

# PROJECT FINANCE IN ASIA: GOVERNING VARIABLES OF PAST, PRESENT, AND FUTURE PF ARRANGEMENTS IN POWER PROJECTS

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Project finance (PF) market in Asia had been dominated by greenfield power project finance in 1990s prior to the Asian crisis. This greenfield PF structure was characterised by fixed priced power purchase agreements, foreign currency financing, and high dependency on export credit and multilateral agencies, guarantees and incentives. This paper presents variables that govern PF arrangements and analyzes them to explain why sponsors preferred such a common structural arrangement in PF in Asia, what variables resulted in this common structure's inability to withstand the Asian crisis, and whether a new PF structure will emerge in the future in response. Findings reveal that a PF arrangement is organized under a transaction specific structure and it is governed by variables attributed to institutional environment and transaction specific aspects. The institutional environment specific variables indicate the level of risk within PF transactions and result in particular security measures in PF in an unstable institutional environment like in Asia. As such, transaction specific variables are measures or responses to address the credit risk, which in effect causes different PF structures. These findings answer the above questions and provide a rationale for different PF arrangements in Asia.

Keywords: project financing, transaction governance, institutional environment, credit risk, Asia.

## INTRODUCTION

Project finance (PF) has been a financing mechanism, particularly for the private sector. In the recent past, the private sector has begun to finance infrastructure projects through PF arrangements in Asia and the trend seems likely to continue in the foreseeable future in Asia as well as in Europe (Esty, 2000). The term "Project Finance" has been used to explain many types of financing for projects (Lang, 1998; Nevitt *et al.*, 1998). However, the definition of PF for the present study could be adopted from Nevitt *et al.*, (1998: 3) as follows:

*"A financing of a particular economic unit in which a lender is satisfied to look initially to the cash flows and earnings of that economic unit as the sources of funds from which a loan will be repaid and to the assets of the economic units as collateral".*

The economic unit in the definition refers to a capital investment project with a set of legally and economically independent assets with a single industrial use (Esty, 2000). For example, it could refer to highways, pipelines, power plants, and

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telecommunications systems that rely on asset use to service debt and generate equity returns. In PF, creditors have recourse only to the project's cash flow and assets since each project is legally independent. Esty (2000) states that due to these reasons PF typically represents a form of off-balance sheet finance, meaning that project assets and liabilities do not appear on the sponsor's balance sheet. However, Nevitt *et al.* (1998) asserted that the key to successful PF is structuring the financing of a project with as little recourse as possible from the sponsor while at the same time providing sufficient credit support through guarantees or undertakings from a sponsor or third party, so that lenders will be satisfied with the credit risk. Therefore, the foundation of PF is stability of the cash flow and its security structure to accommodate the credit risk in the transaction.

Furthermore, adaptation of PF for infrastructure projects, particularly in power project (PP) finance, has characterized arrangements to mobilize non-recourse finance in Asia in the 90s. The objective of this paper is to present variables that explain why sponsors preferred a common structural arrangement in PF in Asia, what variables resulted in this common structure's inability to withstand the Asian financial crisis, and whether a new PF structure will emerge in the future in response. In addition, the paper attempts to foster the case study approach, which forms the methodology for the current empirical work, to investigate empirical questions that arise from a phenomenon.

The paper is presented in four sections. First, we identify the common structural arrangements for PF of PPs in Asia. It introduces a framework within which the governing variables are discussed in the third section. The case studies with other methodological characteristics are discussed prior to their application in two Asian PP finance transactions, in the next section. This is followed by a conclusion.

