

## **Lending Behavior of Japanese Megabanks in Indonesian Project Finance Market**

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### **ABSTRACT**

This study aims to demonstrate the characteristics of Japanese megabanks in the Indonesian project finance market. Our investigation intends to show the international competitiveness of the top three megabanks in the international project finance ranking. This topic is worth investigating because megabanks consider overseas activities as a pillar of their growth strategies. We examined the project finance transactions executed from 2005 to 2014 in Indonesia. In total, 64 deals were investigated, including 112 tranche. We determined the factors affecting participation probability of each bank. In order to identify characteristics of respective banks, we used the multilevel mixed logit model, and estimated random effects for intercept and coefficients. We structured our sample as repeated measurement data with two levels of deals and banks. Hence, the sample size increased to 7469. Our main findings focus on differences in the lending behavior between Japanese megabanks and the other banks. First, megabanks responded sensitively to transactions sponsored by Japanese companies. Relationships between megabanks and sponsor companies can explain the vivid response to this factor. Second, variables related to the Japan Bank for International Cooperation (JBIC) increase participation probability of megabanks. Our results showed that these effects were exerted on megabanks most dramatically. In other words, the high profile of megabanks in the Indonesian project finance market is partly supported by JBIC.

Keywords: Project finance, Japanese bank, Multilevel mixed logit model

### **1. INTRODUCTION**

Project financing is significant for Asian countries that have an increasing demand for infrastructure development. Delays in infrastructure development could be considered a bottleneck for the economic growth of fast-growing Asian countries. According to the estimates by the Asian Development Bank (ADB), capital requirements for infrastructure

constructions from 2010 to 2020 amount to eight trillion US dollars. Asian countries have undertaken large-scale infrastructure projects such as the East–West Economic Corridor projects in Indochina, and the Golden Quadrilateral project in India<sup>1</sup>.

Developing countries have previously depended on loans from foreign governments to complete their large-scale projects because infrastructure development requires a significant amount of capital. However, only public funds are not sufficient to finance these capital requirements, and therefore utilizing private funds is necessary to meet the increasing capital needs for infrastructure development. This situation implies significant business opportunities for private financial institutions. We investigate international project financing that attracts the banking industry.

International project financing is also important for formulating growth strategies of Japanese megabanks: Bank of Tokyo-Mitsubishi UFJ, Mizuho Bank, and Sumitomo Mitsui Bank. Megabanks have recently made a big leap in this business area. Although French banks such as BNP Paribas and Credit Agricole have previously demonstrated competitive advantages in project financing, megabanks dominated the top three positions of arranger bank ranking in 2014. They are aggressively expanding overseas loans including project financing that are expected to make better interest rate margins because banks' domestic revenues are shrinking due to prolonged decrease of long-term interest rates.

Project financing is instrumental in the Indonesian context. Indonesia is expected to exhibit considerable demand for infrastructure due to its significant potential for economic growth. The country has the fourth-largest population in the worldwide (241 million). A period of demographic dividend, in which demand increase is expected, is estimated to continue until 2030 because the average age of the country is only 28.

However, a lack of infrastructure is creating a bottleneck for economic growth. Infrastructure development cannot meet the increase in demand caused by economic growth. For example, the paved road ratio is 60%, although the road network accounts for 90% of domestic transport. Therefore, transportation capability is weak, and congestion overwhelms the metropolitan areas. Jakarta has a population of approximately 10 million; however, the city has no metro or mass transportation system. Jakarta city government initiated a metro network in 2013, and the first stage of its construction is scheduled to be

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<sup>1</sup> The East–West Economic Corridor is an economic development program initiated to promote development and integration of four Southeast Asian countries: Myanmar, Thailand, Laos, and Vietnam. The Golden Quadrilateral is a highway network connecting many major industrial, agricultural, and cultural centers of India. A quadrilateral of sorts is formed by connecting Delhi, Mumbai, Kolkata, and Chennai.

completed by the end of 2016.

