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Incentive Proliferation? Making Sense of a New Wave of Development Programs

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ABSTRACT

A new wave of development programs that explicitly use incentives to achieve their aims is under way. They are part of a trend, accelerating in recent years, to disburse development assistance against specific and measurable outputs or outcomes. With a proliferation of new ideas under names such as "payments for performance," "output-based aid," and "results based financing," it is easy to lose sight of basic underlying similarities in these approaches and to miss some significant differences.

This paper proposes a way of classifying and distinguishing the range of incentive programs being debated today, emphasizing two particular dimensions: the agent whose behavior the incentive seeks to change and the specificity of the output or outcome measure. It begins by characterizing a basic incentive arrangement, discussing the range of available contracts and how they appear in development programs, presents a classification of existing incentive programs and illustrates the scheme with examples. The paper concludes by identifying four broad categories that address different problems and offers some cautionary notes.

Keywords: incentives, foreign aid, principal-agent model, innovation, contracts, performance, prizes.
JEL codes: D86, F35, O20, O31

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Introduction

Development programs have always incorporated incentives in the sense that the structure of aid contracts and payment mechanisms rewards certain types of behaviors over others. If the typical aid program in the 1950s and 1960s was an engineering project (dams, irrigation systems, ports, roads), the payment mechanisms rewarded progress in disbursing against pre-approved construction plans. However, such payment mechanisms did not necessarily reward efficiency (since cost-savings generated no surplus for the implementer), nor did they reward operation and maintenance (since aid funding stopped with completed construction). Today, the emphasis on delivery of services (education, health, water) and the poor track record of many aid programs have generated interest in explicitly using incentives in development programs, not only to improve efficiency and sustainability but also to encourage innovation and promote behavioral changes. Take for example the following:

> *A health ministry pays a weekly stipend to patients who complete their TB treatments (individual treatment incentives)*
>
> *An aid agency pays a network of nongovernmental health-care facilities a bonus for reaching targets such as the number of antenatal visits and vaccine coverage rates (Pay for Performance)*
>
> *Foundations and agencies create a market for a new vaccine by committing to pay a predetermined price for a maximum number of doses to companies that develop and license an effective vaccine (advance market commitment).*
>
> *A development bank creates a trust fund that offers low-income countries a $200 payment for every additional child who completes primary school (COD Aid)*
>
> *A social development ministry creates a program to pay poor families a monthly stipend, conditional on demonstrating that their children are attending school and receiving preventive healthcare services (conditional cash transfers)*
>
> *A foundation offers a prize for launching a financial transaction system based on mobile phones in a poor country (prize for technological innovation)*
>
> *A bilateral agency offers access to additional grant funding only to countries that display evidence of good public-sector performance according to independently assessed criteria (country selectivity)*

Each of these examples is part of a new wave of development programs that explicitly use incentives to achieve their aims. They are part of a trend, accelerating in recent years, to disburse development assistance against specific and measurable outputs or outcomes.

With a proliferation of new ideas under names such as “payments for performance,” “output-based aid,” and “results based financing,” it is easy to lose sight of basic underlying similarities in these approaches and to miss some significant differences. This paper proposes a way of classifying and distinguishing the range of incentive programs being debated today, emphasizing two particular dimensions: the agent whose behavior the incentive seeks to change and the specificity of the output or outcome measure. It begins by characterizing a basic incentive arrangement, discussing the range of available contracts and how they appear in development programs, presents a classification of existing incentive programs and illustrates the scheme with examples. The paper concludes by identifying four broad categories that address different problems and offers some cautionary notes.

The basic anatomy of incentives

An incentive is the promise of a reward (or the fear of a punishment) that encourages certain behaviors and discourages others. Every society has institutions that provide such incentives to individuals in different parts of their lives, including rules for hiring workers and remunerating them, for obeying traffic and tax laws, for participating in community activities, or fulfilling family obligations. They also create an environment of incentives for businesses, corporations, government officials, agencies, and other organizations. Development programs enter these contexts with their own complexities and introduce new incentives that may work with or against some of the prevailing incentives.

When development programs are implemented in these contexts, they modify financial and nonfinancial incentives, whether the program involves a contract between an aid agency and a government to finance construction of a road; a contract to purchase health-care services from an NGO for a particular population; a prize offered for discovering a higher-yield staple; a contract to hire a new public-sector teacher; or a cash subsidy to a poor family. In each case, the structure of the incentive can be described as an arrangement between one party who has an objective (building a road, improving the quality of teaching) and who delegates the task to someone else in return for some promised reward (payments, bonuses, prizes, salaries). The way people and organizations respond to these incentives will depend on a number of factors related to the existing patterns of incentives, including the ways funders and recipients perceive their interests and understand the development program;[1] the kinds of information generated and used by funders and recipients; and the credibility of the arrangement’s rewards and sanctions for performance.

Consider a typical situation for a development agency:

[1] This paper refers to funders and recipients. Funders include grant-making institutions (foundations, bilateral agencies) and public-sector lenders (MDBs); recipients are generally low- and middle-income countries but can also be subnational governments, service providers, NGOs, firms, communities, households, or individuals.

A staff person from a bilateral agency goes to a low-income country to develop an education program aimed at increasing the proportion of children who complete primary school. The staff person thinks the country is doing a reasonable job of running its schools but is concerned that teacher absenteeism may discourage attendance and that students may be dropping out because of poor teaching. The government says that if the agency provides funds, they will improve teacher performance and attendance, but the staff person is not sure they will be able to follow through on the commitment. She considers two options for a new grant: one would pay for a series of training programs for teachers and train supervisors in managerial approaches to improving attendance; another would be released in tranches for achieving improvements in teacher attendance and student completion.

The economic literature provides insights about such relationships with reference to a principal-agent model.[2] In these models, a principal hires or contracts an agent to accomplish his or her objective. In the example above, the bilateral agency can be characterized as a principal who is offering a contract to an agent, in this case, the recipient country government. The staff person is considering two different kinds of contracts: one that would disburse against expenditures on specific activities and another that would disburse against input and output measures (teacher attendance and student completion, respectively). Making this decision can be hard. As the literature on principal-agent models has shown, when the principal and agent have both diverging objectives and differential access to information, it becomes very difficult to delegate tasks in a way that efficiently achieves the principal's aims. To see how this occurs consider some alternatives.

If *the principal and agent have identical objectives and have perfect information*, then few problems arise.[3] The agent will do what the principal would have done in his or her place and the principal knows (because of perfect information) about any extenuating circumstances and whether the goals were accomplished. For the example above, if the funding agency knew that the government was wholly committed to increasing primary completion, then it could provide funds with the assurance that they would be applied properly. With perfect information, it would also know what the government had done to increase primary completion and how much was achieved by its actions. This is not, however, the way the world usually works.

If, instead, *the principal and agent differ in what they would like to achieve but still have perfect information*, then the agent may prefer to divert resources and efforts to goals that

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[2] Ross 1973 is one of the earliest formal presentations of a principal-agent model. Sappington 1991 provides a more accessible explanation of the model and draws out the implications based on a good review of the literature that developed after Ross's article was published.

[3] This discussion draws heavily on the exposition in Savedoff 2010.

are not shared by the principal. Nevertheless, the existence of perfect information keeps the agent from pursuing his or her own goals because the principal will observe that the agent has breached the contract. In the example, the government may be interested in using the grant funds for a number of things unrelated to primary completion rates—such as expanding secondary schooling, reducing the incidence of infectious diseases, or winning the next election. Yet knowing that the agency can observe the use of funds and activities would still keep the government in line. In reality, most agencies do not have such perfect information and certainly not without expending resources to monitor and analyze data.

In most real cases, *objectives diverge and information is imperfect*. In development work, the principal and agent generally share objectives or they would not be entering an agreement in the first place; but they also have substantive objectives that differ. Furthermore, the principal rarely knows exactly what the agent has done or the conditions that facilitated or obstructed progress. The combination of these two features—divergent objectives and imperfect information—gives agents room to do things that may deviate from the principal's intention.[4] Such deviations may be well intentioned (or even socially preferable), but they can also be corrupt. In the example, using the grant to reduce the spread of infectious diseases might violate the terms of the development grant but could still be justifiable as the greater social priority for that particular country or time. By contrast, using the resources to hire unnecessary staff or solely to promote the government's electoral success would abuse the trust delegated to the government and violate social ethics.

The principal-agent model is not the only way to look at such relationships. In some cases it is more useful to analyze the relationship as a process of bargaining between independent parties, anonymous interactions through a market, collaborations among partners, or direct hierarchical control. For example, understanding why the World Bank and IMF have waived so many conditions of the structural adjustment loans over the years (Birdsall et al. 2003) probably requires an analysis of bilateral negotiations between independent actors. Similarly, budget support programs are most frequently described in terms of partnerships or bilateral bargaining. In many cases, funders will directly contract NGOs or consulting firms to conduct operations which may be better understood in terms of direct hierarchical control. In all these cases, however, elements of the principal-agent model continue to have a bearing, such as the role played by information, the terms of the explicit or implicit contracts, and the sharing of risk (Levinthal 1988).

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[4] The principal-agent literature tends to focus on asymmetric information—that principal and agent have access to different information. This paper will discuss imperfect information because it also encompasses cases in which both principal and agent are equally uncertain about relevant factors such as the technology of production or states of nature. Thus, asymmetric information is treated here as a subset of imperfect information.

Principals and agents can structure their relationship in many different ways to address the particular features of the tasks involved. Much of the principal-agent literature focuses on employment contracts (Hölmstrom and Milgrom 1991) and relationships between shareholders and corporations (Douglas 1989), but it has also been applied to a range of questions related to moral hazard in insurance (Arrow 1963), efficiency of public administration and bureaucracy (Bergman and Lane 1990), sharecropping (Stiglitz 1974), and physicians (McGuire 2000). The most prominent issues in this research involve the way imperfect information affects the efficiency of contractual arrangements and how the agent's aversion to risk influences the optimality of different payment mechanisms.

While the treatment of imperfect information and risk aversion are fundamental to the efficiency of different arrangements, they are insufficient to fully characterize the range of relationships between principals and agents. For example, the World Bank applied a principal-agent framework to the problem discussed in *Making Services Work for Poor People* (World Bank 2004) and distinguished five different elements of accountability that influence service provision. These elements are the process of selecting and instructing an agent (*delegation*), paying for the service (*finance*), the agent's activities (*performance*), finding out what happened (*information*), and rewarding or punishing performance (*enforceability*).[5] By highlighting these five elements in the context of how citizens, policymakers, and service providers interact, the report provides a complete frame for analyzing public service provision and identifying possible failures in the accountability relationships between these actors. In the case of the recent wave of development programs that utilize incentives, an additional feature distinguishes principal-agent relationships: the actors are funders and recipients who are often in different countries and respond to entirely different constituencies.[6]

For the purpose of classifying incentives in development programs, then, a number of questions need to be answered regarding the character of the principals and agents, the kinds of information available and the nature of the goals involved. In particular, distinguishing different incentive approaches requires answers to the following questions:

- What information is known and by whom about performance?
- What information is known and by whom about available technologies?
- Are goals specific and measurable?

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[5] See, in particular, chapter 3 in World Bank 2004.

[6] For example, aid agencies are in many ways more accountable to their own country's taxpayers and political institutions than they are to the intended program beneficiaries. See World Bank 2004 (Chapter 11) for a discussion of the ways donor agency relationships differ from other accountability relationships.

- Are relationships between principals and agents ongoing?
- Who are the agents and how do they respond to incentives?
- Who are the principals and how do they behave in relation to different outcomes?