## **POWER PROJECT FINANCE ARRANGEMENTS IN ASIA**

The nature of PF results in a particular form of organization of the transaction, which differs from both market and the firm, and has its own logic (Devapriya and Pretorius, 2002). As such we define a PF arrangement as,

*" Mobilization of non-recourse/limited recourse finance (following Nevitt,1998) to a transaction specific structure within which input contracts, financial contracts including guarantees and incentives, supply and output purchase contracts are initiated, executed and negotiated in a particular institutional environment to develop a physical asset and thereby to generate service".*

While the "institutional" refers to the legal, administrative and customary arrangements for repeated human interactions (Pejovich, 1998), they are so considered at two levels in this definition. First, at a macro level they refer to the institutional environment that affects the organization of PF arrangements in a particular economy. They can be identified as "rules of the game". Institutions associated with the derivation of a transaction specific structure for a particular PF arrangement are considered at a micro level as the second level of institutions. They represent " the game" itself. According to Williamson (1996) the institutional environment can be a constraint on institutional structure at the micro level. Therefore, this demarcation naturally leads to identifying two governing criteria of PF arrangements as institutional environment specific and transaction specific factors.

The necessity for an appropriate transaction specific structure is felt in managing different risks through a web of contracts in PF. According to Palay (1984) transaction

governance could be defined as the institutional framework within which contracts are initiated, negotiated, monitored, adapted, enforced and terminated. In this, governance structure risk management is necessitated by the fundamentals of PF, in that its success largely depends on stability of the cash flow to accommodate the credit risk. The strength and weakness of the transaction specific structure is spelt out by the institutional framework which could be influenced by a particular institutional environment. Hence, the level of risk in the cash flow depends on the strength and weakness of the transaction governance. In the event that institutional environment characterizes unstable conditions, the necessity for security structure is strong. Therefore while the success of PF is largely influenced by institutional factors, this indicates that the transaction specific characteristics could possibly be in response to the institutional environment. It is within this framework that the paper discusses and presents the governing variables of PF arrangements in PPs in Asia.

Table 1. Adaptation of PF arrangements for private PPs in Asia: 1990-1999

Country	PF arrangement		Total Nos.	Project Cost* US\$ Million (Cumulative nominal figures in different Yrs.)	Total Project Capacity (MW)
	BOO	BOT			
(1).China	15	50	65	16,050	3,443
(2).Thailand	38	3	41	4,845	5,774
(3). India	28	4	32	10,310	12,029
(4). Philippines	11	16	27	8,631	5,945
(5). Pakistan	19	None	19	5,533	4,929
(6). Indonesia	3	10	13	8,965	5,967
(7). Malaysia	8	None	8	4,523	4,293
(8). Sri Lanka	1	1	2	64	60
(9). S. Korea	2	None	2	1,081	1,038
(10). Nepal	None	2	2	224	96
(11). LAO PDR	None	2	2	536	336
(12). Papua NG	None	1	1	50	24
(13). Vietnam	None	1	1	81	72

\* Nominal value of project costs has been totaled to view the scale of PF investment in each country for BOO/BOT projects. (Source: PPI Project Data Base, World Bank)

In Asian countries two popular PF arrangements have been used in the greenfield PP finance market during 1990-1999 (**Table-1**). They are, namely Built-Operate-Transfer (BOT) and Built-Operate-Own (BOO) models. The fundamental difference between those PF modalities lies in the duration of which the assets remain within the private sector, the mechanism of ownership, and the other conditions and requirements under which the project is executed. Further, among the contractual arrangements fixed price Power Purchase Agreements (PPAs), foreign currency financing, and a high reliance on Export Credit Agencies (ECAs) and multi-lateral organizations are the distinguishing characteristics of these common PF arrangements for many PP finance in Asia. These factors largely reflect security measures in PF arrangements. Hence the question arises as to why such measures are necessary to reduce the riskiness of the cash flow in PF arrangements in response to the unstable institutional environment in Asia.

Further, while the success of these common modalities were hampered by political changes in countries like India and Pakistan, the Asian financial crisis provided severe pressure on this common structure due to the necessity of renegotiations of tariffs in

