Concept Symposium 2016
Governing the Front-End of Major Projects

Are Real Options sufficiently appreciated in project evaluations?

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Over the last decade, Real Options have been implemented in the 'daily' project language.

However, many early phase project evaluations are missing out on Real Option discussions:

- Real Options are not evaluated at all
- The basic premises for Real Option value (uncertainty, new information over time, managerial
- flexibility) are neglected or misunderstood
- The range of Real Option types is not explored and the discussion is on one or a few option types only

In addition, one might ask if Real Option phrases are blurring an agenda of short-time savings or liquidity focus.

This presentation will, based on several early phase project evaluations of large public Norwegian projects, discuss the frequency of the above shortcomings.

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Are Real Options sufficiently appreciated in project evalutions?

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Jan Rune Baugstø
Head of Analyses

Have been involved in approx 25 QA1/QA2

Prior work experience	**Key competencies**	**Profession**
• Oil and Gas	• Decision Support	Head of Analyses
• Insurance	• Analyses	**Joined Atkins**
	• Quality Assurances	08/98
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Qualifications

Civil Engineer, NTH (NTNU)
Business Economist, BI
Intermediate economic history, UiO
Master of Management Finance, BI

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Background

Real Options were first coined in 1977.

In the project area, it was hardly considered for many years, but over the last decade, Real Options have been implemented in the 'daily' project language.
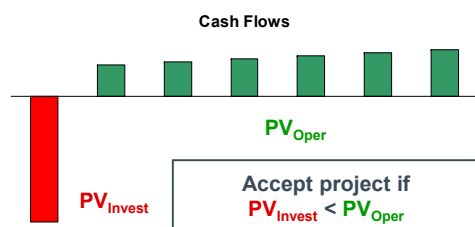
But

- Do we in a structured way implement Real Options in project evaluations ?

- Is there a general good understanding of the basic premises for Real Option value ?

- Do we explore the range of option types ?

- How do we balance Real Options vs other criteria ?

Ultimately, may lack of - or limited - Real Option evaluations lead to choosing wrong project alternatives ?

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A BRIEF INTRODUCTION TO REAL OPTIONS

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Real Options

Common evaluation

Cash Flows

PV_{Oper}

PV_{Invest}

Accept project if
$PV_{Invest} < PV_{Oper}$

A static picture,
even if a risk analysis is conducted

But, in reality (maybe….)

- The project do not start as planned, but are deferred
- The project lifetime is shortened or extended
- The project 'production' is not constant, but may vary
- The project may create opportunities for other projects and thereby add value
- … and many more potential changes

Consequence

The flexibility, and corresponding value increase, which is exercised in most projects is effectively assumed away in a traditional NPV analysis

Real Options

High uncertainty –
high option value

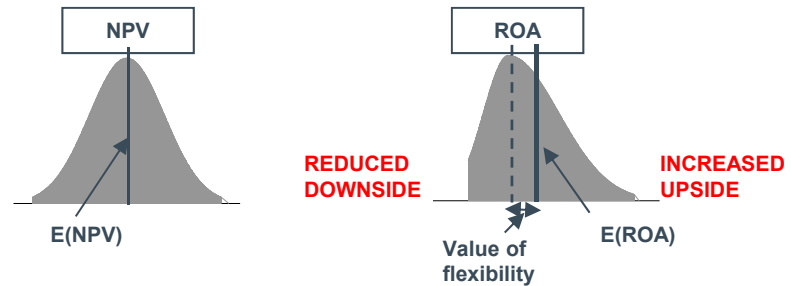| DEFINITION |
|---|
| A Real Option |
| • is the right |
| • but not the obligation |
| • to undertake certain initiatives e.g. deferring, abandoning, expanding, staging |
| • (to a certain cost – exercise price) |
| • (in a certain time – life of the option) |

PREMISES
If
• the future is highly uncertain, and
• it is very likely that new information appear over time, and
• there is managerial flexibility to respond to this new information
then Real Option value may be substantial
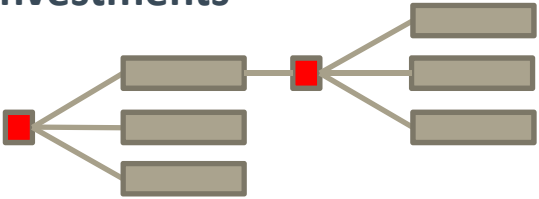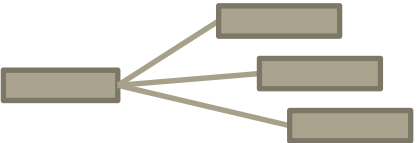
High managerial flexibility –
high option value

NPV

E(NPV)

ROA

REDUCED DOWNSIDE

INCREASED UPSIDE

Value of flexibility

E(ROA)

Types of Real Options

Defer	Change scale
Abandon	**Switch**
Staged investments	**Growth**

Many projects hold several options and they may interact and this interaction can make a larger total option value than the sum of each single option.

ARE REAL OPTIONS SUFFICIENTLY APPRECIATED IN PROJECT EVALUATIONS ?

