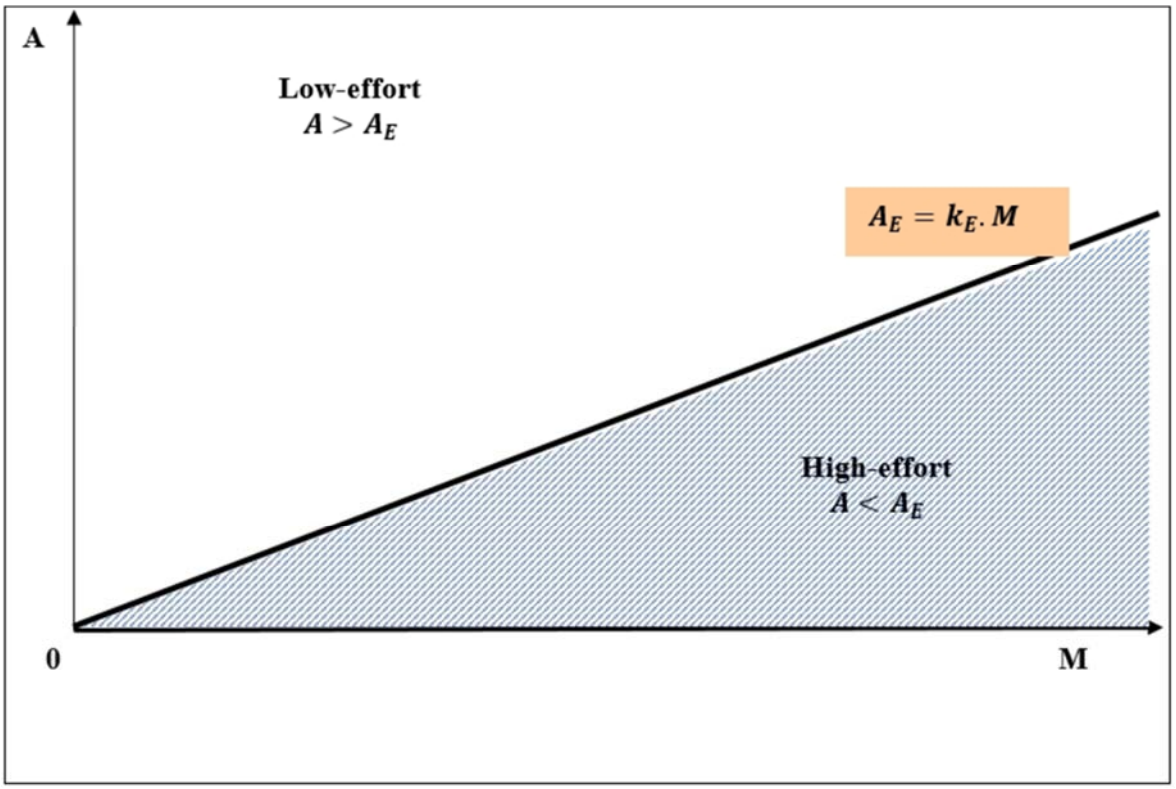
Let $\boldsymbol{k_E} = \left[\frac{(1+F)}{\theta . g(q)}\right]^{1/\beta}$ (8)

and $A_E = \boldsymbol{k_E}.M$ (9)

The government will exert high effort if $A < A_E$ and low effort if $A > A_E$. The locus $A = A_E = \boldsymbol{k_E}.M$, therefore, is the borderline determining effort level. For a given circumstance (characterized by $\boldsymbol{k_E}$), the relationship between the amount of aid A allocated for the project and its importance M can determine the behavior of the government. Excessively high A relative to M can induce the government to exert low effort, compromising aid effectiveness.

The relationship between A and M is depicted in Figure 1, with M on the horizontal axis and A on the vertical axis. In this figure, the line $A = A_E = \boldsymbol{k_E}.M$ divides the space into two areas: the lower area represents the condition $A < A_E$, while the upper area represents $A > A_E$. As such, the two areas are associated with the two different levels of government effort: high in the lower area and low in the upper area.

Figure 1. Government behavior



3.2. Government behavior at equilibrium

For a given development project X, the government's behavior is revealed at the equilibrium determined by aid demand and supply. The importance of the project is represented by $\boldsymbol{M_X}$ and the government's demand for aid to support the project is represented by the equation $\boldsymbol{M = M_X}$. Demand ranges from 0 to +∞, while the specific amount of aid is decided by the donor. In the graph, the demand curve is a vertical line crossing the horizontal axis at $\boldsymbol{M_X}$ (Figure 2).

