ALTERNATIVE PROJECT FINANCE STRUCTURES IN DUTCH DBFMO PROJECTS

ENHANCING THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND APPLIED PROJECT FINANCE STRUCTURES

Content  Master Thesis - Construction Management & Engineering
Student  Jeroen Vincent Hofstra
Number  1268740
Date  6th of September 2013
I - COLOFON

Author
J.V.Hofstra

Student Construction Management & Engineering
jeroen.hofstra@gmail.com
+31(0)6-13389383

Institution
Delft University of Technology, Netherlands
Faculty of Civil Engineering and Geosciences
Stevinweg 1, 2628 CN, Delft, The Netherlands

Company
Ballast Nedam Concessions
Ringwade 71, 3439 LM, Nieuwegein, The Netherlands

Committee
prof.dr.ir. J.K. Vrijling (TU Delft)
Professor Probabilistic Design & Hydraulic Structures

ir. L.P.I.M. Hombergen (TU Delft)
Researcher Design & Construction Processes

prof.dr. J.P.M. Groenewegen (TU Delft)
Professor Economics of Infrastructures

E.K. Goverde (Ballast Nedam Concessions)
Senior Investment Manager

D.S.M. Alma (Ballast Nedam Concessions)
Senior Investment Manager
II – PREFACE & ACKNOWLEDGMENTS

This report presents the research I conducted to finish my master at the Delft University of Technology in The Netherlands. This thesis combines two subjects that interested me during my master course Construction Management and Engineering: Project Finance and DBFMO. During some brainstorm sessions, it became clear that Dutch contractors face difficulties with acquisition of long term bank finance for DBFMO projects. From this viewpoint I started to analyse this problem and its consequences for the public and private sector. Conducting this research provided me a strong learning curve and extended my knowledge on project finance in DBFMO projects. I am very grateful to Ballast Nedam Concessions, which provided me the opportunity to conduct this research and required resources, knowledge and support.

During the process I found that public and private parties related to the Dutch DBFMO market are busy to find cheaper and more robust solutions for the financing problem. The financial and construction sectors try to collaborate more intensively to find cheaper solutions. During the World Infrastructure Summit in November 2012, it was shown clearly how parties from different sectors have other perspectives regarding the problem and possible solutions. It showed me the relevance of a master thesis in this field of knowledge, which has been a driving factor throughout the process.

At first I would like to acknowledge my graduation committee for their contribution to this research. My supervisor Eline Goverde for her on-going day-to-day support throughout the process and provision of critical and detailed feedback. Dirk Alma for the help on defining the research problem and support during the first phase of the research. Leon Hombergen for showing me the public sector view on this research and daily support. John Groenewegen for his external view on the subject and help with structuring the report. Finally I would like to thank Han Vrijling for chairing the graduation committee and providing thoughts on economic and financial aspects to increase the quality of the report.

Secondly many thanks go to all interviewees for sharing their perspectives and thoughts on project finance structures in DBFMO projects. Furthermore the quality of this research really benefited from the support and knowledge of Wouter van den Berg, Friso van der Meijden and Marcel Kooman from Ballast Nedam.

Last but not least I would like to thank friends and family for their patience and trust in me while conducting this research. In particular I would like to mention my girlfriend Cathelijne van den Berg, my parents Tette Hofstra and Ria Schaefer, my brother Roland Hofstra and my housemates. Also the main reviewers of my report throughout the process have been very helpful: Renee Jaarsma, Bram Kool and Jaap Zijlstra. I am also grateful to all other persons that supported me, but are not mentioned here.

Hopefully you will enjoy reading this report and please don’t be reluctant to contact me for any further information or thoughts on this subject.

Jeroen Hofstra
### III – TABLE OF CONTENT

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I - Colophon</td>
<td>2</td>
</tr>
<tr>
<td>II – Preface &amp; Acknowledgments</td>
<td>3</td>
</tr>
<tr>
<td>III – Table of Content</td>
<td>4</td>
</tr>
<tr>
<td>IV - Summary</td>
<td>6</td>
</tr>
<tr>
<td>V - List Of Abbreviations</td>
<td>9</td>
</tr>
</tbody>
</table>

#### Chapter 1  Introduction of The Research

- §1.1 Background                              | 11   |
- §1.2 Problem Analysis                        | 14   |
- §1.3 Research Objective                      | 19   |
- §1.4 Research Design                         | 20   |

#### Chapter 2  Theoretical Context of The Research

- §2.1 New Public Management                   | 22   |
- §2.2 Principal-Agent Theory                   | 23   |
- §2.3 Theoretical Framework                    | 26   |
- §2.4 Relevance of the Research               | 27   |

#### Chapter 3  Project Finance in DBFMO

- §3.1 DBFMO in Infrastructure Projects        | 30   |
- §3.2 Project Finance Structures              | 35   |
- §3.3 Categories of Financiers                | 44   |
- §3.4 Main Elements in Financiers Perspectives| 47   |

#### Chapter 4  Perspectives of Financiers in DBFMO

- §4.1 Data Sources                            | 51   |
- §4.2 Perspectives                            | 52   |
- §4.3 Findings                                | 56   |

#### Chapter 5  Case Studies

- §5.1 Case Study I (DUO² Tax Office)          | 57   |
- §5.2 Case Study II (N33 Highway)             | 61   |
- §5.3 Findings                                | 65   |
| Chapter 6 Alternative Project Finance structures | 68 |
| §6.1 “Hadrian’s Wall” | 68 |
| §6.2 “Europe 2020 Project Bond Initiative” | 70 |
| §6.3 “Commute” | 72 |
| §6.4 Findings | 74 |
| §6.5 Recommendations | 76 |

| Chapter 7 Further Optimisation | 78 |
| §7.1 “Top-up” | 78 |
| §7.2 Design Guidelines | 79 |

| Chapter 8 Conclusion | 83 |
| §8.1 Findings | 83 |
| §8.2 Reflection | 86 |
| §8.3 Further Research | 88 |

| VI – Bibliography | 89 |
| VII - List of Figures & Tables | 93 |
| VIII - Appendices | 95 |
IV - SUMMARY

DBFMO (Design-Build-Finance-Maintenance-Operate) is an integral contract between public and private parties in which the construction, operation and financing of a public infrastructure is developed and operated for 20-30 years by the private sector. Various private sector parties team up in different consortia in order to offer the best bid to the government and win the contract. According the viewpoint of New Public Management this way of contracting may increase efficiency of the public sector, since private agents (contractors, consultants) are considered to execute the works more efficiently. The efficiency in DBFMO contracts compared to traditional contracting is called ‘Value for Money’ or ‘VfM’. Two components have a positive effect on VfM from a government's point of view, namely (1) the integration of design, build, maintain, operate-related activities and (2) the transfer of risks from public to the private sector. DBFMO is the preferred contract for outsourcing an infrastructure project when the generated VfM outrages the higher transaction cost and cost of private financing, the government chooses.

Principal-Agent Theory

In DBFMO contracts the bidding private consortia are obliged to finance the project through a project finance structure, a combination of 10-30% equity and 70-90% debt from various financiers. The costs of this private financing are higher than if the government would finance the project itself by issuing government bonds for example. The government accepts the higher costs of financing, which can be clarified by consulting principal-agent theory. This theory states that if the government (principal) outsources an infrastructure project to private parties (agents), agency problems will occur since goals of both parties differ and information asymmetry is apparent. Where the government aims to offer high-quality infrastructure at the lowest price, the private sector aims to maximise profits. The project finance structures in a DBFMO contract can be seen as a monitoring mechanism for the government, since financiers of project finance debt force the executive consortia partners to pursue the goals of the government. The repayment of debt and interest to financiers namely relies on periodic availability fees from the government, which are based on the actual delivered service quality. Therefore the project finance structure ensures that the Special Purpose Company and consortia deliver quality at low cost.