countries like Indonesia. As a result, the PP finance market in Asia experienced two lean years in 1998 and 1999, while there has also been few project financing for PPs in 2000. However, the year 2000 marked a new PF arrangement for PP with two transactions each in Singapore and Thailand. As such, the SemCogen project in Singapore was the first merchant power financing in Asia outside of Australia (Khairi *et al.*, 2001). The distinguishing difference from previous modalities and merchant power financing is the absence of any fixed priced off-take contract and the benefit of fixed fuel price or amount. Therefore, in merchant power financing while the institutional environmental issues mainly originate from market risks and legal and regulatory risks, project and structural risks lead to transaction specific issues. Accordingly, large conglomerates entering into merchant power financing tend to adapt "corporate loans" in PF so that sufficient diversification from debt repayment sources could be sought from the parent company. The question is whether this is an essential security measure to reduce the volatile nature of cash flow in the new PF structure that could be badly affected by an unstable institutional environment. While merchant power financing seems to hold the future for PPs finance in Asia (Khairi *et al.*, 2001), it remains vitally important to identify which variables resulted in such a new PF arrangement and why the common structure failed to withstand the Asian crisis.

## **RESEARCH HYPOTHESIS AND GOVERNING VARIABLES OF PF ARRANGEMENTS IN ASIA**

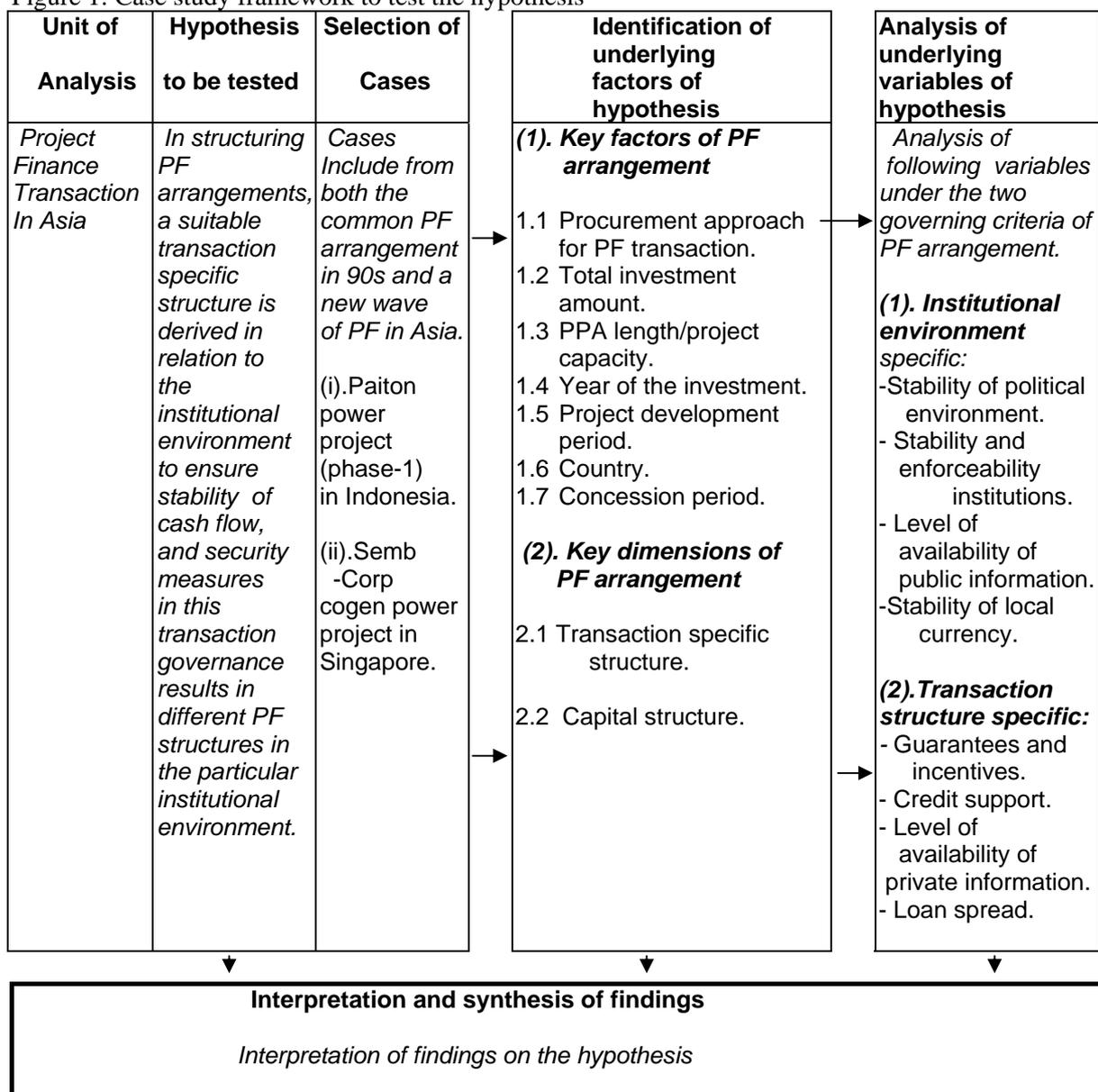
The forgoing discussion revealed that the typical PF arrangement is governed by two criteria, i.e. institutional environment specific and transaction specific. Further identification of present and past PF arrangements in Asia raised a number of questions. Underlying factors of those questions are associated with the above two criteria. Within this background we developed the following hypothesis for empirical testing:

*"In structuring PF arrangements, a suitable transaction specific governance structure is derived in relation to the institutional environment to ensure stability of the cash flow, and security measures in this transaction governance result in different PF structures in the particular institutional environment".*

According to Devapriya and Pretorius, (2002) the following are institutional environment and transaction structure specific variables. While institutional variables represent factors attributed to the transaction specific governance structure and thereby the stability of cash flow, security structure of the PF arrangement is largely represented by the transaction specific variables.

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|---|---|
| (a). Institutional environment specific variables             | (b). Transaction specific variables                         |
| (i). <i>Stability of political environment</i>                | (v). <i>Credit support for the loan</i>                     |
| (ii). <i>Stability and enforceability of the institutions</i> | (vi). <i>Guarantees and incentives for the loan</i>         |
| (iii). <i>Level of availability of public information</i>     | (vii). <i>Information about the status of the promoters</i> |
| (iv). <i>Stability of local currency</i>                      | (viii). <i>Loan spread</i>                                  |

Figure 1: Case study framework to test the hypothesis



## CASE STUDIES FOR HYPOTHESIS TESTING

A case study approach is used to analyze how variables influence the organization of PF arrangements in a particular institutional environment, in order to empirically test the hypothesis. Case study methodology has been widely applied as a qualitative approach in empirical studies (Yin, 1984, Stake,1995). However, the essence of case studies is a systematic approach to analyze individual cases or series of cases in testing a hypothesis or answering the questions. In this regard, Yin (1984) provides a framework for logical representation of research design for case studies. Following this, we developed a case study framework (Figure 1) with the inclusion of a basic unit of analysis, identification and analysis leading to interpretation of findings. The hypothesis is operationalised into the framework using the governing variables of the two criteria. Further, two or more cases enable us to rely on the replication logic within each additional case to confirm the relationships between the constructs, and enhance our confidence in the validity of the hypothesis (Yin, 1984; Stake, 1995). The case study framework (Figure 1) achieves such replication. Furthermore, the analysis

is supplemented by the survey methodology to overcome the constraints that one or two cases could not capture the development phenomenon over a period of time (Stake, 1995). As such, data was gathered from the 6<sup>th</sup> Annual Conference on Financing Power & Energy Projects in Asia held in Singapore on 24<sup>th</sup> and 25<sup>th</sup> September 2001. 120 delegates representing different professionals in the PF environment attended the forum. The author posed questions on the variables of current empirical work during discussion sessions. In addition, structured interviews were conducted with ten financiers and legal advisers to collect data on the importance of variables in structuring PF transactions in Asia.

### **Application of case study framework**

The case study framework is applied for Paiton Power Project (Phase-1) in Indonesia and SembCorp Cogen Power Project in Singapore. While the former reflects the common PF structure in PPs in the 1990s, the new wave of PP finance is reflected by the latter PF transaction. Data for the Paiton PP is extracted from Lang (1998), while Kayal (2001) and Khairi *et al.* (2001) are referred for SembCorp Cogen Power Project. In applying the framework, key factors and dimensions are discussed separately for each project while analysis of variables is combined so as to facilitate the synthesis of findings on the hypothesis testing.

