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World Bank-Borrower Relations and Project Supervision

Les Rapports entre La Banque Mondiale et ses Emprunteurs et le Contrôle de Projets

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## **Abstract**

This paper explores the relevance of the principal-agent model for analyzing development projects using data from World Bank-funded projects. After demonstrating that World Bank loan agreements can be viewed as principal-agent contracts, the paper explores the importance of the agency problem in determining project performance. Predictions from an adversarial model contrast with those of a cooperative model. The importance of information in the adversarial model links World Bank supervision to project performance. Data support the relevance of the agency problem and the role of supervision as monitoring. The paper concludes with suggestions for modifying project selection and implementation to reduce agency problems.

Cet article examine la pertinence du modèle principal-agent dans l'analyse des projets de développement, en utilisant des données sur des projets financés par la Banque mondiale. Après avoir montré que les accords d'emprunts auprès de la Banque mondiale peuvent être considérés comme des contrats de type principal-agent, l'article examine l'importance du problème d'agence dans l'évaluation des projets. Les prédictions d'un modèle non-coopératif diffèrent des prédictions d'un modèle coopératif. Le rôle de l'information dans le modèle non-coopératif établit un lien entre le contrôle des projets par la Banque mondiale et les résultats de ces projets. Les données confirment la présence du problème d'agence et le rôle de la direction comme moniteur. En conclusion l'article propose des méthodes pour la sélection et la mise en place des projets afin de réduire les problèmes d'agence.

### **Biographical Note**

Christopher Kilby, Assistant Professor of Economics at Vassar College, received his PhD from Stanford University and specializes in the political economy of development assistance.

#### Publications:

“Aid and Sovereignty,” *Social Theory and Practice*, vol. 25, no. 1, 1999, p. 79-92.

“Supervision and Performance: The Case of World Bank Projects,” *Journal of Development Economics*, vol. 62, 2000, p. 233-59.

“Sovereignty and NGOs,” in Stiles, Kendall, ed., *Global Institutions and Local Empowerment: Competing Theoretical Perspectives*, New York, St. Martin’s Press, 1999.

“Foreign Aid and Domestic Politics: Voting in Congress and the Allocation of USAID Contracts Across Congressional Districts,” *Southern Economic Journal*, forthcoming.

## **I. Introduction**

This paper explores the relevance of the principal-agent model for understanding problems encountered during the implementation of development projects and the role of donor supervision. I outline conditions for the existence of an agency problem and demonstrate that World Bank-borrower relations fit these conditions. To investigate the significance of this agency problem, I develop two models, an adversarial model in which the principal-agent relationship is the only source of implementation problems and a cooperative model in which technical factors are the only sources of implementation problems. I compare implications of these models with data from World Bank-funded projects and find that the predictions of adversarial model are largely born-out. These results suggest that more borrower control of project selection and design will improve project implementation. The adversarial model also underscores the function of World Bank supervision as monitoring and its potential for improving project performance.

The adversarial model describes an agency problem between the World Bank and its borrowers. Borrowers face a moral hazard; their objectives differ from those of the World Bank, which are embodied in the project's design. The borrower thus has an incentive to deviate to the extent possible given the World Bank's limited ability to observe borrower actions and enforce agreements. From the World Bank's point of view, these deviations add to implementation difficulties and lower project performance on average. World Bank disbursement procedures and project supervision can be seen as mechanisms to mitigate this agency problem. The degree to which World Bank and borrower objectives differ and the extent to which World Bank preferences dominate the project selection and design process may vary by country and project type. Thus, measurable project and country characteristics will reflect the severity of the agency problem. The monitoring component of World Bank supervision should improve project performance by reducing the incentive to deviate. World Bank supervision-as-monitoring will have a greater impact when incentives to deviate are greater.

In the cooperative model of World Bank-borrower interactions, the borrowing government does not deviate intentionally from agreements. Differential information about borrower actions is irrelevant.

Implementation problems are purely technical and the relevant component of World Bank supervision is assistance. In contrast to the supervision-as-monitoring interpretation, domestic expertise and international consultant services can substitute for World Bank supervision-as-assistance. Since supervision-as-assistance improves borrower welfare (in contrast to supervision-as-monitoring which promotes World Bank-specific objectives), the borrower will supervise to the extent possible given its domestic capabilities and foreign exchange position. The observable link between supervision-as-assistance and project performance is uncertain since available data record World Bank supervision, not overall supervision. Characteristics which could reflect an agency problem should have no impact on performance nor on the effectiveness of supervision.

Data from over 1400 World Bank-funded projects, however, support the importance of agency problems in determining performance and explaining the role of World Bank supervision. In 10 of 11 cases, the predictions of the adversarial model are consistent with data on interim and final performance ratings and in every case where the adversarial and cooperative models differ, the data side with the adversarial model. The impact of supervision is largely consistent with a monitoring function as suggested by the principal-agent model. In short, agency problems play an important role in determining project outcomes; recognizing these problems will allow development agencies to improve the effectiveness of aid.

Throughout this paper, the measures of project performance are ratings by World Bank staff. Performance ratings evaluate how well the project is expected to accomplish objectives set-out in the Staff Appraisal Report and other loan documents. Use of a World Bank rating, though reflecting institutional biases, is entirely appropriate in this situation. It is the principal's assessment of performance which is relevant in the adversarial model while in the cooperative model, all assessments of performance are the same at least on average.

This paper is best understood as an exploration into the underlying determinants of project performance. Developing the adversarial and cooperative models side by side provides a framework in

which to understand the empirical regularities in performance ratings. Some of these regularities are already well documented. Numerous studies have found lower project performance in less developed, low growth countries (Kaufmann and Wang 1995; Operations Evaluation Department 1997; Burnside and Dollar 1997; Dollar and Pritchett 1998; Isham and Kaufmann 1999). World Bank supervision is known to improve project performance (Kilby 2000). Casual empiricism suggests that, for projects, shorter is better and that a project's performance is likely to improve over time. Other findings (such as the impact of external financing and the conditions under which supervision is most effective) are new. The framework allows us to understand what all these patterns imply about the relationship between aid donors and recipients. By identifying the principal-agent relationship as a significant cause of implementation problems, this approach suggests steps to improve the development effectiveness of international aid.

The rest of this paper develops these ideas. Section II describes salient aspects of World Bank lending procedures and the project cycle. Section III outlines necessary and sufficient conditions for the existence of an agency problem and how World Bank-borrower interactions fit these conditions. Section IV presents the adversarial model and the implications for project performance and supervision. Section V describes the cooperative model and its implications. Section VI compares the two sets of predictions with available data. I close with a broader view, suggesting methods for improving development effectiveness by reducing the scope of agency problems in World Bank lending.

## **II. World Bank Procedures and the Project Cycle**

This section describes World Bank project cycle lending procedures and measures of project performance. The discussion of the project cycle provides background and illustrates the extent of World Bank influence over project selection and design. The project cycle has three phases: planning, implementation, and evaluation.

Planning consists of identification, preparation, appraisal, negotiation and board approval. Identification develops the conceptual basis for the project while preparation entails extensive planning,

culminating in a report detailing project implementation which the borrower submits to the World Bank (World Bank 1997, 2.7-2.8). Appraisal is a critical evaluation of the project plan by World Bank staff. Appraisal results are presented in a Staff Appraisal Report (SAR) which is the starting point for negotiations with the borrower. Negotiations establish key legal covenants and timetables for project implementation. Any changes are incorporated in the SAR and reflected in legal agreements. These documents rather than the borrower's preparation report are presented to the World Bank board of directors for approval and become the standard against which performance is evaluated.