This paper investigates how megabanks compete in the Indonesian project finance market. We have earlier observed activities of megabanks by their ranking in arranger bank league tables about project financing, but could not learn the details of competition situation in this market. Hence, we try to demonstrate characteristics of lending patterns for megabanks. In order to address this question, we obtain detailed data of transactions such as loan terms and syndicate structures from the database, which covers a wide range of project financing transactions. We will compare megabanks and their major competitors by using this dataset. More specifically, our investigation focuses on the Indonesian market, and detects differences in lending behaviors of major banks in project financing.

We can demonstrate the position of this study by comparing research questions with previous studies. This study belongs to the research field that detects differences in the lending behavior among bank types. Previous studies that investigated syndicated loan markets could be useful references for our study, and comprise three research frameworks, and two research methods.

The first framework is the comparison between foreign and local banks. This topic has attracted interest from academic researchers because active market entries into developing countries by Western banks have increased since the 1990s. For example, Haselmann and Wachtel (2011) detected differences in lending behaviors between foreign and local banks of 25 European countries. They found differences in the determinants of interest rate spreads between the two bank types. Pessarossi, Godlewski, and Weil (2010) investigated whether information asymmetry affects loan participation of foreign banks. They built a measurement to capture information asymmetry based on ownership concentration of the borrower. They introduced this measurement as an explanatory variable to estimate the equation.

The second framework is the comparison between commercial and investment banks. For example, Harjoto, Mullineaux, and Yi (2006) examined 6080 syndicated loans in the U.S. conducted from 1996 to 2003. They investigated differences in spread decisions between bank types. Their empirical results showed that investment banks granted loans with longer maturities and higher spreads to companies with relatively lower profitability and higher leverage.

The third framework compares major city banks and regional banks in terms of their lending patterns. Yamaguchi (2015) investigated the lending behaviors of two types of banks in international syndicated loan markets. This study detected factors affecting

participation probability of regional banks in syndicated loans by using the data of transactions executed from 2009 to 2014. These examinations demonstrated the characteristics of regional banks' behavior compared to that of major city banks.

This study has two similarities with the existing literature: empirical model and research question. The empirical model employs a binary choice model to investigate participation probability of respective banks in project finance transactions. Regarding the research question, we study differences in lending behavior of banks in the project financing market.

Meanwhile, this study is different from previous studies in two aspects. First, our research interest focuses on the lending behavior of Japanese megabanks, but not the general trend of banks in project financing. This is because cross border project financing has a great importance for growth strategies of megabanks and infrastructure exports, both of which are a part of the Japan Revitalization Strategy<sup>2</sup>. Second, we will distinguish characteristics of lending behavior of respective banks by using a multilevel mixed logit model. This research framework is different from previous studies that employ the framework comparing two types of banks. These differences enable us to contribute to a major research topic.

The remainder of this paper is structured as follows. In the next section, we provide an overview of the Indonesian project finance market from two perspectives. The league table of arranger banks demonstrates a supply structure of this market. Basic statistics of samples presents the characteristics of transactions. The third section explains the methodology, multilevel mixed logit model, and the reason for employing it. Moreover, we demonstrate specific model specifications. The fourth section demonstrates the estimation results and characteristics of megabanks by using the estimates of random coefficients. Finally, Section 5 summarizes the results of our investigation, and explains their implications for future studies.

## **2. OVERVIEW OF THE PROJECT FINANCE MARKET**

### **2.1 League table**

We demonstrate activities of Japanese megabanks in the Indonesian project finance market from the league table. This league table covers transactions that were executed from 2005 to 2014. This research period is rational to investigate the lending behavior of

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<sup>2</sup> On June 14, 2013, Prime Minister Abe issued a message upon the formulation of the "Japan Revitalization Strategy." This strategy comprises three action plans, of which Strategy of Global Outreach includes the increase of infrastructure exports.

megabanks because they expanded overseas activities during this period. The league ranks major banks in terms of the total amount of deals in which they participated.

Table 1 presents the actual ranking, and this result is consistent with prior expectations. We expected the megabanks and other foreign banks to dominate the league table because the former occupy the top three positions in the global project finance ranking of 2014, and they additionally reached a record-high market share of 14.9% as arranger bank. Megabanks occupy the top three positions in the Indonesian market similar to the global rankings.