The amount of ODA the donor considers for the project is determined by the importance of the project and other factors including geopolitics and the donor's perception about the importance of the project. For simplicity, the donor's supply of ODA for the project is assumed to take the following form:

$$A = \rho . M^{\gamma} \quad (10)$$

Where $\rho > 0$ and $0 < \gamma < 1$

The coefficient ρ is determined by factors other than M and captures the donor's interest in the project and the donor's evaluation of the country's current context. Eq (10) suggests that aid is increasing and concave on M. For a given importance of M, the stronger the donor's interest in the project (represented by ρ), the larger the aid amount A.

The government's behavior is revealed at the equilibrium point H, where the demand curve $\boldsymbol{M = M_X}$ crosses the supply curve $A = \rho . M^{\gamma}$ (Figure 2). Point H can be in the upper area (low effort) as shown in Figure 2, or in the lower area (high effort). While anecdotal evidence about governments' low effort is abundant, there are also cases in which governments exert high effort in using foreign aid during early stages of development.[6]

Figure 2. Government behavior at equilibrium

4. Policy Insights

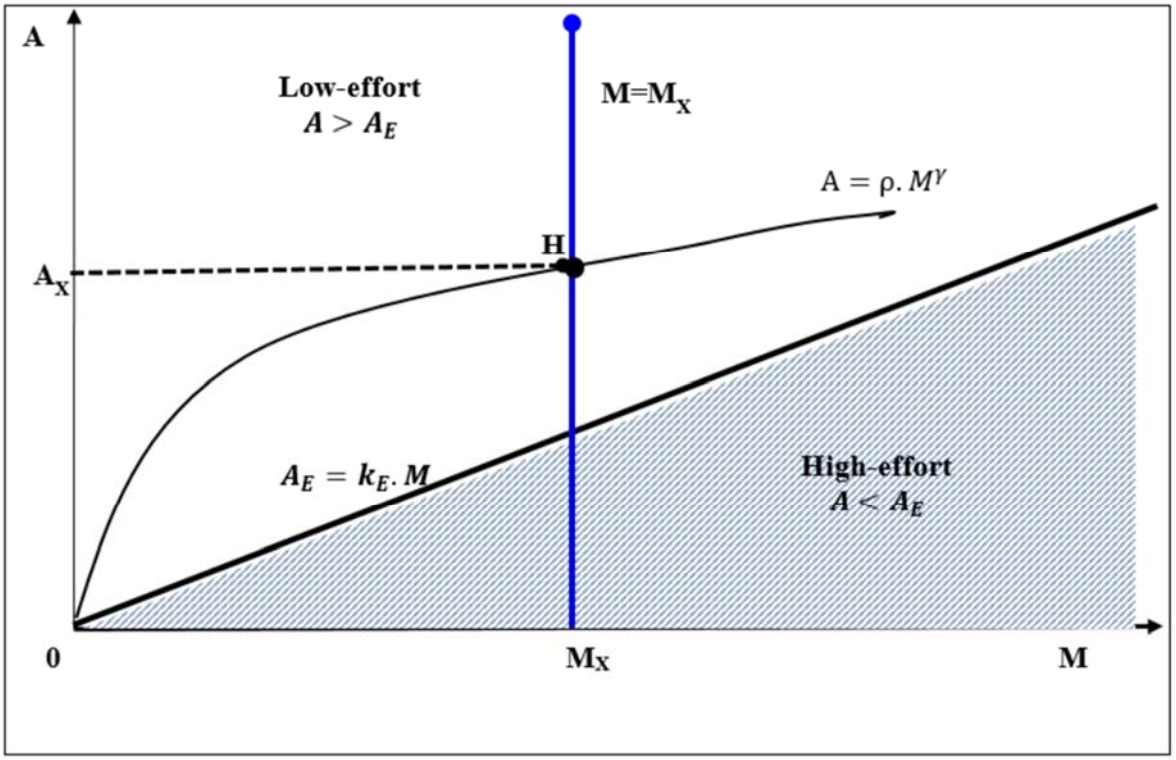
This section applies the proposed model to generate insights into the three salient problems in aid policy: aid dependence, aid deficiency, and measures to enhance aid effectiveness.

4.1. Aid dependence

To illustrate how the model describes the aid dependence problem, project X is assumed here to represent a large number of projects that are similar in nature, for which the recipient country needs aid. Assuming that the government currently exerts low effort in implementing project X (Figure 2), equilibrium point H lies in the upper area as long as changes in parameters affecting Inequality (7) are not sufficient to shift equilibrium behavior from the upper to the lower area.