Throughout the planning process, the World Bank has considerable influence on project selection and design. Although identification and preparation are nominally the borrower's responsibility, the World Bank involvement has increased over time (Baum 1982, 6, 8, 17) averaging 100 weeks per project (World Bank MIS data). Furthermore, during appraisal by World Bank staff, the project "may be extensively modified or redesigned." (Baum 1982, 17)

Recent changes in World Bank procedures and policies, such as a greater focus on stakeholder, NGO and borrower participation and concern for borrower ownership, have increased the role of the borrower in project selection and design (Picciotto and Weaving 1994) yet substantial World Bank influence remains (World Bank, 1997, 1.7, 2.4). A recent paper by World Bank staff (Deininger et al. 1998, p. 405) states:

In most cases, countries are not in a position of having a well-defined investment program from which World Bank staff can pick and choose. World Bank staff are usually heavily engaged in identifying and developing new investment opportunities. And in most cases, projects are not close to being fully designed before World Bank staff become involved. In fact, World Bank staff usually play a major role in project design and conceptualization.

The implementation period follows board approval. All World Bank staff and consultant time spent administering the project during implementation is termed supervision.<sup>1</sup> Supervision includes monitoring, management advising and technical assistance, though monitoring is the main activity. Monitoring takes



place both in Washington, D.C. (where staff examine progress reports, statements of expense, and requests for disbursement) and during “missions” to the borrowing country (where staff gather information and discuss implementation issues with government officials). World Bank operations staff spend about one quarter of their time on supervision; the average project receives 12 staff weeks of supervision annually. Project supervision budgets are determined annually as part of a bank-wide planning process.

Project performance is also evaluated annually during implementation by World Bank managers. Performance is evaluated again at the end of the implementation period by the Operations Evaluation Department, a semi-autonomous auditing unit. Performance ratings reflect the expected development impact of the project, not loan performance in the sense of a commercial bank.<sup>2</sup>

### **III. Development Projects as Principal-Agent Contracts**

The two actors in a principal-agent contract are the principal who wishes to have something done and the agent who agrees to do it. The necessary and sufficient conditions for an agency problem are: 1) the contracting parties have different objectives; 2) the principal’s information about the agent’s action is incomplete or imperfect; and 3) “extreme” contracts are excluded. Incomplete information may be the optimal choice because the cost of collecting additional information outweighs the expected benefits or may be the result of exogenous institutional constraints on monitoring. Similarly, extreme contracts may be dominated by interior solutions or may be outside institutional bounds.<sup>3</sup>

World Bank loan agreements can be viewed as principal-agent contracts with the World Bank as principal and borrowing government as agent.<sup>4</sup> The World Bank has certain objectives and chooses to “employ” the borrower as an agent to implement (some of) these objectives. The World Bank’s objectives include a high level of performance in the project and a low cost while the “payment” to the borrower is disbursement of funds and possibly continued interaction in the future. The borrower maximizes project performance and funds disbursed but has other potentially conflicting objectives — such as a diversion of project resources or a different distribution of project benefits — which arise from a different assessment

of performance. Following the vocabulary of the literature, I refer to this as minimizing effort.<sup>5</sup>

At the most abstract level, the agent is the nexus of control in the borrowing country: the electorate, the ruling government, or the military. However, there are agency problems at all levels of project implementation. Rather than attempting to describe a hierarchical system of principals and agents, I view machinations below the top level as an uncertain implementation technology, the outcome of which is affected by the agent's effort level.<sup>6</sup>

Likewise, I treat the World Bank as a single actor. I assume that World Bank employees face incentives which are compatible with implementing the organization's goals. For this analysis, I assume that internal World Bank agency problems are less important than the agency problem between the World Bank and its borrowers.<sup>7</sup>

#### **A. World Bank, Borrower and Project Objectives**

The measures of project performance examined in this paper compare project objectives (rather than World Bank objectives) with the expected outcome of the project.<sup>8</sup> Therefore, the relevant difference in objectives is between project and borrower. World Bank objectives enter the determination of performance only indirectly as they influence project objectives. We can think of a structural model in which project performance is determined by the gap between project and borrower objectives and by supervision while project objectives themselves are determined by borrower objectives, the gap between World Bank and borrower objectives, and relative bargaining strength.<sup>9</sup> A reduced form model collapses this structure, with project performance determined by the gap between World Bank and borrower objectives, relative bargaining strengths, and supervision. This is summarized in Figure 1 below.

[Figure 1]

**C** is inversely related to project performance, i.e., the closer the outcome is to the project objectives, the better the performance. **C** is determined by **B**, the gap between project and borrower objectives, and by supervision. **B** in turn is a function of **A**, the gap between World Bank and borrower objectives, and the

relative bargain power of the two sides which determines where along interval **A** the project specification lies.

Why might World Bank and borrower objectives differ? Equivalently, why might World Bank and borrower rankings of potential projects differ? If markets are imperfect, transactions costs are significant, or public goods exist, the ranking of projects will depend on preferences and systematic differences in preferences will lead to systematic differences in rankings.<sup>10</sup> The most systematic difference between World Bank and borrower preferences is the rate of time preference. The World Bank is typically more farsighted than its borrowers, lending for investment rather than current consumption. It is concerned with a narrower range of problems than is the borrowing government, namely long term investment. Other issues such as current consumption, government budget shortfalls, and foreign exchange shortages rank lower on the World Bank's list of priorities.

Governments have many legitimate reasons for placing more weight on current consumption. When the standard of living is very low, sacrificing current consumption to improve the situation of future generations — who may be better off in any case — is not an obvious priority. Furthermore, what one party views as consumption, another may view as investment. In some cases, more consumption can be viewed as an investment in human capital. Likewise, efficiency wage arguments suggest that labor productivity may improve as consumption increases from very low levels.<sup>11</sup>

Governments also have less admirable motives for favoring current consumption. Such policies as urban food subsidies and protection for certain industries may be politically motivated. Even if benefits are to be distributed evenly, short-run benefits have great appeal if the government's hold on power is precarious as it is in many developing countries.<sup>12</sup> This tendency is often noted in the development literature. For example, in *Overseas Aid*, Mosley (1987, Chpt. 4) discusses the relative preference of borrowers for consumption over investment, political shortsightedness, and how the substitution of foreign aid-funded investment for domestically-funded investment may increase consumption. In short, for a host of reasons,

time preferences differ because the time horizon of Third World policy makers and World Bank bureaucrats differ.

### **1. Bargaining and Project Objectives**

As noted above, differences between World Bank and borrower objectives (**A**) are relevant for project outcomes only to the extent that World Bank objectives are reflected in the project plan (**B**). Although projects are officially the borrowers' and the World Bank does not force projects on unwilling countries, the World Bank clearly does influence the identification and design of projects. The World Bank itself has called attention to this fact as it has become concerned with a lack of "borrower ownership." (Picciotto and Weaving 1994, 43) Indeed, the entire project approach to lending can be seen as a method of promoting World Bank objectives. Loans with no conditions, immediate disbursement, and no attached project plan provide a more efficient method for resource transfer. In principle, World Bank project activities need not be tied to financial aid — the World Bank could provide these as technical assistance independent of project financing.

The degree to which a project reflects World Bank rather than borrower preferences depends on the relative bargaining power of two parties. The World Bank has lending targets for individual countries, regions, and sectors. If lending is lagging behind World Bank targets or if other sources of capital are available, the borrowing country may have an advantage in negotiations. For example, Malaysia (until recently) might accept only projects which conform closely to its preferences. On the other hand, countries with limited access to international financial markets and greater borrowing needs (those with low GDP per capita levels, low growth, and large deficits) have a weaker position and may compromise on some projects.