## **PAITON POWER PROJECT (PHASE -1) FINANCE IN INDONESIA**

### **Key factors**

The project was procured through a BOO arrangement with a total investment of USD 2.5 billion for a 30 years concession period. It has generation capacity of 2x615 MW. The concession award was made to the sponsors in August 1992; while the project company signed the PPA in February 1994. This was followed by financial closure in July 1995.

### **Key dimensions of PF arrangement**

#### *Transaction specific structure*

The Government of Indonesia (GOI) awarded the project company “the exclusive right” to negotiate the Paiton PP. Private power policy in Indonesia spelt out the legal and administrative procedures and framework that governed the PF of the Paiton project under a BOO arrangement. The concession agreement created the institutional arrangement to initiate, negotiate and enforce the contracts within the project.

Further, the PPA has also defined the judicial and administrative procedures at the transaction level, particularly the security element of the revenue generation in PF. Under PPA, the company was responsible for the design, financing, construction, ownership and operation of the plant, and selling the net dependable capacity and net electrical output of the plant to PLN (Perusahaan Listrik Negara - the government's utility). It could therefore be identified that both the institutional environment and the institutional characteristics at the transaction level have created the governance structure for PF in the Paiton project.

#### *Capital structure*

Debt and equity ratio in the non-recourse financial structure is 73 to 27 percent respectively. According to Babbar and Schuster (1998), this indicates a typical level of financial leverage in PF transactions for PPs in Asian countries. The equity component consists of both shareholders equity and subordinated debt, while the latter

amounted to 55 percent of the total equity. Debt financing of USD 1,820 million includes both commercial and non-commercial sources. US\$ 180 million of 9.34 percent bonds due in 2014 under Rule 144A refinanced the commercial bank facility in the USA capital markets.

## **SEMBCORP COGEN POWER PROJECT FINANCE IN SINGAPORE**

### **Key factors of PF arrangement**

A special purpose borrowing entity was established to procure the project through PF. Debt was raised from four tranches to finance the construction, development, and operation of an 815 MW gas-fired combined-cycle co-generation power plant. Financial closure was arrived at December 18, 2000. The US\$ 390 million project was sponsored by Tractable (30% share ownership) and SemCopr Engineering Pte. Ltd (70% share ownership) and raised the equivalent of US\$ 300 million of debt in Singapore dollars. The project commenced its commercial operations in the fourth quarter of 2001. It sells electricity to the Singapore Electricity Pool, as well as steam to its industrial customers on Jurong Island.

### **Key dimensions of PF arrangement**

#### *Transaction specific structure*

SembCogen project has its own transaction specific structure which resembles the BOO transaction structure seen in the Paiton project. However, the joint venture (JV) arrangement between the Tractable and SemCopr Engineering Pte has influenced the transaction specific structure. The JV has been signed in order to form a special purpose borrowing entity, SembCogen, to raise non-recourse finance and thereby construct and operate the plant. It is governed by the legal system in Singapore. Within this arrangement the loan contract, turnkey contract and other supply and maintenance contracts are initiated, designed, negotiated and executed for the project. Most importantly, the transaction structure in SembCogen includes a membership agreement with the power pool through which the plant sells electricity and its capacity. The latter arrangement has added merchant power financing characteristics to the project.

#### *Capital structure*

The total project investment amounts to US\$ 390 million of which US \$300 million is financed in terms of non-recourse debt. In the highly leverage capital structure equity component, about US\$ 90 million comes from JV, while debt was raised from four different tranches from commercial lenders and a development agency in Singapore.

## **ANALYSIS OF UNDERLYING VARIABLES OF THE PAITON AND SEMBCOGEN POWER PROJECTS**

### **Institutional environment specific variables**

#### *Stability and enforceability of institutions*

The stability enforceability of the institutions reflects the general legal environment, specifically the legal and administrative mechanisms that govern PF arrangements. As discussed above, the transaction specific structure in the Paiton project was derived in response to BOO/BOT regulations in Indonesia. However, the institutional arrangement for BOO/BOT PF transactions was at a developing stage and has partly

contributed to the delay in financial closure. The effect of institutional factors is revealed by bond ratings for the project. The rating agencies were compelled to give it a BBB rating since enforcement of laws were subject to uncertainty and there were interpretative differences under Indonesian law. This rating indicated the level of risk inherent within the transaction, particularly in relation to the institutional environment.