Table 1. Participation ranking

Rank	Lender	Amount (Million USD)	Deal Count
1	Sumitomo Mitsui Financial Group	11,223	19
2	Mizuho Financial Group	7,123	19
3	Mitsubishi UFJ Financial Group	7,089	14
4	ING Group	6,132	10
5	Japan Bank for International Cooperation	5,398	10
6	Standard Chartered Bank	4,836	10
7	PT Bank Rakyat Indonesia *	4,636	15
8	PT Bank Mandiri *	4,539	18
9	BNP Paribas	4,013	9
10	PT Bank Negara Indonesia *	3,764	18
11	Credit Agricole Corporate & Investment Bank	2,348	6
12	Sumitomo Mitsui Trust Holdings	2,121	4
13	DNB	1,950	2
14	Deutsche Bank	1,920	2
15	PT Bank Central Asia *	1,888	4
16	Industrial & Commercial Bank of China	1,792	3
17	Australia & New Zealand Banking Group	1,787	5
18	Bank of China	1,765	3
19	Fortis Bank	1,758	3
20	Portigon	1,658	2

Source: Thomson Reuters, *DealScan*

Notes: Asterisk denotes local bank.

The amount indicates the accumulated amount of all deals in which each bank participated.

Meanwhile, there are three local, state-owned banks in the top ten ranking. Bank Mandiri was established in 1998 by the merger of four banks (Bank Bumi Daya, Bank Dagang Negara, Bank Exim, and Bank Pembangunan Indonesia (BAPINDO)) controlled by the Indonesian Banking Restructuring Agency, due to non-performing loan problems caused by the Asian currency crisis. Bank Mandiri is the largest bank in terms of asset size. Bank Negara Indonesia, established in 1946, was the first bank to be established by the government and issued currency as a central bank. This bank changed its status to a state-owned commercial bank in 1995, and is now the country's fourth-largest bank. Bank Rakyat is a commercial bank that focuses on supporting small and medium-sized companies, and its assets are the second largest in the banking sector.

We did not expect aggressive activities of local banks. Project financing business is limited to a part of financial institutions such as Western and Japanese banks that are eager to conduct international business. This is because project financing requires sophisticated expertise including understanding laws and regulations, and evaluating project risk. Project financing is defined as a loan to a specific project and its repayment resource is limited to cash flows generated from that project. Screening of conventional loans judges the repayment probability by focusing on borrower credibility and collateral value. Meanwhile, for project financing, banks analyze cash flow of a specific project and screen its asset value as collateral. Further, project financing entails several risks that should be monitored. For example, monitoring comprises diversified components: verification of construction progress updates, cost repayments in the construction stage and confirmation about operations, and financial reporting of special purpose company (SPC) in the operation stage.

However, Table 1 presents a certain presence of local banks in project financing. The activities of these banks increased because of the increase in the infrastructure projects in which local sponsor companies participated. Sponsor companies from developed countries have led most infrastructure projects in Asia, however, project origin by local companies and banks is expected to increase in the future. Another reason is that infrastructure developments bring huge capital demand for banks in case of private-base financing, and not official development assistance from foreign governments. Furthermore, project financing provides diversified types of revenue such as underwriting and agency fees because the huge size of project financing requires bank syndication.

Meanwhile, the entry of local banks poses a concern regarding their standards not being compliant with the global standards for project screening and loan protection. Measures

arranged by local banks to protect loans are weak and different from those that apply to the rest of the world. This is because local banks emphasize more on long-term relationships with local sponsor companies, as compared to project feasibility, and these relationships affect banks' judgment about lending. Moreover, local banks' screening ability about project feasibility is yet limited.

The league table indicates that local banks emerge as formidable competitors to megabanks contrary to our expectation. These local banks have accumulated expertise about project finance and extend their competitive edge. To understand how megabanks behave in such a competitive market environment, we demonstrate their characteristics based on comparisons in the market.

