# Risk and Capital Structure in Asian Project Finance

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## *Abstract*

We develop and test a multi−level theoretical framework for understanding country−, industry−, syndicate−, firm− and project−specific factors shaping the capital structure and broader risk profile of a quintessentially Asian form of foreign direct investment ("FDI") called project finance. Empirical analyses of 238 projects announced for 13 Asian countries from 1995−2004 support hypotheses derived from our framework, and suggest that country−level institutional factors such as a Common Law legal system, syndicate−level factors such as the concentration of equity among syndicate sponsors, and project−level factors such as the US dollar cost of the project all substantially affect project capital structure and risk.

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# RISK AND CAPITAL STRUCTURE IN ASIAN PROJECT FINANCE

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# RISK AND CAPITAL STRUCTURE IN ASIAN PROJECT FINANCE


## Abstract

We develop and test a multi-level theoretical framework for understanding country-, industry-, syndicate-, firm- and project-specific factors shaping the capital structure and broader risk profile of a quintessentially Asian form of foreign direct investment ("FDI") called project finance. Empirical analyses of 238 projects announced for 13 Asian countries from 1995-2004 support hypotheses derived from our framework, and suggest that country-level institutional factors such as a Common Law legal system, syndicate-level factors such as the concentration of equity among syndicate sponsors, and project-level factors such as the US dollar cost of the project all substantially affect project capital structure and risk.



Keywords: project finance, foreign direct investment, risk, governance, institutions

## 1. Introduction

This paper provides the first broad sample evidence linking the capital structure of so-called "project finance" investments to various country-, industry-, syndicate-, firm- and project-specific factors identified in previous international business ("IB") research but never before applied to this large and increasingly important form of foreign direct investment ("FDI") in Asia. Empirical research on risk and investment in foreign countries by multinational corporations ("MNCs") has not been explored with great precision due to the inability to observe risk indicators tied to specific projects. Wholly-owned subsidiaries or cooperative FDI modes, often used by MNCs, pool local investment risks into their broader corporate portfolio. The study of project finance investments, in which a separate legal entity is created and financed by debt that is non-recourse to (bankruptcy-remote from) other assets of the sponsoring MNCs, permits the observation of multi-level sources of FDI risk that are uniquely tied to specific projects.

Asia provides an ideal setting for analyzing investment risk associated with project finance-based FDI. Asia has, perhaps, the longest experience with project finance-based FDI. IB researchers familiar with a classic teaching case of FDI and political risk in a decolonizing Papua New Guinea in the early 1970s, Bougainville Copper Ltd. (Hammond and Allan, 1974), may be surprised to learn that Bougainville Copper was itself a project finance structure sponsored by its Australian MNC parent, Rio Tinto. Since the mid-1990s, project finance has become the dominant segment of overall FDI in many Asian countries. Based on data collected from Thomson Financial (Thomson-SDC, 2006) and the World Bank (WDI, 2006) from 1995-2004 the US dollar value of announced project finance deals in the Philippines comprised 78 percent of all net FDI inflow to the country. In Indonesia over the same period, announced

project finance deal values amounted to virtually the entire dollar amount of all net FDI inflow. Project finance-based FDI is a worldwide phenomenon with historical roots and current dominance in Asia. Understanding project finance in Asia yesterday and today can tell us much about trends elsewhere in the world tomorrow.

We take a first step at studying how recent Asian experience with project finance can inform IB research about fundamental issues related to investment risk. Our study draws on Lessard's (1996) taxonomy of FDI risks to identify key determinants of project risk in a "target risk" framework with concentric rings of country-, industry-, syndicate and firm- as well as project-level risk factors. Using this framework, we predict that several factors in these concentric rings shape project risk assessments in Asia, including the (Asian) country where the project will be constructed and operated, the project industry, the size of the firm syndicate, the lead-sponsoring firm's country of domicile and previous project experience, and overall project size.

We investigate empirical support for our target risk framework predictions through empirical analyses of capital structure (debt-to-total project capital ratio) observed for 238 announced project finance deals worth more than $100 billion in 13 Asian countries from 1995-2004. Our empirical analyses largely confirm framework predictions. We observe higher leverage (debt-to-total capitalization) indicative of lower risk for announced investment projects: 1) in Asian countries with greater wealth, lower external debt, Anglo-American Common Law systems, stronger creditor rights, and faster adjudication of legal disputes; 2) when syndicate ownership is more concentrated (fewer firms); 3) when the lead sponsoring firm has previous Asian country and or industry experience; and 4) in smaller (lower cost) projects. In addition, we find significant differences in risk determinants for power generation industry projects compared to projects across all industries. Our results generally vindicate the promise of greater

precision in FDI risk assessment when researcher attention and methods focus on project-based FDI, particularly in Asia. This focus sharpens further when thinking about project risk at multiple levels, including more novel country-institutional and syndicate levels. Our results also point to several avenues for future research, including how and when lead sponsoring firm and broader syndicate experience may spill over industries and Asian countries for risk assessment purposes.

To make these points in greater detail and to discuss their implications for research and practice, we divide the remainder of this study into five sections. In Section 2, we describe project finance structures and practices, note key distinctions from other FDI modes, highlight how these distinctions aid research on investment risk, and highlight advantages of doing this research in an Asian context. In Section 3, we develop our target risk framework and related predictions linking country-, industry-, syndicate-, lead sponsoring firm-, and project-specific factors to their impact on project capital structure, our proxy for project risk. In Section 4, we explain data and methods used to test our predictions. In Section 5, we discuss multivariate regressions and related bivariate, non-parametric regressions of project capital structure on multi-level risk factors from our target risk framework. In Section 6, we conclude our study with a discussion of key findings and implications for scholars interested in moving forward within this novel and potentially rewarding stream of research analyzing risk and investment for the bulk of FDI in Asia today and elsewhere tomorrow.

## 2. Empirical Research Setting

*Defining and Distinguishing Project Finance as an FDI Mode*

We focus our investigation on a particular mode of FDI investment, most often referred to as project finance. This mode of FDI has grown dramatically over the last two decades, with a

compound annual increase of almost 20 percent during the 1990s, hitting $217 billion in 2001 (Esty, 2004). In project finance, a project company is formed as a separate legal entity owned by a single sponsoring firm or a syndicate of sponsoring firms. The essential features of a project company that make it attractive as a research setting are its organizational independence from the parent company and its financial transparency. Typically, local project companies are bankruptcy-remote from parent organizations sponsoring the project and all project stakeholders agree in advance to limit recourse only to project assets in the event of a dispute with sponsors or a failure of the project (John and John, 1991; Esty, 2004). The absence of recourse-debt allows MNCs to invest in large-scale, capital intensive projects by circumventing any existing debt covenants an MNC may have and by avoiding any subsequent risks associated with increasing amounts of debt on the MNC's corporate balance sheet. Also typically, project companies are focused on a single business and provide detailed disclosure of funding and performance information to otherwise skittish project stakeholders. These features contrast with other non project-based FDI modes where stakeholders may have legal recourse to the corporate asset profile of the parent MNC in the event of disputes or bankruptcy.

IB and related management research on risk and investment has largely ignored this distinction to date. Project-based FDI is used predominantly to finance large infrastructure projects in construction, transportation, energy generation and transmission, oil and gas exploration and refinery, telecommunications, and water and sewage. The financing structure used to govern the project is entirely unique to the project itself, where the debt and equity financing arrangements are independent from the balance sheets of the parent MNC sponsors. This unique organizational feature offers the opportunity to examine how various levels of risks affect the

financial governance of project companies. We have a "cleaner" setting to observe and analyze risk-related behavior in a project-based FDI context.