Problem statement

Banks have a prominent role in the provision of long term debt to DBFMO projects. As a consequence of the crisis mainly, commercial banks face difficulties to provide finance for 20-30 years to the DBFMO project, since risks on defaults of repayment to their own funders increased significantly. Development banks are backed by public authorities and therefore still able to provide some long term debt, but during the crisis they aim to spread their limited resources over different economic and societal relevant projects. It can be said that the changed perspectives of the banks are not longer matched by the project finance structures which are applied by bidding consortia. The present situation on long term finance for DBFMO projects (1) decreases competition between financiers, (2) is likely to increase financing cost, and (3) may disable the monitoring mechanism in the end if no long term debt is available.

Alternative Project Finance Structures

There are however potential financiers which aim to invest in long-term assets, such as institutional investors from the capital market. Consortia need to explore whether the match between applied project finance structures in DBFMO projects and the perspectives of current and potential financiers
can be enhanced. Alternative project finance structures help consortia to enhance this match and enable the monitoring mechanism at lower cost than present project finance structures. In order to see whether alternative project finance structures can be established, the perspectives of current and potential financiers were identified on the project finance elements risk, structure and return. The included financiers are strategic investors, commercial banks, development banks, infrastructure funds and pension funds & life insurance companies. Two present Dutch DBFMO projects were analysed. It was concluded that the perspectives of commercial and development banks were not properly matched. However it is noticed that institutional investors are mainly investing in equity of SPCs, their provision of debt to DBFMO is hampering. Until now, only the N33 project will acquire debt from a pension funds after construction is finished, but the interest is compensated for inflation. This clarifies the deteriorating availability of long-term finance. Both public and private parties are developing alternative project finance structures, in which the financiers perspectives are better matched. Three of the apparent alternatives were analysed. It was concluded that the perspectives of both banks and institutional investors were better matched with alternative project finance structures offered better matches with the perspectives of banks and institutional investors to step in. The researcher developed the alternative project finance structure ‘Top-up’ and proposes guidelines regarding further optimisation of project finance structures.

**Conclusion**

This research showed how the match between applied project finance structures and perspectives of current and potential financiers can be enhanced. It is also shown that the financing cost can be reduced by some of the alternative project finance structures. Additionally, it is likely that the involvement of investors from the capital market will increase competition between financiers which will lower the cost of debt for DBFMO projects in general. Besides this, it gives the government and bidding consortia a more robust solution regarding the fulfilment of the required long term finance for DBFMO projects. By safeguarding the fulfilment of the project finance structure, also the monitoring mechanism is ensured which is required to prevent the agency problem. For those reasons it is considered plausible that alternative project finance structures, in which the perspectives of financiers are better matched, will be implemented in more DBFMO projects during the upcoming years. Lastly, recommendations are provided to consortia of Dutch DBFMO projects to enhance the match between perspectives of financiers and project finance structures:

- Let institutional investors finance long-term debt of DBFMO projects, since this will lower cost of financing and preserves full committed finance.
- Verify whether the institutional investors accept construction risk and implement subordinated bank loan during construction as short as required.
- Involve institutional investors early and let them invest during construction at the moment their maximum amount of debt is drawn from a revolver bank loan.
- Preserve flexibility regarding drawdown during construction by the use of revolver loan facilities from banks, which are drawn pro-rata with subordinated debt and equity in order to reduce financing cost.
Make use of the flexibility of bank loans through senior debt (alignment) facilities during the ramp-up phase to overcome potential childhood diseases and ensure that institutional investors are repaid according schedule.

Implement project bonds in order provide a more liquid and potential inflation-linked debt investment to the financier during and/or after the construction phase, since this is likely to reduce financing cost.

Preserve a substantial share for banks within a maturity up to 10 year, since this short term debt is cheaper than long term debt from institutional investors.

These recommendations can be used to establish alternative project finance structures in which financiers find their perspectives matched, which enables the monitoring mechanism. Furthermore cost of this project finance structure can be minimised and benefits the change to win for a consortium, since lower ‘agency costs’ deliver more Value for Money to the government.
V - LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBFMO</td>
<td>Design-Build-Finance-Maintain-Operate contract</td>
</tr>
<tr>
<td>Euribor</td>
<td>Euro Interbank Offered Rate</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>Libor</td>
<td>London Interbank Offered Rate</td>
</tr>
<tr>
<td>NPM</td>
<td>New Public Management</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>PFI</td>
<td>Private Finance Initiative</td>
</tr>
<tr>
<td>SPC</td>
<td>Special Purpose Company</td>
</tr>
<tr>
<td>VfM</td>
<td>Value for Money</td>
</tr>
</tbody>
</table>
INTRODUCTION

PART A: EXPLORATION

PART B: ANALYSIS

PART C: DESIGN

EVALUATION
CHAPTER 1  INTRODUCTION OF THE RESEARCH

Since DBFMO and project finance may be new aspects for many readers, this chapter introduces the subject and research problem. Firstly the research background is elaborated (§1.1), followed by the problem analysis (§1.2). From this, a research objective is determined (§1.3) and the structure of the report is explained (§1.4).

§1.1 Background

In order to introduce the subject in general, this paragraph elaborates more on infrastructure development in general (§1.1.1), DBFMO as contractual form in infrastructural projects (§1.1.2) and the implemented project finance structure in the DBFMO projects (§1.1.3).

§1.1.1 Infrastructure Development

Infrastructure is considered to be essential to society since it supports economic development. The aim of the government and its executing agencies is to provide public infrastructure to society against reasonable cost (Weber & Alfen 2010). Traditionally the development and provision of infrastructure is fulfilled by contracting separate project activities for design, build or maintenance service to a private sector party. These parties carry out the contracted works (against contractual agreements), receive a remuneration and their obligation is fulfilled.

In recent years, a change can be observed in the way of contracting infrastructure projects to the private sector. In the 1980’s the ideas raised that the public sector could be modernised and more efficient (Hood 1991). According the ideas of ‘New Public Management’ or ‘NPM’, more market-oriented management by the public sector will lead to more cost-efficiency without ignorance of public sector goals or service of goods (Mongkol n.d.; Yescombe 2007). During the past three decennia, the public sector implemented a set of reforms in order to counter the perceived lack of effectiveness and efficiency of traditional management. The private sector is considered able to provide public services more efficient, at higher quality and at lower cost which reduces the waste of economic resources (Yescombe 2007). The roots of NPM originate from business administration, as performed by private sector parties. The public sector tends to enhance their performance by adoption of (private sector) management methods (Essig & Batran 2005). This also influenced the way of contracting for infrastructure projects by governments. Regarding believes of NPM, integration of different project activities can deliver more cost-efficiency to the government (Yescombe 2007). Contractual forms like DBFMO (design-build-finance-maintain-operate) are based on these believes of NPM.

§1.1.2 DBFMO

DBFMO is a contract between public and private parties in which construction and operation activities of an infrastructure project are integrally outsourced to private sector parties for terms of 20-30 years. Different contractors team up with other executing parties, like operator and suppliers, in consortia and are expected to operate and maintain infrastructure more efficiently than the public sector. The consortium that is able to provide the bid with the most efficiency compared to traditional contracting, called ‘Value for Money’ or ‘VfM’, is granted the project (Yescombe 2007). In the Netherlands, the expected VfM to be generated by DBFMO projects in construction or operation is reported at 10-15%, comparable with €800 million (Dutch Ministry of Finance 2012).