## 2.2 Transaction characteristics

We present the market situation by showing characteristics of transactions that are project financing for infrastructure development and resource exploitation. The number of deals is 64 including 112 tranche. Our sample covers the period from 2005 to 2014

Table 2. Deal overview: Continuous variables

Variables	Mean	Standard Deviation	Min	Max	Sample
Amount (USD million)	255.5	377.6	0.5	2,800	112
Maturity (year)	9.9	5.0	1	20	97
Size	3.7	2.9	1	22	109

Source: Author's calculation based on *DealScan*

Table 2 shows the basic statistics about continuous variables. The mean of loan amount indicates that the loan size of project financing is generally large. The project with the maximum loan amount is LNG development, which along with thermal power plant ranks high because the facilities are large, and require huge capital. Meanwhile, standard deviation is also high due to the existence of very small loans. They are subordinate tranche and small amount. The average maturity is approximately 10 years, and the largest value is 20 years. These figures hold for the general assumption that infrastructure projects with a long period require long-term financing. The transaction with the longest maturity is the project financing for geothermal power plant construction, and that with the shortest maturity is the project financing for bridge loan, which helps in bridging the gap between short-term cash requirements and long-term loans.

Size means syndication size, and is measured by the number of participant banks in the respective syndicate. The maximum value is 22, and this deal is for toll road construction. We find many participant banks of LNG and thermal power generation. Meanwhile, public financial institutions such as JBIC and the International Finance Corporation (IFC) account for most bilateral deals.

Table 3. Deal characteristics

				(Unit: %)	
Project type	Gas-fired power generation	27.7	Distribution method	Syndication	53.6
	Water power generation	7.1		Club	32.1
	Geothermal power generation	5.3	Facility type	Bilateral	14.3
	Other power generation	3.7		Term loan	95.5
	LNG	21.4	Revolving	0.9	
	Oil	4.4	Guarantee	0	
	Mining	10.7	VAT	0.9	
	Road	8.9	Bridge	2.7	
Currency	USD	77.6	Tranche	First tranche	57.1
	IDR	17.8		Below first	42.9
	JPY	3.5	Japanese relationship	JBIC guarantee	9.8
				JBIC participation	9.8
			Sponsor	26.8	

Source: Author's calculation based on *DealScan*

Table 3 demonstrates the deal characteristics from six perspectives. First, the dominant project type the power generation projects, constituting 43.8%, and among these, gas-fired power generation accounts for the largest share (27.7%). Resource exploitation projects (36.5%) follow next. Infrastructure projects including power generation and toll roads are in majority of project financing. Deregulation in the electricity sector explains the large share of power generation projects. Indonesia amended their regulations in 1985, and enabled private companies to enter the electricity market as suppliers. Furthermore, foreign companies have been permitted to enter this market as independent power producers since 1992. After these deregulations, private companies became sponsors of power generation projects and financed the construction costs. The increasing number of such cases contributed to the accumulation of knowledge about infrastructure projects.

Second, USD dominates currency denomination, followed by Indonesian rupiah (IDR), and Japanese yen (JPY). There are certain concerns about USD denomination for



infrastructure projects that generate local currency revenues. Power generation projects and toll roads earn local currency revenues, hence, it is rational for related financing to be denominated in local currency. However, we find that some of these projects are financed in USD, and bear foreign exchange risk. Meanwhile, resource exploitation projects do not have problems with financing in USD because most natural resources are traded in USD in the market.

Third, bank syndication accounts for almost half as a distribution method. The project size of infrastructure and resource development is generally large, and these projects require huge loans. It is difficult for bilateral loans to evade concentration risk on the bank's portfolio due to the large scale of loans. Hence, banks tend to extend loans in syndication to aim diversifying effects. Meanwhile, the share of club deals, 32.1%, is higher than our expectation. This is consistent with the result that the mean of size is 3.7 banks in Table 2, which is smaller than our expectation. Bilateral loans account for a certain share, and are extended by public financial institutions. This is because smooth financing of infrastructure and resource development requires public commitment.

Fourth, approximately 40% of the deals have subordinated tranche. The tranche is defined as a portion, or slice of a loan. This portion is one of several related loans that are offered simultaneously, but have different risks and maturities. The tranche structure aims to attract many participant banks by addressing a variety of their preferences. We observed that facility types, excluding term loans were often used in below-the-second tranche.

Fifth, we find commitment of public financial institutions on project financing: ADB, JBIC, and IFC. Among these institutions, JBIC has a strong presence in the market. JBIC participated in 11 deals, and ADB and IFC in two and four transactions, respectively. Additionally, JBIC guaranteed 11 deals, which are provided to loans extended by private banks in order to cover political risk<sup>3</sup>. This public guarantee primes participation of private banks and facilitates execution of project financing.