[6] For example, Taiwan and South Korea in the 1960s made transformational development progress using foreign aid from the US and Japan, with their effort and commitment even surprising experts from donor countries. The two countries' experiences share thee features: aid played a significant role in economic progress, aid was not given for longer than roughly a decade, and recipient economies became much stronger after aid was curtailed (see Chang, 1965; CBO, 1997).

Figure 2: Effort in project implementation



Mathematically, this equilibrium persists as long as:

$$A_X > \left[\frac{(1+F)}{\theta \cdot g(q)}\right]^{1/\beta} \cdot M_X \qquad (11)$$

Replacing $A_X = \rho M_X$ from Eq (10) into Inequality (11) yields:

$$\rho > \left[\frac{(1+F)}{\theta \cdot g(q)}\right]^{1/\beta} \qquad (12)$$

Which is equivalent to:

$$g(q) > \frac{(1+F)}{\theta . \rho^{\beta}} \qquad (13)$$

This modeling exercise reveals three insights into the aid dependence problem. First, the government's low effort in carrying out an aid project, if present, is an equilibrium choice. That is, without significant changes this choice is persistent. Second, Inequality (13) implies that the government's equilibrium choice is determined by a set of circumstantial characteristics, which include the relative cost of effort, $g(q) = g(e_H/e_L)$, the fraction θ of aid that government elites can capture for personal gain, the disutility F associated with the failure of the project, and the coefficient ρ representing the donor's degree of motivation in providing the aid. Finally, the problem of aid dependence is deepened if Inequality (13) is strengthened due to changes in circumstances that increase the left-hand side or decrease the right-hand side of the inequality.[7] More specifically, changes that reinforce the government's equilibrium low-effort choice include the following:

Increase in the left-hand side: $q = e_H/e_L$ becomes higher, hence $g(q) = g(e_H/e_L)$ is higher. This change could occur when corruption becomes more pervasive and receiving bribery is increasingly acceptable as morale deteriorates among government staff. It should be noted that the influx of "easy" foreign aid can exacerbate this problem.

Decrease in the right-hand side:

- The fraction θ of aid extracted for private gain increases. This could occur when the donor loosens supervision for reasons originating with the donor or recipient government or both, allowing government elites to extract more benefits from ODA.
- The disutility F caused by the project's failure decreases. This could occur when donors are "overcrowded" within a given recipient country, motivating the donor to compete in order to maintain government interest in a project even if that project fails. This can occur also if the evaluation of and accountability for the project's performance is not publicized and aid dependence becomes an accepted culture within the country.
- The coefficient ρ rises. This could result from the donor's increased eagerness in providing ODA, as motivated potentially by geopolitical forces or the influence of lobbyist groups.

[7] The case of Zambia's aid dependence presented by Dollar and Svensson (2000) provides an excellent illustration of this problem.