In order to measure the VfM the different consortia offer, the government compares the financial outcome of their bids with a hypothetical equivalent project as delivered through traditional public-
sector contracting (Public Sector Comparator or PSC). Comparing different components of these projects shows which bid offers the most VfM for the government. When comparing DBFMO with the PSC, four components are divided from a governmental point of view (Dutch Ministry of Finance 2002; Algemene Rekenkamer 2013; Siemiatycki & Farooqi 2012):

- Cost of designing, building, maintaining and operating the project;
- The estimated cost of) risks retained by the public sector;
- Transaction costs of the government for contracting, consultation and monitoring;
- Cost of financing

The figure shows the comparison between the project if it would have been contracted in a traditional way and DBFMO. One may notice that the four components represent different amounts in the two contractual forms. The following figure elaborates how these components differ between the PSC and DBFMO:

Since these costs for the government are spread over the total lifetime of 20-30 years, the cost of future cash flows are accounted for in current value by applying a discount rate. This is done because the present value of cash decreases over time and future cash flows are worth less than a similar cash flow appearing at present (Brealey et al. 2008). The sum of the discounted costs mentioned above, calculated for DBFMO and PSC should show whether VfM will be generated. More information on this valuation method called Net Present Value (NPV) will be provided in Appendix A. The differences between the four components within DBFMO and traditional contracts will be elaborated shortly (Yescombe 2007; Weber & Alfen 2010):
Cost | Effect | Differences
---|---|---
DBMO | Lower Cost | It is perceived that the private sector can anticipate on operation and maintenance activities during designing or building the infrastructure, when this is contracted jointly in DBFMO. This efficiency will reduce overall cost for DBMO-related activities related to traditional contracts.
Risk | Lower Cost | In traditional contract the public sector retains many risks, which are often monetised by multiplying the probability of occurrence with the expected cost in case the risks fires. DBFMO contracts aim to allocate risks at the party who is best able to bear them, which entails many risks are transferred to the private sector. Risks related to construction delays can best be transferred to the main contractor within the consortium for example.
Transaction | Higher Cost | These cost entail the cost for the government to arrange the project, facilitate the project, consult agents, developing a proper contract and monitoring the progress and performance. Since the DBFMO projects are larger in scope and timespan, and the financing component is added, transaction costs are higher in DBFMO projects compared to the traditional contracting.
Finance | Higher Cost | The cost of private financing are higher than if the government would have funded it by itself. This is due to the financial risk that private financiers bear in the project, since their repayment relies on the performance of the project over time. More on this will become clear in the rest of the report.

Table 1: Public cost in traditional and DBFMO contracts

Where the NPV-corrected cost for DBMO activities and risks are lower in a DBFMO contract, the finance and transaction cost are higher. In general can be stated that the calculation of VfM can determined by the following formula:

\[ VfM = \Delta NPV(DBMO) + \Delta NPV(risk) - \Delta NPV(transaction) - \Delta NPV(finance) \]

Value for Money is generated for the government if the positive effect of DBFMO on the (1) cost for DBMO activities and (2) risk transfer outrage the negative effect on (3) transaction cost and (4) financing cost. More on these four components is elaborated in Appendix B. The financing cost are strongly related to the implemented project finance structure by the consortium, which is the main subject of this research and will be further elaborated in §1.1.3.

§1.1.3 Project Finance

The government obliges a bidding consortium to acquire sufficient financial resources to finance the project by implementing project finance. This means that the consortia, which are most often initiated contractors, are obliged to finance the project upfront by a combination of equity (10-30%) and debt (70-90%) investments from them and external financiers. These investments from the financiers can be recovered by availability fees, which are paid periodically by the government as remuneration for provided service by the Special Purpose Company (SPC). The SPC is a specially erected company in which the parties of the winning consortium collaborate throughout the DBFMO project. The height of the availability fees is based on the actual performance of the SPC and provides high quality service according standards in the contract. Since availability fees are 'equally' spread over the term of the contract, long-term finance is required to fulfil the financing demand (Delmon...
Investors in Dutch DBFMO projects may help better match with financing DBFMO projects than DBFMO market. Recently, capital market investors, such as institutional investors, show their interest to enter the DBFMO projects whether current and potential financiers can fulfil the demand for private financing through project finance. New regulation of Basel III forces commercial banks to focus on short-term finance. This causes a change in the perspective of commercial banks regarding project finance structures. These extra financing costs are related to the extra risks that financiers bear compared to direct lending to the state through government bonds. These extra risks were transferred from the government to the SPC in DBFMO projects to deliver VfM (Yescombe 2007). Debate on this issue may even be encouraged by the fact that the government is able to acquire money relatively cheap by issuing government bonds at present. The higher cost of financing affect the purpose of DBFMO: Generating Value for Money. However this is a topic of debate (HM Treasury 2012; Yescombe 2007), it seems that the government accepts these higher costs of financing in general. In Chapter 2 is clarified why these extra costs are accepted. More elaboration on different debates on DBFMO is given in Appendix C.

§1.2 Problem Analysis

At present three trends can be seen within the Dutch DBFMO market, which jointly form the reason for this research. Before these trends are described, a problem statement is determined for this research (§1.2.1). The first trend is the preference of the Dutch government to use DBFMO as contract for infrastructure development (§1.2.2). Secondly, consortia in Dutch DBFMO projects face difficulties to acquire sufficient long-term bank finance (§1.2.3). Thirdly, institutional investors show increased interest in financing DBFMO projects (§1.2.4).

§1.2.1 Problem Statement

Project finance structures in Dutch DBFMO projects previously mainly relied on long-term bank finance. New regulation of Basel III forces commercial banks to focus on short-term finance by imposing more financing costs for the banks itself when providing finance with maturities over 10 years. This causes a change in the perspective of commercial banks regarding 20-30 year lasting financing of DBFMO projects. Since banks pass on extra costs of their own funding, the interest rates are likely to increase. It can be said that the applied project finance structures in DBFMO projects do no longer match with this changed perspective. This leads to lower availability of long term bank finance for the consortia and higher cost of private financing through the project finance structure for the government. In case the availability of long term debt deteriorates, competition between financiers deteriorates and drives up the cost of finance further (United Nations n.d.). Since the Dutch government aims to use DBFMO as preferred contract for future infrastructure development, the demand for private financing through project finance structures increases. It is questioned whether (1) current and potential financiers can fulfil the increasing demand for project finance for DBFMO projects, and (2) whether Value for Money is preserved despite increased cost of project finance structures.

Recently capital market investors, such as institutional investors, show their interest to enter the DBFMO market. Where the capital market aims at long-term investments, their perspectives may better match with financing DBFMO projects than the banks. The introduction of institutional investors in Dutch DBFMO projects may help to preserve or increase VfM by (1) increasing availability of long-term finance and (2) lowering financing cost (Dutch Ministry of Finance 2011).
However, investments by institutional investors in DBFMO projects are only applied in a limited amount of projects at present. For this reason the government and private sector are already exploring whether capital market investors are willing to participate in DBFMO projects. Potential financiers may have different perspectives regarding project finance structures in DBFMO, which should be taken into account by consortia when exploring whether these financiers may provide long-term finance to DBFMO projects. The research problem is summarised as follows:

**Problem Statement**

**Due to a mismatch between the changed perspectives of banks and the applied project finance structures, consortia in Dutch DBFMO projects face a deteriorating availability and higher cost of long term finance. Higher costs of project finance structures in the bids of consortia negatively affect the value for money to be delivered to the government. In case the consortia are able to match applied project finance structures and perspectives of the current and potential financiers, increased availability of long term finance and lowered financing costs can be established.**

The problem will be further analysed by elaborating three trends. In §1.3 a viewpoint will be determined on this problem statement.

**§1.2.2 Preference to use DBFMO for development of Dutch infrastructure**

Public authorities on national and international level are supporting the development of infrastructure throughout Europe in order to assist a revive of the European and national economies (European Investment Bank 2004). Measurements should ensure that the infrastructure development won’t stagnate or decline in the coming years, since this is seen often when crises appear and governmental budget deficits occur (Hammami et al. 2006).

The Dutch government also aims to hold on to their planning for infrastructure projects in order to fulfil infrastructure demand and help the economy revive. As DBFMO is considered as a way to fulfill this demand for infrastructure more cost-efficient than traditional contracting, DBFMO contracts are preferred if they are expected to generate more VfM (Rijksoverheid 2012). If DBFMO is not estimated to deliver VfM for a certain project, a traditional form of contracting is applied.

Associated with the increased demand for DBFMO is an increased demand for project finance by Special Purpose Companies. This means that more financial resources are required from the private sector, since the consortia is obliged to ensure that the projects are financed through a project finance structure. Regarding this demand, another trend can be noticed in the banking sector.

**§1.2.3 Long-term bank finance becomes less available and more expensive**

The required finance for Dutch DBFMO projects has been mainly acquired from banks, in the form of long-term bank loans through a project finance structure. However banks are active in the market for short-term lending (money market), consortia have always been able to fulfil their financing demand for 20-30 years since banks were able to arrange this without many problems (World Infrastructure Summit 2012, 2012).

However the consortia relied on the money market to acquire the major part of the required finance, there is also a possibility to (in)directly acquire finance from the ‘capital market’. Where the money market is focused on financing up to 10 years, the capital markets focuses on investments with
longer maturity. It is said that the private sector as a whole relies for 80% on the money market in Europe, where companies in the USA and Canada are more often financed by the capital market (Delta Lloyd 2013; Dutch Ministry of Finance 2012). First the three main options for the consortia to acquire long-term finance for DBFMO projects are summarised in the following figure:

<table>
<thead>
<tr>
<th>Option 1: Money Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to provide a long-term loan, banks acquire finance (back-end) from other banks in the money market and lend this out for longer terms (front-end) to the consortium (later SPC). When the term of the back-end loan matures, the bank refines this loan by a new loan. The interest rate at which the banks lend from each other changes periodically and is seen as a risk-free rate called 'Euribor' or 'Libor' (inter-bank lending rate). When lending this money out to the consortium, the bank adds a margin, which can be seen as their business model to earn money and cover risks related to recovery of the loan. They also earn money from fees for arranging capital market investment of other services for example.</td>
</tr>
</tbody>
</table>
Options 2: Capital market (through bank)

When acquiring financing in case long-term loans are demanded by the consortium, the bank may issue long term loans bonds which are bought by long-term investors from the capital market. Since the bank is not borrowing the money from another bank, the risk-free rate is based on a comparable investment for the capital market investors: the government bond of the involved country with a risk premium since investments in government bonds are considered less risky than investing in private parties. For acquiring this loan (back-end) from the capital market, the banks add an extra margin as remuneration when lending this money out to the consortium (front-end).

Option 3: Capital Market (directly)

A third way of financing the consortium is direct investment from the capital market. As mentioned, direct capital market investment is the most common way to finance companies in The Netherlands, but it is of main interest for this research. Since capital market investment is not widely applied in Dutch DBFMO projects, this research will further explore the possibilities to involve capital market investors. It should become clear what their perspective is regarding financing of DBFMO projects in order to see whether they can be involved.

Regarding the first two options in which the long-term financing to the SPC is provided by a bank to the SPC, the credit crisis played an important role. The credit crisis also showed that banks (un)intentionally face high risks of bankruptcy since they were highly leveraged (a lot of debt compared to equity). Many banks went bankrupt due to the low equity buffers they held for situations in which their assets became worth less. As a consequence, capital market investors became reluctant to lend long-term finance to banks since they face risk of bail-in if the bank tends to go bankrupt (Allen & Overy 2012). This caused that access of banks to the capital market shut down, which made them rely on interbank lending (option 1). The crisis also meant that banks reduced their appetite to lend money to each other, since they faced more risk regarding recovering their outstanding (especially long-term) loans. This means that banks have less access to long-term finance from both capital market and money market. Within the money market, some banks are still willing to lend out money but most often against higher cost to compensate risks.

Since banks seem to face many risks, public authorities sharpened regulation for banks by implementing Basel III. This regulation forces banks to increase the match between the maturity of the loan to the consortium (front-end) and their acquired finance from the financial markets (back-end). In case a bad match is established, the bank is obliged to increase (costly) equity buffers to compensate the risk associated. In case the bank provides a loan of 20 years and can only acquire finance for 5 years, it needs to refinance this loan after 5 years. Whether this is possible against adequate costs is uncertain and for this reason more risk is associated. For this higher risk and increased costs by extra equity buffer, the banks (1) pass on the extra costs of this buffer and risk to the SPC, or (2) stop the provision of long-term financing to companies. This mainly applies for commercial banks (not development banks), of which the differences will be further elaborated in Chapter 3.

From this it can be derived that new regulation of Basel III changed the perspectives of banks regarding long-term finance to consortia, both the provision itself and the cost. The consequences of this changed perspective may affect the probability to fulfil the total financing demand for DBFMO projects when using the existing project finance structures. Long-term finance is still acquired for
recent DBFMO projects, since (1) mainly development banks face less difficulties to provide long-term finance than commercial banks under the Basel III regulation, and (2) commercial banks pass the extra cost of their own funding to their clients (the consortium). However, the availability of long-term financiers is severely deteriorated. This might reduce the competition which is likely to increase the costs of project finance structures in DBFMO projects in general (Dutch Ministry of Finance 2012). Besides this, the controlling role of the financiers regarding the SPC should be ensured in order to ensure efficiency of the SPC.

As a consequence of the mentioned trend in the banking sector, less VfM is generated by the project finance structure in DBFMO projects due to (1) increased financing cost, and (2) insufficient long-term financiers to control the SPC adequately. In general, the present project finance structures in DBFMO projects are not matched with the (changed) perspective of banks regarding the provision of long-term finance to DBFMO projects. The deteriorating availability of financiers counteracts the expected VfM to be generated by DBFMO projects.

§1.2.4 Interest of institutional investors to finance Dutch DBFMO projects

While Dutch DBFMO projects mainly use long-term bank financing in project finance structures, the capital market might offer alternative financing sources or constructions (Dutch Ministry of Finance 2012). In foreign countries the capital markets, and institutional investors, are involved in many infrastructure projects. Even Dutch pension funds are investing in foreign infrastructure (Weber & Alfen 2010), but the Dutch government did not feel the need to involve institutional investors since the availability of long-term bank debt was sufficient for adequate competition.

When this market started deteriorating and it became unclear whether sufficient VfM is generated by DBFMO projects, the government researched the opportunities to involve institutional investors. Those parties possess large sums of money from policy holders to invest, which could be used to invest in infrastructure. Besides this, they are able to provide long-term finance at lower cost, since they are operational in the capital market and are funded differently than for example banks (Dutch Ministry of Finance 2011). Explorative discussions between the Dutch government and institutional investors resulted in the following conclusions, namely (1) there are no barriers for institutional investors to finance DBFMO, (2) pension funds are already co-investing in equity of DBFMO projects, and (3) institutional investors are not investing in debt of DBFMO projects, due to high organisational cost and the fact that liquidity of the assets is too low for the expected returns.

Besides this, institutional investors like pension funds partly invest in (relatively) risk-free long term government bonds. As a consequence of measurements taken by the EIB and the good financial status of the Dutch government, these investment don’t deliver adequate return. For this reason, the institutional investors are looking for other investments with a similar profile which can be found in DBFMO projects (Infrastructure Journal 2012).

This conclusion made the Dutch government eager to explore the possibilities of alternative debt financing and the effect on VfM. Recently, the Dutch pension fund APG provided long term debt to a Dutch highway-project (N33). This investment shows the potential of this alternative way of financing DBFMO projects in The Netherlands. Both public authorities and private consortia in the Dutch DBFMO market are recently investigating the opportunities of alternative financiers of debt for their projects (Infrastructure Journal 2012). Not many of these alternatives are implemented yet, but may form solutions for the upcoming pipeline of DBFMO projects.

Concluding, it can be stated that involvement of institutional investors helps to generate alternatives for the project finance structures in DBFMO, which are mostly financed by long-term bank loans up
till now. Involving institutional investors may help generating more VfM by (1) lowering cost of debt for DBFMO projects and (2) increasing competition for the financing of DBFMO (Dutch Ministry of Finance 2011). Institutional investors are considered to act differently from banks and are probably less experienced in Dutch infrastructure investment. In order to involve the institutional investors in Dutch DBFMO projects, their perspectives and backgrounds need to be taken into account.

§1.3 Research Objective

This paragraph will describe from which viewpoint the research will be approached (§1.3.1) and from here a research objective is determined (§1.3.2).

§1.3.1 Viewpoint

The research problem was based on a mismatch between the perspectives of banks and applied project finance structures, leading to a deteriorating availability and potential increases in the costs of financing. The Dutch government may expect a decrease in Value for Money since it is affected by increased cost of project finance. Since the Dutch government prefers DBFMO contracts for infrastructure development, they aim to preserve Value for Money by broadening the market of financiers (Dutch Ministry of Finance 2011; Dutch Ministry of Finance 2013). Therefore the government starts to explore whether consortia, which are mainly driven by contractors, are able to involve (institutional) investors from the capital market through alternative project finance structures. Costs of financing DBFMO projects may decrease, since (1) these sources of long-term finance may require lower returns, and (2) competition between financiers will be increased. This is beneficial for the VfM to be delivered by the project.