Last, we focus on Japanese nationality of project sponsors because this factor is expected to affect participation of Japanese megabanks in such projects. The share of Japanese sponsors is 26.8%, including Marubeni Corporation, Mitsubishi Corporation, Sumitomo Corporation, ITOCHU Corporation, Tokyo Electric Power Company, Kansai Electric Power Company, Kyusyu Electric Power Company, and J-POWER. These are trading conglomerates and electric power companies.

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<sup>3</sup> Most of these guarantees are provided as JBIC Loan Facility Enhancing Global Business Development.

### 3. METHOD

#### 3.1 Model

We use the multilevel mixed logit model to investigate binary responses about whether respective banks participate in a transaction or not. This examination demonstrates the characteristics of Japanese megabanks in the project finance market.

The multilevel mixed logit model has two major advantages over the simple logit model. First, it enables us to extract unobservable differences between economic subjects as random effects. Controlling changing factors caused by other observable variables permits the detection of unobservable variables. Second, compared to conventional cross-section or time-series data, this model significantly increases the number of observations, and hence the estimation accuracy can be expected to increase. Let us suppose that there exist 100 transactions, and 10 participant banks. In conventional cross-section analysis, we investigate the average response of 10 participants from a sample size of 100. Meanwhile, the multilevel mixed logit model can examine responses of the respective 10 banks to 100 transactions. Using this model can increase the sample tenfold, and the efficiency and unbiasedness of estimators can be expected to increase due to the augmented information amount.

Our multilevel mixed logit model has random effects on intercept and coefficient, and is structured into two levels. Level-1, the lower level, comprises transactions ( $i=1, 2, 3, \dots, N$ ), and Level-2, the upper level, comprises banks ( $j=1, 2, 3, \dots, K$ ). This hierarchical structure can examine factors to explain the responses of individual bank  $j$  on each transaction  $i$ , that is whether bank  $j$  participates in transaction  $i$  or not. In other words, our data is repeated measurement data.

Our model expresses bank  $j$ 's willingness to participate in transaction  $i$  by employing latent variable  $y_{ij}^*$ . This unobservable variable is defined as follows.

$$y_{ij} = \begin{cases} 1: \text{Bank } j \text{ participates in transaction } i \text{ if } y_{ij}^* > 0 \\ 0: \text{Bank } j \text{ does not participates in transaction } i \text{ if } y_{ij}^* \leq 0 \end{cases}$$

Level-1 of our model is specified as follows<sup>4</sup>.

$$\text{logit}(p_{ij}) = \beta_{0j} + \beta_1 x_{ij} + \gamma_j z_{ij} + e_{ij}$$

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<sup>4</sup> This model specification follows Hedeker and Gibbons (2006).

Here  $p_{ij}$  denotes the response probability  $Pr(y_{ij}=1)$  for the decision-making process of bank  $j$  on transaction  $i$ . For simplicity, this equation has two types of explanatory variables. First,  $x_{ij}$  has a common fixed effect among transactions. Intercept  $\beta_{0j}$  and coefficient  $\gamma_j$  include random effects, which are different for individual banks. This intercept and coefficient are formulated at Level-2 of our model as follows.

$$\begin{aligned}\beta_{0j} &= \beta_0 + u_{0j} \\ \gamma_j &= \gamma_1 + u_{1j}\end{aligned}$$

Here,  $\beta_0$  is a common intercept among transactions, and  $u_{0j}$  is a random intercept that is different among banks. Meanwhile,  $\gamma_1$  is a common coefficient among transactions, and  $u_{1j}$  represents randomness differing among transactions. Random effect is assumed normally distributed, and independent from explanatory variables. Level-1 residual  $e_{ij}$  is assumed a logistic distribution, and independent from random effects and explanatory variables, respectively<sup>5</sup>.

This model can separate unobservable differences between banks from error terms by considering both common fixed effects that the respective banks share, and random effects that differ among banks. Specifying two levels of the model produces the following estimation equation about variable  $y_{ij}^*$ .

$$\text{logit}(p_{ij}) = \beta_0 + \beta_1 x_{ij} + \gamma_j z_{ij} + u_0 + \gamma_1 z_{ij} + e_{ij}$$

We will estimate the model employing only the random intercept, and the model employing both random intercept and random coefficient. Random coefficient will be estimated sequentially because the variable that is a likely candidate is unknown *a priori*. We examine the statistical significance of each random effect by the log likelihood test, which compares the model employing only random intercept.

