



Concept Symposium 2018

Governing Megaprojects – Why, What and How

Cost Management in Business Contracts

Concept studies show that the cost management in Norwegian public projects in average is good. Public road projects are typically performed through Design Bid Build, where Norwegian Public Roads Authority (NPRA) has the responsibility for the design, and a number of contractors get the responsibility for construction, through a unit price contract. Typically, a project include a number of contracts. While costs control is in average good on the project level, we can see large deviation on the contract level, through scope changes and additions to the contracts. In a study we have looked closer at the cost management of construction contracts. Through quantitative data from NPRA we have look at what extent there are deviations between the initial contract sum and the final sum for the contract. We found that in average, the deviation between initial contract sum and final cost for the contract is 17,1 %. We have analyzed different variables that can explain this deviation. Interviews are also performed with experienced people to achieve a more in-depth understanding of the deviations. The overall aim is to identify measures to improve the situation. Overview of preliminary results from the study will be given in the presentation.



Olav Torp

Associate Professor
Norwegian University of Science and
Technology
Norway

The Concept Symposia on Project Governance

The Norwegian Ministry of Finance and the Concept Research Program hosts every second year a symposium on project Governance. Project governance, in brief, is concerned about investments and their outcome and long-term effects. In view of the problem at hand, the aim is to ensure that the best conceptual solution is chosen, that resources are used efficiently and anticipated effects realized. Resource persons from ministries, governmental agencies, academia, international organizations, and industry are invited. In order to facilitate professional exchange and direct communication between participants, the number of individuals is restricted. The aim is to initiate further international cooperation and research on important issues related to project governance.

<https://www.ntnu.edu/concept/concept-symposium>



NTNU – Trondheim
Norwegian University of
Science and Technology

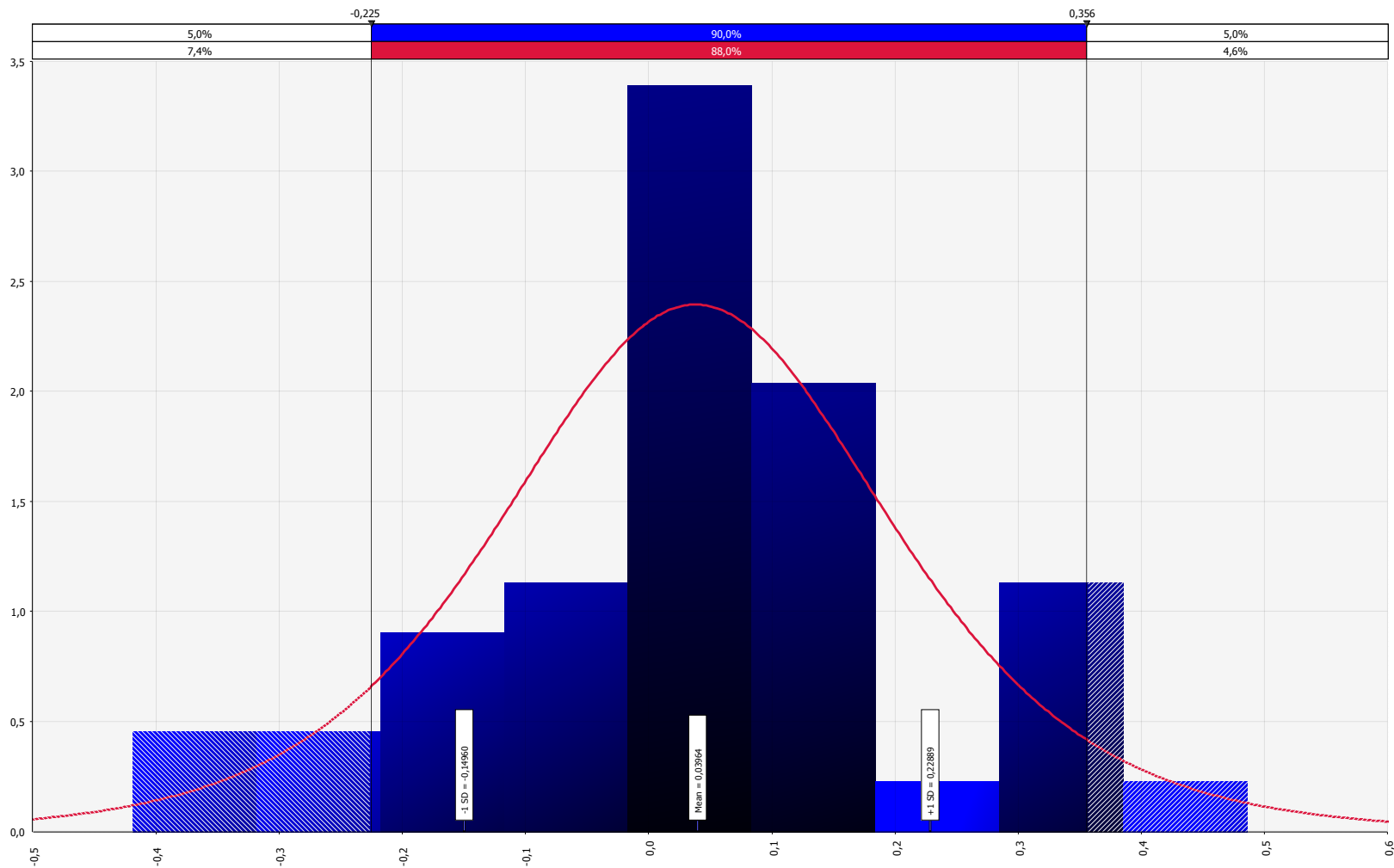
Cost Performance in Construction Contracts

Olav Torp
Associate Professor,
Concept research programme
Concept Symposium 2018, Sola strandhotell, 5-7 September

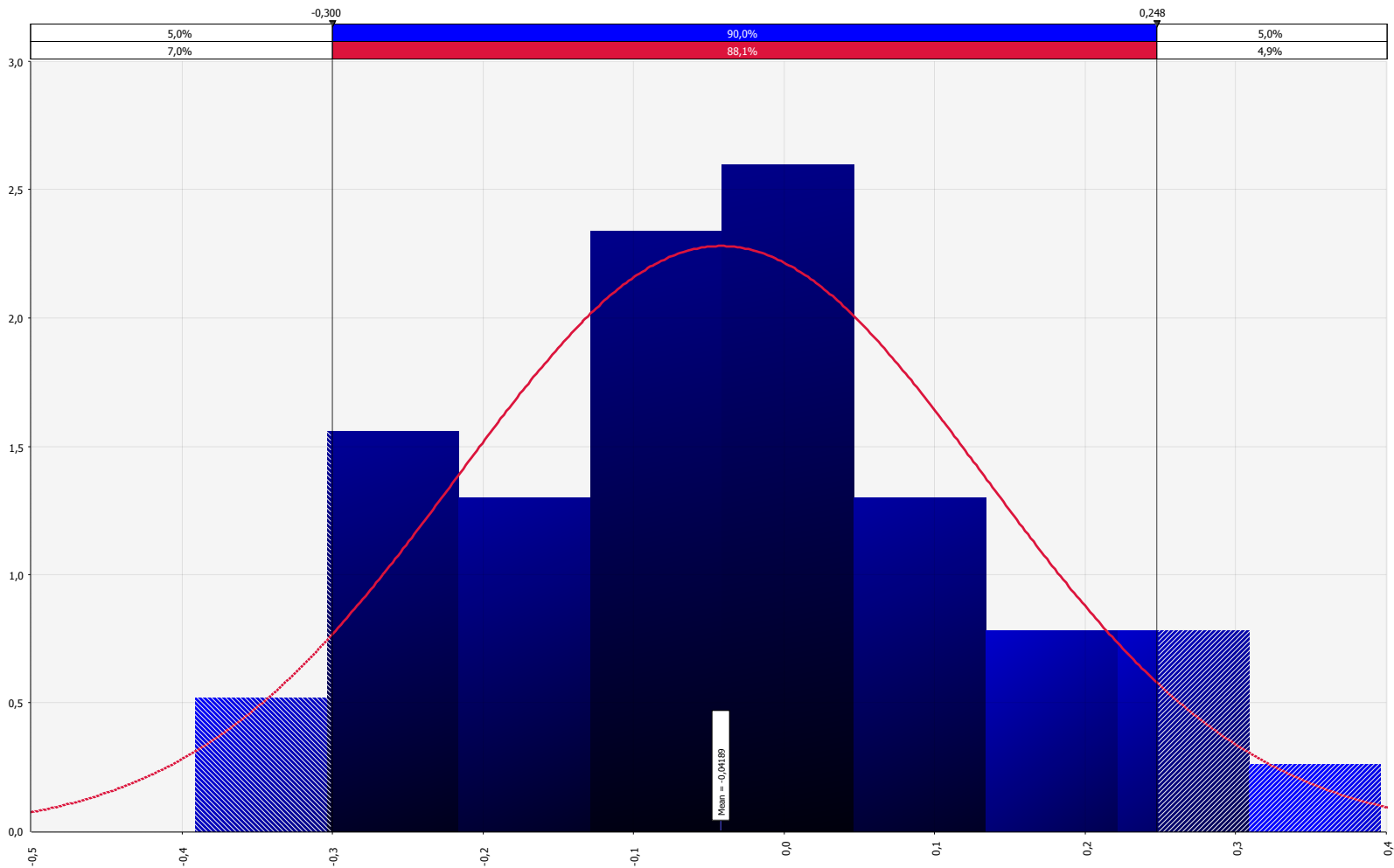
This presentation

1. Cost performance in Norwegian road projects
2. Causes of overruns
3. This study
4. Overruns in Norwegian road construction contracts
5. Conclusions

Cost performance in Norwegian road projects is generally good



A majority of road project keep within budgets



However...

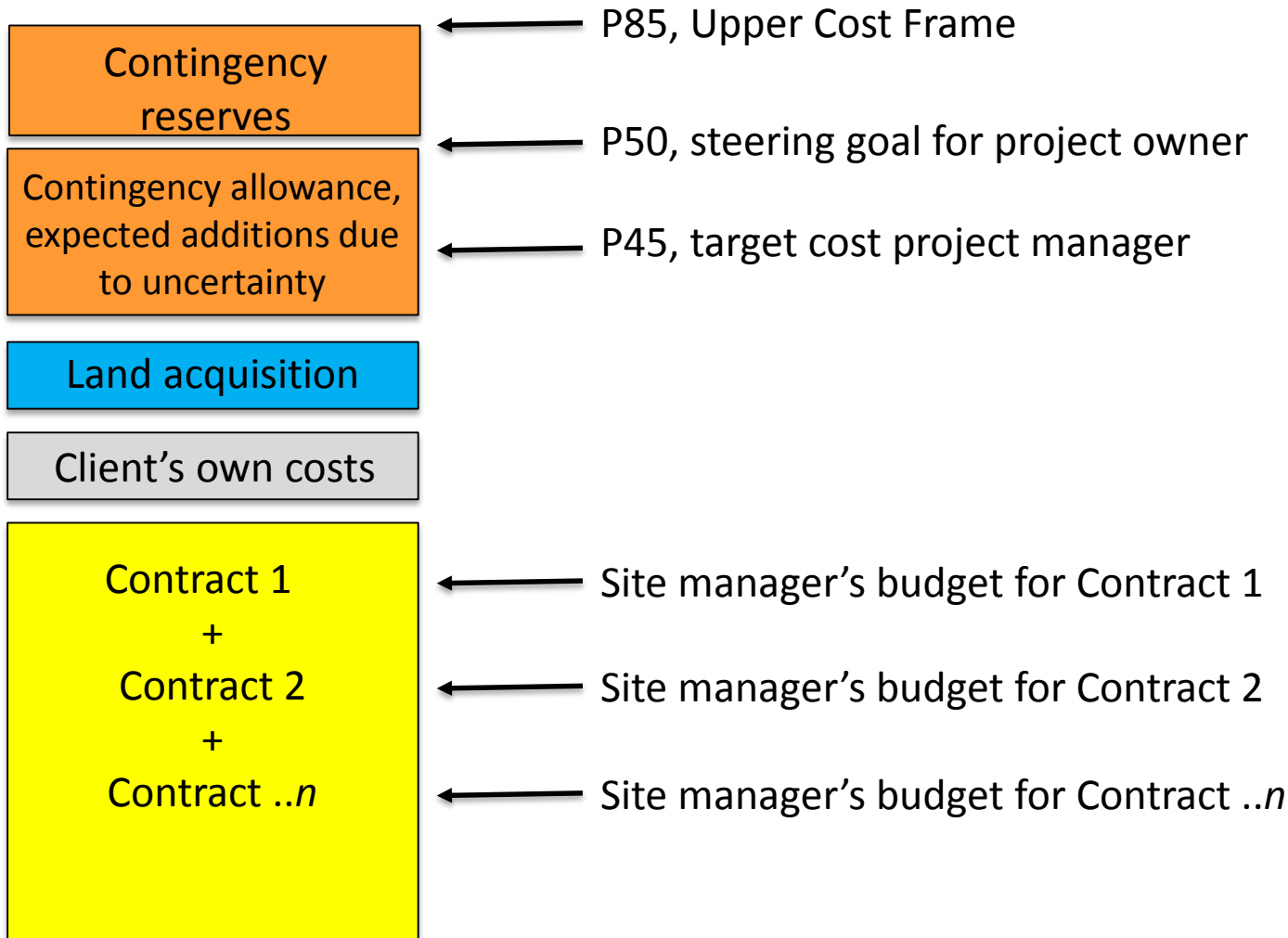
- 57 per cent of projects have final costs above the P50, and 35 per cent above the P85 (should be 50/15)
- Some projects overrun budgets by 20-40 per cent