Since the DBFMO contract obliges the consortia to acquire project finance, the government actually relies on the market regarding the actual financing cost. As mentioned, one of assessment criteria for bids from private parties on the project are the cost of financing. So in case a consortium is able to provide a bid with lower financing cost, more VfM can be offered to the government which improves their position related to competitors. Due their focus on long-term investments, it is likely that institutional investors have different perspectives than banks (Infrastructure Journal 2012). It is thought that consortia are able to offer more VfM through alternative project finance structures in case they are able to enhance the match between perspectives of current and potential financiers and the applied project finance structures. The research is approached from the viewpoint of consortia.

§1.3.2 Objective

The following objective was determined for the research, according the viewpoint of the consortia:

Research Objective

Providing recommendations to consortia in Dutch DBFMO projects in order to enhance the match between the perspectives of financiers and applied project finance structures.

In §6.5 the recommendations are provided.
§1.4 Research Design

In order to achieve this objective, a research design was established to structure the research. First a set of research questions was formulated (§1.4.1), followed by the structure of the report (§1.4.2) and an explanation of the sources of data that were used during the research (§1.4.3).

§1.4.1 Research Questions

The following main research question is determined in order to achieve the research objective:

Main Research Question

**HOW CAN CONSORTIA IN DUTCH DBFMO PROJECTS ENHANCE THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND APPLIED PROJECT FINANCE STRUCTURES?**

The following sub-research questions are determined to answer the main research question:

Sub Research Question A

**WHICH ELEMENTS OF PROJECT FINANCE STRUCTURES IN DBFMO PROJECTS DETERMINE THE PERSPECTIVES OF CURRENT AND POTENTIAL FINANCIERS?**

Sub Research Question B

**TO WHAT EXTENT ARE PERSPECTIVES OF CURRENT AND POTENTIAL FINANCIERS MATCHED IN APPLIED PROJECT FINANCE STRUCTURES?**

Sub Research Question C

**HOW CAN THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND PROJECT FINANCE STRUCTURES IN DBFMO PROJECTS BE ENHANCED?**

The sub-research questions are used to structure the report by dividing the content in three parts A, B and C.
§1.4.2 Report Structure

Generally the report is divided in five parts. Besides the introduction and evaluation, the determined sub-research questions are used to structure three core parts A, B and C of the report. Some of the parts are further divided by two chapters, as can be seen in the following figure:

![Figure 2: Research Structure]

For every part of the research the content is shortly elaborated:

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>The research subject is introduced, the problem analysis is presented and a research objective is determined. Theories on New Public Management and Principal-Agent theory are used to establish a theoretical framework.</td>
</tr>
<tr>
<td>Exploration</td>
<td>More in-depth knowledge on project finance in DBFMO is presented in order to understand the research, expand the theoretical framework and determined how perspectives of financiers.</td>
</tr>
<tr>
<td>Analysis</td>
<td>This exploration of the research is used to define perspectives of potential and current financiers. These perspectives are analysed on the extent to which the match in existing project finance structures by case studies.</td>
</tr>
<tr>
<td>Design</td>
<td>Alternative project finance structures, as designed by the DBFMO market, are analysed in a similar way as the case studies. Findings from these analyses are used to provide recommendations and generate a new alternative project finance structure.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Findings from the research, reflection of those conclusions and recommendations on further research will be presented.</td>
</tr>
</tbody>
</table>

Table 3: Report Content

§1.4.3 Types of Research

The research was established by three forms of data: literature study, interviews and case studies. Literature studies were applied to determine the theoretical context of the research and which aspects determine financiers perspectives. This source is relevant to clarify the background. Interviews supported to determine the perspectives and provided empirical data to gain insight in the actual perspectives, as financiers look at project finance structures in DBFMO. Interviews gave the author of this report a recent view on the problem and potential solutions. Case studies helped to see to which extent financiers perspectives are matched in present project finance structures.
CHAPTER 2  THEORETICAL CONTEXT OF THE RESEARCH

In order to put the research problem in perspective, the theoretical context is determined. This context helps to understand the purpose and theoretical relevance of the research and will be a backbone throughout the research. The two fields of knowledge were identified which were strongly related to the research problem and each other, namely ‘New public management’ (§2.1) and the ‘Principal-Agent Theory’ (§2.2). These theories are joint and projected on the research subject in order to draw the theoretical framework of the research (§2.3). Lastly, the relevance of this research is further elaborated (§2.4).

§2.1 New Public Management

A theoretical background for the preferred use of DBFMO contracts by the Dutch government, is provided by ‘New Public Management’ or NPM. In §2.1.1 is determined what NPM entails and §2.1.2 describes the connection with the use of DBFMO contracts for infrastructural projects.

§2.1.1 Generation of efficiency and cost savings

As mentioned in Chapter 1, New Public Management can be seen as a field of knowledge that deals with a set of reforms in order to increase efficiency of the public sector. One of the main concerns of NPM is whether activities or tasks can be arranged by the public sector, but executed by the private sector. It is important that this outsourcing generates cost savings and efficiency, which is beneficial for the public sector and society. Efficiency and thereby cost savings can be reached by integrating production quantities (economies of scale) and outsourcing for example (Essig & Batran 2005). Main reforms by NPM, which can be noticed nowadays, are summarised as follows (Yescombe 2007):

- Decentralisation of government;
- Separation of purchase and provision of public services;
- Output- and performance-based measurements for public services;
- Privatisation of public services;
- Contracting public services to the private sector

DBFMO can be seen as contracting-out public services to the private sector in order to gain efficiency. This will be further elaborated in the next paragraph.

§2.1.2 Value for Money through DBFMO in infrastructure projects

Infrastructure is considered as a key public service, since it supports economic development. The role of the public authorities is to provide public infrastructures to society against a reasonable price or at no cost to the tax-payers. Private sector parties are not able to achieve this solely, since they aim to make profit and can not take into account externalities, such as societal benefits or economic growth, which the public sector is able to deliver (Weber & Alfen 2010).

Theoretically, public-private partnerships, which is the overarching expression for contractual forms like DBFMO, aim at outsourcing infrastructure-related activities to the private sector in order to gain efficiency (VfM) compared to traditional contracting (Turner 2009). This supports the perspective of NPM. The Dutch government confirms that DBFMO is used as contractual form for infrastructure in case VfM is generated. If this is not the case, traditional contracts are applied for the infrastructure projects (Dutch Ministry of Finance 2012).
Despite efficiency, transactions cost increase as a consequence of extra coordination efforts like “drafting, negotiating and safeguarding an agreement” (Williamson 1985). Besides this, private financing may increase the cost of finance for the project, which also affects the efficiency (Yescombe 2007). In case no efficiency is expected to be generated, due to high transaction or financing cost for example, a traditional approach of contracting infrastructure seems more adequate (Shaoul 2005).

In conclusion, it can be said that the New Public Management is considered to increase efficiency in the public sector. DBFMO may contribute to this efficiency by generating VfM in infrastructure projects, if implemented well.

§2.2 Principal-Agent Theory

Examine the outsourcing of infrastructure development in the light of NPM, the government contracts work to a Special Purpose Company. Principal-agent theory deals with associated agency problems in these type of relations (§2.2.1). DBFMO contracts contains several mechanisms in order to overcome the agency problem. The implemented project finance structure in DBFMO can be seen as such a mechanism, which clarifies the acceptance of the extra cost of financing (§2.2.2).

§2.2.1 Agency Problem

The relation between the government and the SPC (forthcoming from the winning consortium) can be defined as a contract between a principal (government) and an agent (SPC) (Jensen & Meckling 1976). Eisenhardt (1989) describes a situation in which the principal does not know exactly if the agent behaves according the contract. It is stated that the ‘agency problem’ occurs in this situation in which (1) interests of the principal and agent differ and (2) information asymmetry between agent and principal is apparent. These two key assumptions are considered in principal-agent relations.

Different interests of principal and agent

Interest may differ due to the origin of a certain party: The government aims to provide proper health care to society, while the private health institutions may partly focus on their profit. It is difficult and costly for the principal to verify whether the agent acts according their interest, since the principal does not have the capacity and knowledge to do this for example.