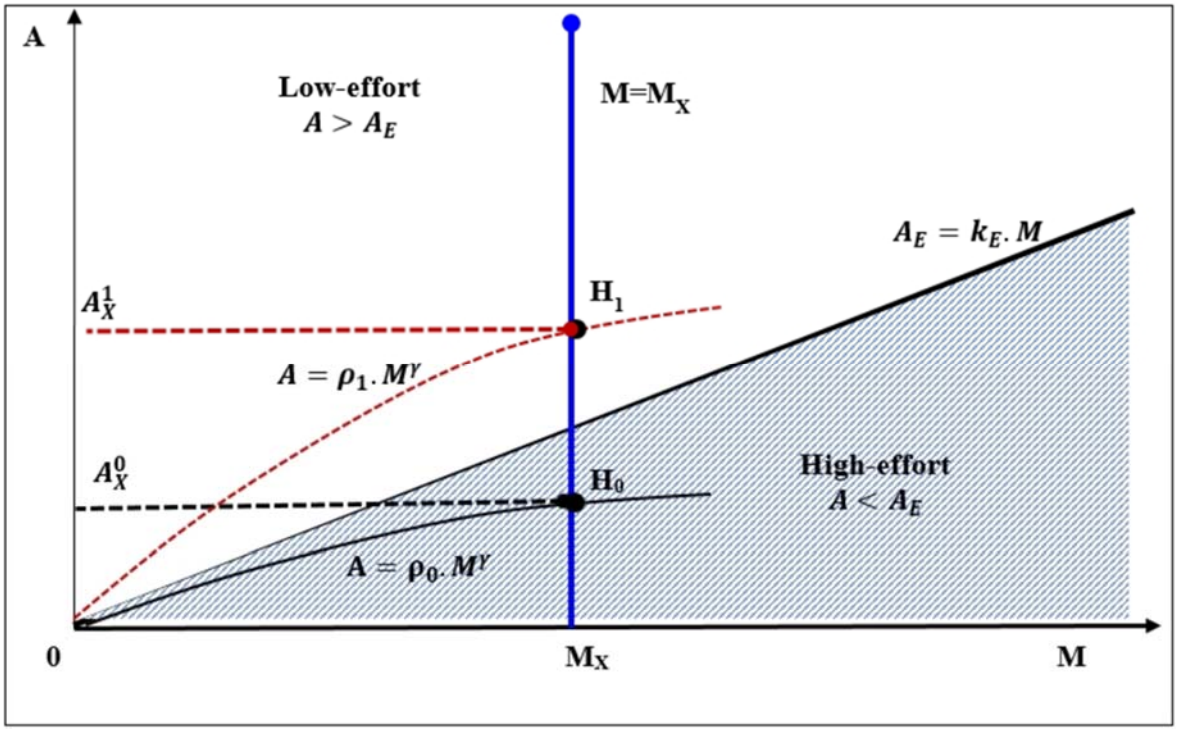
4.2. Aid deficiency

The model can also help predict adverse consequences that deficient aid policy can cause for recipient countries. Although the donor may be altruistic and its aid generous, the aid policy may still have negative effects on the recipient country due to deficient strategic design or negligence in monitoring project performance.

4.2.1. Lack of strategic design in aid policy

For reasons such as geopolitical or economic motivations, the donor may decide to significantly increase aid without undertaking careful assessment of the recipient country context. This aid expansion policy, which may lack a sound strategy absent robust contextual analysis, can shift the equilibrium level of government effort from "high" to "low," leading to deterioration in aid effectiveness. As shown in Figure 3, the aid expansion policy increases the coefficient ρ in Eq (10) from ρ_0 to ρ_1 ($\rho_1 > \rho_0$). As a result, the aid supply curve rotates upward from $A = \rho_0 . M^{\gamma}$ to $A = \rho_1 . M^{\gamma}$; hence, the equilibrium point shifts from H_0 in the high-effort area to H_1 in the low-effort area. The government now receives more aid than before ($A_X^1 > A_X^0$), while exerting a lower level of effort (Figure 3). This suggests that even an altruistic donor can compromise project effectiveness through increased generosity and stronger motives to provide aid, if due diligence and sound strategy are lacking.

