Project Finance: Determinants of the Bank Loan Spread

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Abstract

This paper proposes an empirical study of the lender's strategy in the specific context of the Project Finance approach. More specifically we focus on the banks loans as they represent the major part of financing sources. The main goal is to define, through a global analysis, the main factors that have a significant impact on the bank loan cost, called spread. The results have shown that the loan spread in the context of Project Finance is mainly affected by the presence of guarantees and also the level of the country risk.

Keywords: Project Finance, Large Projects risks, Loan terms, Loan cost, Country risk.

1. Introduction

During the last decades, a new financing approach of major projects, called Project Finance, characterized by high investment costs and high risks, is more and more applied. This approach aims the long-term financing of infrastructure and industrial projects based upon the projected cash flows of the project rather than the balance sheets of its sponsors. Usually, a project financing structure involves a group of equity investors, called 'sponsors', and a 'syndicate' of banks or other lending institutions that provide loans to the operation. They are mostly non-recourse loans, secured by the project assets and fully paid from project cash flows, rather than from the general assets or creditworthiness of the project sponsors. The financing is typically secured by all of the project assets.

Generally, a special purpose entity is created for each project, and so the project company has no assets other than the project. In this context, risk identification and allocation are a key component of project finance. A large project is often exposed to a number of technical, environmental, economic and political risks, particularly in developing countries.

Project financing is mainly characterized by a high debt level. The debt/equity ratio of the projet's company is generally around 70% (Esty, 2004), 82% of the loan part take the form of syndicated banks loans. Facing this specific financing approach, the banks will usually adopt a different strategy than the one commonly applied for the more conventional loans. In fact, the bank will not evaluate the solvency and the creditworthiness of the sponsors but only the project and its potential to generate the necessary cash flows for loans repayment.

In this paper we will focus on the syndicated banks loans as they are the major part (70 to 90%) of project finance funding. We will analyze the specific approach used by the bankers to evaluate the project risks and fix their cost, and more specifically the spread. To achieve this goal, we will review, in the first part, the main previous empirical studies analyzing the bank loan cost and the different variables affecting the spread. Then, in the second part, and taking into account the most pertinent variables detected in the different studies, we will propose our own empirical model that shows how the spread may vary in relation with these variables.

2. Review of The Main Empirical Studies

Several authors have studied the specific features of Project Finance (PF) loans and the determinants of the loans cost. This cost includes both commissions and margin (spread) but it's the second component that has been the main point of interest.

For Pollio (1998), and based on a sample of 123 projects using Project Finance scheme and 207 others using corporate financing, average loans spreads included in Project Finance reached 101 bp, higher about 32 bp than average spreads applied to conventional loans.

The smallest spread observed for loans to PF is 6.25 bp, while the highest is 300 bp; comparable spreads for corporate finance loans are respectively 0 and 250 bp. The author finds that the spread increases with country risk and the use of US dollar as the currency issue, and decrease with the existence of guarantees and currency risk (project revenues generated in a different currency than the loan). He explains the negative relationship between exchange rate risk and spread as following: when a loan is exposed to currency risk, banks will usually require the borrower to cover such risks as a condition of obtaining the loan. Thus, by eliminating currency risk, the sponsors will benefit from a lower spread.

On the other hand, Dailami & Leipziger (1997) studied the determinants of the spread within the foreign currency loans for infrastructure projects in emerging countries. The authors emphasize firstly the role of private investments in infrastructure projects to attract foreign capital to developing countries. They also reminded the importance of the loan terms: the existence of long maturities significantly reduces the risk of payment default or the non respect of project debt service obligation, and the spread would therefore be lower. Taking as an example a loan with a maturity of 5 years with an interest rate of 7%, and another loan with a maturity of 15 years with an interest rate of 8% , our authors show that the probability of default is about two times higher in the first case than in the latter, although the interest rate is lower . Furthermore, by analyzing the determinants of the spread, they begin by recalling the key element that distinguishes a foreign loan from a local loan, which is the existence of country risk. The model they developed incorporates both macroeconomic variables and specific variables in the project. They conclude that the spread charged by lenders depends on their own perception of risk, the presence of external guarantees and country risk factors. Lenders also require higher spreads in countries with high inflation and particularly in the case of transport projects.