In general, project plans impose World Bank preferences on the borrower, the degree of imposition depending on the closeness of the two parties' objectives and the relative bargaining positions. At one extreme, a borrower may be indifferent to the project, agreeing to the contract only because of the "payment" of disbursed funds, the concessional component of the loan, and the prospect of future loans. At the other

extreme, the borrower may endorse the project heartily and would undertake it even if World Bank funding were perfectly fungible. The typical case is in between with some divergence between the actual project and the borrower's ideal. The severity of the agency problem (i.e., the incentive the borrower has to deviate from the project plan) depends on how closely project objectives align with borrower objectives and how well the World Bank can discern borrower actions.

### **B. The Cost of Information**

The second element of a principal-agent problem, incomplete or imperfect information, is also apparent in World Bank projects. Many World Bank staff state that information about projects is imperfect despite monitoring of implementation and loan conditionality compliance. This impression is confirmed by ex post audits which often uncover new problems and by the failure to cancel projects which are later judged unsatisfactory. Of 465 projects with unsatisfactory final ratings, only 25 % had substantial cancellations.<sup>13</sup>

Why is information incomplete? Assuming it is an unconstrained choice, incomplete information results from balancing the marginal cost and the expected marginal benefit of supervision. The balance is reached before full information when information is costly since the marginal cost of supervision is constant while the expected marginal benefit is declining.<sup>14</sup>

The marginal benefit of supervision falls, at least past some level of supervision, for two reasons. First, the "amount" of new information generated by additional supervision declines since the most flagrant violations are detected easily. Second, the value of additional information declines past some point since the World Bank has only a limited ability to "punish" the borrower. In the terminology of the principal-agent literature, the participation constraint binds. With the expected marginal benefit of supervision diminishing, the optimal level of supervision stops short of complete information.<sup>15</sup>

Incomplete information can also result from a direct limit on supervision. The World Bank may limit supervision to safeguard borrower sovereignty and ownership. Beyond a certain point, additional monitoring may interfere with the domestic affairs of the government or be interpreted as overstepping allowed bounds.

Excessive World Bank involvement also may weaken the borrower's sense of responsibility for and commitment to the project. In a repeated setting, excessive supervision of one project may set a precedent which shifts more of the responsibility for management to the World Bank. To prevent setting such precedents, the World Bank may impose limits which are not optimal in a one project setting.

In sum, World Bank information about borrower actions appears to be incomplete or imperfect because of limited supervision. This may be the result of constraints on supervision or of balancing the marginal cost and marginal benefit of information at the project level. In either case, incomplete information is a rational choice. Policy advice is not so simple as "Collect more information."

### **C. Extreme Contracts**

The final condition for an agency problem is the exclusion of extreme contracts, namely unconditional loans, no lending, or implementation by the World Bank. The first two are clearly sub-optimal within the framework of the problem. Because World Bank and borrower preferences over projects differ, unconditional lending with lump-sum loan disbursement and no World Bank involvement in project planning or administration would lead to projects which do not satisfy World Bank objectives. No lending is sub-optimal for both parties since that option is always available and, in the cases we examine, is not chosen. Lending with conditions is revealed preferred to no lending.

Implementation by the World Bank may appear preferable to both parties since implementation might proceed more smoothly. However, the World Bank does not consider implementation to be one of its roles. The institutional lexicon carefully denotes projects as "World Bank-funded" and the phrase "borrower ownership" is oft repeated (World Bank 1997, 1.6). There are three central reasons why the World Bank does not implement projects. First, the World Bank charter as a lending institution excludes direct implementation. This must be viewed as a temporary impediment, however. If there were a strong motive for taking a more active role in implementation, the charter could be amended or reinterpreted (as some argue was the case with structural adjustment lending). Second, development of the borrower's domestic

capabilities to plan, implement and manage — institutional development — is an important objective. Finally, by maintaining some distance from the project, the World Bank reinforces the government's obligation to repay the loan regardless of project performance, an arrangement which is vital for maintaining the World Bank's access to capital. Thus, direct World Bank implementation is ruled out; the principal-agent contract, with its second best outcome, cannot be avoided.

#### **IV. The Adversarial Model**

The adversarial model assumes that the agency problem is the only significant source of implementation difficulties.<sup>16</sup> Hence, it predicts a link between performance, on the one hand, and the divergence of project and borrower objectives and the level of supervision, on the other. The magnitude of supervision's impact will depend on the severity of the agency problem, i.e., the divergence of objectives and the bargaining power of the borrower. When data measuring these variables are available, the predictions may be testable. One complication arises when examining supervision data; the reactive nature of supervision allocation results in a feedback relationship. To avoid this feedback problem, I look at annual changes in performance ratings when examining supervision and other time-varying variables.<sup>17</sup>

Some observables reflect the disparity between project and borrower objectives. These may be direct, indicating the proximity of project and borrower objectives (**B** in the diagram), or indirect, providing information about either the proximity of World Bank and borrower objectives (**A**) or relative bargaining strength. These variables include stage of implementation, length of the project, source of funds, level of development, and growth rate of the economy.

Project and borrower objectives tend to converge as implementation progresses. Once resources are fixed and immutable, the incentive to divert them to other uses weakens because the cost of diversion is high. The incremental cost of completing the project (and receiving the benefits) declines once these initial investments are sunk. Likewise, as the benefit stream draws near, differences in objectives due to different discount rates diminish. Finally, experience in developed countries suggests that political commitment to

a project may build as it progresses from plan to product. All these factors suggest that project and borrower objectives are closer in shorter projects and at the end of projects. Performance will be better in these cases.

The source of funds influences bargaining power and hence reflects the proximity of borrower and project goals. In general, objectives will align more closely in projects with a low percentage of external financing. This is clear in the limit when all funding comes from the government budget. Therefore, project performance should vary inversely with the percentage of external financing.

Project performance is also likely to be better for borrowers with a higher level of development or faster growth. These countries are better able to postpone consumption and resist budget pressures than countries with less robust economies; as a result, the government's rate of time preference is likely to be lower, more nearly matching that of the World Bank. These variables also indicate the borrower bargaining strength. Countries with strong, growing economies have better access to international capital markets (or can generate domestic investable surplus) and are less dependent on World Bank funds. The existence of outside options strengthens their bargaining position making these countries less willing to accept projects which do not reflect their own objectives fully. Such countries also have the technical expertise to take an active role in project selection and design, increasing their influence in setting project objectives.<sup>18</sup>

Higher levels of supervision should also lead to better performance on average. More supervision increases the probability of detecting existing violations — deviations from project objectives, schedules, procurement regulations, and legal covenants. Information about violations is used to determine disbursement and to set standards for correcting problems. In turn, the actual or anticipated implications of supervision influence borrower actions. If the level of supervision is high, violations are more likely to be detected and the expected cost of violations rises, inducing the borrower to exert more effort (i.e., commit fewer violations). Borrower effort, in turn, influences project performance.

Following this line of argument, supervision will have a greater effect on performance when the agency problem is more severe. When the number and degree of violations of the project plan are high, a given level



of supervision will identify more violations. Returning to the previous variables, supervision will have a greater impact on performance early in the implementation period, in longer projects, when the percent of external financing is high, or when the level of development and growth rate of GDP per capita are low. These implications are summarized in the first column of Table 1.

[Table 1]

## **V. The Cooperative Model**

The cooperative model assumes that the agency problem between the World Bank and its borrowers is not significant. Instead, implementation problems arise because of technical factors. The cooperative view notes that World Bank-borrower interaction is purely voluntary and premised on a commonality of interests, i.e., the welfare of the citizens of the borrowing country.