*Project Finance in Asia*

Project-based FDI is increasingly important around the world. But it has, perhaps, the longest history of use, the greatest current popularity, and the brightest prospects for expanded use in Asia. There, a confluence of trends is at work. Developing Asian countries have historically faced severe capital limitations mitigated only partially by family connections, clan membership, local bank capital, and intrusive but chronically under-funded state agencies. With deregulation and privatization in the 1980s and 1990s, a surge of much-needed infrastructure investment highlighted these limitations. In contrast to projects located in the United States and Western Europe, projects in many Asian countries face greater country-level risks due to these countries' political instability and weak regulatory and legal frameworks. But foreign project sponsors are nonetheless attracted by potentially high returns if only the down-side risk of occasional project failure or expropriation might be decreased. In this context, Asian project finance has surged over the last two decades.

Lang (1998) provides case studies of several Asian project-financed investments fitting this trend. We draw on one case study to illustrate key attributes of project-based FDI in Asia. The AES Pak Gen Project, a $US 349 million oil-fired power station located in the Punjab province and sponsored by the US MNC, AES Corporation, had its beginnings in the Pakistani government's 1993 invitation to foreign firms to create independent power projects in response to chronic power outages, particularly in rural areas. Initial financing for the AES Pak Gen project consisted of 28 percent equity and 72 percent debt. On the equity side, AES held about 25 percent share while the International Finance Corporation ("IFC"), a division of the World Bank, held the

remaining 3 percent. Debt financing comprising the other 72 percent of project capital came from loans provided by a syndicate of ten banks and the Export and Import Bank of Japan (JEXIM). The Bank of Tokyo, together with Deutsche Bank and Sanwa Bank, co-managed the lending syndicate. The estimated total project cost was $350 million.

Figure 1 outlines the essential characteristics of project finance and illustrates these components in the Pak Gen Project. AES Pak Gen Limited is organized as a separate project company, or "special purpose vehicle" ("SPV") owned by sponsors AES and the IFC. The bank syndicate supplies most of the capital to fund $350 million in construction and start-up operations. A 30-year concession with supply agreements committing Pakistani state energy agencies to buy power within pre-set quantity and price ranges mitigates market risks. Side agreements with Japanese construction firms and AES provide for specialized construction and operation expertise. The basic features of the Pak Gen Project, including a high concentration of equity ownership and principally non-recourse debt financing, is typical of project finance investments in Asia.

*** *Insert Figure 1 Approximately Here* ***

*Project Finance Capital Structure as a Risk Indicator*

The Pak Gen vignette suggests an important and transparent proxy for understanding risk and its determinants in a project finance context. Research in finance has a rich history investigating links between organizational risk and capital structure. Modigliani and Miller (1958) demonstrated that, in the absence of bankruptcy costs and tax subsidies, firm value is independent of its financial structure. But this seminal insight has prompted a generation of scholars to analyze the effects of taxes, bankruptcy risks and a host of other country-, industry-, firm- and specific product-factors shaping firm capital structure, particularly the split between equity and debt

capital.[1] Central to this work is an assumption that more risk to the firm threatens firm willingness and capability to service debt obligations. This, in turn, leads firms to have less debt as a percentage of total capital funding firm operations. Myers (1984) highlights this in discussing financial distress. Risky firms borrow less and depend more on equity-based capital.

Together, these insights suggest that risk and firm capital structure are closely linked, with higher (lower) risk leading to lower (higher) levels of debt as percentage of total capital. These insights also tell us that determinants of risk reflected in capital structure have multiple sources at multiple levels. There are country-, industry-, firm-, and even lower-level factors shaping risk related to a firm's operations. For our research on risk in project finance in Asia, these insights imply that project capital structure can be observed cleanly and partitioned based on these different sources. Esty (2002) draws this out in noting, for example, that projects located in countries with higher sovereign risk ratings and a better credit profile tend to have higher levels of project leverage –more debt as a percentage of total capital— indicative of lower overall risk. We follow Esty and others[2] by partitioning country-level factors even more finely than with simple risk ratings. Indeed, we can partition country-, industry-, syndicate-, lead sponsoring firm- and even project-specific sources for a detailed understanding of links to project leverage and, thus, project risk across Asian countries and projects.

## 3. Target Risk Framework and Determinants of Risk

*Target Risk Framework*

To identify and justify our list of risks affecting project capital structure, we draw on Lessard's (1996) taxonomy of FDI risks and define a project finance "target risk" framework.

[1] See*, e.g.,* Brealy and Myers (2006) for an overview of this research.
[2] Researchers have shown that determinants at other levels of analysis also shape organizational capital structure and risk. Capital structure, for example, is affected by the level of fixed assets and firm size (Harris and Raviv, 1991) in industrialized countries (Rajan and Zingales, 1995) as well as in developing countries (Booth, Aivazian, Demirguc-Kunt, and Maksimovic, 2001). Booth *et al*. (2001) find that country factors matter as much as firm-specific factors in explaining capital structure.

Lessard notes that offshore projects sponsored by MNCs reflect a host of risks, including broad macroeconomic and institutional risks commonly associated with the project's country or regional domicile, to mid-range risks related to industry characteristics, to more idiosyncratic risk factors linked to the project's size and ownership structure. Sources of risk identified by Lessard are re-iterated in finance and related business monographs (Finnerty, 1996; Lang, 1998; Buljevich and Park, 1999) and articles (Esty, 2002, 2003, 2004) focusing specifically on project finance. Figure 2 illustrates how we adapt Lessard's organizing logic to our project finance target risk framework. It is a set of concentric circles where each circle represents categories of risk from the broadest and most general (country) levels, to the narrowest and most specific (project) levels, and levels in between.

*** *Insert Figure 2 Approximately Here* ***

We propose that greater project risk originating from country-, industry, syndicate, lead sponsoring firm-, and or project-specific factors will be associated with lower project leverage. Hence, we examine the impact of risks on project leverage within each category or concentric ring. Figure 2 summarizes our predictions associated with risk factors within each concentric ring.

*Country-Level Determinants of Risk*

We work "from the outside in" of our target risk framework and begin with country-level risks. Country-level institutional and economic factors have clear links to investment risk documented by researchers across the social sciences. Researchers in law and finance, for example, have found that countries with Anglo-American Common Law legal institutions provide better investment protection, both to creditors and to shareholders, than do countries with Continental European Civil-Law institutions (LaPorta, Lopez-de-Silanes, Shleifer, and Vishny, 1998). Common Law principles originating in England rely substantially on judicial precedents to resolve legal

disputes as opposed to explicit codes enunciated occasionally by legislators or enforced by executives or bureaucrats. Thus, Common Law nurtures the organic evolution of practical heuristics enforced by politically independent decision-makers. A general consensus among legal scholars (Reynolds and Flores, 1983, 2003; Coffee, 1999; Ribstein, 2005) endorses Common Law over Civil Law institutions for creditor and investor protection purposes. Applied to our context, we predict that projects located in Common Law countries will exhibit higher leverage indicative of lower risk than similar projects located in Civil Law countries (Hypothesis 1).

Differences in legal system may matter for project risk and capital structure, but so might the norms of enforcement –rule of law—no matter the system involved. This logic follows from institutional economics and legal perspectives that focus more on norms of respect and enforcement for law and law enforcers rather than what laws may actually be "on the books" (Liebcap, 1989; North, 1990). In this study, we investigate three institutional factors which previous theory, empirical research and intuition suggest have a substantial impact on project risk, and therefore, leverage. They include strength of creditor rights, law enforcement rates, and integrity of the legal system.

We expect that the host-country creditor rights are likely to have a substantial impact on project risk reflected in project leverage. La Porta and colleagues (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998), for example, show that creditor rights vary substantially across countries. Some countries permit creditors to foreclose on borrower assets easily, while other countries make it all but impossible even though foreclosure laws are on the books in both countries. We expect that projects located in countries with strong creditor protection will have higher leverage indicative of lower risk (Hypothesis 2).