### 3.2 Explanatory variables

Our model includes four categories of explanatory variables: loan terms, distribution method, project types, and Japanese relationship. The first category comprises three variables. *LAMOUNT* is the log value of the loan amount converted to USD million. We

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<sup>5</sup> We used STATA 13 for model estimation. On the initial setting, STATA computes an optimum solution by using Gauss-Hermite quadrature approximation.

forecast the coefficient of *LAMOUNT* to be positive. Large size of project financing requires more participant banks, and this increases participation probability in such loans. The next variable is *MATURITY*, which is the loan period represented in years. We cannot forecast the coefficient of *MATURITY*. For corporate financing, we expect effects of longer maturity on participation probability to be negative. Long-term loans have higher risk on collectability because it is difficult to forecast the economic situation and corporate performance in the distant future. Meanwhile, project financing has a long maturity, and we cannot evaluate beforehand the effect of this longer maturity on project financing. The last variable, *USD*, is a dummy variable that equals to one if the loan is denominated in foreign currencies, and zero otherwise. The sign of *USD* is expected to be positive based on the result of currency denomination in Table 2, which shows a large share of *USD*. It is much easier for foreign banks to fund in USD in inter-bank markets because they have fewer branches in Indonesia, and thus cannot collect abundant local currency deposit. In contrast, we should pay attention that local banks prefer loan transactions denominated in IDR because of their funding structure.

The second category of explanatory variables is the distribution method including only one variable. *BILATE* is a dummy variable taking a value of one if a loan is extended at bilateral base. We expect the sign of this variable to be negative. This is because the lender of a bilateral loan is limited to one bank, and this reduces participation probability in such loans. Furthermore, Table 3 demonstrates that public financial institutions dominate bilateral loans as lenders in order to cover the subordinated part of loans.

The third category includes the project types, *POWER* and *LNG*. *POWER* is a dummy variable indicating whether the loan's purpose is the construction of power plants; and if the purpose fits the definition, this variable takes a value of one. *LNG* is a dummy variable taking a value of one if the loan's purpose is the exploitation of LNG. The signs of *POWER* and *LNG* are expected to be positive based on the observation in Table 3 that shows that these two variables take the first and second position, respectively as project type.

The last category includes variables capturing effects of Japanese relationships on loan participation: *JSPON*, *JGUARAN*, and *PRIMING*. We employ these variables in order to examine the response of megabanks. *JSPON* is a dummy variable taking a value of one if the sponsor of the project is a Japanese company. *JGUARAN* is a dummy variable that equals to one if the tranche is guaranteed by JBIC, and zero otherwise. *PRIMING* is a dummy variable indicating whether JBIC participates in the deal; and if the deal fits the definition, this variable takes a value of one. We do not expect significant responses of

banks to these variables in general. Our focus is on the response of megabanks to these variables, and we expect a large and positive random effect on the coefficient.

#### 4. EMPIRICAL RESULTS

##### 4.1 General results

Table 4 presents the estimation results for six models. Only the first model is a random intercept model, and the rest include random intercept and coefficient both. Likelihood ratio tests confirmed that the multilevel mixed logit model is more suitable than the logit model. These tests rejected the applicability of the conventional logit model for all models, and indicate that banks' preferences toward transactions differ among individual banks. It is suitable to distinguish unobservable bank characteristics as random effects. Further, it is appropriate to extract random effects in considering large variations in the participation number as observed in Table 1.

We discuss four general results. First, banks tend to participate in loans of larger size. The coefficient of *LAMOUNT* is positive and statistically significant for all models. For example, Model 2 demonstrates that the expected gain in participation per *LAMOUNT* averages 0.087 across banks, with a standard deviation of 0.001. We can explain the positive relationship between participation probability and loan amount from risk-averse behavior by syndication. Project financing has a nature of large size, and this brings concentration risk on the portfolio of banks. Hence, banks generally avoid this risk by forming a syndicate. This behavior and large size of loans requires more bank participation, and these factors increase participation probability. The result for *LAMOUNT* is consistent with the general assumption.