There is also the study of Kleimeier & Megginson (2000), which is much more detailed and comprehensive than the previous ones. Based on a comparative study of a sample of loans to PF and several samples of other kinds of loans, all representative of syndicated bank loans in the international capital markets, the authors found significant differences between PF loans and the other types of loans. Firstly, the PF loans are characterized by an average maturity of 8.6 years, about two times higher than other loans. In addition, PF loans are most often contracted at fixed interest rates (13.9% against 5.9% in other loans). In addition, PF loans in variable rates use less frequently the LIBOR as a base rate (38.8 %) than all syndicated loans (69.5 %). A surprising result found by the authors is that the PF loans are rarely accorded to borrowers located in the United States: while U.S. companies account for 55.8 % of all syndicated loans, they receive only 13.9% of PF loans. Indeed, the average borrowers in PF is located in riskier countries, and these loans are usually granted for the development of projects to tangible assets (oil & gas, real estate, electric utilities) .

According to Kleimeier & Megginson, the most obvious difference between PF loans and more traditional syndicated loans is their destination. While most traditional loans are arranged to finance acquisitions or LBO, refinancing existing projects or corporate financing, all major loans to PF are associated with specific industrial projects.

In the second part of their study, our authors have developed a model to meet two goals. The first one is to determine which variables have a significant impact on the loans spread, and the second goal is to see if PF loans are more or less expensive than other types of loans. Following their analysis, the authors found that loans spreads to PF are directly related to country risk of the borrower, the use of covenants in loan agreements, and the level of leverage of the project. Spreads are also higher when the borrower operates in an industry in tangible assets and decreases significantly with the presence of external guarantees. In addition, although the spreads to other forms of loans are negatively related to the loan amount and positively related to maturity, these variables do not have a significant impact in the case of loans to PF. On the other hand, and unexpectedly, the authors observed an average loans spreads to PF (130 bp) lower than most categories of loans and also the spread of the overall sample of syndicated loans (134 bp). This result is somewhat surprising because observers generally expect loans spreads to PF to be higher than other loans because repayment is not guaranteed by project sponsors (non-recourse or limited recourse loan) and also because of the higher degree of perceived risks. However, to explain this result, the authors remind clearly that the structure of project financing reduces significant agency costs inherents to the lender/borrower relationship, and project financing is an effective approach of controlling large projects with relatively transparent revenues. Moreover, Esty (2000) shows that the loan's cost is based on the structure (size and concentration) of the banks syndicate, which in turn varies according to political risk.

The author finds that the lenders compensation (commissions + spreads) is positively related to country risk, and there is a positive and significant relationship between the loan's cost and the share held by the arranging banks. Esty explains this result as following: an increasing proportion of arranging banks in the syndicate increases profits control, discourages expropriation by the government, and allows the renewal of contracts at a lower cost. The project sponsors should therefore normally compensate lenders for the benefits derived. Thus, the author tested the hypothesis that the loan's cost is positively related to the number of arranging banks and their share in the syndicate.

In another study, Esty (2002) also affirms the assumption that spreads are positively linked to the share of funding provided by foreign banks. This hypothesis was based on two arguments. On one hand, the presence of foreign banks indicates the absence of lending capacity in the host country, and these banks are then required to enter into the market despite their informational disadvantage. On the other hand, foreign banks used to discourage a possible government intervention. Thus, the positive relationship between loan's cost and the participation of foreign banks would be compensated by the benefit provided.

While comparing these empirical studies, we can see that each of them includes a different set of explanatory variables, depending on the research goal. Some associated with the loan variables are used in all regressions, while other variables differ significantly. Thus, the variables related to the loan, the amount, maturity and guarantees are the most used. Also, variables related to projects, especially the leverage's level, country risk and currency risk are also often included. However, other variables appear in one or the other study, such as inflation, covenants, the structure of the syndicate or the share of foreign banks.

A very important element from our point of view, which is virtually absent from these studies, is the project industry. Indeed, it would be interesting to see if the loan's cost varies significantly depending on the specificities of the industry such as energy, transport or telecommunications.

3. Empirical analysis

3.1. Data sample specificities

The main source of data used in our study is *Dealscan*. This database, provided by Loan Pricing Corporation (LPC), a subsidiary of Reuters, is a reliable source of information on primary and secondary loan markets in America, Europe, the Middle East, Africa and Asia -Pacific. It gives access to the terms and detailed information about more than 155 000 loans or bonds transactions.