We also expect that speed of enforcement in contract disputes will also affect project risk reflected in project leverage. Again, we derive our insight from the law and finance literature (La Porta *et. al*., 1998; Shleifer, 2003; Djankov, McLiesh, and Schleifer, 2006). Djankov and his colleagues (Djankov *et al*., 2006), for example, document a positive relationship between the ease of enforcing debt contracts in breach and a country's level of private credit. They measure enforcement as the number of days required to settle a debt contract and measure private credit as the ratio of a country's private credit claims from commercial banks and other financial institutions to the country's GDP. Projects located in countries with faster enforcement will exhibit lower risk reflected in higher leverage (Hypothesis 3).

The general level of integrity and respect for law is also likely to matter for risk and capital structure in investment projects. Pistor and her colleagues (Pistor, Raiser and Gelfer, 2000) construct a legal enforcement index based on survey data for transition countries. In a sample of 22 Central and Eastern European "transition" countries from 1994-1998 their regression analyses suggest that private credit availability is explained substantially by the level of respect for rule of law and law enforcement officials. Hadfield (2005) echoes these points in holding that investor protection across the non-industrialized world is reliant on basic institutional concerns about the quality of judicial norms of practice and the transparency of legal dispute resolution processes. Based on such logic and evidence, we predict that projects located in countries with stronger law and order will exhibit less risk reflected in higher leverage (Hypothesis 4).

The economic environment of a particular host country may also influence project risks. Credit rating agencies such as Moody's and Standard and Poor's assign sovereign ratings gauging the ability and willingness of governments –and by implication, other sub-sovereign

businesses and individuals—to honor their financial obligations. These ratings are important because private companies or other institutions within a particular country are unlikely to receive credit ratings higher than the sovereign rating of the country in which they are domiciled, and thus credit ratings are indicative of a country's attractiveness for lending and investment. Cantor and Packer (1996), Vaaler, Schrage, and Block (2006) and others have shown that these sovereign risk assessments improve for countries with larger economic size (GDP), lower inflation, low (but not extremely low) external debt levels, and greater wealth. These regularities provide the basis for four new predictions linking project risk and leverage to country-level economic factors. Project risk will decrease (leverage increase) in countries with: larger economic size (Hypothesis 5), lower inflation (Hypothesis 6), low (but not extremely low) external debt (Hypothesis 7) and greater wealth (Hypothesis 8).

*Industry-, Syndicate/Sponsor-, and Project-level Risk Determinants*

On our target risk framework, we move now from the outermost ring to inner rings. In the process, our risk categories become increasingly specific to the project and its sponsors. Industry (within country) characteristics may also matter for project risk and leverage. Extensive evidence indicates that leverage varies across industries (Harris and Raviv, 1991), due in large part to differences in the tangibility of assets. Williamson (1988) treats debt and equity not only as alternative financial arrangements but also as alternative governance structures and argues that each type of financing is dependent upon the nature of the assets, where debt should be used for assets that are largely re-deployable. This logic partly explains higher debt levels found in project finance across all industries, since project finance is used for large infrastructure projects that have highly re-deployable and highly tangible assets. But leverage differs within countries across industries. Differences in industry betas within countries (Lessard, 1996) testify to this, and

suggest that project risk and leverage will differ as well. We make no formal predictions regarding trends increasing or decreasing risk in particular industries. Rather, we engage in an exploratory analysis of differences in leverage and leverage determinants for energy generation and transmission projects compared to the total sample from all industries.

Moving further toward the target of our framework, we arrive at the next ring representing project syndicate and lead sponsoring firm factors. Project finance investments are characterized by highly-concentrated equity ownership, with a syndicate of typically two or three sponsoring shareholders (Esty, 2004). Esty and Megginson (2003) suggest that the tendency toward more concentrated ownership and smaller syndicates is reduced agency costs through better incentives alignment and oversight of managers by owners with a larger stake in its success (Jensen and Meckling, 1976). Thus, we predict that project risk is reduced as project ownership concentrates in syndicates of decreasing size (Hypothesis 9). We note that this agency-based prediction competes with another view also raised by Esty and Megginson (2003) in the related context of bank lending syndicate size and risk. They conjecture that larger size syndicates permit broader risk-sharing, which in turn, permits more lending in riskier countries. Applied to project finance, their alternative logic implies that larger (not smaller) equity syndicate membership decreases project risk.

Our target risk framework also takes into account differences in firms leading the syndicate. Previous country and or industry experience has long been shown to affect an MNC's investment strategy decisions and performance. Previous host country experience can provide a lead sponsoring firm with crucial market knowledge (Johanson and Vahlne, 1977). It can affect an MNC's decision about whether and where to locate operations overseas (Henisz and Delios, 2001), and influence overseas operation survival and profitability (Shaver, Mitchell, and Yeung,

1997; Luo and Peng, 1999). Previous host country experience also helps a firm overcome its inherent liability of foreignness (Zaheer, 1995). Henisz and Delios (2004) suggest that firms benefit not only from informational benefits accrued from experience but also from the ability to influence the surrounding environment. This literature suggests that a sponsor's host country experience may mitigate some of the uncertainties and risks involved in a new project in the same host country. We, therefore, expect that projects led by sponsors with previous project finance experience in the host country or in the industry or both will have less risk reflected in higher leverage (Hypothesis 10). Furthermore, we predict higher project risk and lower leverage when the lead sponsor is foreign (Hypothesis 11).

Finally, idiosyncratic project-specific attributes may matter for risk assessment and project capital structure. We are now in the inner-most circle of our target risk framework. One project-specific factor, project size, is likely to matter for risk purposes. Larger projects represent harder-to-reverse commitments (Ghemewat, 1991) if poorly planned and or executed. By implication, smaller-sized projects are also easier to reverse or liquidate. Thus, we predict that larger projects will have lower leverage indicative of higher overall project risk (Hypothesis 12).

## 4. Empirical Methodology

*Empirical Equation Terms*

To investigate evidence related to these 12 predictions derived from our target risk framework, we define the following equation for estimation:

$$\begin{aligned} Leverage_{ijklt} &= \beta_0 + \sum_{m=1}^{4} \beta_{1-4} HostCountryInst_l \\ &+ \sum_{n=1}^{5} \beta_{5-9} MacroEconomic_{lt} + \beta_{10} SyndicateOwnership_{ijklt} \\ &+ \beta_{11} SponsorExperience_{ijklt} + \beta_{12} Foreign_{ijklt} + \beta_{13} Cost_{ijklt} + \varepsilon_{ijklt} \end{aligned} \quad (1)$$

In Equation (1), L*everage* is our dependent variable and measures the ratio of debt to total capital invested in project company *i,* sponsored by syndicate *j* with lead sponsoring firm *k,* located in country *l*, and first announced in year *t*.

We then specify several right-hand-side variables to explain *Leverage* consistent with our target risk framework development immediately above. The expected signs for these 13 right-hand-side variables are given in Figure 2 and in parentheses below. Again, proceeding from the outermost to innermost concentric rings, we start with four *HostCountryInst* ($\beta_1$-$\beta_4$) country variables *l* familiar to law and finance research linking differences in cross-country economic phenomena to cross-country institutional differences (La Porta *et al.*, 1998; Djankov, La Porta, Lopez-de-Silanes and Shleifer, 2003; Djankov *et a*l., 2006). Measures for these four terms are fixed over years *t*, and include:

- *Common Law* ($\beta_1$) (+): This is a dummy variable that equals 1 if the host country *l* has a Common Law legal system and equals 0 if it has a Civil Law system. *Common Law* is expected to be positively related to *Leverage* indicative of lower project risk.

- *Creditor Rights* ($\beta_2$) (+): This is an aggregate index measure running from 0 (weak creditor rights) to 4 (strong creditor rights) for each host country *l*. *Creditor Rights* is expected to be positively related to *Leverage* indicative of lower project risk.