Figure 3: Consequences of lack of strategic design in aid policy



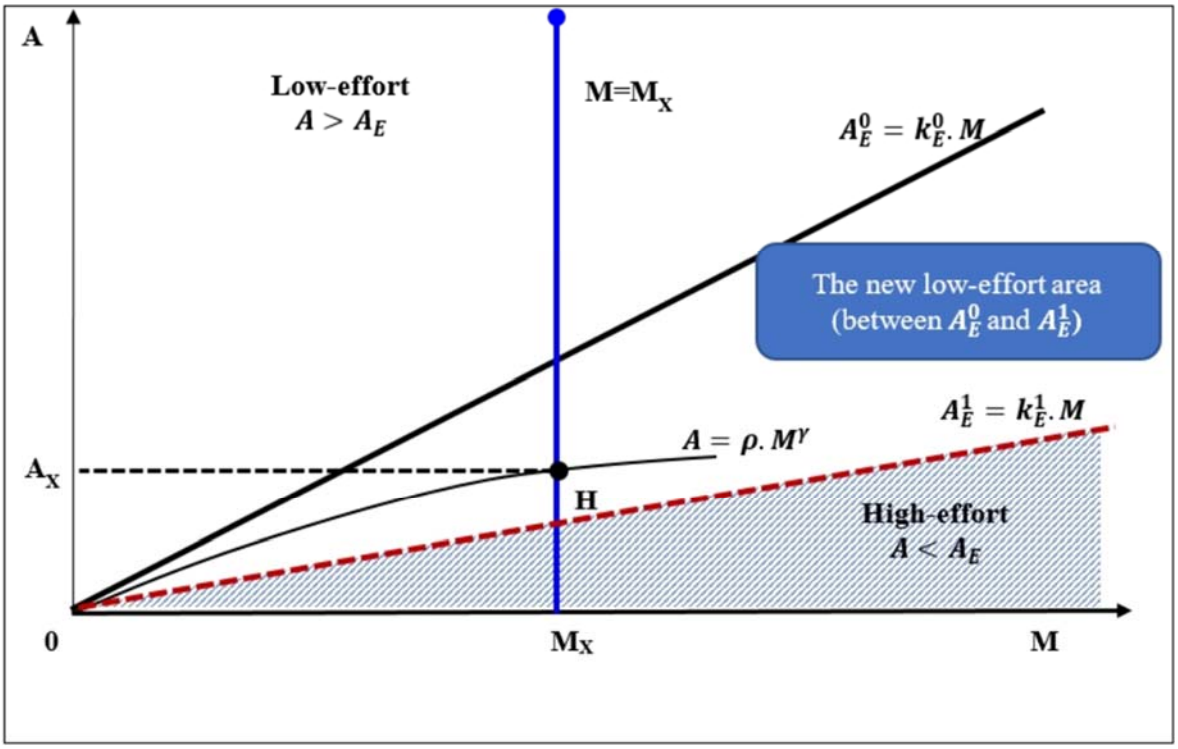
4.2.2. Lack of effective monitoring

It is not uncommon that donors fail to effectively monitor project performance and a project's ability to help improve governance. Nevertheless, donors often tolerate deterioration in recipient countries' institutional quality. Under such circumstances, donors maintain aid levels while expressing little or no concern about the worsening state of recipient efforts and institutional quality. This negligence, together with other unfavorable circumstances in the recipient country, can cause coefficient $k_E = \left[\frac{(1+F)}{\theta . g(q)}\right]^{1/\beta}$ in Equation (8) to decline. This may occur in three cases: (i) increase in the fraction θ that government elites can extract from aid due to lack of monitoring and increasingly pervasive corruption practices; (ii) reduction in the disutility F due to deterioration in government transparency and accountability, particularly as donor competition increases within the recipient country; and (iii) increase in the relative cost of effort $q = e_H/e_L$ resulting from a deterioration in the general work ethic within a recipient government, particularly as high

effort and good performance are unrewarded, and complacency and laziness become more acceptable.

As shown in Figure 4, a decline of the coefficient $\boldsymbol{k_E}$ rotates the line $\boldsymbol{A_E = k_E.M}$ clockwise, narrowing the area of high effort and enlarging that of low effort. As a result, the equilibrium choice the government's effort at point H falls in the low effort level (Figure 4).

Figure 4: Consequences caused by lack of effective monitoring



4.3. Strategic approaches for the donor to influence effort level

If the donor is altruistic and eager to enhance aid effectiveness, the model indicates that the donor can guide the government's equilibrium choice from low to high effort.[8] For this

[8] If the donor is bureaucratic, it is indifferent to the government's effort level. As such, if the government lapses into low-effort status, it may become trapped in that equilibrium indefinitely. Regarding this point, Easterly (2002) identifies factors contributing to the "dysfunctional bureaucracy" deeply rooted in donor organizations. This helps explain why aid dependence has been persistent in many countries. Araral (2005) provides an insightful study of this problem as present in the Philippines' irrigation sector. On the other hand,

purpose, the donor must consider all strategic approaches that ensure that the equilibrium H in Figure 2 shifts from the upper (low-effort) area to the lower (high-effort) area. There are two strategic approaches for achieving this: changing the aid arrangement and encouraging reforms in the recipient country.

4.3.1. Changing the aid arrangement

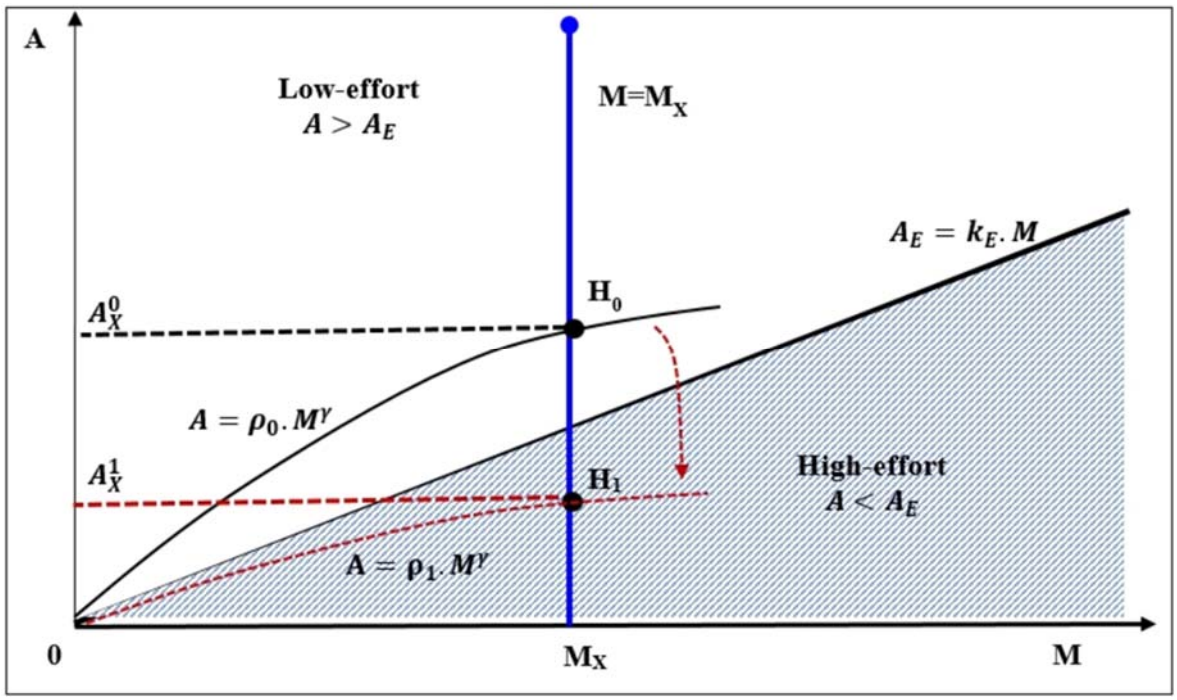
By applying stricter conditions on providing aid, donors reduce the coefficient ρ in Eq (10) from ρ_0 to ρ_1 ($\rho_1 < \rho_0$), causing the aid supply curve to rotate clockwise. There are two scenarios in which this change can shift the equilibrium point H from the low-effort to the high-effort area, depending on the government's response and negotiation with the donor.