Our study focuses on loans for project financing in various sectors, and in 26 countries. While eliminating loans that don't include details on the loan's amount, we are able to analyze a total of 2055 loans (amount: 426.9 billion $USD). It should be noted that these are 2055 loan tranches (given that a loan may include several tranches).

While analyzing the sample of 2,055 PF loans, we can identify the main financial characteristics of these operations (Table 1). The average amount of a loan tranche is 208 million US$. The average maturity of a loan to PF is 8.5 years; it seems relatively low and unsuitable compared to the long life duration of major projects (20 years in average). Moreover, these loans are more often granted with variable interest rates including spreads vs. LIBOR (39% of loans) than with fixed rates (1.5%). We also note that the external guarantees often accompany this type of loan (28% of loans), and the majority of industries concerned integrate collaterals (60%).

3.2. The variables of the study

The loan spread to PF depends on the specificities of the loan itself and also on the project's characteristics.

• *The dependent variable*

The dependent variable is represented by the spread or margin, which is defined as the difference between the contract rate and the base rate. In most cases, the loan's rate to PF is expressed in terms of a margin over LIBOR (London Interbank Offered Rate). There are also loans based on EURIBOR (Euro Interbank Offered Rate) or SIBOR (Singapore Interbank Offered Rate).

• *The independent or explanatory variables*

The model analyzed includes two categories of explanatory variables. Those linked to the characteristics of the loan and those related to the characteristics of the project.

- *The variables related to the characteristics of the loan*

Based on the empirical literature, two variables seem to be relevant in representing the characteristics of the loan: the loan's amount and maturity. The loan's amount is expressed by the variable "Amount" and the loan term by the variable "Maturity ". The most common currency in PF is the U.S. dollar. Therefore, and in order to include loans expressed in other currencies, these were converted into dollar. The exchange rate used is the average rate of the year of loan's signature.

For the loan's amount, many authors (Scott & Smith (1986), Blackwell & Winters (1991), Kleimeier & Megginson (2000)) agree that in the context of the lending's decision, this variable is irrelevant. The argument is that loans to PF are not considered rare, and so their amount doesn't impact their cost. From this point of view, the variable "Amount" of the loan has no significant impact on the spread. However, it is possible to associate the risk to the loan amount: higher loan's amount could induce a greater risk for the lender because the loan constitutes a larger share of its loan portfolio. This argument suggests that a positive coefficient would also be possible. Thus, the sign of the coefficient cannot be predicted with certainty. For this reason, we will omit to make a hypothesis on this variable.

In addition, studies differ on the expected sign of the variable "Maturity", measured either through theoretical or empirical literature. The empirical results demonstrate a significant positive coefficient (Scott & Smith (1986), Dailami & Leipziger (1997)), but also a non-significant negative coefficient (Booth (1992), Kleimeier & Megginson (2000)). Thus, as for the variable loan's amount, it is difficult to hypothesize the sign of the variable maturity.

A third feature of the loan included in the sample is the existence of guarantees. In the case where there are guarantees (from the host government, the sponsors, or an export credit company) for the loan to finance a project, the loan risk is assumed to be lower. This is the result reached by some empirical studies (Pollio (1998), Dailami & Leipziger (1997) or Kleimeier & Megginson (2000)). As in most of these studies, we will represent the variable "Guarantees" by a binary variable (dummy) which takes the value 1 if there is a warranty or 0 otherwise. Thus, a significant negative impact is expected for this variable.

- *The variables related to the characteristics of the project*

A first and very important variable that is present in all empirical studies on the spread is the "Country Risk". Indeed, the major projects have such a magnitude that the occurrence of any unexpected event in the host country may jeopardize their development. According to Esty (2004), country risk refers to the risk of transfer and availability of foreign currency. More generally, it includes the political risks associated with the development of a project in a given country.

Globally, the country risk is the probability that the occurrence of changes in the political, economic, financial or social rules in the host country affects the project's profitability and therefore its ability to repay the debt subscribed. The country risk mainly includes the risk of war, expropriation or inconvertibility of the currency.

The political risk, a largest component of the country risk, generates a high probability of costly default either due to strategic reasons or to liquidity problems. Strategic default consists in direct or indirect expropriation by the hosts governments. It also consists in an illegitimate appropriation of the value by managers or funders. Liquidity issues are another kind of default. These may include macroeconomic, political or competitive factors that may cause the inability of the borrower to fulfill its obligations to repay the debt.