Asymmetry of information between principal and agent

Since the agent is often a specialist compared to the principal, the agent may have more information than the principal (information asymmetry) on the contracted work which he can use at his own interest. Two aspects of the agency problem can be divided: ‘adverse selection’ and ‘moral hazard’.

Adverse selection occurs when the agent (un)intentionally misrepresents its ability to perform the work to be executed. Since the principal is not a specialist, he faces difficulties to verify the actual ability of the agent to perform the work (Eisenhardt 1989).

Secondly moral hazard refers to a lack of effort from the agent to perform as agreed in the contract, also called shirking (Eisenhardt 1989). This problem is caused by the fact that the agent has more insight in the works to be carried out and may see opportunities benefits itself. Here the principal is not able to verify whether the agent pursues the principals interest.

As a consequence of this principal-agent relationship, the government faces difficulties to verify whether the SPC (or consortium in the preliminary phase) will be able to execute the work and
pursue the principals interest while executing the project. This is mainly caused by information asymmetry. It is considered impossible that the agent acts maximal according the principals interest at no cost automatically (Jensen & Meckling 1976).

**Agency cost**

In principal-agent theory it is assumed that the agency problem can be reduced by purchasing information. According Jensen and Meckling (1976), cost for the obtaining information are referred to as ‘agency costs’. Agency costs are defined as the sum of:

- ‘Monitoring expenditures’ by the principal;
- ‘Bonding expenditures’ by the agent;
- ‘Residual loss’

The principal can reduce the divergence between interests by implementing incentives for the agent which limit opportunistic behaviour and reduces information asymmetry. Examples of these ‘monitoring mechanisms’ could be monitoring systems, a board of directors and outcome-based or behavioural contracting. Secondly, the agent can implement guarantees which ensures that the agent acts according standards or the principal is compensated in case this was not done properly. ‘Bonding mechanisms’ can be found in compensation schemes in case of delay for example. The mechanisms however may never completely disappear, which leaves a residual loss for the principal (Jensen & Meckling 1976; Eisenhardt 1989). The efficiency of mechanisms depends on the apparent situation, since one solution may work for a specific problem but not for the other. Implementing more monitoring systems than necessary does not automatically generate more information to the principal (Eisenhardt 1989). Despite the fact that agency costs are common practise in these relations, the principal and agent should aim to act efficiently regarding the implementation of mechanisms. Implementation of too much mechanisms leads to undesired and unnecessary extra agent cost. Minimisation of agency cost is therefore desired.

§2.2.2 DBFMO contracts

It was stated that agency problems may occur when interests of principal and agent are not aligned and the information asymmetry is apparent. In any kind of public procurement, information asymmetry may arise between the government (principal) and the SPC (agent). This relation can be visualised as follows (De Palma et al. 2012):

![Figure 3: Principal-Agent relation in DBFMO](image-url)
The goal of the government is generating efficiency by partly out-sourcing the development and provision of infrastructure, while the goal of the private sector is to maximise profit (Devapriya & Alfen 2005; Demirag & Khadaroo 2011). Since the private sector provides the infrastructure and related services directly to the public (tax-payers) in the DBFMO project, the government relies on information from the SPC (consortia in earlier phases) regarding their ability and actual performance. Due to the specialist role of the private sector parties regarding construction and operating activities, it is difficult for the government to verify whether the SPC provides adequate information, the SPC performs well and whether it does not only pursue its own interests. Besides this, the government may face difficulties with assessing whether the consortia are actually able to execute the works (De Palma et al. 2012).

Main mechanisms to solve agency problems

DBFMO contracts contain mechanisms that deal with the agency problem that occurs when the government outsources the development of infrastructure. A couple of main mechanisms are elaborated:

1. The first mechanism in DBFMO is the coupling between the quality of service and the payment to the SPC. The government only pays the full availability payment in case the performance agreed upon is delivered (Algemene Rekenkamer 2013). In this way the goals of government and SPC are better aligned.

2. Integration of design, construction, maintenance and operation in a single contract forces the consortia to pursue optimisation of these activities in terms of planning and cost (Yescombe 2007).

3. The competition between different consortia to win the large DBFMO contracts forces private sector parties to optimise their bids. In the end this competition is likely to deliver more efficiency to the government (Demirag et al. 2010).

4. DBFMO entails a long-term (20-30 years) contract and availability fees are spread over the life cycle of the contract, which forces the agent to pursue long-term commitment and delivery of quality service (Yescombe 2007). Besides this, the principal is able to learn about the behaviour of the agent over time by gathering information (De Palma et al. 2012).

5. The DBFMO contract obliges the SPC to use a project finance structure, in which the main contractors are required to show their commitment by investing equity as strategic investor (Weber & Alfen 2010; Yescombe 2007). Additionally, consortia are obliged to acquire a substantial amount of debt from external financiers. Since repayment can only be derived from the availability fees, the financiers will therefore monitor the SPC on its behaviour according the governments interest (Devapriya & Alfen 2005). This aligns the interest of the SPC with the interest of the government. Besides this, the financiers carry out due diligence processes in advance to verify whether the consortia are able to carry out the works (Yescombe 2007; Weber & Alfen 2010).

Project Finance Structure as monitoring mechanism

Regarding the last point mentioned, the implemented project finance structure can be seen as a monitoring mechanism, implemented by the government. The mechanism ensures that the interest of the SPC will be aligned with the interest of government (Algemene Rekenkamer 2013). It does not
take away that public finance is a cheaper way of funding of private funding in general (Yescombe 2007). While Dutch government bonds are issued at interest below 2% in 2012 (Financieel Dagblad 2012), the private sector adds a risk premium on top of this risk-free rate (Yescombe 2007). The government accepts these extra costs related with private financing. Project finance structures in DBFMO projects can be certified as monitoring mechanisms, implemented by the government against extra (agency) cost in order to align the interest of the SPC with the goal of the government. Agency cost need to be minimised to optimise Value for Money of the DBFMO project. These thoughts describe the desirability of a project finance structure within DBFMO projects from the governments point of view.

§2.3 Theoretical Framework

In this paragraph a the theory is projected on the research problem (§2.3.1) in order to establish a theoretical framework (§2.3.2).

§2.3.1 Projection on the research problem

When examining §2.1 and §2.2, it is shown that NPM and principal-agent theory describe two different aspects regarding the out-sourcing of works from the public to the private sector. NPM shows that the public sector aims to gain Value for Money by out-sourcing infrastructure development to a private parties. The principal-agent theory describes that agency problems may occur in the consequential relations between principal and agent. Project finance structures in DBFMO contracts can be seen as a monitoring mechanism to align the interest of the SPC with the interest of the government. As a consequence the government accepts the higher ‘agency costs’ of financing, which need to be minimised to optimise VfM to be gained by the DBFMO project.

In the problem statement was mentioned how availability of long-term finance is deteriorating, which may rise the question to which extent the monitoring mechanism in DBFMO projects can be enabled. Simultaneously the (agency) costs of private financing are likely to increase, which should be minimised as stated in §2.2.1. Since the project finance structure is used as a monitoring mechanism by the government, it is important that financiers are willing to enter the project finance structures against low cost.

From the viewpoint of this research, the consortium is the party that should solve these issues by exploring alternative project finance structures in which the match with perspectives of financiers is enhanced.

§2.3.2 Framework

A conceptual model is established to visualise the theoretical framework:

![Figure 4: Theoretical Framework](image-url)
The consortia should ensure that the perspective of financiers is matched in order to fulfil the obligation to establish a project finance structure and enable the monitoring mechanism, which positively affects Value for Money. Secondly, consortia should try to minimise the cost of this project finance structure to preserve Value for Money.

This research provides recommendations to consortia in order to establish these two aspects. In order to do this, it should become clear (1) which elements define project finance structures, and (2) which current and potential financiers are apparent for DBFMO projects. This is done in Chapter 3.

§2.4 Relevance of the Research

The relevance of the research is determined from a theoretical (§2.4.1) and practical (§2.4.2) viewpoint.