In the first scenario, the government accepts the smaller amount of aid ($A_X^1 = \rho_1 . M^\gamma < A_X^0 = \rho_0 . M^\gamma$) while project importance M_X remains unchanged (Figure 5A). This forces the government to commit more resources to the project and enhances the government's commitment and accountability, while larger budget spending on the project increases public pressure on performance and transparency. As a result, the government's equilibrium choice shifts from H_0 in the low-effort area to H_1 in the high-effort area (Figure 5A).

Svensson (2000) shows that with binding policy commitment, the donor community can use aid to mitigate incentives for rent-seeking activities in the recipient country.

Figure 5A. Changing the aid arrangement (reducing the coefficient rho)

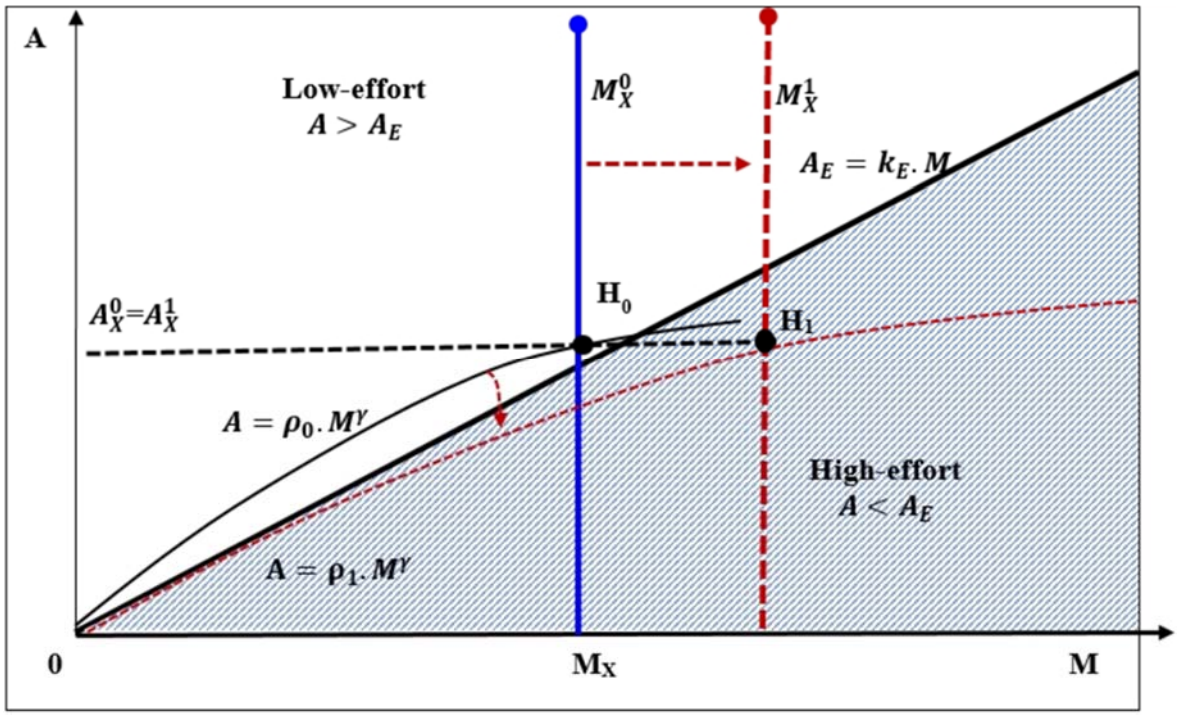
Scenario 1: Government increases its financial share in the project having the same importance M_X