Country risk can be measured through several methods, the most used is the approach of ratings. For our model, we have used the ratings established by ICRG (International Country Risk Guide) which incorporates 22 variables in three subcategories of risk: political, financial and economic. A rank from 0 (highest risk) to 100 (lowest risk) is attributed to each country. The variable used in our model is therefore "country risk rank". A higher rank indicates a lower risk. All empirical studies (Pollio (1998), Dailami & Leipziger (1997) and Kleimeier & Megginson (2000)) agree to say that the spread increases significantly with country risk. As the rank of risk we chose operates in the reverse side of country risk's level (high rank = low risk), we expect a significant negative impact on the coefficient of this variable.

A second variable that represents the characteristics of the project is the "currency risk ". This risk arises when the cash flows generated by a project are expressed in a different currency than the loan's currency.

Thus, it may be represented by a dummy variable that takes the value 1 if the currency risk exists, and 0 otherwise. The study of Kleimeier & Megginson has surprisingly demonstrated a significant negative relationship between the risk of currency and spread. The authors found that the existence of this risk in a PF transaction reduces the spread of approximately 42 basis points. They explain this result by the fact that banks offer lower rates to international borrowers who are willing to borrow in U.S. dollars or in another hard currency. Based on this study, we expect a significant negative impact of currency risk on the spread.

The last variable used is called "collaterals". It was used by Kleimeier & Megginson (2000) in their econometric model This is a dummy variable that takes the value 1 if the borrower operates in an industry integrating tangible and non-specific assets (and therefore collaterals) as aerospace, property management, energy utilities or leisure. Kleimeier & Megginson found a significant positive impact of "collaterals" on the spread. To explain this result, they have two arguments. Firstly, this may be due to the fact that loans are generally used to finance projects including tangible assets, and the specific areas considered as "collaterals" happen to be relatively riskier than average. The second argument is that the riskier projects are financed through PF loans. This result is in agreement with other studies on the loan's cost that have demonstrated that the use of collateral is positively related to the spread (Berger & Undell (1990), Booth (1992), Blackwell & Winters (1997)). Thus, based on these results, a significant positive coefficient for this variable is expected.

Table 2 below shows all the variables contributing to the development of the empirical model, and the expected effect of the independent variables on the spread.

It should be noted that our study does not include variables measuring directly the credit risk, such as the creditworthiness of the borrower, liquidity or leverage ratios. There are two reasons for this omission. The first one is that the database Dealscan does not provide comprehensive information on this type of data. The second reason stems from the fact that the analysis of debt ratios and liquidity for PF borrowers is not as important as for borrowers of the other types of syndicated loans. While the more conventional borrower is usually an operating company that insures the repayment of its loans depending on its solvency and financial strength, the project company is, by definition, newly formed ad hoc company, without external assets or repayment sources. Thus, the loan granted to a company, such as EDF, for example, is fundamentally stronger than the one granted for a structured project sponsored by EDF, although EDF is the sole sponsor.

3.3. Hypothesis of the study

Based on the previous empirical studies and the above explanations, we propose to test the five following hypothesis:

• Hypothesis 1: In the context of project financing, the existence of external guarantees has a significant negative impact on the loans spread.
• Hypothesis 2: In the context of project financing, the country risk's rank has a significant negative impact on the loan's spread.
• Hypothesis 3: In the context of project financing, the currency risk has a significant negative impact on the loan's spread.
• Hypothesis 4: The loan's spread in project finance is higher when it comes to collateral assets.

3.4. The empirical model

We will develop a regression analysis of the loan's spread on the different variables presented above, using OLS estimation (Ordinary Least Squares) technique and correcting heteroscedasticity with White's approach (1980). The main goal of this analysis is to study the impact of exogenous variables on the spread.

The academic literature includes several studies about the loan's cost of the PF, the main ones being developed by Pollio (1998), Dailami & Leipziger (1997) Kleimeier & Megginson (2000) and Esty (2000, 2002). The model we have developed is closer to the one of Kleimeier & Megginson (2000).

To estimate our model we used only observations integrating all informations related to the study's variables. In addition, as a large part of the loans (39% of total) is based on fixed interest rate margin above LIBOR, we further reduced our sample by keeping only operations using the LIBOR as a reference rate. This leads us to a set of 230 loans with a total value of U.S. $ 37,861,000.

Thus, we have proceeded to the estimation of the parameters (β, β_1, β_2, β_3, β_4, β_5 et β_6) of the model described in the equation below using the data processing software Eviews. The dependent variable is the spread over LIBOR, in basis points (bp).

$$\textbf{Spread} = \beta + \beta_1 \textbf{ Amount} + \beta_2 \textbf{ Maturity} + \beta_3 \textbf{ Country risk rank} + \beta_4 \textbf{ Guarantees} + \beta_5 \textbf{ Currency risk} + \beta_6 \textbf{ Collaterals assets} \quad (1)$$

Where:
- Amount = Loan's amount in millions U.S. $;
- Maturity = Loan's term , in number of years ;
- Country risk rank = Low rank indicates a high risk and vice versa .
- Guarantees = binary or dummy variable that takes the value 1 if a the loan has an external warranty and 0 otherwise;
- Currency risk = binary variable taking the value 1 if a loan is exposed to currency risk and 0 otherwise.
- Collateral assets = binary variable taking the value 1 if the loan is granted for a sector incorporating collateral assets and 0 otherwise.

Table 3 shows the results of the estimation based on the final sample. The results demonstrate the non-significance of the variable "Currency risk". This brings us to renew the regression by eliminating this variable. The new results are presented in Table 4.

3.5. Findings interpretation

The estimation of the model is quite satisfactory, with an R2 equal to 0.2 and a Durbin -Watson of 1.34. Moreover, the constant C is significant with a value of 391.8.

• ***Effect of the loan's "Amount" on the spread***

The second row of Table 3 explains the effect of the variable "Amount" on the spread. The result is rather surprising since this effect is negative and significant with a coefficient close to 0.03. An argument can be advanced to explain this result. Indeed, if we represent the variable "Maturity" of loans in terms of their amount (Figure 1), we note that the duration of the loans tends to increase with the amount of funding and the risk of default is then reduced because, as we shall see below, the spread decrease with increasing maturities. The average amount of loans is $ 165 million. For loans amounts less than U.S. $ 75 million, the average maturity of is 8 years, whereas those with a value greater than U.S. $ 75 million, it reaches 10 years.

A significance test (table.5) shows a significant positive effect of the variable "Amount" on the "Maturity".

Another plausible explanation is the impact of country risk on the loans. Indeed, the amount of loans in countries with relatively high risk (low rank) tends to be smaller than the one granted to countries with low risk (high rank). The average amount of loans to projects located in countries with risk rank greater than 75 is U.S. $ 197 million while the number of loans for projects in countries with less than 75 rank is U.S. M$ 126. Thus, banks tend to give higher amounts of loans to low risk countries (see Figure 2). This is what explains the negative impact of the amount on the spread.

However, the impact of "Country risk rank" on the "Amount" is not significant (Table.6).

• ***Effect of the loan's "Maturity" on the spread***

Based on the results, the variable "Maturity" has a significant negative impact on the spread. The coefficient found indicates that an increase of one year in the loan term result in the reduction of the average spread of about 2.3 basis points. The average maturity of loans is approximately 8 years.

In fact, despite the wide contract network specific to Project Finance operations, the credit risk of a non-recourse debt is related to the project's incomes generation planning. Large and intensive capital projects often require significant investments during the initial phase of their development, and start to generate revenues after a long construction's period. Thus, the necessity to adjust the debt repayments obligation to the project' incomes generation usually involves much longer maturities for project finance than for other financing approaches.

Thus, projects that are financially viable in the long term may face a cash shortage in the short term. All things being equal, obtaining a long term credit implies a lower debt repayment during the initial years of the project. This will help moderate liquidity constraints of the project company, thereby reducing the risk of default. Extended terms loans for PF should therefore be perceived as less risky than short-term loans. Moreover, we note that the loan's maturity may vary depending on country risk (Figure 3). Indeed, when country risk decreases (country risk rank increases) loans term is longer. Loans to countries with risk rank lower than 75 (relatively risky) have an average maturity of 7.6 years, while those with a risk rank more or equal to 75 (relatively less risky) are granted with average duration of 8.3 years . Thus, banks give longer durations loans to projects with low country.

It should be noted that the significance test shows no significant impact of the country risk rank on the maturity of loans (table7).