Information about performance. How costly is it to know what is happening? In general, principals have limited information about what their agents are doing. Even in the most tightly controlled workplace, workers have some discretion and more immediate detailed knowledge of their efforts and activities. When this information is necessary to determine whether agents are fulfilling their obligations, principals may have to expend money and effort to find out about or at least verify reports by their agents' activities. In development programs, information about activities and progress can be costly to obtain for a number of reasons: program activities are often carried out by many people, in foreign countries, in dispersed locations, using different languages and reporting systems, and with different social standards and cultural references. The choice of structuring a contract will also depend on the costs of monitoring processes relative to the costs of measuring and verifying outputs.

Information about technologies. Do principals and agents know how to produce the desired outcome? If principals know the technology for achieving their aims, it is easier for them to determine appropriate rewards, monitor processes, and direct their agents. If principals don't know the technology, they may be better off monitoring and paying for outputs. In such an event, the agents either need to know the technology themselves or experiment to discover the best way of achieving the program's aims.

Many of the new incentive programs for development explicitly seek to foster technological innovation. This is most apparent in programs aimed at research and development of new drugs for neglected diseases or prizes for new ways to address climate change. But other programs also use incentives to encourage innovation of another kind, what we could term managerial or institutional innovation. In many development programs, the technologies of service provision are well known, yet expanding and maintaining the services is nonetheless problematic for reasons related to difficult political, social, cultural, institutional, or environmental contexts. This is true of water provision wherever wells and pumps are installed but fail to be maintained; wherever schools are built but teaching is poor; and wherever energy projects are completed but fail to operate efficiently. Thus, another class of incentive programs seeks ways to encourage local learning and local innovation to solve these "software" problems. In this paper, the term technological innovation will be extended to encompass this kind of managerial or institutional know-how as well.

Are goals specific and measurable? Programs with fewer goals are easier to monitor, measure, and control than those with many goals. In particular, programs with multiple

goals give greater discretion to agents in allocating efforts and resources across tasks. In development programs, this increased discretion may be a good thing, allowing local agents to respond to local information about needs and effective application of funds. However, it can also divert resources in ways that contradict the principal's intentions. Another tradeoff arises with programs that have very few specific goals. Better targeting and priority setting may improve the ability to achieve those specific goals; however, this improvement may come at the cost of diverting efforts from the agents' other, less measurable or unmonitored responsibilities.

The technical capacity to measure and verify performance also conditions the design of a development program. Principals cannot pay for performance that they cannot measure. Furthermore, they cannot credibly withhold payments or impose sanctions if they cannot independently verify information provided by their agents. When goals cannot be precisely measured, development programs are generally structured as partnerships in which funders and recipients learn "on the job," adjusting activities and resource allocation in response to a range of diverse information related to outcomes which are, themselves, subject to continual adjustment. When goals can be precisely measured but not independently verified, then agreements are vulnerable to opportunism.

A further complication in measuring development program performance arises in cases where short-term goals of achieving increased service provision or productivity conflict with longer-term goals related to local capacity to maintain and sustain such services. Paying for the delivery of health services or construction of potable water connections might be successful in the short term. However, once payments cease, local institutions may lack the financial or managerial capacity to expand or maintain these systems.

Are relationships between principals and agents ongoing? When principals and agents make a one-time agreement with no expectation of an ongoing relationship, fewer mechanisms are available to encourage good performance on both sides.[7] Principals who know they will never work with the agent again might be tempted to exaggerate demands or reduce payments opportunistically; agents who know the arrangement is one-time only might be tempted to use substandard materials or cut corners in ways that violate the spirit but not the letter of the contract. By contrast, if the arrangement is renewable, the value of future contracts may be sufficient to constrain opportunistic behavior in the current arrangement. A similar constraint is introduced by the visibility of the principals' and agents' behaviors to other actors with whom they may want to contract in the future. In such cases, the reputation they develop from their current activities may constrain opportunistic behavior. At the other extreme, when the principal and agent know with some certainty that they will be recontracting, other forms of opportunism can emerge. For example, principals may use

[7] Sappington 1991 discusses a range of issues that arise under this condition.

agents' current performance to reveal information about costs that allows them to reduce payments in the future; while agents might manipulate information to inflate costs in subsequent negotiations.

Development programs involve a full range of relationships, ranging from one-time contracts (perhaps an agency procures emergency grain from a local supplier) to arrangements involving some likelihood of recontracting (as when an agency contracts health services from a local NGO) and those with high likelihoods of recontracting (as when a bilateral agency establishes an aid program with a developing country that it deems to be strategically important). The more that the relationship resembles an ongoing bilateral relationships, the more it is like a repeated game between two independent actors. The more the relationship resembles arms-length relationships with the possibility of recontracting, the more it operates like a market; and the more it operates like a market, the greater the potential role played by reputations and mechanisms for assessing the performance of different actors in that market.

Who are the agents and how do they respond to incentives? One of the clearest differences among incentive programs for development is found in the character of the agents that are involved. Programs can engage individuals, families, communities, corporations, NGOs, agencies or governments. In each case, the design of incentives must take into account the different ways such agents behave and apply the appropriate lessons. A program encouraging individuals to adopt healthy behaviors requires different models of incentives and behavior than a program encouraging governments to adopt good public finance practices.

In addition, some programs deal with only one or a few agents, while others deal with many. The costs of contracting with and monitoring and supervising a few agents are generally much lower than the same tasks involving many agents, especially if they are spatially dispersed. At the same time, the existence of many agents creates opportunities for principals to learn more about the true costs of production by inviting agents to compete for contracts or by benchmarking different agents against one another. The costs to principals of administering contracts are also likely to be lower when agents are homogeneous and higher when agents are heterogeneous.

