

Reasonable concession period for build-operate-transfer road projects in the Philippines

Shinya Hanaoka^{*}, Hazel Perez Palapus

Department of International Development Engineering, Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan

Received 9 October 2010; received in revised form 5 February 2012; accepted 16 February 2012

Abstract

This paper provides a methodology to determine the reasonable concession period that would be advantageous both to the government and the private sector with the impact of risks taken into consideration in the financial evaluation using Monte Carlo simulation and bargaining game theory. The simulation produced a range of concession period for the private sector and government to negotiate. Bargaining game theory was employed in an attempt to find a specific concession period. To demonstrate the applicability of the proposed methodology, two Build-Operate-Transfer (BOT) road projects in the Philippines were used as case studies. The resulting concession period was found to be longer than the actual concession period granted to the private sector indicating the impact of risks in the cash flow. With the proposed methodology, the government could further enhance its policies in processing BOT projects with the end in view of increasing private sector participation in infrastructure development.

© 2012 Elsevier Ltd. APM and IPMA. All rights reserved.

Keywords: Road projects; Concession period; Build-operate-transfer; Risk analysis; Bargaining game theory

1. Introduction

The Government of the Philippines recognizes the indispensable role of private sector in infrastructure development. Through Build-Operate-and-Transfer (BOT), private sectors are able to participate in the implementation of large-scale infrastructure projects helping the government to alleviate its financial burden while providing the necessary infrastructures which are critical to economic growth and development. The [Philippine BOT Law \(2006\)](#) enables qualified private sector to finance, construct, operate and maintain any financially viable projects in partnership with infrastructure agencies of the government. Ownership of the infrastructure project is transferred to the government after a specified concession period.

Concession period starts from the signing of the concession agreement between the government and the private sector indicating the span of time within which the private sector is

responsible for the construction phase and operation phase of the BOT project. In the Philippines, the length of concession period is usually decided by the infrastructure implementing/head agency. Currently, there are two BOT road projects implemented in the country. The Southern Tagalog Arterial Road (STAR) Tollway is currently operational with a 30-year concession period from 2000 to 2029 while the Tarlac–Pangasinan–La Union Expressway (TPLEX) is under construction with a 35-year concession period from 2008 to 2043. Prior to the projects' submission to the evaluating agency to facilitate subsequent approval, the length of concession period is already defined and thus treated as an input parameter in project evaluation. Moreover, a quantitative risk analysis which considers the impact of variability in the concession parameters has not yet been put into practice. At present, the evaluating agency adopts a single point or deterministic modeling in project evaluation wherein a single best guess value of each variable is used to determine the financial indicators.

While [Shen et al.'s \(2002, 2007\)](#) studies offered an analytical deterministic method for determining the length of concession period to be granted to the private sector, they cannot be applied

^{*} Corresponding author.

E-mail addresses: hanaoka@ide.titech.ac.jp (S. Hanaoka), hppalapus@gmail.com (H.P. Palapus).

directly to the case studies used in this paper. The cash flow structure generated for the case studies does not follow the cash flow trend of the hypothetical project used in previous studies. Likewise, the methodology which utilizes simulation model proposed by Shen and Wu (2005) cannot be applied to the case studies as the same hypothetical project was employed. On the other hand, Ng et al.'s (2007) used simulation to consider the impact of risk on cost, revenue and profit of public–private partnership (PPP) projects under different internal rate of return (IRR) scenarios to determine the appropriate concession period. While the use of IRR as a significant criterion for project evaluation is recognized, this paper uses net present value (NPV) as an evaluation criterion. National Economic and Development Authority (NEDA), the agency mandated to evaluate major BOT projects in the Philippines, affirmed that the NPV criterion is widely accepted by accountants, financial analysts and economists (NEDA et al., 2005b). It is recognized that both the NPV and IRR methods have the advantage of taking into account the time value of money and thus both are viewed as superior to the non-discounting techniques in project evaluation (Holmes, 1998).