§2.4.1 Theoretical Relevance

This research will be of theoretical relevance since it considers the project finance structure as a monitoring mechanism, which is associated with agency cost to be paid by the government. Since the project finance structure is used as a monitoring mechanism, it is required in the DBFMO project. Consortia should find a way to enable the monitoring mechanism through a project finance structure and try to minimise the cost to increase the chance to win future DBFMO contracts.

Project finance structures should be matched with perspectives of financiers

It follows from the problem statement that current and potential financiers are not willing to participate in case the project finance structure does not meet their perspective. By matching the project finance structures with the financiers perspectives, financiers enter the project and the monitoring mechanism is enabled.

Agency cost should be minimised in order to increase Value for Money

Once the monitoring mechanism is enabled, the extra financing cost are validated as agency cost. It is however desired to minimise these agency cost in order to increase Value for Money.

These assumptions will help to determine relevant subjects to be further explored (Part A), which will be used to analyse the present situation (Part B) and establish solutions (Part C).
§2.4.2 Practical Relevance

The research can be defined as practical relevant at three levels:

**Macro Level**

On a macro level the basics of New Public Management aim to let the public sector operate more efficiently. DBFMO is considered as a way to achieve this goal in infrastructure projects, but the research problem seems to counter the VfM to be generated. This research helps to preserve VfM by DBFMO projects.

**Mesa Level**

At mesa (national) level it can be seen that many infrastructure projects have been executed in the ’60s till ’80s. According an expected lifecycle of 30-50 years and the demand for infrastructure, a big flow of infrastructure projects is expected in the upcoming decennia. The government should ensure that this demand is fulfilled, which requires sufficient funding. Contracting through DBFMO is a way to ‘pull’ some projects forward to prevent giant budget deficits or unfulfilled demand for infrastructure.

**Micro Level**

On project (micro) level different consortia compete during the tender phase in order to win the project. The winning consortium provides the most VfM, which is partly determined by the cost of financing. If the consortium is able to lower the cost by using alternative project finance structures, the chance to win a project becomes higher.

The research is conducted at Ballast Nedam Concessions, a large contractor in The Netherlands that searches for innovative ways to finance DBFMO projects. Finding new and cheaper ways of financing DBFMO may help the company to win more projects and increase profit. Since more DBFMO projects will be tendered, advantage can be created in case alternative project finance structures are applied.
PART A - EXPLORATION

Sub Research Question A

Which elements of project finance in DBFO projects determine the perspectives of current and potential financiers?
CHAPTER 3    PROJECT FINANCE IN DBFMO

To understand how the research problem emerges at present, it is desired to know what project finance structures entail and why they are used in DBFMO projects. This information is used to determine some key elements in financiers perspectives. Background and purpose of DBFMO projects are first elaborated (§3.1). Secondly the project finance structures are further elaborated (§3.2). Lastly different types of financiers are determined (§3.3) and main elements in their perspectives are defined (§3.4).

§3.1 DBFMO in Infrastructure Projects

A general definition is given for DBFMO as a guidance through the report (§3.1.1), followed by a short elaboration of the process (§3.1.2) and organisation of a DBFMO project (§3.1.3). Lastly some elaboration of different risks in DBFMO projects is given (§3.1.4).

§3.1.1 Definition of DBFMO

Public Private Partnerships (PPP) is a more common name used for these types of relationships in The Netherlands (Weber & Alfen 2010). Yescombe (2007) mentions PPPs (and PFIs) entail some key elements, namely:

- A long-term (20-30 year) contract between a public and private sector party;
- Integration of design, construction, finance and operation activities for the development of public infrastructure by the private sector party;
- Payments are spread over the total term of the contract to the private sector party for the use of the infrastructure, which are paid by the public sector party or users of the infrastructure;
- The infrastructure remains in public sector ownership, during or at the contract end.

DBFMO can be seen as the common form of contracting in PPPs in The Netherlands. From the mentioned elements a definition of DBFMO was established:

DBFMO is a ‘type of contract’ for infrastructure development that formally establishes the relation between the public and private sector parties, in which responsibility for activities regarding construction or operation are transferred to the private sector party for a term of 20-30 years and payments are (1) spread over the whole contract life, (2) paid by the government and (3) based on availability of the infrastructure and service quality.
§3.1.2 Phases in DBFMO projects

Generally the total project consists of five different phases:

- **Initiation Phase**
  - During the initiation phase the public sector analyses the feasibility of a potential project and whether a project will be contracted traditionally or as DBFMO project.

- **Tender Phase**
  - During the tender phase the public sector selects the best party to execute the project. In order to meet the obligations of a DBFMO different contractors establish a 'consortium' with other parties, like operators and advisors. Different consortia establish bids in order to offer the best quality against the lowest price to the government (Rijksoverheid 2012). The bids of different consortia are compared by the public authority on many factors (Yescombe 2007):
    - esthetical and technical quality of the design;
    - speed of completion;
    - reliability of the involved parties;
    - quality of service;
    - risk allocation by the bidder;
    - innovation;
    - height of the yearly remuneration to be paid by the public authority;
  - During the tender phase a project finance structure is set up by the consortium and financiers are acquired to finance the project. The consortia go through a long and extensive competition, which ends with one consortium that wins the DBFMO contract. After closing of the contract and financial close (signing the financial contracts) the consortium starts the preparation for the construction-phase takes place. The first two phases take two to four years approximately.

- **Construction Phase**
  - After awarding of the project, the winning consortium partners establish a Special Purpose Company (SPC) (see §3.1.2 and §3.1.3). The construction phase takes up to five years, depending on the size and complexity of a project. In these years the required investments (capital expenditure or CAPEX) are done and equity and debt are provided by financiers to pay these expenditures. The SPC tries to manage that the project is finished as determined in the contract, since otherwise it may face fines and postponement of the availability fees (Weber & Alfen 2010). The financiers of the projects also focus on this, since these budget overruns or postponed revenues are negatively affecting their
return on equity or repayment of debt and interest. This phase is considered very risky regarding construction issues and time delays and may therefore be avoided by some types of the financiers (Weber & Alfen 2010).

**Operation Phase**

After completion of the construction, the operation (& maintenance) phase will start which entails a term of 20-30 years. During this whole period the SPC is responsible for the operation, maintenance and availability of the constructed infrastructure. For some infrastructures a main service component is included, which includes the cleaning and facility management for instance. Revenues are based on the performance and quality of the project, which make it essential for the consortium to think of the operational aspects when designing and constructing the infrastructure. A smart extra investment during the construction-phase might save a lot of operational cost or can reduce the amount of extra required maintenance for example (Yescombe 2007).

**Closure**

After the operation phase, the DBFMO contract is completed and the infrastructure asset is completely under public supervision again. This last phase may also consider a bit more risk, since small maintenance, operation or hand-over issues may occur and a agreed level of quality needs to be achieved before take-over can take place (Yescombe 2007).

§3.1.3 Organisation of DBFMO projects

After a consortium has won the tender and achieved the status ‘preferred bidder’, a Special Purpose Company is established in which the different private parties collaborate during the project. In this The organisational structure is schematised in the next figure:

![Figure 6: Organisational Structure of a DBFMO project](image-url)
Main parties and their roles in the organisation of DBFMO projects are summarised in the following table (Weber & Alfen 2010; Yescombe 2007; Delmon 2005):

<table>
<thead>
<tr>
<th>Party</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public client</td>
<td>Initiator of the project, which contracts the SPC to execute works regarding the project for a term of 20-30 years. This party pays fees to the SPC according the performance/availability throughout the term of the contract.</td>
</tr>
<tr>
<td>Special Purpose Company</td>
<td>After the project is won, the consortium partners establish a company in which they collaborate during the particular DBFMO project. It is the main entity that is contracted by the public client, and is only solely focused on the specific project.</td>
</tr>
<tr>
<td>Shareholder</td>
<td>The shareholders are owner of the SPC and mainly consists of a combination of sub-contracting parties (sponsors) and financial investors. These parties finance the project by providing equity as a part of the total financing demand. Shareholders are responsible for the performance and management of the SPC.</td>
</tr>
<tr>
<td>Lender</td>
<td>These private financiers provide debt to the SPC in order to fulfil the finance demand of the project. The control the SPC on its performance to ensure that their debt is repaid as agreed.</td>
</tr>
<tr>
<td>DBMO contractor</td>
<td>This main contracting party is often a joint venture of sub-contracting parties, which executes contracting works. It subcontracts the works to the D&amp;C and O&amp;M contracts. This party bears the risks regarding construction and operation activities and therefore represents the sub-contractors towards the SPC.</td>
</tr>
<tr>
<td>D&amp;C contractor</td>
<td>This contractor is responsible for the design and construction of the project. After the construction phase, their role is minimised by remaining responsibility of the quality of constructed works.</td>
</tr>
<tr>
<td>O&amp;M contractor</td>
<td>This contractor execute works regarding operation and maintenance during the operation phase.</td>
</tr>
</tbody>
</table>