Similarly, the SembCogen project emerged from the government policies on deregulation of the power market through introducing a power pool. The special purpose borrowing entity was organized within this background in accordance with the legal mechanism of Singapore. The transaction specific structure reflected how the power pool had introduced a new contractual arrangement to the typical PF structure. Further, the market risk, such as changes in bid price and fuel price changes, affected the structural aspects of the transaction. In order to manage these risks, long-term fuel supply contracts and capital assistance schemes have been adopted into the project structure.

#### *Stability of local currency*

Stability of local currency is referred to the relative stability of domestic currency. In structuring the Paiton project the local currency fluctuation has been addressed through denominating the tariff in US dollars. As such, the tariff is payable in Indonesian Rupiah (Rp), with the PLN responsible for providing US dollars to the company if the latter cannot convert enough Rp revenue into US dollars. Further, instability of the local currency (i.e. exchange rate fluctuation) has resulted in deriving many adjustable components in the tariff structure so that will be protected from foreign exchange risk and inflationary effects. The government policy of gradual currency depreciation has affected the debt serving ability with bankers are concerned about this policy change and its possible implications.

In contrast, the SembCorp project has taken the advantage of the relatively stable Singapore dollar for raising debt. The project raised US\$ 300 million of debt in Singapore dollars. The relative strength of the Singapore dollar has avoided the need to resort to hedging mechanisms. However, power pool rules are still being institutionalized in the power industry. As a result measures such as cash lock, cash sweeps and release mechanisms based on historical debt serving coverage ratio (DSCR) have been taken against any negative implications on the cash flow.

#### *Stability of the political environment*

This variable represents the stability of the political environment in the host country. The introduction of private power program by the government of Indonesia in 1990 led to commission the Paiton project under a PF arrangement. Political blessing in terms of guarantees for PLN's payment obligation were received for the project. These strengthened the transaction governance since it showed reliability of institutions at the transaction level. With much more stable political conditions that characterized the reasonable predictability of government policies on privatization programs, the SembCorp project received the comfort of non-recourse finance and healthy signals for the security of the assets based investment in Singapore. This was particularly reflected in the deregulation of the power industry in Singapore.

#### *Level of availability of public information*

This variable measures the level of availability of public information about the legal, administrative and customary systems, and on the general economic environment affecting PF transactions in the host country. As such, the introduction of a private power program in Indonesia made the participants aware about the institutional

environment within which non-recourse finance was feasible for the Paiton PP. This information made all parties informed about the "rules of the game" based on which the long-term contractual framework was adopted for the project.

In the SembCogen project, lenders as well as sponsors were reasonably exposed to public information on the procurement of merchant power financing since the project was organized following the government's electricity program begun in 1995. However, power pool rules are still being institutionalized in the power industry. As a result, the absence of adequate information on the "rules of the game" caused cash flow uncertainty. In order to respond to these conditions, measures have been taken to restructure the transaction.

### **Transaction structure specific variables**

#### *Guarantee and incentives*

Guarantees and incentives indicate whether the loan has a third party guarantee or where there is any incentive for the syndicated loan or for the transaction. They have been arranged in the Paiton project to ensure firmness of the cash flow, counter party credit worthiness and the ability to deal with the long-term contractual framework. The GOI has specifically backed the project by providing a letter of support for PLN's payment obligations as the purchaser, and issued a coal support letter. These guarantees enhanced the effectiveness of the BOO transaction structure since PPA largely governed the structure of the project. The guarantees and incentives in the PPA were arranged to hedge inflation, fuel prices, and control the regulatory risk, in order to allocate currency risk to PLN. Also, non-commercial debt financing from Export - Import Bank of Japan (JEXMY) received political risk coverage from the Ministry of International Trade and Industry of Japan (MITI).