There is room for improvement!

Typical causes of cost overruns in road projects

- Immature estimates / underestimation of risks
- Market conditions and –trends
- Challenging soil conditions
- Existing infrastructure in the ground
- Weak client organisation
- No external QA
- Scope creep
- **Poor contract specifications and expensive change orders**

Unit price contracts are the most common contract type in Norwegian road projects



A project is made up of several contracts

- Contingency reserves are normally non-existing at contract level
- Projects can avoid overruns even if contracts overrun, as long as contingencies are sufficient to cover unexpected events and “known unknowns”
- A unit price contract is a strategy by which the client retains most of the risk
- It may be cheaper to pay for additional work than to pay the contractor to include the risk in his bid
- But the lowest bid wins procedure may give the contractors a perverse incentive to under-bid

However, large overruns in contracts should be avoided

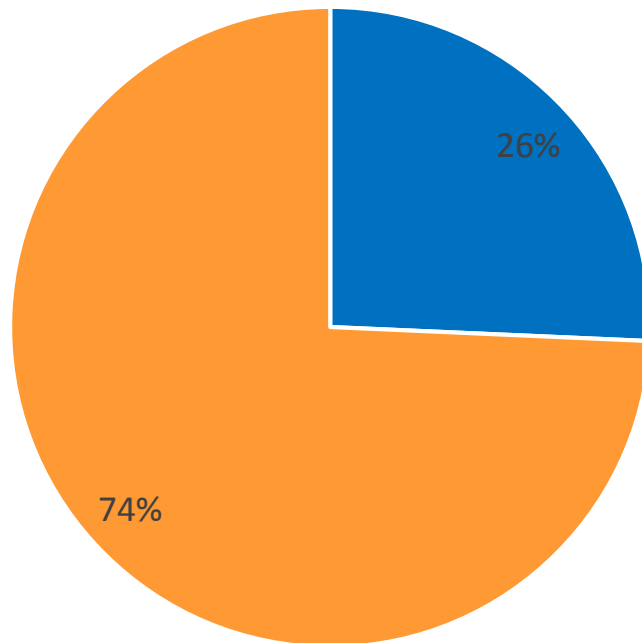
- Additional work is more expensive than agreed works
- Often the result of conflicts and disagreements which may lead to delays and poor work relations in the project
- Contract overruns may lead to project overruns

This study

- > 1000 road construction contracts signed 2009-2014, and finished 2012-2016
- 712 contracts included in the dataset
- Different works: groundwork, electrical engineering, bridge work, tunnelling, etc.
- From very small ~ EUR 5 million to large, ~ EUR 170 million.