Table 4. Estimation results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
<i>LAMOUNT</i>	0.106** (0.047)	0.087* (0.049)	0.110** (0.048)	0.103** (0.049)	0.106** (0.047)	0.107** (0.047)
<i>MATURITY</i>	-0.006 (0.015)	-0.006 (0.015)	-0.007 (0.015)	-0.007 (0.016)	-0.007 (0.015)	-0.006 (0.016)
<i>USD</i>	-0.194 (0.152)	-0.193 (0.152)	-0.636** (0.264)	-0.208 (0.157)	-0.212 (0.155)	-0.189 (0.155)
<i>BILATE</i>	-1.455*** (0.293)	-1.450*** (0.293)	-1.496*** (0.296)	-1.769*** (0.327)	-1.576*** (0.310)	-1.580*** (0.309)
<i>POWER</i>	0.249* (0.149)	0.249* (0.149)	0.257* (0.152)	0.239 (0.160)	0.261* (0.152)	0.244 (0.149)
<i>LNG</i>	0.431** (0.176)	0.431** (0.176)	0.452** (0.180)	0.438** (0.183)	0.447** (0.178)	0.433** (0.016)
<i>JSPON</i>				-1.618*** (0.485)		
<i>JGUARAN</i>					-2.001** (0.927)	
<i>PRIMING</i>						-1.196** (0.481)
<i>Constant</i>	-5.197*** (0.818)	-4.852*** (0.853)	-5.290*** (0.838)	-5.080*** (0.855)	-5.161*** (0.820)	-5.179*** (0.833)
Random effects						
Coefficient		<i>LAMOUNT</i>	<i>USD</i>	<i>JSPON</i>	<i>JGUARAN</i>	<i>PRIMING</i>
s.d.		0.001	2.399	5.353	5.646	3.222
Intercept (s.d.)	0.920	0.523	0.940	0.801	0.863	0.860
LR test	0.000	0.000	0.000	0.000	0.000	0.000
AIC	2699.50	2699.69	2609.98	2578.41	2677.55	2663.26
Sample size	7469	7469	7469	7469	7469	7469
Number of group	77	77	77	77	77	77

*Notes:* \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

Standard errors are depicted in parentheses.

The second point for discussion is currency denomination. Contrary to our expectation, *USD* does not have a significant effect on participation probability. This result can be explained by differences in participation decision between local and foreign banks. We find local banks reluctant to participate in transactions denominated in *USD*. Local banks

participated in 22 out of 87 transactions, and this share does not reach a quarter of the USD transactions. The financing structure of local banks explains this tendency. Local banks can mobilize abundant local currency deposits, and they have strong incentives to participate in local currency transactions. Meanwhile, there are 20 local currency transactions, and foreign banks participated in only one transaction among them. Moreover, Japanese megabanks did not participated in any local currency transaction. The reason of this lending pattern is that foreign banks have easy access to USD funding in inter-bank markets, and they cannot collect enough local currency deposits because they do not have a wide coverage of branch network in Indonesia.

The third point of estimation results is the project types. The signs of coefficient for *POWER* and *LNG* are both positive and statistically significant. These types of projects increase participation probability, and their results are consistent with the observations in Table 3. The share of power generation project and LNG exploitation project are 43.7% and 21.4%, respectively. For power generation project, private companies easily enter into the electricity market as producers because liberalization of the market has proceeded. This factor increased the number of power generation projects. Furthermore, the project scheme of these projects has already been established, and it is easier for banks to screen risks compared to other types of projects. Specifically, capacity charge enables project profitability to be calculated in the early stage of the project<sup>6</sup>.

Japanese relationships constitute the fourth point to be examined. All three variables, *JSPON*, *JGUARAN*, and *PRIMING*, have negative and statistically significant coefficients. In general, these Japanese relationships do not increase participation probability.

#### 4.2 Characteristics of megabanks

Our research focus is the lending pattern of megabanks. The models employing random coefficient can demonstrate characteristics of respective banks as responses to specific explanatory variables<sup>7</sup>. We estimated random effects of intercept and coefficients for respective banks, and ranked the banks in terms of random coefficient magnitudes.

