

M-Y. CHENG, C-C. HSIANG. **Bid decision making with prospect game theory.** *Gerontechnology* 2012;11(2):318; doi:10.4017/gt.2012.11.02.349.00 **Purpose** This study proposes a new bidding decision model (Prospect Game Theory Model for Bidding Decision, BD-PGTM) for construction companies to set optimal bidding prices. **Method** This study has successfully integrated fuzzy preference relations (FPR) with fuzzy rating (FR), cumulative prospect theory (CPT) and game theory (GT)¹⁻³. FPR was employed to forecast implementation probability for bidding strategies, and to simplify and overcome traditional reliance on evaluator experience in prediction. FR was introduced to forecast value functions and probability weight functions of competitor's primary decision maker (PDM), and to solve the problems of inability to elicit competitor's preference functions. CPT was included to calculate the prospect value of all companies' PDM for all bidding strategy combinations. Lastly, GT was used to analyze PDM-determined bidding strategy. The optimal bidding prices derived from the proposed approach will be able to secure both the contract award and be as profitable as possible. **Results & Discussion** This study has verified the proposed BD-PGTM by using actual bidding projects from construction companies in Vietnam. It has also helped PDM to get exact optimal bidding prices.

References

1. Tversky A, Kahneman D. Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk Uncertainty* 1992;5:297
2. Wang TC, Chang TH. Forecasting the probability of successful knowledge management by consistent fuzzy preference relations. *Expert Systems with Applications* 2007;32:801;
3. Cheng MY, Hsiang CC, Tsai HC, Do HL. Bidding decision making for construction company using a Multi-Criteria Prospect Model. *Journal of Civil Engineering and Management* 2011;17(3):424

Keywords: bidding decision making, cumulative prospect theory, game theory

Affiliation: National Taiwan University of Science and Technology, Taipei, Taiwan;

E: chiachi@cycu.edu.tw

Full paper: doi:10.4017/gt.2012.11.02.349.754

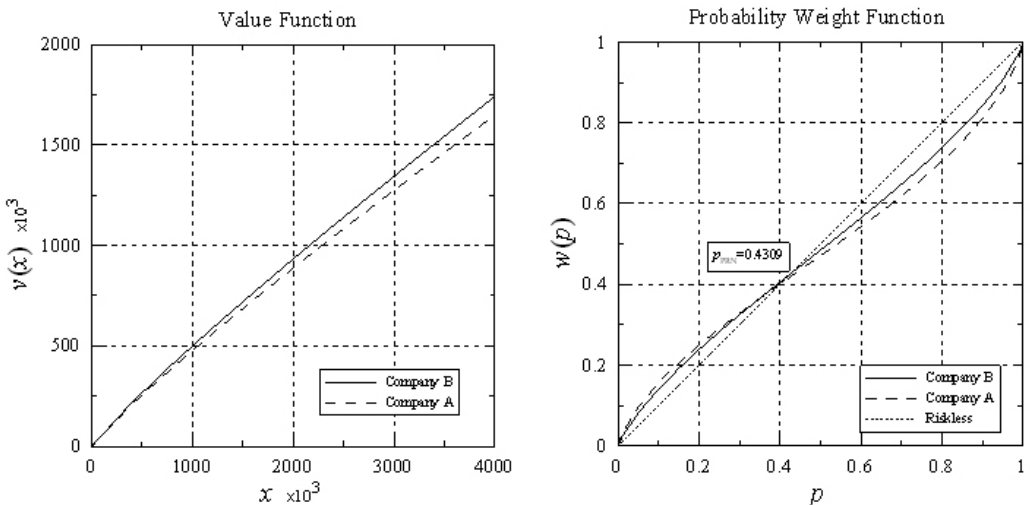


Figure 1. Forecast result of company B's value function and probability weight function