There are many possible variants of cooperative behavior. The World Bank and the borrower may have the same objects or the two parties may simply select project objectives (as outlined in a project plan) and follow these. In the latter case, the process of selecting a project may involve compromise on one or both sides; this compromise may be based on “fair sharing rules” or on the relative bargaining strengths of the parties. Similarly, the costs of the project may be divided according to different mechanisms. The costs to the World Bank are the percentage of the project’s cost financed by the World Bank loan, the amount of preparation done by the World Bank, and the amount of supervision done by the World Bank.<sup>19</sup>

The common element of all these interpretations of cooperative behavior is that once a project plan is selected, both parties follow it. As in cooperative game theory, the agreement is binding though no individually rational reason or enforcement mechanism is offered. Consequently, there is no role for asymmetric information during implementation and only technical issues influence project performance. The monitoring aspect of supervision is irrelevant to project performance and hence we focus on supervision-as-assistance. Considering the impact of World Bank supervision-as-assistance from an empirical point of view, the key distinction is between the impact of supervision-as-assistance on performance (which is positive) and

the *measurable* impact of *World Bank* supervision-as-assistance on performance (which is uncertain because substitutes exist). The predictions are summarized in the second column of Table 1.

### **A. Technical Determinants of Performance**

From a purely technical point of view, performance may vary with the stage of implementation. The early stages of a project are generally the most crucial since much of the activity and investment happens early on. With more happening, more problems can arise in these stages than at later stages. Once a problem is identified, efforts will be made by both the World Bank and the borrower to correct the problem. If initial problems are solved faster than new problems arise, the resulting pattern is declining performance followed by gradual improvement.<sup>20</sup>

Short projects may have better or worse performance than long projects. To the extent that short projects are less complex, we may expect better performance. However, when difficulties do arise, given the short time frame, they may not be solved easily. With countervailing influences, there is no clear link between performance and length.

The case *is* clear for source of funds: based on technical factors, there should be no relation between the percentage of external funding and performance. Since the cooperative model assumes that project plans are followed, the source of funds cannot influence implementation.

Both the level of development and the per capita growth rate of the economy are likely to be linked positively to project performance. Development projects share many attributes with other investment activities. Both types of investments perform better when markets function well, when physical and social infrastructure are developed, and when the government deficit is low. Since both the level of development and the growth rate give an aggregate measure of how other investments perform in a particular environment, they should also have some predictive power for the performance of development projects.

### **B. Supervision-as-Assistance**

The positive impact of supervision-as-assistance is self-evident: within reasonable bounds, more inputs

result in more output. Such assistance should have a greater impact in longer, more complex projects. However, there is no a priori reason to believe early supervision-as-assistance has a different impact on the subsequent change in annual performance rating than later supervision-as-assistance.<sup>21</sup> Thus, stage of implementation has no effect on supervision's impact as we measure it.

The effectiveness of supervision-as-assistance will vary with the project's external environment, e.g., the country's level of development and economic growth rate. In a conducive environment, a greater percentage of project problems will be internal and hence fixable while in a more difficult environment external problems mount and cannot be remedied. Technical knowledge from the West is also more applicable in a relative developed country. Hence, in contrast to supervision-as-monitoring, supervision-as-assistance will have a greater impact in relatively developed, growing economies.<sup>22</sup>

Another difference concerns the source of funds. As noted above, the source of funds is irrelevant in the cooperative model. The impact of supervision-as-assistance should not vary with the percentage of external funding.

This description of the impact of supervision-as-assistance does not take into account that we observe only World Bank inputs. Because substitutes exist for World Bank supervision-as-assistance (in contrast to supervision-as-monitoring), the data do not tell us the overall level of supervision inputs projects receive. What inferences can we draw?

Borrower-provided supervision-as-assistance may be complementary or simply additional to World Bank input. The extra supervision-as-assistance is complementary to World Bank activities if government staff or consultants serve as intermediaries between World Bank supervisors and project implementors. Alternatively, borrower self-supervision may be a substitute for World Bank staff and consultants. The relevant point is that governments can obtain substitutes for World Bank supervision by using government staff and domestic experts or by hiring international consultants, possibly the same ones the World Bank hires.

Despite agreement on objectives in the cooperative model, the level of supervision provided by the borrower will not be sufficient from the World Bank's point of view. Countries are World Bank clients precisely because they face constraints on access to foreign capital markets, on foreign exchange, and on domestic expertise. Left to itself, the borrower will select less supervision than the World Bank would because of a higher opportunity cost of supervision (the result of thin domestic expertise and a high shadow price on foreign exchange raising the opportunity cost of hiring foreign experts).<sup>23</sup> Responding to this shortfall, the World Bank will provide some fraction of overall supervision and hence World Bank supervision serves as a proxy for overall supervision.

It is a biased proxy, however. The fraction of overall supervision done by the World Bank will vary systematically between borrowers. Countries with lower levels of development and growth rates face more severe constraints and hence must receive a higher proportion of their supervision from the World Bank. In these countries, 10 weeks of World Bank supervision may indicate, say, 15 weeks of overall supervision. In countries with higher levels of development and growth rates, five weeks of World Bank supervision may indicate the same 15 week total.<sup>24</sup>

This bias influences two of the relationships discussed above. Recall that the cooperative model predicts better performance in more developed, high growth countries — countries in which World Bank supervision is a smaller share of total supervision. Thus the correlation between performance and World Bank supervision understates the positive relation between performance and overall supervision. As a result, the cooperative model has no prediction about the relationship between performance and World Bank supervision. Second, the effectiveness of supervision will be overstated in high growth, relatively developed countries. In the example given above, if supervision has the same impact in each type of country, five weeks of World Bank supervision in a relatively developed, high growth country will have the apparent same impact as 10 weeks in the less developed, low growth country. Note that this bias *reinforces* the empirical predictions of the cooperative model for the effect of level of development and growth on the impact of

supervision.<sup>25</sup>

## VI. Empirical Evidence

This section compares data from World Bank-funded projects with the predictions of the two models as outlined in Table 1. Results are presented in Tables 2, 3 and 4. The data cover all World Bank-funded projects completed and rated between 1981 and 1991, a total of 1447 observations at the project level or 6120 annual observations (an average of four per project). When examining any individual characteristic, the actual number of observations will be less due to missing data for that characteristic.<sup>26</sup>

The first four categories (plus a composite category) are examined at the project level in Tables 2 and 3, the remainder at the annual level in Table 4. Table 2 presents a cross-tabulation where the impact on performance is measured by the difference in final project performance ratings. These ratings are the final “Satisfactory / Unsatisfactory” rating of overall performance from the World Bank’s Operations Evaluation Department. Table 3 extends this to a multi-variate analysis, presenting probit estimation results. Table 4 turns to time-varying characteristics where the impact on performance is measured by the difference in correlations with the change in annual performance rating.<sup>27</sup> These ratings are from the Annual Review of Portfolio Performance of the Operations Policy Review Department; annual changes in ratings range from -2 to 2.

Variable and category definitions are straightforward. Project length is the number of years of the planned implementation period. Short projects are those less than the sample mean of 5.8 years.<sup>28</sup> The percent of external funding is the ratio of World Bank funding plus co-financing to total project cost. Projects with a low percentage of external funding are those with less than the sample mean of 59.5%. The level of development is measured by GDP per capita prior to the start of the project. A low level of development is a GDP per capita below the sample average for the year the project started. The growth rate is the GDP per capita growth rate prior to the start of the project. A low growth rate is one below the sample average of 0.6%.<sup>29</sup> Stage of implementation is the percentage of the planned implementation period

completed. The early stage is the first half of the planned implementation period. Finally, supervision is the number of weeks of World Bank staff and consultants time recorded for the supervision activity for a project in a given year.