In the second scenario, the government keeps the aid amount unchanged ($A_X^1 = \rho_1 . M^\gamma = A_X^0 = \rho_0 . M^\gamma$), requiring a substantial increase in the importance M_X of the project (Figure 5B). There are a number of measures that can help the government raise the importance M_X of the project. For example, the government can institute regulatory changes or encourage complementary investments that enhance the expected impact of the project. These initiatives shift the government's equilibrium choice from point H_0 in the low-effort area to point H_1 in the high-effort area (Figure 5B).

Figure 5B. Changing the aid arrangement (reducing the coefficient rho)

Scenario 2: Recipient keeps the aid amount unchanged by enhancing the importance the project



Changing the aid arrangement to induce the government's productive behavior, as presented above, is often necessary for development projects. As argued by *The Economist* (1999):

> "[…] aid could work if it were properly directed" and "Rich countries should be much more ruthless about how they allocate their largesse, whether earmarked or not. Emergency relief is one thing. But mainstream aid should be directed only to countries with sound economic management."

4.3.2. Promoting reforms through aid and more robust collaboration

Promoting reforms in the recipient country that address factors related to Inequality (13) can help shift the government's equilibrium effort from the low- to the high-level. Under this approach, the donor does not change the aid amount but requires reforms and collaboration to cause the curve $A_E = k_E.M$ to rotate counter-clockwise, enlarging the high-effort area such that the existing equilibrium point H falls into this area (Figure 6).

Rotating the curve $A_E = k_E.M$ counter-clockwise requires increasing the coefficient $k_E = \left[\frac{(1+F)}{\theta.g(q)}\right]^{1/\beta}$ in Eq (8). This can be done through the following measures.[9]

- Reducing the fraction θ that government elites can extract from aid. This requires more effective monitoring of project progress, tighter supervision of unproductive activities that generate personal gains form aid, enhanced transparency in budgeting and operations, and attention to key performance indicators and outlays available for public monitoring. This approach also requires more effective control of corruption, especially among those involved with the project, and raising the costs of personal malfeasance.

- Reducing the relative cost of effort $q = e_H/e_L$. This requires reforms to make high effort more rewarding and better supported, while making low effort costlier. Possible measures include institutional arrangements (enhancing accountability and asserting a strong mandate), organizational strengthening (applying performance-base management), and human resource development (recruiting more qualified people and providing them with better training, especially for management of the project).

- Raising the disutility F associated with the project's failure. First, the importance of the project and its link to outcomes must be clearly outlined and publicized. Leaders and citizens must understand why the discontinuation of the project would compromise national developmental goals. Second, scenarios that forecast the costs and national strategic setbacks of project failure should be publicized to encourage political and popular support. Finally, monitoring and evaluation should be robust enough to measure project progress against international best practice benchmarks.

[9] The model assumes that the parameter α, which reflects the government's acceptance of risk, is constant.