Who are the principals and how do they behave in relation to different outcomes? Many principal-agency models depict the principal as a single entity with the capacity to construct and enforce the contracts it offers its agents. In the world of development programs, however, principals themselves vary in a number of ways. Principals can be individuals, private foundations, corporations, international NGOs or public agencies; the way they operate and behave will affect how agents perceive and respond to their programs. In particular, the funder's credibility disbursing funds, monitoring, and enforcing terms will be different in light of the pressures they experience from their shareholders or taxpayers, laws

and regulations of the host government, and whether their own operational performance is strong and consistent. Furthermore, many agents in developing countries contract with more than one principal. In such cases, agents can take advantage of the situation by using the resulting ambiguities with regard to resources and activities to increase their own discretionary space. They are also likely to respond more strongly to those principals who are more exigent (Spiller 1990).

The ease of obtaining information on performance and information on technologies, along with the characteristics of goals, relationships, agents, and principals, conditions the effectiveness of different contractual arrangements. What kinds of contracts are there and when are they effective?

The terms of principal-agent contracts

If principals and agents differ with regard to their objectives and access to information, how can they agree to terms that achieve their shared goals? Two factors are particularly important in conditioning the kinds of agreements that might be effective: (1) the information the principal has or can obtain about the processes required for implementation and (2) the difficulty of specifying and measuring the outputs. When the principal has a good understanding of the production process and outputs are difficult to measure, arrangements that involve *direct contracting* and supervision are generally more effective. When the principal has less information about the production process but can easily measure outputs, then setting terms that *pay agents per unit of output* or with bonuses for meeting production targets are preferred. The contrast between typical contracts for assembly-line workers and sales representatives demonstrates this phenomenon. Firms with assembly-lines usually contract workers and pay them for their time, directly observing their effort and monitoring whether they are producing at the required pace. By contrast, sales representatives who are travelling, meeting clients, and making sales pitches, are difficult to monitor and are frequently paid all or in part by commission. It is also worth noting that much professional work is paid on salary for work in which agents are expected to use substantial discretion in apportioning their time and effort and for which outputs are wide-ranging in characteristics and quality. Development programs span this range of contractual terms, with funders sometimes directly contracting and supervising agents, sometimes paying for outputs.

The range of contracts between principals and agents—from direct contracting to paying agents for the goods or services they produce—has important implications for efficiency and innovation. When principals directly contract agents to produce according to a known technology and pay for their time and inputs, the agents have little discretion in how they undertake a task and little incentive to find more efficient ways to perform. In contrast, when principals agree to pay for outputs, agents can capture benefits by improving efficiency or innovating.

In addition to direct contracting and paying for outputs, other principal-agent arrangements are possible. Principals can offer *prizes* for any agent that achieves a particular goal (such as the X-Prize for spacecraft, genome sequencing, and energy-efficient cars). They can also establish *tournaments*, in which a specific group of agents compete for a reward. This applies to individuals competing within a firm for a promotion or to be selected for a sports team (Lazear and Rosen 1981; Green and Stokey 1983). Additionally, principals can create criteria for entering contracts with agents, establishing some kind of reputation or *qualification threshold* or other form of eligibility requirement. Agents who wish to participate in the contract then have an incentive to undertake activities that qualify them for the contracts, such as a school achieving accreditation in order for its students to be eligible for public scholarships.

Each of these contracting arrangements has its counterparts in the field of development. *Traditional aid projects* tend to function like direct contracting, even when the funder is not explicitly "hiring" the grantee, because the aid agreement usually specifies the budget lines associated with specific tasks (such as training teachers in education or constructing roads in transportation) and pays against proof of expenditure. The funder enters this kind of agreement with the expectation that completing the tasks within budget will achieve the aims in terms of educating children or reducing transportation costs; however, there is no guarantee that these aims will be achieved even if all the tasks are completed within budget and on time.

Development programs that incorporate *performance-based incentives* function more like payments for outputs. These programs depart from traditional approaches by explicitly measuring and paying for progress on measures related to the goal. Funders have used these approaches for individuals when they pay patients to complete tuberculosis treatment, households when they offer stipends to families who keep their children in school, communities when they pay to preserve forests, or countries when they transfer grants in proportion to increased vaccine coverage.

A number of development agencies are using *country selectivity*—allocating resources to recipients based on certain eligibility criteria—similar to qualification thresholds. By conditioning grants on a recipient's performance on measures of good governance, such programs seek both to create incentives for countries to improve their governance and to allocate grants toward countries where the funds are more likely to be effectively and efficiently used.

Prizes and tournaments are somewhat less common among development programs but are increasingly under consideration. Advance market commitments for drugs can be seen as a way of creating effective demand in a market or, given the small number of potential pharmaceutical companies, can be considered a prize for winning a competition.

Classifying and distinguishing incentives for development

One way to distinguish the current range of incentives for development is to classify them along two dimensions: a feature of the situation and a feature of the incentive payment. In this regard, the paper follows Musgrove (2010), who produced a glossary on results-based financing arrangements in the health sector. In that paper, Musgrove distinguished programs on one axis by the kinds of agents involved, focusing on beneficiaries and health-care providers. On the other axis, he placed the type of payment, with fee-for-service at one end and non-monetary incentives at the other. This paper extends and modifies Musgrove's framework in three ways. First, it encompasses programs outside of the health sector. Second, it extends the agents to include a wider range of organizations, institutions, and even countries. Finally, it arrays the programs across the second axis in terms of whether the incentives are aimed at a single focused objective or a set of multiple objectives.