• ***Effect of the "Country risk rank" on the spread***

The impact of the country risk rank on the spread is negative and significant. But in our case, the result should be interpreted inversely. Indeed, as we explained above, according to the country risk's index (ICRG), used in our model, a higher country risk's rank indicates a lower risk country. For example, Bahrain, who reached a rank of 88 in 2005, is less risky than Turkey whose rank is 67.3. The average rank of the country risk in the sample is 74. Rising 1 point in the rank (less risky country) results in reducing the spread of 2.3 basis points, and vice versa. This result seems perfectly logical, as the possible occurrence of a country risk, such as an expropriation of the project, will lead to disastrous consequences. It is therefore normal that banks tend to set higher margins for loans to projects located in countries at risk.

In fact, the importance of country risk appears especially in large international projects financed by foreign funds. Even if the project is considered economically and financially viable, its ability to service foreign investors debt or equity depends closely on government policies of the host country related to the mobility of capital and currency convertibility, which are beyond the control of the project company.

The impact of the country risk rank also depends heavily on the existence or not of external guarantees, intended to cover this type of risk. In the case of absence of guarantees, the average spread varies between 180 and 220 basis points. Whereas the average spread is between 90 and 160 basis points if loans have external guarantees.

For relatively risky countries (country risk ranking between 44 and 74), the average loan spread without guarantees is approximately 218 bp, while the average spread for secured loans is 150 bp. Similarly, for countries with low risk (country risk rank between 74 and 88), the average spread on loans without guarantees is 200 bp , and 111 bp for the loans with guarantees.

Table 8 summarizes all the scenarios. The impact of the existence of guarantees is important because it reduces the average spread about 89 bp in countries with low risk, and 68 bp in risky countries.

• ***Effect of the "guarantees" on the spread***

A highly predictable result is the negative and significant impact of the variable "Guarantees". The existence of external guarantees in project finance generates the reduction of the spread of 91.4 basis points! This result explains why borrowers in PF are willing, more than other types of borrowers, to engage the necessary costs (time, effort, and money) needed to implement the required guarantees. Compensation, in terms of reducing the spread level, is much higher.

Loans to projects involving external guarantees represent 28% of total loans Project Finance. These loans include an average spread of 125 bp, whilst in case of absence of guarantees the average spread reaches 208 bp.

This impact also takes into account the country risk (see impact of country risk on the spread). A lower average spread (111 bp) is observed in case of loans for projects receiving external guarantees and developed in relatively low risk countries.

• ***Effect of the "Collateral assets" on the spread***

Projects integrating collateral assets have a positive and significant impact on the spread, with a coefficient of 27.3. This result is mainly due to the fact the projects integrating collateral assets are relatively risky.

4. Conclusion

Our empirical research has targeted the analysis of the determinants of bank's cost to Project Finance, and especially the margin or spread integrated. A first regression analysis has identified the non-significance of the variable "currency risk", thus infirming the third hypothesis of our study. By performing a second regression without this variable, we observed a significant negative impact of the variables "amount" and "maturity". This result is explained by the fact that higher loan amounts are granted for a longer duration and the credit risk is therefore spread over time, which generates a lower spread.

We find that the most significant variables are the guarantees and the country risk rank. Indeed, even if the main principle of "pure" project finance means that no warranty is granted to lenders, most projects are based on a limited recourse financing against the sponsors and the levels of risk coverage that depend on the degree of risks perceived by lenders. The study showed that the existence of external guarantees in a Project Finance generates the spread's reduction of 91.4 basis points. Loans to projects involving external guarantees represent 28% of total loans to project finance. These loans include an average spread of 125 bp, against 208 bp in case of absence of guarantees. This impact also takes into account the country risk. A lower average spread is observed in case of loans for projects receiving external guarantees and developed in relatively low risk countries (111 bp).
On the other hand, the "country risk rank" has a significant negative impact on the spread: an increase of one unit of country risk rank (lower country risk) generates the reduction of the spread of 2.3 bp. This result confirms the second hypothesis of the study, and is explained by the fact that banks set less favorable conditions for risky countries, especially those with high political risk.

Thus, at the end of this study, we can say that spreads set by banks as part of project financing operations depend primarily on the level of country risk and the existence (or not) of external guarantees. Moreover, it should also take into account the banker's own perception of the risks of a particular project. It should not also exclude the impact of the industry. In fact, and knowing that the three main sectors involved in project finance transactions are energy, oil & gas and transportation, it would be interesting to see how the bank margin may vary from one sector to another .