[Table 2]

The results presented in Table 2 clearly match the predictions of the adversarial model (Table 1, column 1) more closely than those of the cooperative model (column 2). In each case, the group of projects predicted to have less severe agency problems shows better average performance. Project length is negatively related to performance with 70.2 % satisfactory long projects as compared to 73.7 % for short projects. High levels of external funding also correlate negatively with performance with 65.7 % satisfactory projects with high external funding as compared to 77.1 % for those with low external funding. Level of development is positively related to project outcome with projects in higher GDP countries averaging 75.4 % satisfactory as compared to only 68.5 % in lower GDP countries. Growth is also positively linked with outcome as 76.7 % of projects in high growth countries achieved satisfactory outcomes while only 64.3 % in low growth countries did. There is a dramatic difference between projects which the adversarial model designates as having major agency problems and those having minor agency problems. In long projects with high levels of external funding which take place in less developed, slow growing economies, only 50.5 % achieve their objectives while in short projects with low levels of external funding which take place in more developed, faster growing economies, 81.8 % achieve their objectives. Finally, except for project length, all the performance differences are statistically significant at the 95 % confidence level.

[Table 3]

An alternative approach to examine the project-level data is a probit analysis which estimates the probability of a satisfactory rating given project/country characteristics. This offers the advantage of a multi-variate analysis allowing for covariance between variables. Table 3 presents results from both bivariate and multi variate probits. The bivariate probits are similar to the cross tabulations above except that the

continuous independent variable is used directly rather than “high/low” categories. The bivariate results confirm the cross tabulation findings in terms of sign and level of significance. Both project length and external financing have a negative influence on performance while GDP level and growth rate have a positive influence. Again, except for project length, the coefficients are statistically significant at the 95% level. The third column labeled “ $\Delta P/\Delta X$ ” is a probability differential which is comparable to the “Difference” column in Table 2. For each subcategory (e.g., long and short projects), I calculate the predicted probability based on the subcategory mean and the probit coefficient estimates. As expected, there is a close correspondence between the two methods.

The multi variate probit results do reflect some correlation between the independent variables. As one might expect, the covariance of the percentage of external funding and the level of development reduces the magnitude and significance of these variables with level of development significant only at the 90% confidence level. The magnitude of the probability differentials are also reduced, especially for level of development. However, the predictions of the adversarial model clearly stand.

[Table 4]

Turning to annual variables examined in Table 4, we again find more support for the adversarial than the cooperative model though the picture is not quite as clean. Performance is more likely to improve in projects with fewer agency problems and supervision is more effective in projects with more agency problems (with one exception). Stage of implementation is positively correlated ( $\rho=0.168$ ) with improvement in performance as is supervision ( $\rho=0.029$ ). The impact of supervision on performance varies across groupings of projects. It diminishes as projects progress; the correlation of supervision with change in performance is 0.130 early in projects but only 0.011 later on. Supervision is slightly more effective in projects with high levels of external funding as the correlation between supervision and change in performance is 0.031 as compared to 0.028. Projects in more developed countries benefit from supervision less than their less developed counterparts with the correlation between supervision and change in

performance -0.004 in the former and 0.050 in the latter.<sup>30</sup> Likewise, supervision has less impact on project performance in high growth countries, with a correlation of 0.016 versus 0.047. When comparing the major agency problem cases (early in long projects with high external financing in less developed, low growth countries) with the minor agency problem cases, the correlations between supervision and change in performance are markedly different, 0.190 versus 0.011. One category bucks the pattern, however. Project length has a negative impact on the effectiveness of supervision with longer projects exhibiting a correlation of 0.027 and shorter projects a correlation of 0.032. This outcomes supports neither model as both predicted a positive link between project length and the effectiveness of supervision.

The adversarial model fits the data substantially better than does the cooperative model. In 10 of 11 cases, the predictions of the adversarial model match the data, at least in terms of the sign of the statistic computed. In the one category where the adversarial model is at odds with the data, the cooperative model also falls short. In each of the six categories where the two models give conflicting predictions (% External Financing, Stage of Implementation, and impact of Stage of Implementation, % External Financing, Level of Development and Growth on the effectiveness of Supervision), the data support the adversarial model.

## **VII. Conclusion**

The two models of World Bank-borrower relations paint very different pictures of project implementation. In the cooperative model, technical factors determine project performance. The only twist added by the existence of two parties is a measurement problem due to the lack of data on management and technical assistance activities by the borrower. In contrast, the existence of two parties plays a critical role in the adversarial model. Divergent objectives and incomplete information create an agency problem which is the root of implementation difficulties.

Evidence from World Bank-funded projects suggests that agency problems have a substantial impact on project implementation, that the principal-agent model is important for understanding project performance and the role of supervision. Within the current format of project administration, this points to two



approaches to improve the development effectiveness of aid.

The first approach is to reduce the gap between project and borrower objectives by giving borrowers more control in project selection and design. Although the resulting project plans would be less suited to World Bank objectives, actual outcomes would be more suited to World Bank objectives because of improved performance.<sup>31</sup>

This approach is likely to be counterintuitive to practitioners. To accommodate borrower objectives, project plans may not follow “best practices” and may not please the World Bank board of directors. World Bank staff will be tempted instead to win the borrowing government’s consent by offering increased external funding or exerting other forms of pressure. But this temptation should be resisted. The evidence with external funding is striking: after controlling for differences in country characteristics, the probability of a satisfactory performance rating is seven percentage points lower when external financing is high. Other points of leverage are likely to have a similar negative influence during implementation. No matter how good a project looks on paper, its outcome depends on successful implementation and hence on borrower actions.

The second approach is to increase the borrower’s expected cost of deviating from the project plan. The expected cost is determined by the probability of detection and the penalty. Improving supervision will increase the probability of detection. This means increasing the amount of supervision done but also concentrating on situations where agency problems are most significant – early in long projects with a high percentage of external financing in relatively poor, low growth countries. There are several ways of increasing the penalty. The World Bank must act on the information it has. Enforcement of loan conditionality and project schedules is critical.<sup>32</sup> Penalties could also extend beyond delaying disbursement of project funds. Project cancellation must continue as a credible option. Borrowers with good implementation track records could be accorded privileged status in terms of access to funds, debt forgiveness, repayment schedules, and the like. The penalty of a bad implementation record is the loss of these privileges. Although elements of this are in place, they have typically not been linked to project

implementation.

The alternative is abandoning the current project administration format. Institutional constraints are ultimately the source of the agency problem. Limits on supervision and the prohibition of direct World Bank implementation, at one extreme, and the project format of lending, at the other, currently exclude alternative arrangements which would solve incentive and information problems. If these institutional constraints were lifted, the current selectivity approach (Nelson 1996) could be taken to its extreme with the World Bank implementing projects itself when agency problems are deemed critical while abandoning the project format altogether when agency issues are not a concern. Such changes, however, must be weighed against institutional development and respect for borrower sovereignty.

#### **Endnotes**

1. Supervision figures cited exclude time for preparation of project completion reports.
2. Loan repayment is contractually separate from project performance: the borrowing country guarantees repayment regardless of project outcome. Failure to repay has broad implications: exclusion from IMF facilities and international commercial loans, including vital import/export financing. In addition, the ex post performance evaluation is typically before the ten-year mark at which point only a small fraction of the loan has come due.
3. The literature on this subject begins with Alchian and Demsetz (1972) and Stiglitz (1974). All three elements of an agency problem are evident in the classic case of a sharecropping contract between a landlord and an agricultural laborer (Stiglitz 1974). Laborer objectives differ from the landlord's because of the disutility of effort. Information is imperfect because monitoring costs or social norms. Extreme contracts — renting or selling land, wage labor, and landlord labor — are excluded: the first is inefficient due to the landlord's superior risk-bearing ability and the laborer's capital constraints; the second is dominated by a sharing contract because of information costs; and the final contract (no

contract) may be dominated by some contract involving hired labor or may be restricted by social norms.

These conditions are necessary as well as sufficient. In the sharecropping example, if the landlord and the laborer have the same objectives (e.g., the laborer likes to work), a first best optimal obtains. If the landlord has complete information, he can write a forcing contract. Finally, if the landlord sells the land or provides his own labor, there is no principal-agent contract.

4. One could conceive of more complex, hierarchical models in which, for example, the aid organization is the agent for donor states or taxpayers and in turn uses the recipient government as its agent. Such models are more useful for examining whether the aid organization's actions reflect donor state or taxpayer objectives. See, for example, Gauthier (1990) and James (1995).

5. See, for example, the standard text by Milgrom and Roberts (1992).

6. The argument that ultimate responsibility rests with the highest level of management is parallel to Penrose (1959). Any unsolvable internal borrower agency problems — those which remain even if the borrower takes all possible steps to eliminate them — are by definition technical problems, relevant for the cooperative model discussed below. The defining characteristic of technical problems is that they happen in spite of, rather than because of, borrower actions.

7. This approach is also taken in Gauthier (1990) and Mosley et al. (1991).

8. More precisely, performance is the degree to which the project at its current stage of implementation is expected to achieve the goals as set forth in the SAR and related documents. We must refer to the expected outcome since ratings, whether interim or “final,” are made before all project benefits are known. In using project ratings, I assume differences between actual outcomes and expected outcomes are not systematically related to the variables examined. See Kilby (1994, 2000) for procedural, organizational, and empirical evidence supporting this assumption.

9. In this section, I equate supervision with supervision-as-monitoring, donor monitoring of recipient actions.

10. In the stylized world of perfect markets and costless redistribution, all projects could be ranked in terms of their net present value using the international interest rate as the discount rate and market prices for inputs and outputs. The choice between competing projects is simply a production decision; the only connection between projects and social welfare is via an intertemporal budget constraint. All other effects of the project could be altered by buying and selling goods on the international market and costlessly redistributing goods or income domestically. Assessing project performance and ranking potential projects is straightforward under these conditions. This is sometimes referred to as the Fischer Separation Theorem.

As we move away from the stylized world, this simplicity breaks down: consumption and production decisions become intertwined. If access to international capital markets is limited, the appropriate discount rate in the net present value calculation is the social rate of time preference of consumption since, at the margin, investment means less consumption today. Similarly, if the government cannot redistribute costlessly because of transactions costs, non-tradeable goods or public goods, then the actual distribution of project costs and benefits will influence social welfare. If market prices are distorted due to market imperfections or government intervention or if the project provides a public good, opportunity costs must be used in the net present value calculation rather than market prices.

11. Thanks are due to an anonymous referee for pointing out legitimate reasons for favoring current consumption. See Stiglitz (1988) for a discussion of efficiency wage theory.

12. This applies even if the government remains in power for a long period. If the government is in a weak position, it may be forced to use relatively shortsighted methods to maintain its hold on power.

13. Calculated from a sample of 1796 projects for which all data were available between 1972 and 1990. Of the unsatisfactory projects, 115 had 25 % or more of the loan amount canceled, 47 had 50 % or more canceled. Although not all unsatisfactory projects should have been canceled (since sunk costs enter the rating process but are irrelevant when considering cancellation), the cancellation rate would certainly be

higher if information about project implementation were complete.

14. The marginal cost of one staffweek of supervision is approximately \$3,000.

15. Although some theoretical work in information economics finds increasing returns, those arguments do not apply in this situation. The results of Radner and Stiglitz (1984) and Singh (1985) apply only close to no information. Holmstrom and Milgrom (1991) present a model in which the marginal value of information increases with its breadth. In the current example, this argument has less force since the borrower's objectives are not orthogonal to the World Bank's. World Bank supervision begins with the areas where objectives differ most then extends to less contested aspects of the project, resulting in diminishing returns.

16. Relaxing this assumption to allow technical problems as well introduces complications but ultimately strengthens the results of the paper — that the agency problem is significant. If technical difficulties derail a project, the borrower may become less supportive of the project. Since the cases where the adversarial model's predictions differ from the cooperative model's predictions determine whether the impact of the agency problem is quantitatively important, the interaction described makes it more likely that we would falsely reject the adversarial model.

An example might clarify this point. Suppose that short projects do better in the adversarial model but worse in the cooperative model (in fact, project length's impact is uncertain in the cooperative model). A short project is more likely to fit the borrower's objectives and, in the pure adversarial model, performance is better. However, a short project is more likely to encounter technical difficulties which cannot be solved in time so, for technical reasons, project performance deteriorates. This undermines borrower support for the project and further reduces performance. The end result may be that short projects do worse even though the principal-agent model applies. If the data show the opposite, we have a strong confirmation of the adversarial model.

17. Using annual changes in performance solves the feedback problem because supervision is allocated on

an annual basis. The annual performance rating at the end of year  $t-1$  enters the supervision allocation decision for year  $t$ ; at the end of year  $t$ , the next performance rating is given.

18. World Bank performance evaluation could be prejudiced against projects whose goals diverge from the World Bank's. In this case, the link between a strong borrower bargaining position and project performance would be biased downward. If such a bias exists, it further strengthens the results reported below.

19. Cooperation can be pushed one step further. Gauthier (1990) and James (1995) stress a commonality between the immediate institutional interests of the World Bank and the bureaucratic objectives of implementing agencies within the borrowing government. The result may be collusion, possibly to the detriment of the interests of the World Bank's shareholders or the citizens of the recipient country.

20. A simple example illustrates this. Suppose project implementation takes five years and new project problems are discovered in the following pattern: four in the first year, three in the second year, two in the third year, one in the fourth year, and none in the fifth year. Once problems are identified, supervision can solve up to three problems per year. With these assumptions, the project has four unsolved problems at the end of the first year, four at the end of the second year, three at the end of the third year, one at the end of the fourth year, and none at the end of the fifth year. Assuming performance is inversely related to the number of unsolved problems, we have the pattern described.

21. Although early assistance may have a greater impact on the eventual outcome of the project (since there is time for identified problems to be solved), we can only look at the impact after one year because of the feedback issue. The length of time examined in 'early' and 'late' cases is the same.

22. One could make an argument for the opposite position: expert advice has the greatest value where it is most lacking. In cases where project problems are internal and within the competence of experts, supervision-as-assistance will be more effective in less developed, low growth countries. I do not introduce this argument in the text because the next step in analysis — considering the measurable

impact of World Bank supervision alone — changes the argument. I thank an anonymous referee for identifying this.

23.If a country maintains any type of currency control, the opportunity cost of foreign exchange (also called the shadow price) will differ from the nominal cost. Typically, developing countries suffer from a shortage of foreign exchange and an overvalued exchange rate. For more on the shadow price of foreign exchange in the context of development projects, see Squire (1988), pp. 1123-4.

24.A simple model illustrates this point. In the cooperative model, the World Bank and the borrower maximize the objective function:  $P(S) - C_i(S)$  where  $i$ =World Bank or borrower,  $P(S)$  is project performance as a function of supervision and  $C_i(S)$  is the cost of supervision. Assume a positive diminishing marginal benefit for supervision ( $P' > 0, P'' < 0$ ) and a constant marginal cost of supervision ( $C_i(S) = \alpha_i S$  where  $\alpha_i$  is the opportunity cost of supervision). Solving this maximization problem yield  $S^*(\alpha_i)$ , a decreasing function of  $\alpha_i$ . Assuming the World Bank augments borrower supervision, the fraction of supervision done by the World Bank is  $s = 1 - S(\alpha_b) / S(\alpha_{WB})$ , an increasing function of  $\alpha_b$ . Since the  $\alpha_b$ , the borrower's opportunity cost of supervision, is higher in less developed, low growth countries, the fraction of supervision done by the World Bank supervision will be higher in these countries.

25.The type of World Bank supervision-as-assistance will also vary with the level of development and growth rate. In relatively developed, high growth countries with substantial access to expertise, World Bank supervision-as-assistance will be confined to specialized, high return activities. In less developed, low growth countries without access to expertise, World Bank supervision-as-assistance will run the gamut of activities, some high return, some not. In more technical terms, World Bank supervision-as-assistance will be complementary in the first case (and hence high return) but supplementary in the second case (and hence lower return). This solves the problem raised in an earlier note (22).

26.For example, only 1128 projects have data on source of funds.

27.The cross tabulation approach of Table 2 is unwieldy with the extra dimension in Table 4.

28.I use the planned rather than actual length to avoid the endogeneity issue of projects becoming long once they encounter problems and delays.

29.GDP and growth rate are measured at the start of the project to reflect the borrower's bargaining position.

30.The negative correlation may be explained by over optimism in World Bank staff working in more developed countries. Rather than downgrade a project, they may simply supervise more intensively in the (sometimes mistaken) belief that the problems can be solved. In any case, the correlation is quite small in absolute value.

31. De Bijl (1994) explores the trade-off between control and project outcome in a more general model in which a principal motivates an agent by giving the agent discretion in project selection. Although this is costly to the principal as the project selected usually is not the principal's first choice, project outcome is improved because the agent exerts more effort. This demonstrates that the World Bank may further its own objectives by relinquishing more control to borrowers during project preparation.

32.See Mosley et al. (1991) for cases where violations were detected but funds released nonetheless.



## References

- Alchian, A. and H. Demsetz, "Production, Information Costs, and Economic Organization," *American Economic Review*, vol. 62, no. 5, 1972, p. 777-95.
- Baum, W.C., *The Project Cycle*, Washington, The World Bank, 1982.
- Burnside, C. and D. Dollar, "Aid, Policies, and Growth," Policy Research Working Paper 1777, Development Research Group, Washington, The World Bank, 1997.
- Dollar, D. and L. Pritchett, "Assessing Aid: What Works, What Doesn't Work and Why," Washington, The World Bank, Washington, 1998.
- De Bijl, P. W. J., "Delegation of Responsibility in Organizations," Mimeo, Tilburg, The Netherlands, CentER for Economic Research, Tilburg University, 1994.
- Deininger, K., L. Squire, and S. Basu, "Does Economic Analysis Improve the Quality of Foreign Assistance?," *The World Bank Economic Review*, vol. 12, no. 3, 1998, p. 385-418.
- Gauthier, B., "Agency Problems and Structural Arrangements within International Economic Organizations: The Case of the World Bank," Political Economy Working Paper 143, St. Louis, School of Business and Center in Political Economy, Washington University, 1990.
- Holmstrom, B. and P. Milgrom, "Multi-task Principal-Agent Analyses: Incentive Contracts, Asset Ownership, and Job Design," *Journal of Law, Economics, and Organization* vol. 7, 1991, p. 24-52.
- Isham, J. and D. Kaufmann, "The Forgotten Rationale for Policy Reform: The Productivity of Investment Projects," *Quarterly Journal of Economics*, vol. 114, no. 1, 1999, p. 149-84.
- James, J., *The State, Technology, and Industrialization in Africa*, London, Mcmillan, 1995.
- Kaufmann, D., and Y. Wang, "Macroeconomic Policies and Project Performance in the Social Sector: A Model of Human Capital Production and Evidence from LDCs," *World Development*, vol. 23, no. 5, 1995, p. 751-65.
- Kilby, Christopher, "World Bank-Borrower Relations and Project Supervision," Discussion Paper No. 9414, Center for Economic Research, Tilburg University, the Netherlands, 1994.
- \_\_\_\_\_, "Supervision and Performance: The Case of World Bank Projects," *Journal of Development Economics*, Vol. 62, 2000, p. 233-259.
- Kirk, R., *Elementary Statistics*, 2nd ed., Monterey, Brooks/Cole Publishing Company, 1984.
- Milgrom, P. and J. Roberts, *Economics, Organization and Management*, Englewood Cliffs, Prentice-Hall, 1992.
- Mosley, P., *Overseas Aid: Its Defence and Reform*, Brighton, Wheatsheaf Books, 1987.

\_\_\_\_\_, J. Harrigan and J. Toye, *Aid and Power: The World Bank and Policy-based Lending*, vol. 1., London, Routledge, 1991.

Nelson, J., "Promoting Policy Reforms: The Twilight of Conditionality?," *World Development*, vol. 24, no. 9, 1996, p. 1551-9.

Operations Evaluation Department, "Annual Review of Development Effectiveness," Report 17196, Washington, The World Bank, 1997.

Penrose, E.T., *The Theory of the Growth of the Firm*, New York, NY, Wiley, 1959.

Picciotto, R. and R. Weaving, "A New Project Cycle for the World Bank?," *Finance & Development*, December 1994, p. 42-4.

Radner, R. and J. Stiglitz, "A Nonconcavity in the Value of Information," in Boyer, M. and R.E. Kihlstrom, eds., *Bayesian Models in Economic Theory*, New York, North-Holland, 1984.

Singh, N., "Monitoring and Hierarchies: the Marginal Value of Information in a Principal-Agent Model," *Journal of Political Economy*, vol. 93, no. 2, 1985, p. 599-609.

Squire, L., "Project Evaluation in Theory and Practice" in Chenery, H. and T. Srinivasan, eds., *The Handbook of Development Economics*, vol. II, Amsterdam, North-Holland, 1988, p. 1093-139.

Stiglitz, J., "Incentives and Risk Sharing in Sharecropping," *Review of Economic Studies*, vol. 41, no. 2, 1974, p. 219-55.

\_\_\_\_\_, "Economic Organization, Information and Development," in Chenery, H. and T. Srinivasan, eds., *The Handbook of Development Economics*, vol. I, Amsterdam, North-Holland, 1988, p. 93-160.

World Bank, *Task Managers Handbook*, Washington, DC, The World Bank, 1997.