- *Enforce* ($\beta_3$) (-): This is the natural log of the number of days to resolve a payment dispute through the courts for each host country *l.* *Enforce* is expected to be negatively related to *Leverage* indicative of higher project risk.

- *Law and Order* ($\beta_4$) (+): This is a measure of the integrity of the legal system for each host country *l*, a 10 point scale, with a higher number indicating greater integrity. *Law and Order* is expected to be positively related to *Leverage* indicative of lower project risk.

Next, we include five *MacroEconomic* ($\beta_5$-$\beta_9$) country variables *l* familiar to international economics (Cantor and Packer, 1996) and business (Vaaler and McNamara, 2004; Vaaler *et al*., 2006) research linking differences in cross-country lending and investment risk to cross-country macroeconomic differences. These five terms include four which can and do vary over years *t*.

We assume that project company sponsors weigh both current year t and previous year t-1 information on each macro-economic term l, thus we use two year moving averages in years *t* and *t-1*. These four macro-economic terms include:

- *Log GDP* ($\beta_5$) (+): This is the two-year moving average of the natural log of the gross domestic product (GDP) in current $US of host country *l*. *Log GDP* is expected to be positively related to *Leverage* indicative of lower project risk.

- *Inflation* ($\beta_6$) (-): This is the two year moving average annual percentage change in consumer prices in host country *l*. *Inflation* is expected to be negatively related to *Leverage* indicative of higher project risk.

- *External Debt* ($\beta_7$) (-): This is the two year moving average sum of public, publicly guaranteed, and private non-guaranteed long-term debt, use of IMF credit, and short-term debt divided by GDP for host country *l*. *External Debt* is expected to be negatively related to *Leverage* indicative of higher project risk.

- *External Debt Squared* ($\beta_8$) (-): This is the squared value of *External Debt* for country *l* in year *t*. It permits investigation of possible non-linear (quadratic) effects. *External Debt Squared* to be negatively related to *Leverage* at average and higher levels of *External Debt* indicative of higher project risk at average and higher levels.

A fifth macroeconomic term is a 0-1 dummy related to differences in country *l* wealth. It does not vary across years *t*:

- *Rich Host Country* ($\beta_9$) (+): This is a dummy variable that equals 1 if the host country *l* is either Australia, New Zealand, Japan, Hong Kong, or Singapore. *Rich Host Country* is expected to be positively related to *Leverage* indicative of lower project risk.

We move inward on our target risk framework to include variables related to project syndicate *j*. A tenth right-hand-side variable, *SyndicateOwnership* ($\beta_{10}$) (+) is measured as the Herfindahl index of equity ownership by all equity sponsors in the syndicate *j* for project *i* in country *l* in year *t*. We sum the square of each sponsor equity share in the syndicate to arrive at a number between 1 (where there is a sole sponsor) and nearly 0 (where the syndicate is large and ownership diffuse). In line with our agency-based view of risk and syndicate size, we expect that *SyndicateOwnership* will be positively related to *Leverage* indicative of lower project risk.

An eleventh variable, *SponsorExperience* ($\beta_{11}$) (+) is a dummy variable that equals 1 if the lead syndicate member *k* (defined by largest equity interest) in syndicate *j* for project *i* in country *l* in year *t* has previously been in a similar project syndicate. We define similarity first based on whether the lead sponsor has previously been a part of a project syndicate in the same industry within the same country. We also explore alternative definitions that are less specific – previous syndicate membership within the same country (no matter the industry), or previous syndicate membership in the same industry (no matter the country). For any of these formulations *SponsorExperience* is expected to be positively related to *Leverage* indicative of lower project risk. A twelfth variable, *Foreign* ($\beta_{12}$) (-) is a dummy variable equaling 1 when the parent firm of the lead sponsor *k* is domiciled outside the project host country. This term can and does vary across projects *i*, syndicates *j*, countries *l* and years *t*. *Foreign* is expected to be negatively related to *Leverage* indicative of higher project risk.[3]

At the center of our target risk framework, are project-specific factors. We include a thirteenth right-hand-side term for that innermost category, *Cost* ($\beta_{13}$) (-), which is the natural logarithm of the total project cost in $US millions for project company *i* sponsored by syndicate *j* and lead sponsor firm *k* in country *l* in year *t*. *Cost* is expected to be negatively related to *Leverage* indicative of higher project risk.

*Estimation Strategy*

We are estimating a cross-section of project *Leverage* measures on several right-hand-side terms differing primarily across countries but also syndicate structure, lead sponsor characteristics, project size and even industry differences. Accordingly, we rely primarily on a generalized least squares ("GLS") estimator with clustering on countries. The clustering

[3] Where project equity is split equally between a foreign and domestic sponsor, we code the observation as 0 indicative of domestic lead sponsorship.

adjustment uses robust (wider) standard errors and deals with possible lack of independence among the error terms due to unobserved effects that may be unique to a particular host country.

*Leverage* measures range from 19 –meaning that 19 percent of total capital is debt-- to approximately 100 with a mean of approximately 75. Several observations are very near 100, the highest value *Leverage* can take.[4] Thus, we have the possibility of right (upper-limit) censoring on the dependent variable that could bias estimates. To investigate that possibility, we also use an alternative Tobit estimator to check the consistency of results obtained from GLS estimation. Tobit estimation does not permit clustering adjustments, thus we trade precision in treatment of standard errors for greater confidence in coefficient estimate magnitude and sign whether indeed there is censoring-related bias.

Finally, we implement several non-parametric bivariate analyses described as locally weighted scatter plot smoother ("Lowess") estimations. Lowess analyses compute linear regressions around each observation, $x_{ijklt}$, with neighborhood observations chosen within some sampling bandwidth and weighted by a tri-cubic function. Based on the estimated regression parameters, $y_{ijklt}$ values of *Leverage* are computed. These $x$, $y$ combinations are then connected yielding a Lowess curve. A higher bandwidth results in a smoother Lowess curve. We use the Lowess estimator to examine in detail specific bivariate relationships between Leverage and key right-hand-side variables across the broad sample, and for a sub-sample drawn from the power generation industry only. GLS, Tobit and Lowess estimations are performed with Stata Version 9.0 (StataCorp, 2005) using the commands "reg" (with "cluster" option) and "tobit" and "lowess" respectively.

[4] Projects occasionally begin with approximately 100 percent debt-capitalization. In these cases, the nominal equity sponsor or sponsors are also temporarily substantial project creditors.

*Data Sources and Sampling*

Data for our sample come from several sources. Our primary source is the Thomson-SDC Project Investment on-line database (Thomson-SDC, 2006). This database provides information on specific project financed investments, or project companies, across a large number of industries and countries. Some of the variables specific to our study include the announced date of the project, the country where the project is located, the industry or sector of the project, the size of the project (cost), the capital structure of the project, the distribution of the original equity ownership of the project, the parent firms of the sponsors, and the home nation of the sponsor and sponsor parent firms. From this primary source, we identify 238 projects announced from 1995-2004 for 13 Asian countries with complete data for all terms in our empirical equation.[5] All information for our dependent variable, *Leverage*, and our right-hand-side terms, *SyndicateOwnership*, *SponsorExperience*, *Foreign* and *Cost*, come from Thomson-SDC.

Data for the *Common Law* term comes from La Porta *et al.* (1998), while the source for *Creditor Rights* and *Enforce* come from Djankov *et al.* (2006). Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2003) provide measures for *Law and Order*. The World Bank's World Development Indicators ("WDI") provide data on country and year-specific macroeconomic variables *Log GDP*, *Inflation*, *External Debt* and *External Debt Squared*.