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Tables

Table 1: **Financial characteristics of the loan's sample**

Number of loans	2055
Total value of loans (M$US)	426887
Average loan amount (M$US)	208
Median	75
Minimum	0,15
Maximum	21587
Average maturity (years)	8,5
Loans with fixed interest rate (%)	1,5
Loans with spread vs LIBOR (%)	39
Average country risk rank	76
Loans with external guarantees (%)	28
Loans with currency risks (%)	58
Loans to collaterals (%)	60
Average spread vs LIBOR (bp)	155

Table 2: The variables of the study

		Expected signs
Dependent variable:	Spread	
Independent variables	Amount	?
	Maturity	?
	Guarantees	-
	Country risk rank	-
	Currency risk	-
	Collaterals	+

Table 3. Regression analysis of loans spread determinants in Project Finance

Dependent Variable: SPREAD

Method: Least Squares

Sample: 1 272

Included observations: 230

White Heteroscedasticity - Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	**386.3169**	**67.07809**	**5.759211**	**0.0000**
Amount	**-0.029258**	**0.010725**	**-2.728002**	**0.0069**
Maturity	**-2.230066**	**1.322738**	**-1.685947**	**0.0932**
Country risk rank	**-2.264559**	**0.741241**	**-3.055090**	**0.0025**
Guarantees	**-91.58818**	**21.56277**	**-4.247515**	**0.0000**
Currency risk	**2.694511**	**19.97136**	**0.134919**	**0.8928**
Collateral assets	**27.37659**	**10.36952**	**2.640101**	**0.0089**

R-squared	**0.209007**	**Mean dependent var**	**137.5522**
Adjusted R-squared	**0.187725**	**S.D. dependent var**	**87.44941**
S.E. of regression	**78.81493**	**Akaike info criterion**	**11.60204**
Sum squared resid	**1385230.**	**Schwarz criterion**	**11.70668**
Log likelihood	**-1327.235**	**F-statistic**	**9.820685**
Durbin-Watson stat	**1.343398**	**Prob(F-statistic)**	**0.000000**

Table 4. Regression analysis without «currency risk » variable

Dependent Variable: SPREAD

Method: Least Squares

Sample: 1 272

Included observations: 230

White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	391.8083	54.53179	7.184952	0.0000
Amount	-0.029383	0.010843	-2.710009	0.0072
Maturity	-2.290875	1.201001	-1.907472	0.0577
Country risk rank	-2.300937	0.694271	-3.314176	0.0011
Guarantees	-91.45374	21.42608	-4.268337	0.0000
Collateral assets	27.33260	10.37640	2.634111	0.0090

R-squared	0.208936	Mean dependent var	137.5522
Adjusted R-squared	0.191278	S.D. dependent var	87.44941
S.E. of regression	78.64235	Akaike info criterion	11.59344
Sum squared resid	1385355.	Schwarz criterion	11.68313
Log likelihood	-1327.245	F-statistic	11.83258
Durbin-Watson stat	1.342913	Prob(F-statistic)	0.000000

Table 5. Significance test: effect of the amount on the maturity

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.296124	0.334449	21.81535	0.0000
MONTANT	0.004236	0.000954	4.441490	0.0000

Table 6. Significance test: effect of "Country risk rank" on the "Amount"

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.708205	204.1742	0.003469	0.9972
Country_Risk_Rank	2.222491	2.754556	0.806842	0.4206

Table 7. Significance test: effect of "Country risk rank" on the "Maturity"

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.456754	3.054585	1.131661	0.2590
RANG_RISQUE_PAYS	0.061516	0.041210	1.492743	0.1369

Table 8. Spread (in bp) in terms of country risk and the existence of guarantees

		Country risk	
		Low	High
External Guarantees	No	Spread 1 = 200 pb	Spread 2 = 218 pb
	Yes	Spread 3 = 111 pb	Spread 4 = 150 pb

Figures

Figure 1. Loans "Maturity" in terms of their "Amount"