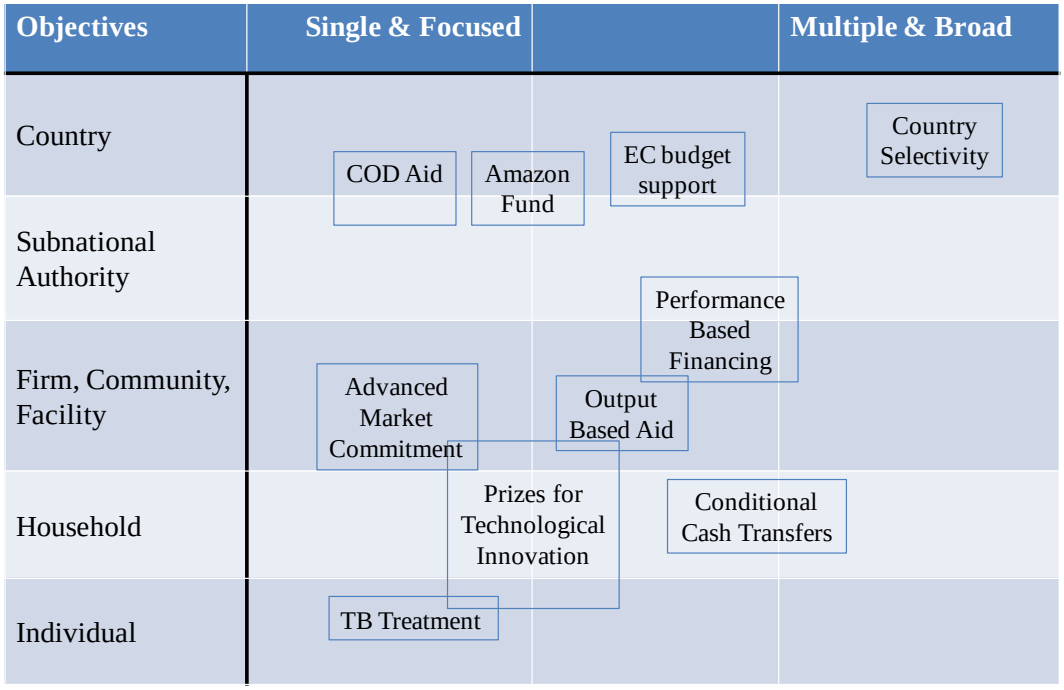
In the classification proposed here, *agents* vary along a continuum from individuals or families, to communities, corporations, subnational authorities, and national governments. This dimension is important because incentives that are effective for one kind of agent may be ineffective or even counterproductive with another. The second dimension characterizes a choice made by the principals (and sometimes the agents) in structuring the program. It represents a continuum from programs with incentives directed at one or very few specific *objectives* (such as completing TB treatment) to those for which objectives are broad (quality of public management) or multiple. This choice is important because it affects the clarity of the incentive and the agents' abilities to reallocate efforts across tasks. It also reflects related choices about the degree of engagement between principal and agent during the program, including the intensity of monitoring and the degree of co-responsibility for strategic planning and implementation.

Figure 1 presents these two dimensions visually, with selected incentive programs classified accordingly. The continuum of agents is presented along the vertical axis, while the specificity of objectives is distributed across the horizontal axis. At the extremes, two very different incentive programs appear. The first is a class of programs that give patients incentives to complete treatment for tuberculosis. These programs are located in the lower left-hand corner of the diagram because they provide incentives to individuals (people who are ill with tuberculosis) and because the goal of their completing a full course of treatment is specific and focused. At the other extreme are programs with country selectivity. These programs increase foreign assistance to countries that are well governed (or improve governance). These programs are located in the upper right-hand corner of the figure because they are focused on countries and because governance is usually measured by a large number of indicators in an effort to encompass a broad concept.

The importance of this classification is apparent when contrasting these two different programs. Individual treatment incentives can be designed with reference to behavioral

models, taking into account the literature in sociology, psychology, and behavioral economics regarding such things as asymmetric attitudes toward gains and losses, self-interest, salience, procrastination, and risk-aversion. The performance indicator also tends to be quite specific, allowing the agent to see exactly which behaviors will be rewarded. At the other extreme, the use of country selectivity must rely on models for the behavior of governments, requiring political, institutional and historical analysis. The indicators used to gauge the quality of a country's governance are multiple and broad. This choice of broad and multiple indicators aims to be comprehensive but comes at the cost of reducing clarity for the agent as to which behaviors are most likely to influence the performance measure and, consequently, be rewarded.

Figure 1: Incentive programs by agent and objectives



The rest of this section describes the incentive programs that were selected for Figure 1. The placement of each program on the diagram is necessarily inexact because programs that appear similar may actually vary in significant ways. For example, a conditional cash transfer program may disburse funds against a single indicator or on the basis of many; or a performance-based financing program might involve health-care services delivered by a single facility, a district or a subnational government.

TB treatment completion (individuals / focused objectives)

A key difficulty of treating tuberculosis is that patients often feel better long before treatment is complete and are tempted to discontinue their medication. If they discontinue

treatment, however, the disease is likely to recur with the added risk of being resistant to drugs. A variety of programs have sought to increase adherence to the treatment regime by giving individuals incentives. For example, programs in Bangladesh and Indonesia collected deposits from patients infected with tuberculosis, returning the deposit only upon successful completion of treatment. In three Russian oblasts, instead of relying on penalties, patients were rewarded with kits that contained food or hygienic items for continuing with their treatments. Despite many successes, some of these programs have also generated perverse effects. For example, some patients in India appear to have stopped taking medications in order to prolong treatment and continue receiving incentives. Subsequently, the program responded by establishing a maximum term for being eligible for the rewards (Beith et al. 2009).

Conditional cash transfers (families / focused objectives)

Conditional cash transfers are antipoverty programs that have a wide range of objectives, including supplementing the incomes of poor families, improving nutrition, and raising educational attainment. One essential justification of these programs has been to interrupt the intergenerational transmission of poverty by investing in the education and health of poor children. They generally establish eligibility for poor households who will then receive a periodic payment after meeting certain conditions, such as good school attendance or consulting health clinics for preventive care. Conditional cash transfer programs treat households as the agents who decide whether children will attend school or work, visit a health-care center or not. These programs can only work if required services are available or providers are likely to respond to the increased demand generated by the program.

Programs in Mexico, Colombia, Nicaragua, and Jamaica achieved high rates of compliance when cash transfers were offered on the condition that recipients complete prescribed preventive health-care visits. However, in Honduras and Nicaragua, some conditions were weakly monitored and some effects were smaller. For example, these programs failed to increase average immunization coverage and it was unclear whether this failure was due to lack of supplies, poor performance at health facilities, or an inadequate incentive (Glassman et al. 2009).

Output-based aid (firms / few objectives)

Output-based aid refers to development programs that pay for outputs instead of inputs. They generally involve contracts with service providers and contractors (not individuals or countries). They also use reasonably well-known technologies but seek to solve managerial problems that hinder project completion and sustainability. Objectives are usually quite specific and tend to be limited in number.

The World Bank's Global Partnership on Output-Based Aid (GPOBA) is a prominent example, financing programs in a range of sectors including water, education, health, energy, roads,

and communication. For example, GPOBA programs have financed water service expansion to poor neighborhoods, making final payments conditional on evidence that water services have been installed and are functioning some six months after installation (Brook and Smith 2001; GPOBA 2010).

Performance-based financing (facilities / multiple objectives)

Performance-based financing (PBF) is a term associated with public-sector programs that provide financial incentives to health-care providers in Cambodia (Soeters and Griffiths 2003) and Rwanda (Soeters et al. 2006; Meessen et al. 2006; Rusa and Fritsche 2007; Rusa et al. 2009). The incentives in these programs tend to be focused at the level of health districts or health-care facilities. Like output-based aid, these programs involve reasonably well-known technologies in terms of the services provided: immunization, prenatal care, treatment for common infections, and counseling. However, the technology of managing and operating these services efficiently is less well known. The performance-based financing programs usually include a range of indicators, some of which pay for specific services while others measure the quality of care required to be eligible for payment.

Practitioners involved in designing and implementing these programs highlight the importance of increasing health facility autonomy and establishing effective planning, management and administrative systems to implement and support the payment schemes. They generally involve a mix of financial incentives and technical support to improve the effectiveness of organizations involved in healthcare provision.

Amazon Fund (country / focused objectives)

Incentives are used in a variety of environmental programs; for example, by paying local communities to protect forests, subsidizing prices paid for environmentally sustainable energy sources, and pollution trading arrangements. In 2009, Norway agreed to make donations to the Amazon Fund, a program managed by Brazil's Banco Nacional de Desenvolvimento (BNDES). This program is national in scope (country level) but is managed by a semi-independent authority (BNDES). It has a fairly focused objective, aiming to reduce carbon emissions associated with deforestation by means of reasonably well-known technologies. Norway has committed US$1 billion over 10 years to the fund, which invests in programs to protect the rainforest. Funds are released in installments so long as Brazil maintains the rate of deforestation—which is independently verified—below the average of the previous 10 years. Germany became the second contributor to the Amazon Fund in 2010. BNDES issues certificates to link donors with the associated reduction of carbon dioxide emissions as determined by a technical committee comprising leading and independent climate scientists (Amazon Fund 2011).

Prizes for high yields (individuals or firms / focused objectives)

Prizes are usually offered in order to motivate a large number of actors to invest time and resources in solving a particular technological problem. By design, they focus on problems for which technologies are uncertain and usually have to be quite focused in their objectives, specifying the criteria for judging winners and awarding the prize.

Prizes have a long history and are associated with advances in navigation, food preservation, and agricultural productivity. Between 1839 and 1939, the Royal Agricultural Society of England (RASE) sponsored annual competitions, awarding medals and monetary prizes that successfully induced a wide range of technological innovations in agriculture (Brunt et al. 2008). More recently, X Prizes have been offered to spur the development of commercially viable space flights, rapid genome sequencing, and low-emission cars. The Virgin Earth Challenge, announced in 2007, offered $25million for a commercially viable design to sequester carbon from the atmosphere. Recent interest in using prizes has turned to environmental and climate change issues (Wheeler and Hoffman 2010) and agricultural stagnation in Africa (Elliott 2010, Masters and Delbecq 2008). In the case of agricultural prizes, potential participants can range from research centers and agro-industrial corporations to local governments and small farmers.

After the recent earthquake in Haiti, the Bill and Melinda Gates Foundation and USAID created the Haiti Mobile Money Initiative and offered a $10 million prize to companies for developing a financial transaction system via mobile phones. In January 2011, $2.5 million was awarded to Digicel for being the first operator to launch a successful mobile money system. A second prize of $1.5 million will be awarded to the second operator to launch a system within 12 months. The remaining $6 million will be awarded after the first 5 million transactions are completed, with the prize money being divided proportionally among all the operators who contributed to the total (BMGF 2011). The structure of the prize was designed not only to induce innovation but also to encourage competition by assuring prize money would be available to second or later entrants.

Advance market commitment (firms / focused objectives)

Entrepreneurs with new ideas usually need the prospect of a potential market before they can invest substantially in the research and design of new and innovative products. This is common in the pharmaceutical industry which develops drugs for medical conditions that are prominent in wealthy countries. It is also common among farmers and agro-industrial firms who invest in research to raise yields for high value crops. When effective market demand is unlikely to materialize, however, there is little incentive to invest in such research and discovery. Consequently, medical and pharmaceutical research is skewed away from addressing diseases in poor countries and agricultural innovation tends to bypass low value crops farmed by low-income households.

This basic problem has been well known for some time but, a working group convened by CGD sought a practical solution to it. They specifically asked whether funders could create effective demand by making a commitment to purchase an innovative product once it is invented. The working group's proposal for an advance market commitment (AMC) explained how public agencies or private foundations could specify the characteristics of a desirable product (such as a vaccine for a disease that is common among poor people) and assure potential manufacturers that, if they develop such a product, they would be able to sell it at a reasonable price (CGD Advance Market Commitment Working Group 2005). As a result of this initiative, six donors committed $1.5 billion to guarantee a minimum price for a fixed number of pneumococcal vaccines purchased by lower income countries. Subsequently, agreements were signed with two firms in early 2010 (Elliott 2010).

The idea of using AMCs to spur innovation and development of technologies suitable for commercial application in low- and middle-income countries has been explored for other neglected diseases (Berndt et al. 2007). It has also been considered for promoting research and development in agriculture (Elliott 2010) and environmental protection (Wheeler and Hoffman 2009).

European Commission budget support (country / broad objectives)

The European Commission (EC) provides budget support for poverty reduction to developing countries. Most budget support programs are aimed at creating a partnership and sharing responsibility between funders and recipients. In this way, they are not specifically framed in terms of incentives. Rather they are described as opportunities for policy dialogue, mutual accountability with reference to performance, and provision of funds that feed into and improve the receiving countries own financial, budgeting, and implementation capacities. Funds are usually provided annually and treated as general revenues rather than targeted to specific ministries or line items. The amount of funding is determined by negotiation and disbursements are made when eligibility criteria are satisfied in relation to progress on public financial management, performance in relation to a country's poverty reduction strategy, and macroeconomic stability.

The EC budget support programs are included here because many of them include a variable tranche that disburses against performance targets alongside the fixed tranches that operate as described above. A review of EC budget support programs through July 2004 included 35 variable tranches across 20 developing countries. The variable tranches represented about 35 percent of the total funding committed to EC budget support programs and addressed an average of 15 indicators. About two-thirds of these indicators applied to the education and health sectors. The review found that an average of 71 percent of these variable tranches was disbursed (Koeberle et al. 2006). As one example, the EC committed up to €35 million for a budget support program with Malawi in 2008 that entailed a fixed component of €26 million and a variable component of up to €9 million. The

EC disbursed €6.5 million of the variable tranche when Malawi achieved three of the four public financial management targets and three of six social targets (Malawi-European Union n.d.). In 2008, the Commission also launched "MDG Contracts" providing longer-term (6-year), more predictable commitments of budget support to selected well-performing countries.[8]

Cash on Delivery Aid (country / focused objectives)

Cash on Delivery Aid (COD Aid) is a proposal that has many similarities with the variable tranches in the EC budget support programs. As described in Birdsall and Savedoff (2010), funders and recipients sign a contract that specifies a shared goal, a progress measure, a payment for each unit of progress, a means for verifying progress, and commitments to publicly disseminate results. The authors describe the approach as "hands off" because recipients have full autonomy in deciding how to achieve progress and complete discretion over how they use any funds they receive. To illustrate the concept, Birdsall and Savedoff (2010) propose a contract for achieving universal primary school completion, in which funders pay US$200 for each additional student in the final year of primary school who takes an approved standardized test. The recipient's report of the number of assessed completers and their test scores is verified by an independent group that retests students at a random sample of schools.

COD Aid differs from the variable tranches of the EC budget support program in a few ways. Unlike the EC budget support program, COD Aid is hands off and does not require any meetings or policy dialogues; rather, the entire focus is on measuring progress and disbursing against that progress. Nor are COD payments subject to eligibility criteria regarding development strategies, macroeconomic stability, or public financial management. Both COD Aid and the EC variable tranches are oriented toward outcomes, but most EC indicators are inputs (such as budget shares allocated to particular sectors, nurses per population) or outputs (share of professionally attended births) rather than outcomes. COD Aid also requires independent verification of progress measures, something which is envisioned in some but not all EC programs.

Country selectivity (country / limited knowledge)

In the late 1990s, an international debate over the effectiveness of foreign aid featured a prominent and compelling idea: that aid is more effective (or only effective) in countries that are governed well. This led some international agencies to experiment with programs

[8] As of early 2011, MDG Contracts have been signed with eight countries (Burkina Faso, Ghana, Mali, Mozambique, Rwanda, Tanzania, Uganda, and Zambia) with total commitments amounting to €1.8 billion (personal communication received from J. Beynon, EU Commission, March 18, 2011).

that select recipients based on the quality of governance, creating an incentive by rewarding those that perform better in this dimension. For example, the World Bank and the African Development Bank both allocate concessional loans to eligible countries on the basis of formulas that include measures of governance. The World Bank uses an index based on its Country Policy and Institutional Assessment (CPIA), including measures of the quality of public-sector management, economic policy, structural policies, and policies for social inclusion and equity (World Bank 2009). The African Development Bank allocates the African Development Fund according to a similar formula (AFDB n.d.).

The Millennium Challenge Corporation (MCC) is a U.S. development program that applies the principle of country selectivity to its programs in a more forceful way. Countries whose incomes are below $3,945 GNI per capita (as of 2011) can be eligible for MCC grants if they also demonstrate they have met certain standards for good governance. The countries that do qualify, by demonstrating good governance, commitment to liberal economic policies, and investment in their citizens, can apply to the MCC for large-scale, long-term grants. Countries that are not fully eligible can apply for smaller threshold grants if they have demonstrated a firm commitment to policy performance improvement and make progress (Dunning et al. 2010).

Other initiatives

There are many other initiatives that apply incentives in the service of development. In each case, they can be similarly situated in terms of the character of the agent and the breadth of their objectives. Some of the terms commonly used to describe incentive programs in development, however, are not easily classified in this way because they refer to a range of programs with different features. For example, Eichler and Levine (2009) analyze performance-based incentives used in health programs, including several of those discussed above: incentives for TB treatment, conditional cash transfers, and performance-based financing. Results-based financing is a term that also encompasses programs with a range of agents, technologies, and objectives (Musgrove 2010, Savedoff 2010). The same is largely true of results-based management, performance contracting, and pull mechanisms.