#### *Credit support*

Credit support indicates whether the lenders enjoy any credit enhancement in terms of bilateral or multilateral institutions' participation either as equity or debt holders in the capital structure. In the Paiton project, ECAs, namely the JEXMY and the Export-Import Bank of the United States (USEXIM), contributed 79.1 percent of the total debt financing. These loans were utilized to fund the construction contracts, which were largely denominated in foreign currencies so as to match borrowing with project expenses. A bilateral agency, Overseas Private Investment Corporation (OPIC) has also contributed to debt financing. These long-term loans gave comfort for the commercial lenders on the creditworthiness of the Paiton project. Similarly, in the SembCorp project, the "Capital Assistance Scheme" from the Export Development Board in Singapore, acted as credit support for the transaction.

#### *Level of availability of private information*

This variable captures the level of availability of private information about the main sponsors in the PF transaction. The main sponsors, namely Mission and Mitsui in the Paiton project and SemCorp Eng. in the SemCogen project; are large, well-known companies who have recognition and reputation in the power sector. While this minimizes effort and resources in decomposition of credit transactions to derive bonding and monitoring mechanisms, it enhanced lenders' positive perception on the transaction.

#### *Loan spread*

The loan spread indicates the credit risk as measured by basis points (bp) above the benchmark price (i.e., London's Inter Bank Offer Rate-LIBOR). It is revealed that the loan spread in both transactions indicates a comparatively higher credit risk. For

example, the commercial facility in the Paiton project has been priced in a range from 177 and 300 bps above LIBOR reflecting the demand for higher risk premium for political risk, and at BBB- because of the low credit standing on Indonesian national debt. In effect, this indicates that the unstable institutional environment in Indonesia has influenced the loan spread of debt financing in the Paiton project. Indeed, in the SembCorgen project, lenders were challenged, for the first time in Asia, to fully understand the demand for power, the price of power in a relatively free market, and the ability of the borrower to become a low cost producer in the market.

Other than specific factors relating to case studies, findings from the survey revealed the importance of variables in arriving at a feasible PF arrangement in Asia. Almost all practitioners participated in the interviews and most of the discussants at the semi-industrial forum held the view that institutional specific variables influenced or need to be addressed at different degrees to arrive at a feasible PF arrangement. They stated that the treatment of those variables in an unstable institutional environment is reflected in transaction specific characteristics, such as a comparatively higher loan spread in Asian PF projects. According to their assertion, sponsors are in a position to reasonably control the unstable institutional environment so that the common PF arrangement has worked well for PP finance in Asia in the 90s.

## **SUMMARY OF THE ANALYSIS**

Case studies reveal that both the institutional environment and institutions at the transaction level drive the transaction specific governance structure for PF. Institutional environment specific variables are largely a reflection of the level of risk associated with cash flow in PF. When the institutional environment characterizes unstable conditions, security measures reduce risk associated with the cash flow. As such loan spread guarantees and incentives and credit support have become responses to (i) an unstable political environment, (ii) unstable institutions, and (iii) an unstable local currency, indicating that transaction specific characteristics respond to the institutional environment. As a result a particular PF arrangement emerges in structuring the transaction. The same set of variables was influential to different degrees for both common and new PF arrangements, confirming the replication logic of the case studies. As a whole, the institutional environment specific variables indicated the level of risk on the cash flow in a particular transaction, while transaction specific variables were measures or responses to address the credit risk. The latter resulted in different PF structures under transaction governance, which is derived particularly in relation to the institutional environment. These underlying factors answer for the questions posed on Asian PF arrangements and reasonably confirm the hypothesis. This sheds light on the sustainability of this new wave of PFs in Asia, which largely depends on the stability of institutions, including the stability of local currencies for merchant power financing.

## **CONCLUSION**

The paper empirically examined the governing variables of PF arrangements in PPs in Asia. The analysis reasonably confirmed the hypothesis that in structuring PF arrangements, a suitable transaction specific governance structure is derived in relation to the particular institutional environment to ensure the stability of the cash flow, and the security measures in this transaction governance resulted in different PF structures in the particular institutional environment. This confirmation answers

questions arising from the current phenomenon of popular adaptation of PF for PP and thus provides a rationale for different PF arrangements in Asia.

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