- Quantitative analyses
- Qualitative analyses (interviews, ongoing)

A majority of Norwegian road construction contracts overrun



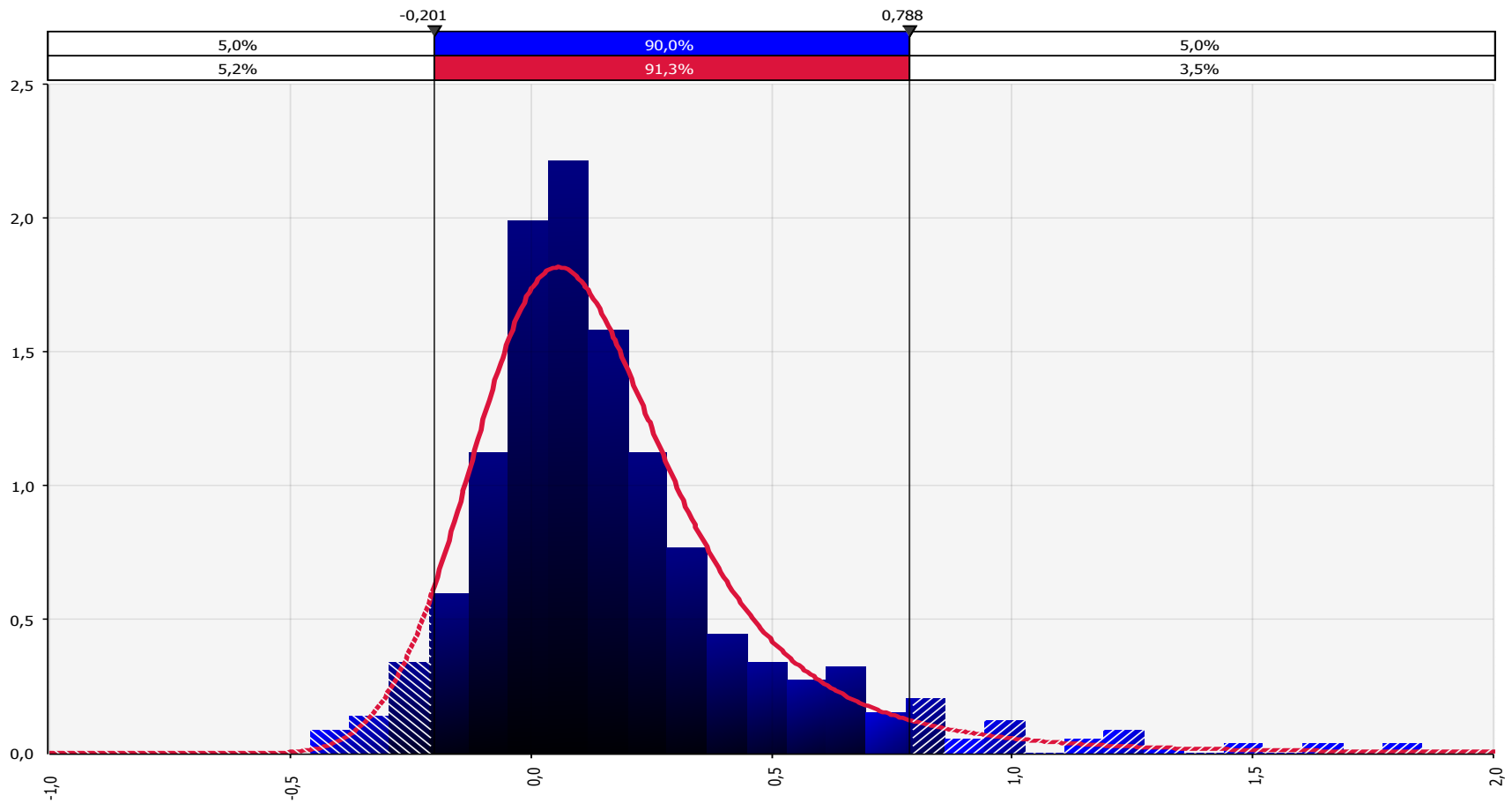
■ Underruns ■ Overruns

74%
of contracts overrun

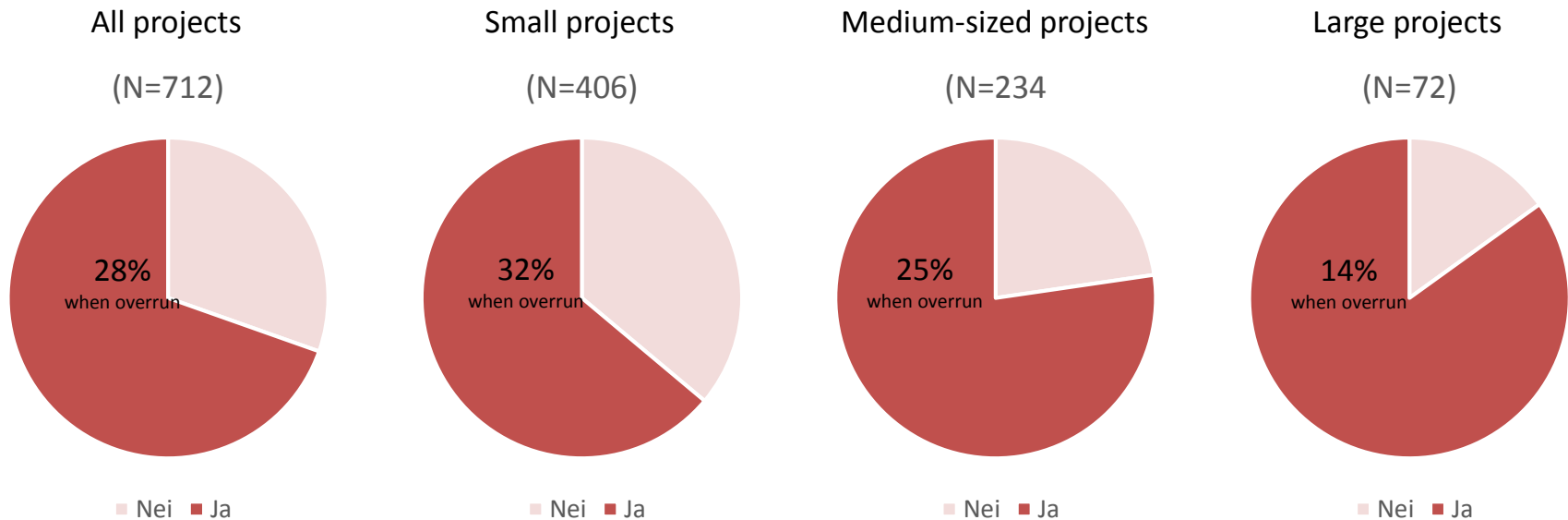
Average overrun is
17%

Average overrun is
28%
when contracts overrun

Overruns much more likely than underruns

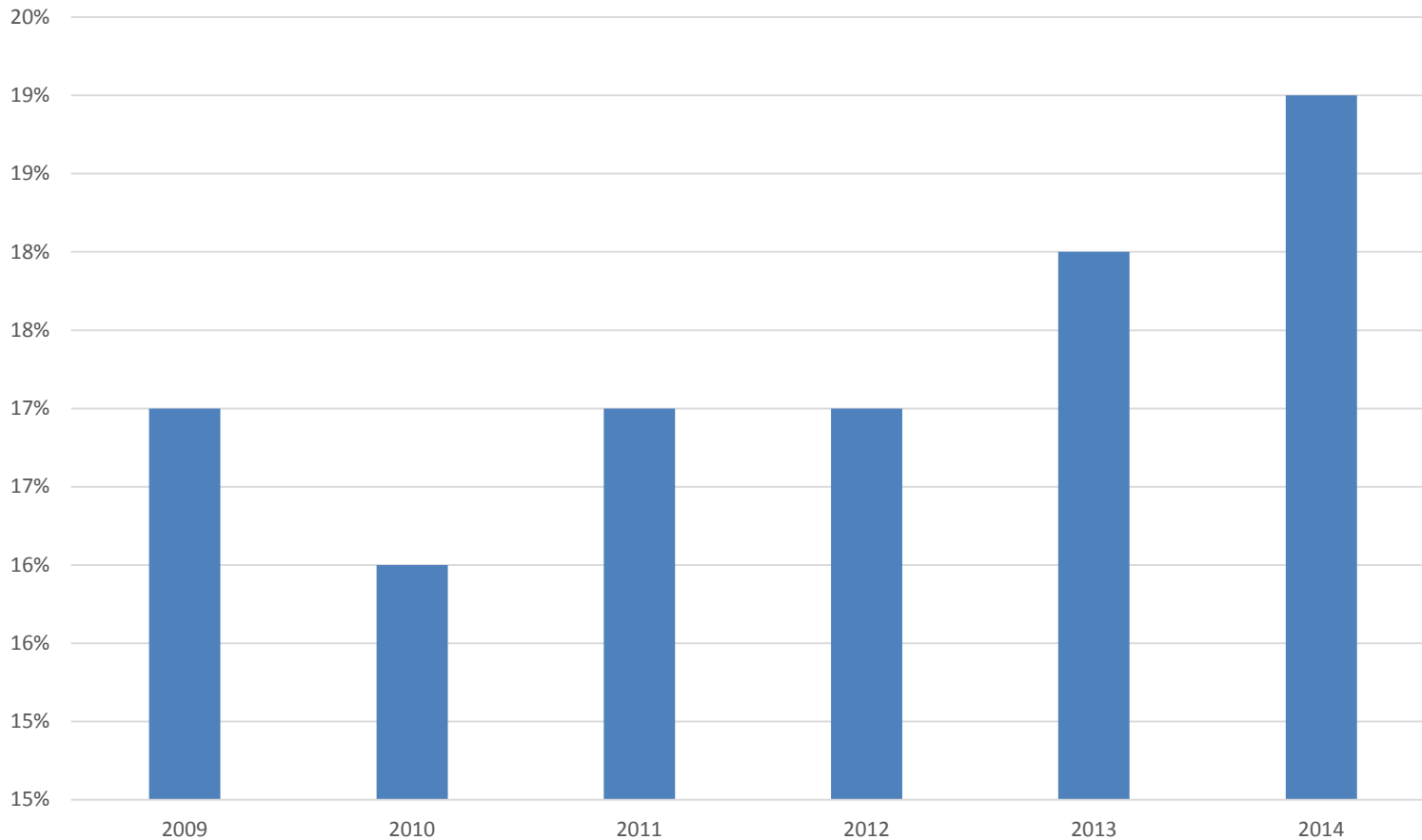


Project size



- Contract size increases the probability of overruns, but the size of the overruns is smaller

Overruns relatively constant over time



Variables that increase the probability of contract overruns

- Project complexity
- Urban location
- Challenging geographical conditions
- Project size

Variables that don't increase the probability

- Less experienced contractors
- Large variations between bids
- Challenging market conditions

Some contracts/projects are more risky than others, but the source of the variation is project-specific