Patterns …

Though incentive programs vary significantly along many dimensions, the classification presented here reveals a rough clustering of programs around four broad areas of concern: problematic behaviors, ineffective management, missing technologies, and poor governance.

The dominant characteristic of programs in the first group is their focus on modifying behavior. They generally involve well-known technologies with incentives aimed at encouraging individuals, families, or households to adopt healthier behaviors or to adjust

their choices in favor of investments in their future welfare. This program group includes the TB treatment programs and conditional cash transfers discussed above, but also include programs that give families vouchers to send their children to schools, that provide a stipend to individuals who remain free of sexually transmitted infections, and that exchange food for garbage collected in crowded shantytowns.

The dominant characteristic of programs in the second group is their concern with ineffective management. They tend to involve relatively well-known technologies—particularly in public service delivery—but are grappling with institutional changes and local learning needed to assure that services are efficient and sustained. This program group includes output-based aid for water, energy and roads as well as performance-based financing for health-care providers and health districts discussed above.

The dominant characteristic of the third group of programs is their concern with missing technologies. In this program group, technological innovation is the primary focus and the particular agents are of secondary importance. This program group includes prizes for developing rapid and inexpensive genome sequencing, high-yield agricultural products, and advance market commitments for vaccines.

The final group is primarily concerned with political and economic relationships among countries. Attaching payments to outcomes in programs like the Amazon Fund, COD Aid, and the EC variable tranches are sometimes characterized as a way to modify the behavior of receiving countries and align their incentives in favor of better outcomes. However, they are more commonly justified in terms of improving the effectiveness of contributing to global public goods (in the case of the Amazon Fund), untangling confused accountability relationships (COD Aid) and clarifying partnership aims (for EC budget support).

… and caveats

It is impossible to catalog all the possible pitfalls of incentive programs. But in addition to the insights above from the principal-agent literature, the following are some of common issues that should be kept in mind when assessing the wide range of incentives being promoted in the service of development.

First, while the term “incentive” is most strongly associated with financial payments rewarding individuals, the range of available incentives is quite large and can include payments to groups as well as nonfinancial rewards. Status, professional recognition, quality of working conditions, and praise can be effective ways of motivating people, organizations, and even countries. In the private sector, the extensive business literature on motivation, working in teams, and award ceremonies attest to the power of nonfinancial incentives in motivating better performance. Responses by governments to public rankings, such as the Corruption Perceptions Index (Transparency International), the Commitment to

Development Index (Center for Global Development), or the Worldwide Governance Indicators (World Bank), are another demonstration that information and reputation can be instrumental for change independent of financial incentives.

Second, predicting the effect of an incentive on behavior depends on using appropriate testable models. Characterizing agents as rational self-interested individuals is useful in many circumstances but not all. In many cases, individuals systematically diverge from choosing actions that maximize benefits and minimize costs. Behavioral economists and sociologists have documented ways in which individuals systematically under- or overestimate risks; make decisions that are time-inconsistent; are influenced by how decisions are framed; and are swayed by opinions and judgments of others (Kahneman and Tversky 1984; Kahneman et al. 1991). Being familiar with these systematic deviations from rational self-interested behavior not only can avoid mistakes in designing incentive programs but may help identify opportunities for more effective approaches. A simple example of this is the way voluntary contributions to pension programs that require individuals to opt out rather than opt in usually experience higher enrollment rates (Thaler and Benartzi 2004).

Third, the way incentive programs measure performance is critical to their designs. One of the most common concerns is that incentives focused on particular measurable targets may divert attention away from equally important but less easily measured goals. Indicators can be designed to reward only *additional* effort by concentrating on change at the margin or to reward *total* effort by including all outputs. They can encourage short-term effort at the expense of long-term sustainability if they do not have an adequate time horizon. When unrealistic targets are set they can discourage rather than encouraging greater efforts. Incentives that reward relative performance may be appropriate where you want to reward the best and drive out the worst agents, but may be inappropriate where the aim is to encourage all agents to improve.

Fourth, any incentive program, like any contract, can be gamed. That is, no matter how detailed and well-designed a program, principals and agents can almost always find ways to exploit the arrangement and benefit themselves in ways that undermine the goals of the arrangement. Some pitfalls can be foreseen and avoided. For example, paying recipients for self-reported progress creates a strong temptation to exaggerate performance. Making independent verification of recipients' progress reports a normal part of a contract not only improves the credibility of the agreement and builds confidence between the two parties, but it also provides recipients with additional information for improving their reporting systems and getting the good management data they need.

Finally, many incentive programs raise questions about encouraging dependence in a counterproductive way. Paying a government to respect human rights or individuals to obey traffic laws seems to overstep a boundary between rewarding actions that are desirable and

offering bribes to fulfill basic responsibilities. This is also related to considering the sustainability of the program. Some changes are likely to persist once an incentive program has been completed. A COD Aid program for expanding primary school completion is likely to lead to investments in infrastructure, hiring, training, and community expectations that will preserve at least some of these gains once it is over. An advance market commitment for vaccine development helps research firms recover their investments and the social benefits can be reaped when the new technology has relatively low marginal production costs. However, cases exist where incentives become a trap, with individuals or organizations becoming "habituated" to the incentive and ceasing to perform once the incentive is removed.

Conclusion

Development programs create incentives whether we like it or not. Recent attention to using incentives in the service of development creates an opportunity to make these incentives explicit and improve their designs. This process will go faster if we take advantage of the extensive literature on how individuals, organizations, and countries respond to incentives and think carefully about designs that are appropriate to the context and problem. At the same time, we shouldn't fool ourselves into believing that there are perfect designs. Instead, by recognizing the complexities, we can design programs that are promising, that avoid known pitfalls, and then evaluate, learn, and adapt from the experience.

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