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Valuing large engineering projects under uncertainty: private risk effects and real options

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Abstract

In all large engineering projects, valuation constitutes an important step during the initial stage as each stakeholder assesses the prospect of his or her investment. The complexity of valuation increases dramatically in the face of uncertainty especially when the risks are dynamic and stochastic in nature. The usual classification in finance theory divides risks into either market or unique. In this research, a new notion of private risk is introduced. A private risk may either be correlated with the market or be unique, but in addition it represents a substantial portion of an investor's wealth and is not tradable due to agency costs or other strategic reasons. The principles of pricing would differ according to the treatment of these different types of risks. Methods that are currently in vogue for pricing private risks are first evaluated, followed by a study of the effect of private risks in real option problems. Through a classic oil and gas exploration and development example, it is demonstrated that the methods chosen for pricing private risks can lead to decisively different real option values, exercise

strategies and development policies. Effectively, the difference in real option values can be interpreted as a form of private risk premium.

Keywords:

Decision analysis | private risk | real option | risk | valuation

Related Research Data

Understanding and Managing Risks in Large Engineering Projects
Source: SSRN Electronic Journal
Using real option and decision analysis to evaluate investments in the architecture, construction and engineering industry
Source: Construction Management and Economics
Time to build, option value, and investment decisions
Source: Journal of Financial Economics
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