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XXIII Congreso de Ingeniería de Organización



**Organizational
Engineering
in Industry 4.0**

BOOK OF ABSTRACTS

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**“13th International Conference on
Industrial Engineering and
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Financing infrastructure in emerging markets under public-private partnerships: managing the impact of foreign exchange on debt service

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Keywords: Infrastructure; emerging markets; public-private partnerships; project finance; foreign exchange risk.

1 Introduction

Many Emerging Markets and Developing Economies (EMDEs) have substantial infrastructure deficiencies they cannot address due to limited public budgets. In such cases the private sector can contribute to bring investments under public-private partnerships (PPPs) arrangements (Andres, 2014).

PPPs are long-term contracts between a private sponsor and a government entity, for the development and management of a public infrastructure, in which the private sponsor is providing the finance to construct, operate and maintain the new infrastructure (Inderst and Stewart. 2014).

2 Objectives

The objective of this research is simulating exchange rate movements and their impact on the debt service coverage ratio (DSCR) of a PPP project as well calculating the optimal size of an initial reserve account to cover potential liquidity shortfalls generated by local currency devaluations.

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3 Methods

Traditional financial modelling techniques rely on purchasing power parity to predict exchange rate movements. Empirical evidence suggests the differential of inflations between two countries is inaccurate to predict exchange rate behaviour both in the short and medium term (Jong & Park, 2017). This research proposes the use of statistical models for time series data to predict exchange rate movements such as the autoregressive conditional heteroskedasticity (ARCH).

To manage liquidity risks the standard practice in PPP projects is to create a reserve account to address liquidity shortfalls. This reserve account is typically funded with an amount equivalent to three to six months of debt service. However, the account does not isolate the impact of individual risks and the sizing is not based on expected financial exposure (Lim Abraham & Cai, 2017). This research proposes a dedicated account for foreign exchange risk and a size equivalent to the revenue loss generated by the single largest currency devaluation projected.

4 Results

The paper will compare the DSCR behaviour under the scenario using ARCH to predict exchange rates movements and to determine the optimal size of the reserve account with the DSCR behaviour under standard scenarios using purchasing power parity to predict exchange rate movements and pre-fixed reserve accounts of 3-month and 6-months of debt service.

5 Conclusion

The use of ARCH would provide a more reliable prediction of the exchange rate movements to assess the impact of currency devaluations in the projected cash flows of infrastructure project. The use of ARCH would also help to estimate the optimal size of a dedicated reserve account to cover foreign exchange risk. This account would reduce the impact of foreign exchange risk on the DSCR and loan defaults compared to pre-fixed reserve accounts.

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