This paper aims to provide a methodology to determine a reasonable concession period that considers the effect of risks on uncertain concession items in project evaluation. The proposed methodology generated a concession period interval within which a specific concession period could be agreed upon by the government and the private sector. Any point within the interval could be considered as the optimal concession period that would be advantageous to both BOT players.

Section 2 of this paper covers the existing practice on determining concession period and current practice of project evaluation in the Philippines. Two case studies on BOT road projects in the Philippines are presented in Section 3. Methodology is presented in Section 4. Results are reported and discussed in Section 5 while Section 6 draws conclusion.

2. Concession period

2.1. Existing practice on concession period

In general, concession period is the span of time granted by the government to the private sector within which the private sector is responsible for the financing, construction and operation of a BOT project. In some cases, the facility is already provided by the government; hence, concession period only includes operation and maintenance of the facility.

It is a common international practice that the infrastructure implementing/head agency of the government sets the length of the concession period of projects to be granted to the private sector and requests the concessionaire to bid for tolls and other project aspects (Zhang, 2009). This has been the case for most of the road projects implemented worldwide as shown in Table 1 where the government of each respective country was the major deciding party in determining the length of the concession period granted to the private sector as well as the extension necessary to compensate for the company's accumulated losses due to lower revenues generated from the project.

In the Philippines, the Department of Public Works and Highways (DPWH) is the authorized agency to implement road projects. Prior to implementation of BOT road projects, DPWH needs to establish the overall viability of the project and submit the proposal/feasibility study and other pertinent documents to the NEDA, the agency mandated to evaluate, review and recommend approval of viable projects for implementation. In the case of STAR Tollway and TPLEX, DPWH already defined the concession period to be 30 years and 35 years, respectively, prior to submission to NEDA. Consequently, NEDA evaluated the projects based on the pre-set concession period, thus, calibrating other parameters like traffic volume and toll fees to evaluate and establish the financial viability of the projects. Upon the project approval, DPWH then prepared the bid/tender documents to proceed with the bidding process to invite and select qualified private sector to undertake the project. Specified in the bidding document is the length of concession period within which the winning bidder could implement the BOT project.

In general, while it is the Government of the Philippines (GOP), i.e., implementing agencies with the concurrence of the Approving Body (the Investment Coordination Committee and NEDA Board), that sets the length of the concession period to be granted to the private sector based on its evaluation, it does not guarantee the level of rate of return of the private sector. The GOP expects that interested/prospective private sector bidders would conduct their own due diligence to verify the assumptions/parameters used in the project evaluation prior to their submission of bids, hence, demand/revenue risks of the private sector are solely borne by the private sector and not guaranteed by the GOP. However, under existing policies of the government, if guarantee on demand is inevitable, GOP may set a minimum, guaranteed rate of return for the private sector on a project-to-project basis and at a limited period of time. Under this exceptional scenario, the GOP shall ensure that the following is clearly addressed/stipulated in its contract with the private sector: (a) contract clause stipulating minimum demand or rate of return which may be guaranteed; (b) contract clause stipulating the availability payment or mechanism to establish minimum revenue payments to the private sector; (c) contract clause stipulating specific period or expiration and coverage for take-or-pay condition; and (d) contract clause stipulating mechanism for monitoring rate of return or demand. The above instruments are expected to be abided by the contracting parties faithfully, and definitely should be considered in the determination of GOP on the length of the concession period during the evaluation stage.

For the five BOT tunnels in Hong Kong, the Hong Kong Government (HKG) has also pre-determined the 30-year concession period of each of the five BOT tunnels and specified it as the 'must' criteria to be satisfied by the concessionaire (Zhang, 2009). Zhang (2009) argued that the five tunnels have the same concession period of 30 years even though the physical length, design capacity, traffic demand, construction time, construction cost, etc., are quite different for each tunnel. Currently, the HKG is resolving issues on uneven traffic distribution among the three harbor tunnels. The HKG has been

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات