ABSTRACT

This dissertation can be seen as organized in three parts. The first part is about valuation of investment opportunities. The second part is about transport infrastructure projects in general and Build-Operate-Transfer (BOT) contracts in particular. The third part is about proposed modifications to 'typical' BOT contract. This part includes an illustrative example for valuation of modified BOT contract.

In the first part, we review literature relating to *option pricing theory* based approach to valuation of irreversible investment opportunities. We also review various financial option contracts and mathematical methods for their valuation.

In the second part, we begin with historical sketch of 'evolution of transport policy' in developing countries. Then, we identify unique features of transport infrastructure projects. We study in detail various phases of BOT projects, related parties, associated risk, and risk sharing/mitigation mechanisms. Finally, we discuss issues arising out of contingent liabilities of government assumed through sovereign guarantees.

In the third part, we address the problems associated with 'typical' BOT contracts by taking an 'options' view of these contracts. We propose modifications to 'typical' BOT contracts and present an illustrative example of a bridge worked under BOT contract. The modified contract comprises of a 'call' with European exercise and a 'put'

with European exercise and path-dependent (Arithmetic Average Asian) pay-off as annuity for remaining life of BOT contract. We model project revenues by a stochastic process with finite, inaccessible, non-absorbing upper and lower bounds. We use state-space approach (dynamic programming) to value the contract. The implementation is in Visual Digital Fortran.

On the whole, this modified contract structure helps us in estimating contingent liability of the government and provides for a 'compensated exit mechanism' for the private party. In effect a win-win situation.

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