## 5. Results

*Descriptive Statistics and Pair-Wise Correlations*

Descriptive statistics and correlations for our sample of 238 projects are reported in Table 1. They largely follow intuition. Again, the mean value of *Leverage* is 75.02. On average,

[5] Those 13 countries are: Australia, Azerbaijan, Bengladesh, China (PRC), Hong Kong, India, Indonesia, Japan, New Zealand, Pakistan, Philippines, Singapore and South Korea.

projects located in Asian countries from 1995-2004 are financed about 75 percent by debt and 25 percent by equity. This sample mean compares well to Esty (2002), who notes 70 percent average leverage in a global sample of projects announced during the 1990s. The 0.67 sample mean for *Common Law* indicates that about 67 percent of our projects are located in host countries with a Common Law legal system. This percentage is substantially higher than in other regions of the world where British colonial heritage and lingering cultural and economic interests had less influence.

*** *Insert Table 1 Approximately Here* ***

The 0.69 sample mean for *Syndicate Ownership* follows from Herfindahl calculations where there are typically only two or three sponsors and one is dominant as the lead sponsor. *Sponsor Experience* of 0.39 tells us that this lead sponsor has previous experience as a member of a project syndicate in country *i* in the same industry in only 39 percent of the projects sampled. Even in Asia where project-based FDI has the longest history, we find that most of the lead sponsors in our sample have never before participated in a project syndicate. We attribute this to Asian privatization policy trends in the 1990s that opened up new industry segments to foreign project investment and investors for the first time. The 0.33 sample mean value of *Foreign* indicates that for about 33 percent of the projects, the parent of the largest equity shareholder is foreign. Of course, many projects include foreign syndicate members other than the lead sponsor. In our sample, the average foreign ownership as a percentage of total ownership is 41 percent. Again, our *Foreign* dummy captures foreign project *leadership*, not merely participation. *Log Project Cost* ($US million) has a mean value of 5.58. The average project cost is $US 545 million and the total cost for the 238 projects in our sample is $US 130 billion.

*Regression Results*

With this descriptive background, we next turn to results from multivariate analyses in Table 2. Overall results support predictions derived from our target risk framework. The first three columns of Table 2 report GLS estimations using alternative definitions of *SponsorExperience*. In Column 1, the dummy equals 1 when the lead sponsor has previously been a member of a project syndicate in the same industry within the same country. In Column 2 we broaden *SponsorExperience* so that the dummy equals 1 as long as the lead sponsor has been a member of a project syndicate in any industry within the country. In Column 3, *SponsorExperience* is one as long as the lead sponsor has previously been a member of a project syndicate in the same industry, no matter the country.

Results from GLS estimation in all three columns are consistent and substantially in line with our framework. Three country-level institutional variables, *CommonLaw*, *Creditor Rights*, and *Enforce*, exhibit predicted signs and are statistically significant either at 10 percent or higher levels. Results in Columns 1-3 suggest, for example, that *Leverage* increases approximately 10 percentage points for projects located in *Common Law* countries of Asia. Again, higher leverage indicates lower overall project risk. Similarly, we find positive signs on coefficients for *Creditor Rights* and negative signs on coefficients for *Enforce*, both in line with framework predictions and statistically significant at 10% or higher levels. If creditor rights are stronger, they are more willing to lend to projects. If time to enforce their rights increases, they are less willing to lend to projects located in Asian countries. These results support Hypotheses 1-3 derived from our target risk framework

Only *Law and Order* exhibits a contradictory sign compared to prediction in Hypothesis 4. Increasing respect for the legal system and its enforcers in country *i* decreases *Leverage* indicative

of greater project risk. We note that *Law and Order* exhibits higher pair-wise correlations with *Common Law*, *Creditor Rights*, and *Enforce*. We conjecture that these three terms are picking up effects that might otherwise pool into *Law and Order*. Indeed, dropping *Law and Order* from our estimation does not change results for these other three institutional terms.

*** *Insert Table 2 Approximately Here* ***

Four of our five country macroeconomic variables exhibit signs predicted by our framework. *Log GDP* is consistently positive and significant at the 5 percent level in support of Hypothesis 5 derived from our framework. Asian countries with larger economic size attract projects with more leverage and less risk. *Inflation* exhibits the predicted negative sign, but is not significant at commonly acceptable levels of support for Hypothesis 6. But *Rich Host Country* is positive and significant in Columns 2-3 at the 10 percent level consistent with Hypothesis 8. Projects in Australia, New Zealand, Japan, Hong Kong, or Singapore, industrialized exceptions to a developing region rule, tend to have higher leverage and lower overall risk.

That leaves *External Debt* and *External Debt Squared*, for which we predict negative signs in Hypothesis 7. Only *External Debt Squared* exhibits the predicted negative sign at 5 percent or higher levels of significance. By contrast, the linear term, *External Debt* is positive (not negative) and significant. We can reconcile this apparent contradiction by interpreting these two terms together. At low levels, a little more external debt may be good for country investment generally and project investment in particular. Increasing external debt represents an "opening up" of current and capital accounts beneficial to foreign investment including project-based FDI. But at higher levels captured by the quadratic term, *External Debt Squared*, the benefits of liberalization increase less, and concerns about illiquidity and default increase.

Together, we see some support for Hypothesis 7, though it is less clear than for *Log GDP* or *Rich Country*.

Coefficients on syndicate, lead sponsor and project-specific terms also indicate support for our target risk framework. *SyndicateOwnership* is positive and significant at the 1 percent level across Columns 1-3 in support of Hypothesis 9. This is consistent with our agency view emphasizing the importance of alignment and oversight incentives rather than an alternative risk-spreading logic we also noted above. *Leverage* increases and project risk decreases with smaller syndicate size. *SponsorExperience* is also positive and significant at 10 percent or higher levels, no matter how we measure previous lead sponsor experience. *Leverage* increases from approximately four to five percentage points in Columns 1-3 consistent with Hypothesis 10. By contrast, the *Foreign* nationality of a lead sponsor does not appear to influence risk as reflected in project capital structure. This lack of support for Hypothesis 11 could mean that there is no significant liability of foreignness to incur in Asian project finance. On the other hand, Makino and Beamish (1998) note that certain developing countries, including Asian countries in our sample, have foreign ownership restrictions that could confound our examination of ownership and project risk. Finally, we note that *Log Project Cost* has the negative sign and significance at 10 percent or higher levels consistent with Hypothesis 12. Larger projects are more risky commitments and have lower leverage. Thus, we find support at commonly acceptable statistical levels for nine of the 12 hypotheses derived from our target risk framework.

These results are largely confirmed in Column 4 where we list results from Tobit estimation. We have *Leverage* measures of approximately 100 for 59 of the 238 projects, thus there is concern that right-hand (upper-limit) censoring is biasing our GLS estimates. But results in Column 4 are largely consistent with GLS estimates in Columns 1-3, though levels of

significance may be lower most likely because of the inability to cluster as with GLS estimations. Possible censoring on the dependent variable is unlikely to have biased our estimates, thus providing even more support for our target risk framework explaining risk in Asian project finance.

We also seek an understanding of possible industry effects on *Leverage* and thus risk. We gain that understanding in Column 5 of Table 2. There, we implement another GLS estimation but include a 0-1 dummy that takes the value of one for all projects listed by Thomson-SDC as being in the "Power" industry. That dummy is interacted with each of the terms in our equation to understand how the impact of these terms may differ, if at all in the case of power projects. Interaction results vary. Six right-hand-side interaction terms differ significantly in effect on *Leverage* in the power industry. *Power* dummy interactions with *Creditor Rights* (8.28, $p < 0.01$), *Law and Order* (8.47, $p < 0.05$), *Inflation* (0.77, $p < 0.10$), *External Debt* (116.90, $p < 0.01$), and *External Debt Squared* (-102.27, $p < 0.01$) are all significantly more positive than their effects on *Leverage* in other industry settings. External Debt and its quadratic interaction terms exhibit particularly large point estimates. Indeed, near maximum levels of *External Debt* (1.33), the net effect of linear and squared terms becomes negative, indicating that concerns of illiquidity and default are, perhaps, more acute in power than in other industry settings where governments are less important as consumers and regulators of project activities. A similar conjecture may explain the significantly more negative effect on *Leverage* for power projects in rich host countries. When *Power*Rich Host Country* equals 1, *Leverage* decreases by approximately 37 percent (-36.99, $p < 0.01$), indicating substantially greater project risk.