- Our analyses reveal some interesting relationships, but the causes of overruns are mainly to be found within and not between contracts

= > Interviews with 10-15 people representing clients, consultancies and contractors

Preliminary findings from interviews

- Improved cost estimates, but more internal competence on road construction earlier compared to today?
- Contract strategy – moves towards increased use of Design Build contracts, early contractor involvement.
- The competition is in most cases good, less competition on maintenance contracts. One challenge is the access to heavy equipment.
- When it comes to large vs small contractors, the small contractors lack systems and routines, and don't have the capacity to follow up changes and claims. Some known contractors are more aggressive than others

Preliminary findings from interviews

- Is there an optimum number of bids? Yes, 4 – 5 bids.
- Cooperation between the client and contractors are in general good.
- Is contract changes really a problem? Yes and no.
 - It will always be changes
 - Could be better than letting the contractor price the risks
 - A problem when exceeding 15 %
 - A problem when the contract specifications are poor.

Preliminary findings from interviews

- There are even higher overruns on design contracts.
- The competence and capacity among designers varies a lot.
- Clients do the front-end planning, but don't have enough capacity to do the detail design themselves.
- Designers are generally not held responsible for poor quality or mistakes in the contract specifications.

The average contract overrun remain high and should be a cause for concern

- May increase the risk of project overruns
- A potential source of conflicts and delays
- The client's assumptions for contract price does not hold

Thank you!

olav.torp@ntnu.no



NTNU – Trondheim
Norwegian University of
Science and Technology