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## **OPTIMAL CONTRACTUAL DESIGN FOR PETROLEUM PROJECTS\***

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### **Overview**

A new and extended classification of project attributes and project design is developed, underpinned by modern contract and incentive theory and experience from a number of Norwegian offshore development projects. By combining theoretical knowledge with practical project experience, a state-contingent best practice for contractual arrangements in offshore development and operational projects is developed.

### **Methods and Results**

Best practice studies have been undertaken for US onshore construction projects, see, e.g., Howard and Bell (1998), and Business Roundtable Report A-7. We depart from these studies by creating a new and extended project classification. We also differ by focusing on an industry with different qualitative features, and where more creative contractual and organisational forms have been applied. Our focus is offshore projects on the Norwegian and the UK continental shelves. We benefit from a sequence of meetings with oil companies, drilling companies, oil service companies. These offshore projects are distinguished from traditional onshore projects in several important respects. Equipment is sophisticated and complex – often involving inseparable R&D components - and all operations are time critical since delays may cause substantial loss in net present value from petroleum extraction. Typically, work processes are parallel instead of sequential, which calls for a high level of co-ordination.

Yet another contribution in the paper is that we build a bridge between two disconnected strands of organisational and contractual analyses: (1) formal theoretical approaches, e.g., incentive and new organisational theory (Milgrom and Roberts (1992), Hillier (1997)), and (2) best practice studies from organisations like Project Management Institute<sup>1</sup>, Construction Industry Institute<sup>2</sup>, and Independent Project Analysis<sup>3</sup>. Surprisingly, with a few exceptions - like Bajari and Tadelis (2001) and Olsen and Osmundsen (2005) - these two approaches do not seem to have any cross references. We draw from both approaches in this paper. Whereas the formal theoretical approach has details on incentive design that are not accounted for in the best practice studies, the best practice approach comprises a number of relevant elements that are abstracted from in the formal models.

### **Conclusions**

In the paper, two main approaches for contract design for offshore projects have been analysed: contract and incentive theory versus the best practice approach. Based on this, a scheme is developed that outlines optimal state contingent contract design. The main conclusion is that contractual design must be tailored to the specific characteristics of the project and the contracting parties. If the parties are financially sound and the project is

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<sup>1</sup> <http://www.pmi.org/info/default.asp>

<sup>2</sup> <http://www.construction-institute.org/scriptcontent/Index.cfm>

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highly specified (detailed engineering has been undertaken), a lump sum tendering process may be called for. On the other hand, for development projects with preliminary engineering, where the buyer would like to influence the construction process and where the contractor has limited financial capabilities, they may want reimbursable contractual terms. Thus, successful project execution relies on a state-contingent strategy.

This is in conflict with an increasing tendency to standardise contracts. For transactions that are small and have a high frequency, standardisation is optimal. For unique and large transactions - which is often the case for offshore projects- it is important to curtail contracts. A standard contract may be useful as a starting point, but critical elements like compensation format and risk sharing must be carefully adjusted

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