*Graphical Illustrations*

Lowess analyses provide helpful graphical complements to the multivariate analyses summarized above. They illustrate non-parametric relationships between *Leverage* and several key right-hand-side variables in Figures 2A, 2B, 3A, and 3B. Figures 2A and 2B illustrate the relationship between *Leverage* and *Log Project Cost* for our entire sample (2A) and for power projects only (2B). Consistent with Hypothesis 12, we see clear negative trends in both figures, with a more pronounced dip for power projects. Again, this is consistent with the greater commitment and risk involved in power projects, particularly in developing countries of Asia.

**** Insert Figures 2A and 2B Approximately Here ****

Figures 3A and 3B illustrate the relationship between *Leverage* and *Creditor Rights* for our entire sample (3A) and for power projects only (3B). Now the trend in both figures is positive, consistent with Hypothesis 2 again. For the entire sample (3A), *Leverage* increases from about 70 to 80 percent as *Creditor Rights* strengthen from 2 to 3. For power projects, the same strengthening in *Creditor Rights* increases *Leverage* slightly above 80 percent, again indicating greater sensitivity in power to changes in project risk. Together, our Lowess analyses confirm earlier GLS and Tobit results and broaden support for our target risk framework explaining Asian project finance risk and capital structure. Country-, industry-, syndicate-, lead sponsoring firm- and project-related factors all shape project risk perceptions and capital structure responses.

**** Insert Figures 2A and 2B Approximately Here ****

## 6. Discussion and Conclusion

*Key Findings*

And this is probably the key finding from our study. Project finance is a relatively novel organizational structure that offers advantages for studying risks associated with FDI because

project companies are naturally occurring organizational forms where the financial structure is unique to the project itself. When studying FDI risk with non project-based wholly-owned subsidiaries and cooperative ventures, it is difficult to tease out risks specific to the local operation from those covered by the local operation's parent MNC. The empirical setting of project finance therefore offers great advantages to IB and related management research aimed at studying FDI risk and its determinants "cleanly". Taking advantage of this empirical setting will pay increasing dividends, since project finance represents a large and increasing percentage of FDI in many Asian countries.

Our results demonstrate that project risk exists at multiple levels. Factors from some levels may matter more than factors from other levels. Country institutional factors matter substantially more than others. *Leverage* for projects located in countries with Common Law systems increases by 10 percentage points. Differences in legal systems matter substantially more than differences, say, in country economic factors such as *Inflation*, or in lead sponsor factors such as *Sponsor Experience*.

Results for *SyndicateOwnership* and *SponsorExperience* indicate significant influence on project capital structure and risk. Projects with more concentrated syndicates and lead sponsors with previous experience both saw higher *Leverage* and reduced risk. But we propose caution in interpretation of such results about this particular finding as lead sponsor experience and syndicate size may be endogenous factors determined by potential sponsors simultaneously. We also note that our measure of previous experience focused on the lead sponsor. We found statistically significant and practically substantial effects on *Leverage* and project risk. But experience by and among *all* syndicate members may also matter, a conjecture we think worthy of future research.

*Implications for Future Research*

Indeed, we see several promising avenues for future research on Asian project finance organization, strategy and risk. Exploration of syndicate structure and characteristics beyond mere size and diffusion of ownership holds tremendous potential for understanding more clearly and deeply project company organization and strategy. Collective syndicate experience, foreignness and familiarity are all likely to matter for how the project is capitalized and what that means for project risk. Previous syndicate "success" at constructing and operating a project may matter more than mere experience. The syndicate unit of analysis is new to IB and related management research. It is neither an alliance nor a network nor other cooperative form of doing business that previous management researchers have previously encountered. It is *terra incognita* that Asian project finance may help us finally explore. Since this FDI form accounts literally for US$ billions in Asian economic activity, there is some practical urgency in this call for exploration.

Our study included only one project-specific factor in explaining *Leverage*, project size. Surely, IB and broader management research can and should uncover other project-specific factors to join size. We think there is great potential value in looking more deeply into the distinct patterns of contracting that link different sponsors, creditors, suppliers, management, employees and communities to the project company. This sort of research extension is unlikely to begin with large-sample statistical studies as we have just executed. The next logical step is thick descriptive case study of two or three recent Asia projects and the contracts that link various Asian project players. Indeed, a broader research agenda for project finance in Asia should include substantial qualitative work complementing broad sample quantitative studies. That way, the Asian past and present experience with project finance can continue to inform future research both for that continent and the broader global economy of which it is a substantial and growing part.

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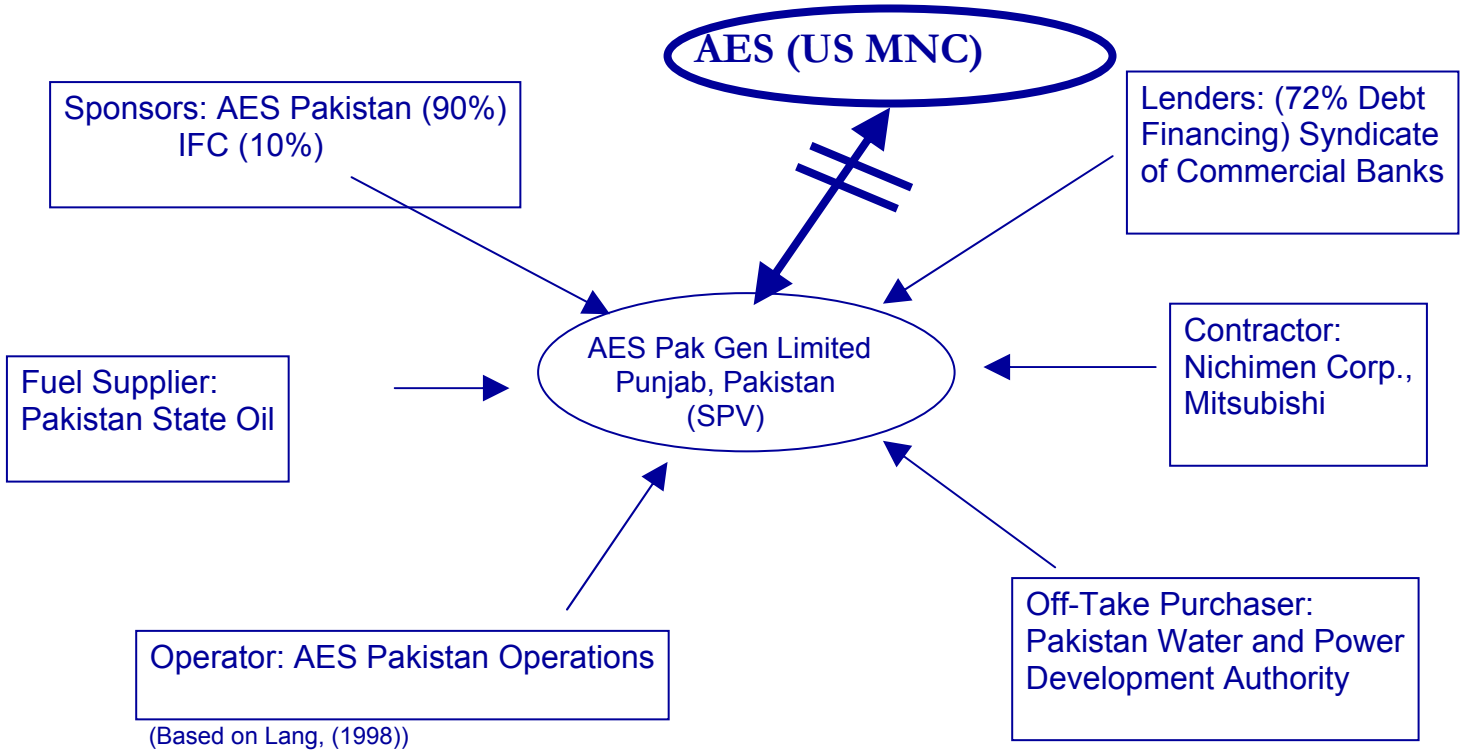
**FIGURE 1**

**AES Pak Gen Project Structure**




(Based on Lang, (1998))

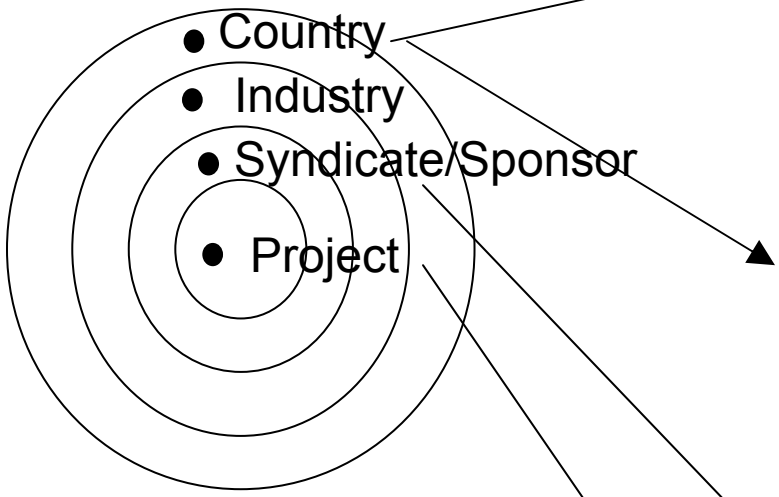
**FIGURE 1 (Continued)**

**AES Pak Gen Project Structure**

| **Classic Project Finance Characteristics** | **Example: AES Pak Gen Project**<br>Province of Punjab, Pakistan: 365 MW Oil-Fired Power Station, Total Cost: $350 Million |
|---|---|
| 1.) Project company legally separated from sponsor firms (equity shareholders) | 1.) AES Pak Gen Limited |
| 2.) Small syndicate of sponsors (equity shareholders) | 2.) AES (U.S. MNC): 90%<br>International Finance Corp: 10% |
| 3.) Bankruptcy-remote debt financing by syndicate of primarily foreign commercial banks | 3.) Syndicate of 10 commercial banks and Export and Import Bank of Japan (JEXIM) provided loans to project company bankruptcy remote to AES' remaining corporate assets |
| 4.) Highly leveraged | 4.) Debt financing: 72%<br>Equity financing: 28% |
| 5.) Limited life projects | 5.) 30 year concession agreement with Government of Pakistan |
| 6.) Extensive contracting relationships | 6.) a.) 30 year input supply agreement with Pakistan State Oil Company<br>b.) 30 year off-take power purchase agreement with Pakistan Water and Power Development Authority<br>c.) EPC agreement with Japanese contractor<br>d.) Operation agreement with AES |

**FIGURE 2**

**Target Risk Framework and Summary of Predictions**




| Risk Factors (Hypothesis Number) | Prediction: Relationship to Project Leverage |
|---|---|
| ***Country Level (Inst):*** | |
| (1) Common Law | + |
| (2) Creditor Rights | + |
| (3) Enforce | + |
| (4) Law and Order | + |
| ***Country Level (Econ):*** | |
| (5) Log GDP | + |
| (6) Inflation | - |
| (7) External Debt | - |
| (8) Rich Host Country | + |
| ***Syndicate/Sponsor Level:*** | |
| (9) Syn Ownership | + |
| (10) Sp Experience | + |
| (11) Sp Foreign | - |
| ***Project Level:*** | |
| (12) Log Project Cost | - |

## TABLE 1

## Descriptive Statistics and Pair-Wise Correlations

| Variables | Mean | Std. Dev. | Min. | Max. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. *Leverage* (Dep. Var.) | 75.02 | 18.50 | 19 | 100 | 1.00 | | | | | | | | | | | | | |
| 2. *Common Law* | 0.67 | 0.47 | 0 | 1 | .19 | 1.00 | | | | | | | | | | | | |
| 3. *Creditor Rights* | 2.56 | 0.71 | 1 | 4 | .23 | .43 | 1.00 | | | | | | | | | | | |
| *4. Enforce* | 5.58 | 0.57 | 3.91 | 6.35 | -.16 | -.42 | -.46 | 1.00 | | | | | | | | | | |
| *5. Law and Order* | 7.01 | 2.51 | 3.33 | 10 | .20 | .63 | .51 | -.82 | 1.00 | | | | | | | | | |
| *6. Log GDP ($US)* | 26.24 | 0.89 | 23.46 | 28.21 | .05 | -.21 | -.07 | -.16 | .38 | 1.00 | | | | | | | | |
| *7. Inflation* | 6.29 | 6.19 | -3.84 | 39.44 | -.20 | -.45 | -.45 | .51 | -.48 | -.04 | 1.00 | | | | | | | |
| *8. External Debt* | 0.41 | 0.21 | 0.10 | 1.33 | .08 | -.16 | -.02 | .44 | -.39 | -.46 | .33 | 1.00 | | | | | | |
| *9. External Debt Squared* | 0.21 | 0.24 | 0.01 | 1.77 | .02 | -.26 | -.09 | .42 | -.39 | -.37 | .50 | .94 | 1.00 | | | | | |
| *10. Rich Host Country* | 0.36 | 0.48 | 0 | 1 | .25 | .52 | .62 | -.82 | .83 | .15 | -.51 | -.19 | -.23 | 1.00 | | | | |
| *11. Syndicate Ownership* (Herf index) | 0.69 | 0.28 | 0.17 | 1 | .26 | .02 | .04 | -.07 | .07 | .09 | -.06 | .15 | .14 | .11 | 1.00 | | | |
| *12. Sponsor Experience* | 0.39 | 0.49 | 0 | 1 | .14 | .01 | .03 | .00 | .07 | .15 | -.01 | .03 | .05 | .08 | .01 | 1.00 | | |
| *13. Foreign* | 0.33 | 0.47 | 0 | 1 | -.03 | .07 | -.01 | -.15 | .12 | -.02 | -.03 | -.01 | .00 | .13 | -.01 | .03 | 1.00 | |
| 14. *Log Project Cost ($US)* | 5.58 | 1.30 | 1.39 | 8.56 | -.12 | -.05 | .09 | .04 | -.06 | -.01 | .01 | .03 | .03 | .01 | -.14 | .18 | -.01 | 1.00 |

*N* = 238.
Correlations greater than .11 or less than -.11 are significant at 10% level ($p < 0.10$) (one-tailed test).
Correlations greater than .14 or less than -.14 are significant at 5% level ($p < 0.05$) (one-tailed test).
Correlations greater than .18 or less than -.18 are significant at 1% level ($p < 0.01$) (one-tailed test)