Table 5 shows the ranking of megabanks and value of coefficients. We find two similarities and three differences in the lending pattern between megabanks and the rest. The first similarity is the response to loan amount. Megabanks have large random coefficients of *LAMOUNT*, and this result indicates that large size of loans increases

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<sup>6</sup> Capacity charge covers fixed costs of power generation projects.

<sup>7</sup> The banks that participated in project financing are shown in the Appendix.

participation probability of megabanks similar to the general trend. The second is the result about *USD*. For this variable, the ranking of megabanks remains moderate, different from those of other variables. The general results in Table 4 demonstrate that *USD* does not produce significant effects on participation in project financing. Megabanks also do not respond to USD denomination sensitively.

Table 5. Estimates of random effects

Variable	Bank of Tokyo- Mitsubishi UFJ		Mizuho Bank		Sumitomo Mitsui Bank	
	Rank	Random coefficient	Rank	Random coefficient	Rank	Random coefficient
<i>LAMOUNT</i>	6	0.922	2	1.044	1	1.096
<i>USD</i>	16	0.822	15	0.849	14	0.857
<i>JSPON</i>	11	1.009	8	1.372	4	1.477
<i>JGUARAN</i>	3	1.738	1	2.011	2	1.956
<i>PRIMING</i>	5	1.579	2	1.749	1	1.892

Meanwhile, differences are related to variables that represent the Japanese relationship. Model 4 demonstrates that the sign of *JSPON* is negative, and that banks in general are not willing to participate in the project financing sponsored by Japanese companies. In contrast to this result, Table 5 shows large value of random effects of megabanks, and this result is different from those of general banks. That is, we find the willingness of megabanks to participate in loans related to Japanese companies. This is because Japanese sponsor companies generally consult megabanks about project financing.

Next, the variables related to JBIC, *JGUARAN* and *PRIMING* have significant effects on megabank participation in project financing as shown by the high ranks in Table 5. These results are in contrast with those of the responses of general banks. JBIC extends loans and guarantees as a policy-based financial institution, and facilitates project financing while complementing the private sector financial institutions. Our results indicate that the pump-priming effect of JBIC is essentially exerted on megabanks. The dominant presence of megabanks in the Indonesian project finance market is supported by the function of JBIC.

## 5. CONCLUSION



This study aimed to demonstrate the characteristics of the lending pattern for Japanese megabanks. Our examination intends to draw one aspect of the international competitiveness of megabanks. Overseas project financing has great importance with not only growth strategies of megabanks. This topic is related to the growth strategy of the Japanese economy, because the Japanese government focuses its attention on infrastructure exports to boost economic growth.

However, it is difficult to detect the lending behavior of banks in the project financing market. Generally, only the league table of arranger banks has presented activities of respective banks. We employed detailed data of project finance transactions obtained from commercial database in order to overcome the shortage of data. Furthermore, the conventional regression model cannot present the lending behavior of respective banks. Hence, we employed the multilevel mixed logit model, and investigated the factors explaining participation probability to identify characteristics of respective banks.

The empirical results presented similarities and differences of megabanks in the lending behavior compared to the rest. We focus on two main differences to present the characteristics of megabanks. First, megabanks responded sensitively to transactions sponsored by Japanese companies. Relationships between megabanks and sponsor companies can explain the vivid response to this factor. Second, variables related to JBIC increase participation probability of megabanks. Participation of JBIC as lender and guarantor has a pump-priming effect to provoke private-sector banks. Our results showed that this effect was exerted on megabanks most dramatically. In other words, the high profile of megabanks in the Indonesian project finance market is partly supported by JBIC.

Lastly, we show two possible extension of this research. The first investigates the generality of lending patterns for megabanks. This study revealed the characteristics of megabanks in Indonesia, however, these characteristics may vary depending on the market environment. Hence, we further examine the lending behavior of megabanks in developed countries. The second extension asks for the pump-priming effect of regional public financial institutions, which play an important role in the project finance market. Emergence of the Asian Infrastructure Investment Bank attracted a great attention from both developing and developed countries. The function of regional public financial institutions is a potential research topic for future investigation.

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