Figure 6: Promoting reforms that enlarge the high-effort area

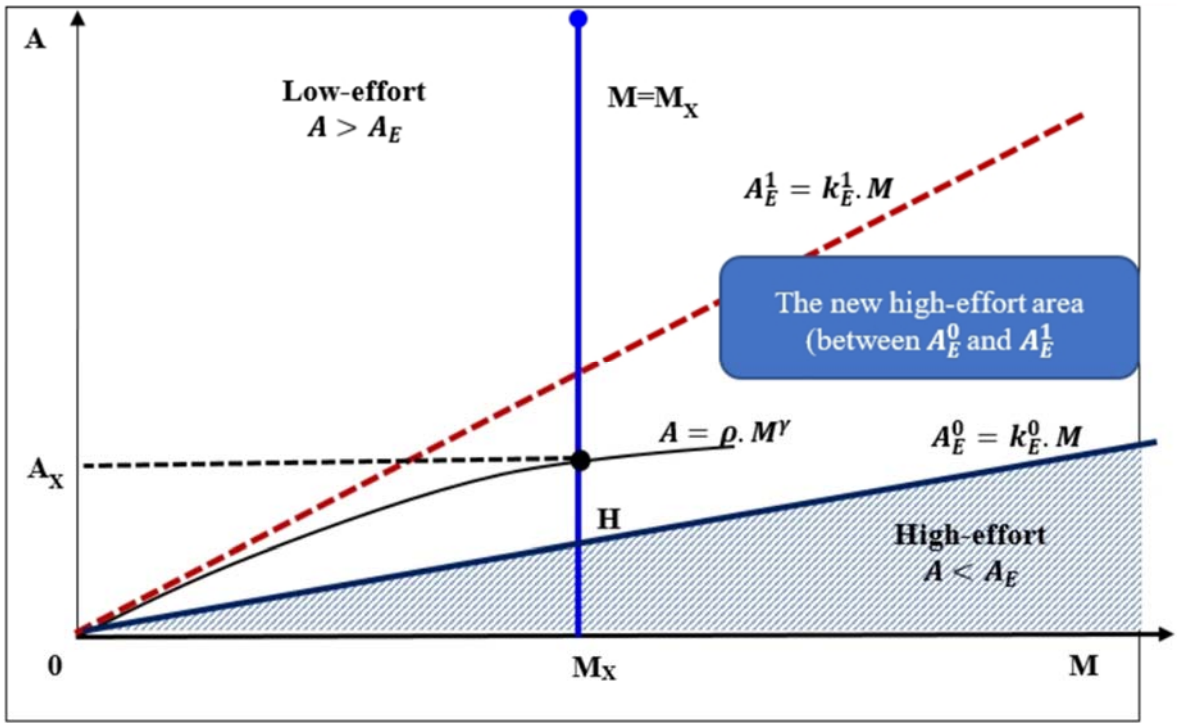


Table 2 extracts policy implications derived from the above modeling exercises. The table can be used as a framework for intervening to improve aid effectiveness.

Table 2: Summary of policy implications

Objective	Recipient actions	Donor actions
Aid dependence		
Decrease the fraction of aid extracted for private gain	Impose tighter supervision of projects	
Increase the disutility caused by project failure	• Decrease "competition" among donors • Publicize evaluation and accountability of project performance • Publicize how project advances national developmental goals	

	Discourage culture of aid dependence in both government and society	
Manage aid interest		Ensure that aid is not provided for reasons that are unrelated to a project's objectives or success
Aid deficiency		
Improve strategic design of aid policy		Ensure that new aid projects of expansion of aid are not done without robust due diligence regarding project risks and objectives
Improve monitoring	Strengthen institutions for measurement, regulation, and enforcement of standards related to projects	Refuse to tolerate deterioration in institutional quality
Strategic approach to influence effort level		
Change the aid arrangement	• Accept less aid and commit own resources • Accept same aid level and increase importance of project	Apply stricter controls on providing aid
Promote recipient country reforms	• Reduce opportunities for government to extract personal gains from aid • Control corruption • Raise costs of personal malfeasance	Maintain aid level but require reforms and additional collaboration
Reduce relative cost of effort	• Reward high-effort behaviors • Enhance accountability • Adopt performance-based management • Recruit more qualified and better trained project managers	

6. Conclusion

Aid programs have been criticized for a long record of ineffectiveness. However, the universally endorsed goal to promote human well-being compels wealthy countries to continue intervening where development lags. A better understanding about why aid ineffectiveness has endured and how donors can overcome this problem is needed. The challenge of aid ineffectiveness emerges first from the formidable constraints to helping poor countries emerge from fundamentally weak development foundations. The problem is exacerbated by contradictory objectives between donors and governments. In the interest of domestic political and fiscal feasibility, donor countries often pursue aid projects that serve their own particular interests, regardless of the impacts on recipient countries. Lack of strategic consideration and insufficient efforts in designing aid strategy and monitoring further constrain aid potential.

This study makes progress towards understanding the causes of aid ineffectiveness and suggests a way for donors to overcome this problem by improving aid policy design and fostering reforms in recipient countries. The model introduced in this paper conceptualizes the relationship between donors and recipients as that of a game in which each acts rationally in self-interest, illustrating that poorly conceived and strategized aid programs yield an equilibrium outcome in which recipient governments maintain low development effort and remain satisfied with aid dependence. Although the model is static, its insights have dynamic implications. It indicates that the government's behavior, while at equilibrium in a given period (high- or low level of effort), can change in the following period due to changes in some of the model's parameters.

This paper's theoretical contribution is the introduction of a nuanced model of how the behavior of donors and recipients is responsible for compromising the effectiveness of aid programs; this provides robust insights into the underexplored culpability of donors in perpetuating aid dependence and aid deficiency. In particular, the model identifies the mechanisms through which generous aid can harm the development of the recipient country. The model provides a sound logical basis on which effective strategic frameworks for aid effectiveness can be developed.

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