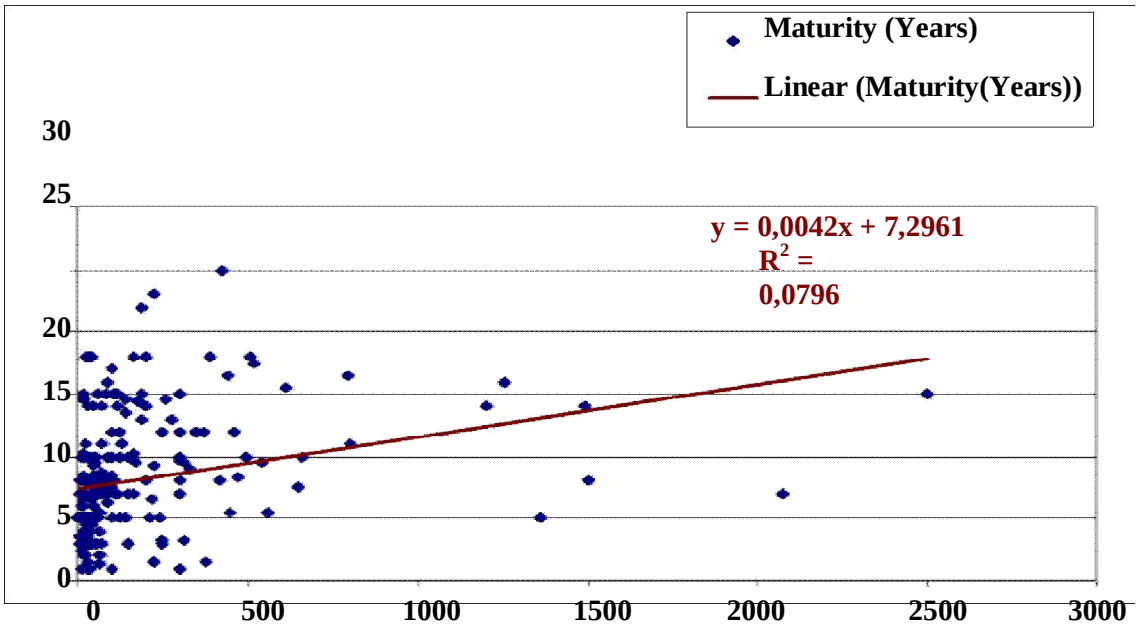

Figure 2. Loan's "Amount" in terms of "Country risk rank"

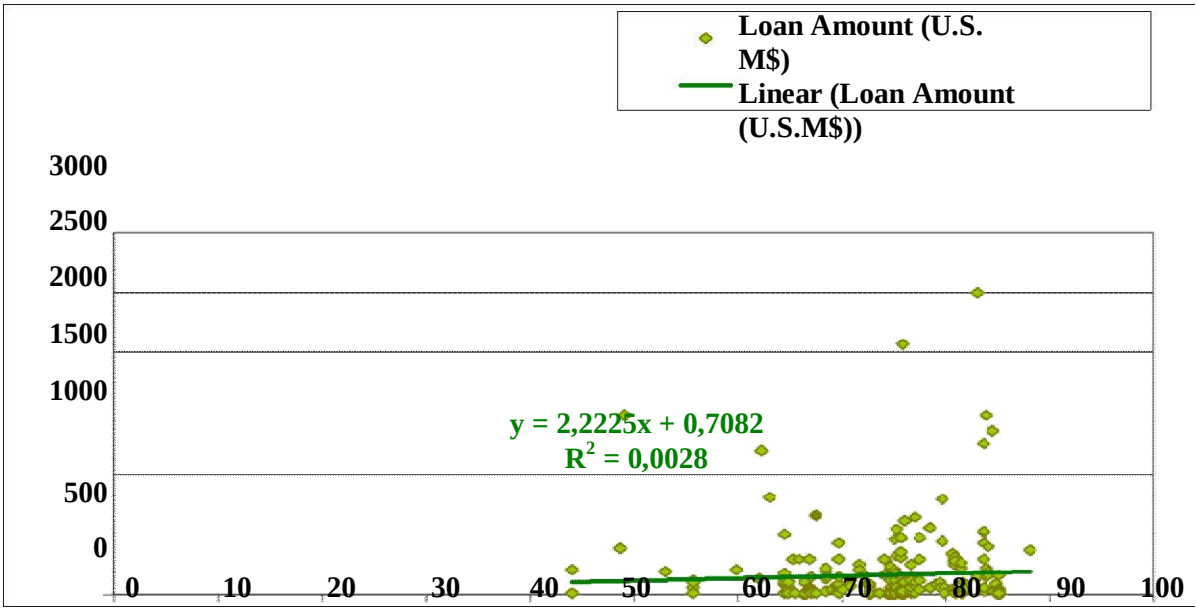

Figure 3. Loan's "Maturity" in terms of "Country risk rank"