# TABLE 2

## Regression Results: Leverage for All Projects Announced in Asian Countries, 1995–2004

| Empirical Models And Estimators→ | (1) (Experience is Industry in Country) | (2) (Experience is Country) | (3) (Experience is Industry) | (4) (56 right censored obs) | (5) (Experience is Country and Industry) |
|---|---|---|---|---|---|
| **Variables ↓** | **GLS** | **GLS** | **GLS** | **Tobit regression** | **GLS** |
| Constant | -35.41 | -47.70 | -50.22 | -58.66 | -134.01 |
| | (44.09) | (45.61) | (43.40) | (67.67) | (45.27 |
| Common Law | 10.14* | 10.70* | 10.76* | 12.47† | 24.05** |
| | (3.91) | (4.09) | (3.90) | (6.82) | (5.87) |
| Creditor Rights | 2.67† | 2.75† | 2.84† | 3.25 | -1.40 |
| | (1.48) | (1.54) | (1.48) | (2.64) | (1.59) |
| Enforce | -8.51† | -8.60† | -8.77† | -11.05 | -20.14** |
| | (4.71) | (4.81) | (4.80) | (7.71) | (5.69) |
| Law and Order | -2.79† | -3.05† | -3.08* | -3.64 | -11.00** |
| | (1.39) | (1.41) | (1.39) | (2.21) | (2.84) |
| Log GDP ($US) | 5.73* | 6.26* | 6.39* | 7.22* | 13.73** |
| | (2.62) | (2.73) | (2.59) | (3.55) | (3.14) |
| Inflation | -0.096 | -0.089 | -0.101 | -0.036 | -0.046 |
| | (0.16) | (0.17) | (0.165) | (0.350) | (0.156) |
| External Debt | 45.37** | 44.48** | 45.01** | 57.44* | 14.53 |
| | (9.56) | (10.20) | (10.24) | (27.52) | (10.95) |
| External Debt Squared | -24.89** | -23.71* | -24.20** | -32.91 | 0.630 |
| | (7.60) | (7.92) | (7.69) | (23.30) | (8.51) |
| Rich Host Country | 3.63 | 4.43† | 4.26† | 6.73 | 26.73** |
| | (2.33) | (2.22) | (2.23) | (7.07) | (6.72) |
| Syndicate Ownership (Herf Index) | 11.53** | 11.25** | 11.62** | 16.45** | 15.94** |
| | (2.92) | (3.14) | (3.13) | (5.44) | (4.27) |
| Sponsor Experience | 4.86* | 3.92† | 3.51* | 6.29* | 5.12† |
| | (1.76) | (1.96) | (1.59) | (2.97) | (2.64) |
| Foreign | -1.37 | -0.88 | -2.20 | -0.91 | -0.70 |
| | (2.31) | (2.48) | (2.53) | (3.02) | (3.57) |
| Log Project Cost ($US) | -1.76† | -1.79† | -1.70† | -2.63* | -0.86 |
| | (0.84) | (0.85) | (0.78) | (1.12) | (1.27) |
| Power Sector dummy | | | | | 120.09 |
| | | | | | (100.62) |
| Power*Common Law | | | | | -15.47 |
| | | | | | (8.90) |
| Power*Creditor Rights | | | | | 8.28** |
| | | | | | (2.41) |
| Power*Enforce | | | | | 0.17 |
| | | | | | (12.62) |
| Power* Law and Order | | | | | 8.47* |
| | | | | | (3.17) |
| Power*Log GDP | | | | | -7.24 |
| | | | | | (6.10) |
| Power*Inflation | | | | | 0.77† |
| | | | | | (0.39) |
| Power*External Debt | | | | | 116.90** |
| | | | | | (34.93) |
| Power*External Debt Squared | | | | | -102.27** |
| | | | | | (23.87) |
| Power*Rich Host Country | | | | | -36.99** |
| | | | | | (10.04) |
| Power*Syndicate Ownership | | | | | -8.44 |
| | | | | | (7.70) |
| Power*Sponsor Experience | | | | | -1.04 |
| | | | | | (2.92) |
| Power*Foreign | | | | | -0.37 |
| | | | | | (3.69) |
| Power*Log Project Cost | | | | | -1.80 |
| | | | | | (1.19) |
| N | 238 | 238 | 238 | 238 | 238 |
| $R^2$ | 0.19 | 0.19 | 0.19 | | 0.26 |

Columns 1-5 report regression coefficients and semi-robust standard errors (in parentheses).
† $p < 0.10$, * $p < 0.05$ , ** $p < 0.01$

**FIGURE 2A**

**Project Leverage and Project Cost for All Projects Sampled**

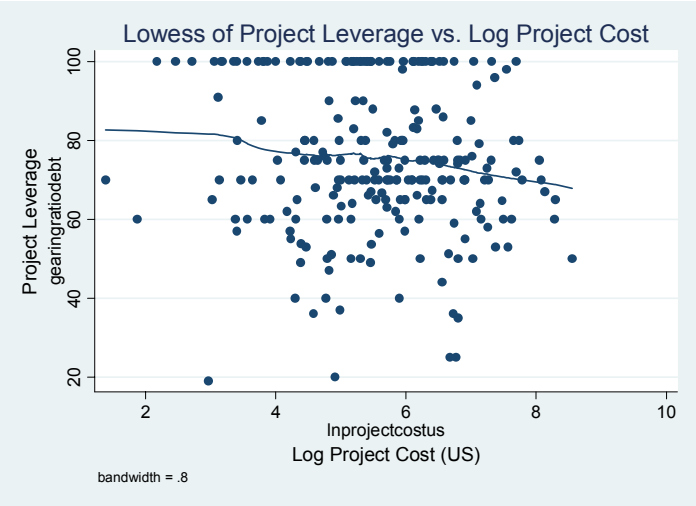
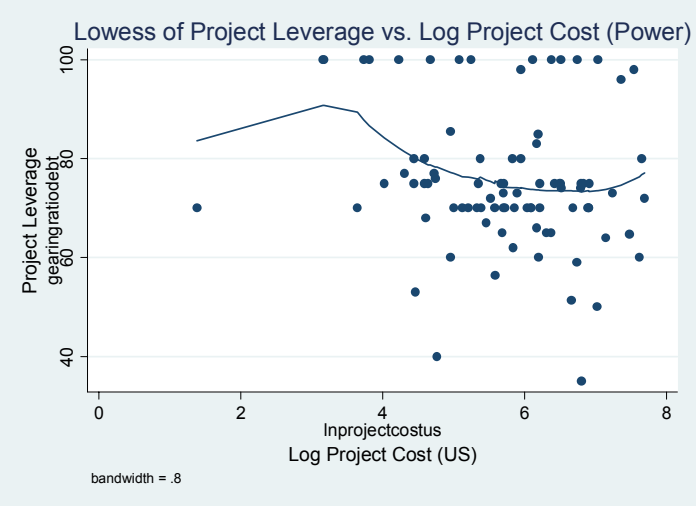


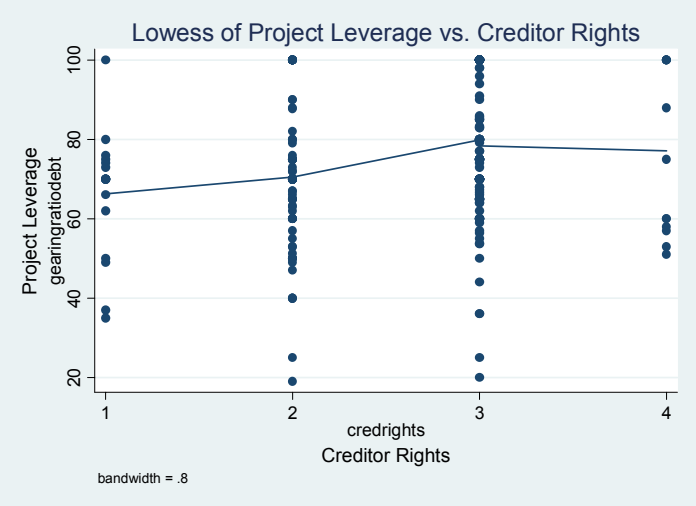

**FIGURE 2B**

**Project Leverage and Project Cost for Projects Sampled from Power Industry**



## FIGURE 3A

## Project Leverage and Creditor Rights for All Projects Sampled




## FIGURE 3B

## Project Leverage and Creditor Rights for Projects Sampled from Power Industry