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Early Phase Project Evaluations

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Some characteristics

- Several alternatives

- Substantial risk

- Supporting decisions on which alternative to choose for further detailing

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Guides ask for real option evaluations

- Ministry of Finance
  - QA1/QA2

- Public guides for socio-economic analyses
  - Basic premises
  - Types of options

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Real Option evaluations may change the rank of the alternatives

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A Real Option document review of public Norwegian QA1s
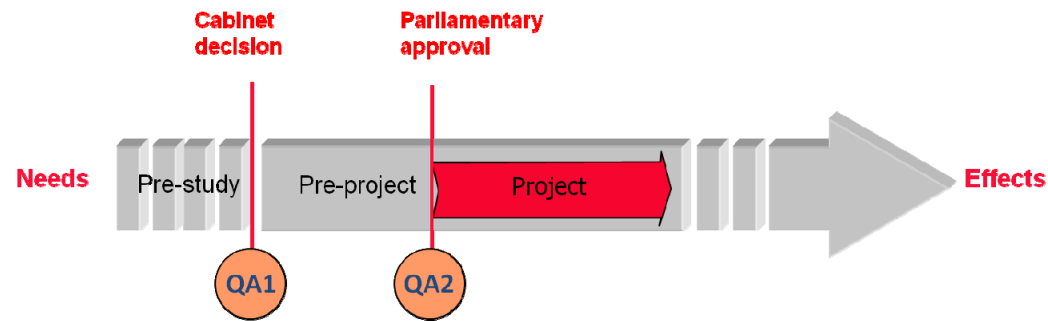
The 25 latest public QA1, 2012-2016

- Infrastructure
- Public buildings
- Police and Prisons
- ICT
- Sport and Culture
- Safety

Potential Shortcomings

- Real Options are not evaluated/discussed at all

- The basic premises for Real Option value are neglected or misunderstood

    - uncertainty

    - new information over time

    - managerial flexibility

- The range of Real Option types is not explored

- Real Options are only discussed in a qualitative way when quantification may have increased the decision support

Real Options are not evaluated/discussed at all

In 4 (16%) of the QA1s, Real Options are not evaluated/discussed at all.

Regardless of project, at least Real Options should have been discussed and argumented out of further evaluations.

The basic premises for Real Option value

In at least 50% of the QA1s, the basic premises for Real Option value are neglected or misunderstood

- Uncertainty
  High uncertainty – high option value
  This is hardly discussed

- New information over time
  General discussion, lack of details
  No discussion of decision rules

- Managerial flexibility
  High flexibility – high option value
  This is hardly discussed

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The range of Real Option types
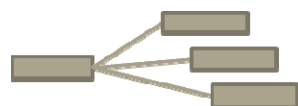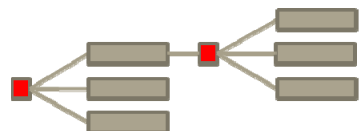
In most of the QA1s, the (full) range of Real Option types is not explored and the discussion is on one or a few option types only.

Some option types are misunderstood.
Most prominently:

- Defer option; short-time savings or liquidity agenda

- Staged investments as a project strategy, referred to as an option

The growth option is never discussed.

This is strange. It is obvious that e.g. infrastructure projects frequently include a growth option with (substantial) value.

Lack of quantitative assessments

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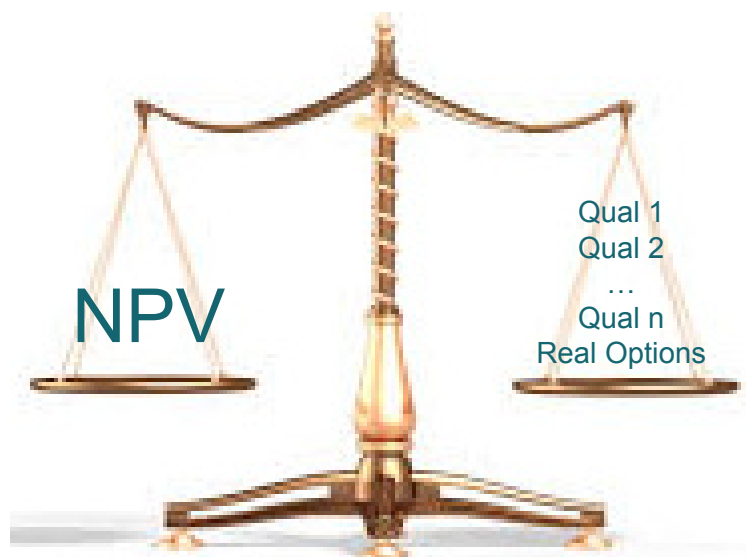
In the 25 QA1s, there is no Real Option quantitative assessment.

In socio-economic analyses

- cost and benefits are quantified as far as regarded justifiable, expressed with a resulting NPV

- remaining criteria are treated qualitative (semi-quantitative) with no weighting.

In the QA1s, Real Options are only discussed in a qualitative way and frequently listed together with non-quantified criteria.

Hard to beat the quantified NPV and strictly speaking: **Real Option Analysis is not an addition to NPV, it is an alternative.**

NPV

Qual 1
Qual 2
…
Qual n
Real Options

Some more observations

- There is no systematic difference in Real Option evaluations from sector to sector or from project type to project type

- Most projects have a long lifetime; Real Options should have been relevant

- It may be asked if decision makers do not ask for Real Option evaluations (?)

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Conclusion - Do the shortcomings matter ?

- The lack of structured Real Option evaluations is a surprised finding

- It is impossible (without a comprehensive study) to answer if lack of Real Option evaluations has led to that 'wrong' alternatives have been chosen

But there is a risk that that happens

Thank you for listening