Figure 1

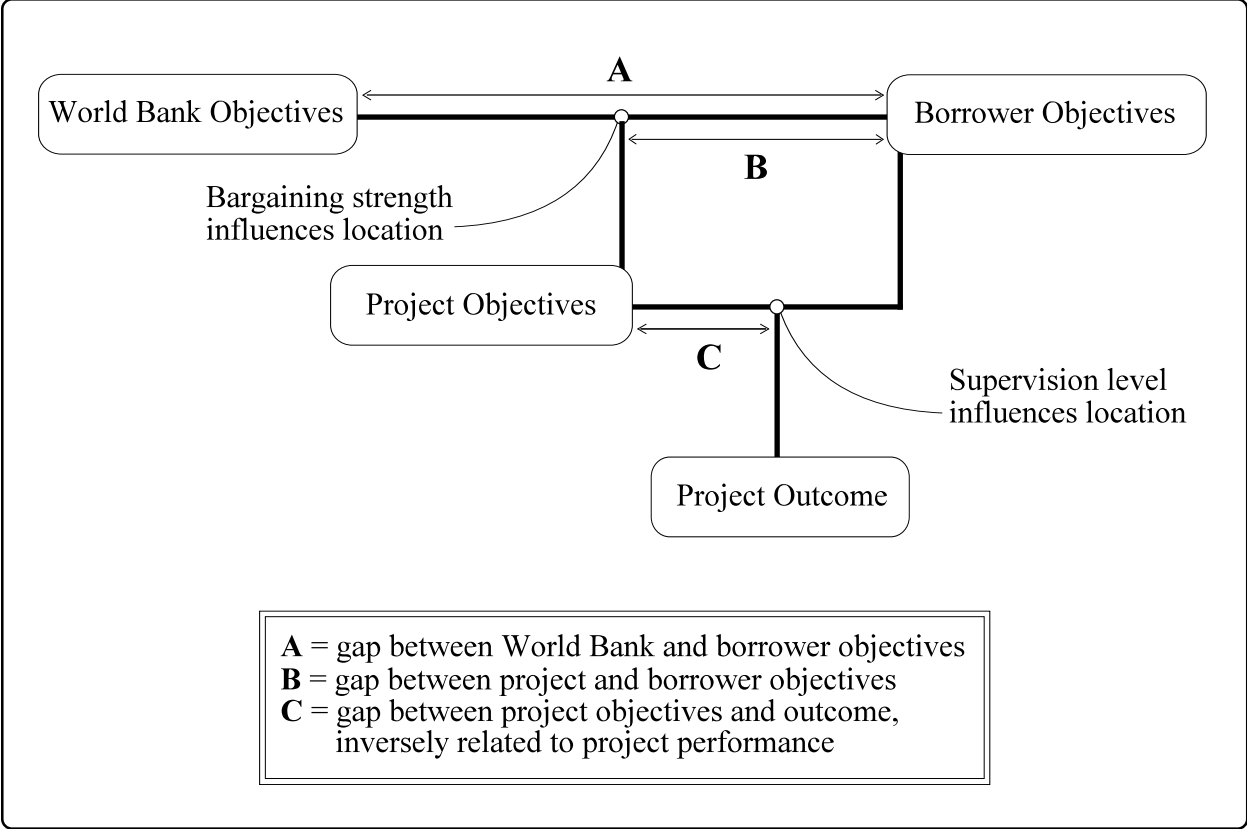


Table 1: Summary of Model Predictions

		Adversarial Model	Cooperative Model	
Impact on Performance	Length	-	?	Measured by Final Performance Rating
	% External Financing	-	None	
	Level of Development	+	+	
	Growth Rate	+	+	
Impact on Performance	Stage of Implementation	+	None	Measured by Change in Annual Performance Rating
	World Bank Supervision Level	+	?	
Influence on Impact of	Length	+	+	Measured by Change in Annual Performance Rating
	Stage of Implementation	-	None	
	% External Financing	+	None	
	Level of Development	-	+	
	Growth Rate	-	+	

For Rows one through four (time invariant characteristics: planned project length, percentage of external financing, level of development at start of project as measured by real GDP per capita, and growth rate of real GDP per capita at start of project), symbols indicate the predicted relationship with performance as measured by final performance ratings:

- + Better performance when variable is larger
- Worse performance when variable is larger
- None No relationship to performance
- ? Ambiguous relationship to performance

For Rows five and six (time varying characteristics: stage of project implementation and staff weeks of World Bank supervision in previous year), symbols indicate the predicted relationship with performance as measured by changes in the annual performance rating.

- + Improving performance when variable is larger
- Worsening performance when variable is larger
- None No relationship to annual change in performance
- ? Ambiguous relationship to annual change in performance

For Rows seven through 11 (staff weeks of World Bank supervision and: stage of project implementation, planned project length, percentage of external financing, level of development at start of project as measured by real GDP per capita, and growth rate of real GDP per capita at start of project), symbols indicated how the impact of World Bank supervision level on changes in the annual performance rating is predicted to vary.

- + World Bank Supervision is more effective when variable is larger
- World Bank Supervision is less effective when variable is larger
- None No relationship to effectiveness of World Bank Supervision
- ? Ambiguous relationship to effectiveness of World Bank Supervision

Table 2: Comparison of Final Performance Ratings

	% Satisfactory	Difference	# of Obs.	Z Stat
<b>Length</b>				
Long	70.2	-3.5	866	-1.43
Short	73.7		581	
<b>% External Financing</b>				
High	65.7	-11.4	551	-4.25**
Low	77.1		577	
<b>Level of Development</b>				
High	75.4	6.9	557	2.81**
Low	68.5		870	
<b>Growth Rate</b>				
High	76.7	12.4	794	5.14**
Low	64.3		633	
<b>Agency Problems</b>				
Major	50.5	-31.3	107	-3.88**
Minor	81.8		55	

\*\* Significantly different from 0 at the 95% confidence level.  
*Z stat* indicates difference of means of binomials (Kirk 1984, p. 312).

Variables defined Table 1 notes. All categories are relative to sample averages:

Length: 5.8 years

% External Financing: 59.5%

GDP per capita growth rate: 0.6%

GDP per capita level averages calculated yearly.

The “Major Agency Problems” category covers projects with: Length=Long and % External Financing=High and Level of Development=Low and Growth Rate=Low. The “Minor Agency Problems” category covers projects with: Length=Short and % External Financing=Low and Level of Development=High and Growth Rate=High.

Table 3: Probit Results

Dependent variable: Final Project Performance Rating

	Coefficient	# of Obs.	$\Delta P/\Delta X$	<i>t Stat</i>
Individually:				
Length	-0.040	1447	-2.9	-1.56
% External Financing	-0.655	1128	-9.0	-3.93**
Level of Development	0.0002	1427	8.0	3.87**
Growth Rate	3.37	1427	9.0	4.81**
Jointly:		1112		
Length	-0.038		-2.8	-1.23
% External Financing	-0.517		-7.1	-2.75**
Level of Development	0.0001		4.7	1.92*
Growth Rate	3.465		9.2	4.34**

\* Significantly different from 0 at the 90% confidence level.

\*\* Significantly different from 0 at the 95% confidence level.

Variables defined in Table 1 notes.

$\Delta P/\Delta X$  indicates the probability differential between means of high and low groups as identified in Table 2. In the joint estimation, other variables are held at their sample means.

Table 4: Change in Performance and Time-varying determinants

	Correlation with Annual Change in Performance Rating	Difference	# of Observations
Stage of Implementation	0.168		6120
World Bank Supervision Level	0.029		6120
Length			
Long	0.027	-0.005	4054
Short	0.032		2066
Stage of Implementation			
Late	0.011	-0.119	5642
Early	0.130		478
% External Financing			
High	0.031	0.003	2451
Low	0.028		2868
Level of Development			
High	-0.004	-0.054	2247
Low	0.050		3783
Growth Rate			
Low	0.016	-0.031	3406
High	0.047		2624
Agency Problems			
Major	0.190	0.179	60
Minor	0.011		186

Variables defined in Table 1 notes; categories defined Table 2 notes. Stage of Implementation is % of planned implementation period completed; “Early” indicates Stage of Implementation < ½.

In the first row, the correlation reported is between stage of implementation and change in annual performance rating. In all other rows, the correlation reported is between annual World Bank supervision (measured in staff weeks) and the subsequent change in annual performance rating for observations in the specified category.