The main contracts between the parties will be determined in order to gain insight in the relations between different public and private parties. Between those parties different contractual relations are apparent (Weber & Alfen 2010; Yescombe 2007; Delmon 2005):

<table>
<thead>
<tr>
<th>Contract</th>
<th>Purpose / content</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBFMO contract</td>
<td>The main contract between public and private sector parties in which the responsibility of development and operation of the infrastructure is outsourced to the (private) SPC.</td>
</tr>
<tr>
<td>Shareholder agreement</td>
<td>The public client obliges the main contractors to show their commitment to the project by investing equity in the project. The shareholder agreement binds them to the SPC and the DBFMO project. Also the distribution of shares is determined.</td>
</tr>
<tr>
<td>Credit agreement</td>
<td>This agreement binds the lenders to provide debt to the SPC in order to finance the project. It also states the interest to be paid and the timing of repayment for example.</td>
</tr>
<tr>
<td>Direct agreement</td>
<td>The direct agreement determines under which (problematic) circumstances the lender steps in the SPC in order to increase performance in case of bad performance. It also</td>
</tr>
</tbody>
</table>
gives the public client the ability to terminate the contract in case the lender decide to withdraw from the project before it is started f.e..

<table>
<thead>
<tr>
<th>DBMO contract</th>
<th>The DBMO transfers the responsibility of all works related to design, build, maintenance and operation from SPC to the separate DBMO contractor. This also means that mainly the activities related to finance and management are retained by the SPC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D&amp;C contract</td>
<td>Through this contract the design and construct activities are outsourced to a D&amp;C contractor.</td>
</tr>
<tr>
<td>O&amp;M contract</td>
<td>Activities related to operation and maintenance are contracted to the O&amp;M contractor.</td>
</tr>
</tbody>
</table>

Table 5: Contracts in DBFMO projects

As mentioned, a consortium is obliged to acquire project finance regarding the DBFMO contract, which is mainly focused on the shareholders and lenders in the SPC. Therefore these parties are considered further during the report.

§3.1.4 Risk in DBFMO projects

In DBFMO the risks of the project are distributed between the public client and SPC. The risks are generally allocated at the party that is able to bear this risk the best (Delmon 2009). It is expected that the party who is best able to bear a risk can reduce the monetised cost of this risk, which delivers efficiency. Yescombe (2007) divides risks in three categories, which are:

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Political</td>
<td>Related to political opposition or changes in law</td>
</tr>
<tr>
<td></td>
<td>Economic</td>
<td>Related to interest rates, inflation and external financial/economic forces, etc.</td>
</tr>
<tr>
<td>Construction</td>
<td>Site</td>
<td>Related to acquisition of site and permits, environmental issues, protesting parties, etc.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Related to the DBMO contract and the subcontractors, price changes, scope changes, etc.</td>
</tr>
<tr>
<td></td>
<td>Completion</td>
<td>Related to delays of construction and design, delivered quality f.e.</td>
</tr>
<tr>
<td>Operation</td>
<td>Operation</td>
<td>Related to expenditure for operation, revenue streams from users, availability and performance, etc.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Related to the actual cost of maintenance services, depending on the delivered quality during construction and compared to early estimates, etc.</td>
</tr>
<tr>
<td></td>
<td>Termination</td>
<td>Related to situation in which the SPC fails, the public client terminates the contract or large disasters occur (force majeure), etc.</td>
</tr>
</tbody>
</table>

Table 6: Risk Categories in DBFMO projects

These risks should be estimated on it’s content, the probability of occurrence and the impact in case of occurrence. From this the risks can be allocated on the best party to bear it. Sometimes consortia choose to transfer some risks back to the government since they are not willing to take it or consider it non-beneficial for the government to outsource this to the private sector (Delmon 2009).
§3.2 Project Finance Structures

In chapter 1 and 2 became clear that project finance structures are implemented in DBFMO projects. In order to understand the mechanisms of project finance its characteristics are further discussed (§3.2.1). It is important to elaborate which instruments are apparent to finance the project (§3.2.2) and how the cash flow method is working in project finance (§3.2.3). Lastly these aspects are related to the cost of project finance structures (§3.2.4), which in the end is paid by the government as agency cost.

§3.2.1 Characteristics of Project Finance

Project finance is a mechanism to raise long-term debt financing for large and major projects from lenders (Yescombe 2007). Not all projects are suitable for project finance, since (1) forecasted future cash flows should be sufficient to meet the requirements of shareholders and lenders, (2) the scale should be sufficient to cover the substantial cost of arrangement and (3) the risk profile of the project should be suitable for risk allocation (Weber & Alfen 2010). DBFMO projects generate stable availability payment from (relatively reliable) governments to the private parties involved in case of good performance. The main characteristics of project finance are determined by literature (Delmon 2005; Weber & Alfen 2010; Yescombe 2007), which will be elaborated here:

Cash flow Based Lending

Project finance is based on the fact that recourse to the shareholders in case of default of the project is very limited or even non-existent. This means that lenders are not able to retrieve their debt investment directly from the shareholders or government. Shareholders are generally liable up to their equity contribution (non-recourse) or a small extent above this in case things go wrong (limited-recourse). The latter is more often used in practise. Liability can be limited to a maximum term (time-limited liability) or amount (amount-limited liability). While the first one is more fits subcontractors role in the project (recourse until two years after construction e.g.), shareholders are more amount-limited since they are considered to remain in throughout the project. In general can be said that project finance is based on cash-flow based lending, since the financiers (both shareholders and lenders) rely on the future cash-flows.

High Leverage

Since lenders rely on the cash flows of the project and not mainly on the involved parties, they are often willing to provide a large share of the required financing. This also has advantages for the government, since debt is considered cheaper than equity due the lower risk involved. As the risk of equity is higher and financing cost for the project are related to this, the project may benefit from a lower equity share. However there are more important aspects on debt and equity, which will be further elaborated in §3.2.2.

Long term finance

Project finance loans have longer terms than corporate loans, like 20-30 years instead of 5-7 years. The high investment (CAPEX) of infrastructure projects can’t be recovered in the short term due the remuneration schedule. Accordingly, the level of yearly required cash flow for debt service can be reduced since the repayment of the loans is spread over a longer term. In this way the lenders and shareholders in the SPC are committed to the project during the whole lifecycle of the project.
Special Purpose Company

Project finance is used for time-limited, legally independent projects. As mentioned before, infrastructure projects often entail substantial financial contribution and risks throughout the project lifecycle. This is why it is considered better to separate the project from their parent company and establish a SPC. This entity bears all the rights and obligations regarding the project and is the main link from the private sector with the public client. Besides this, different private parties are able to easily collaborate through this entity, despite differences in size or financial strength.

Risk Sharing structures

Another main element of project finance is that it is based on optimal allocation of risks at the parties that is best able to bear them. A part of the risks remains at the public client, while the substantial part is transferred by the private parties. The SPC is main responsible for those risks, but also passes certain risks to related parties.

Off-balance sheet financing

As the government is considered to implement project finance to borrow money off-balance this can be different for the parent companies. The debt appears on the balance sheet of the SPC at all time, but (depending on the accountancy system) the shareholder may be obliged to adopt the debt on their balance sheet. Only the debt pro rata their equity share is considered to be relevant in this matter. This means that debt acquired for the DBFMO project is not always considered off-balance like the government. More on the discussion on off-balance sheet government finance can be found in Appendix C.

Monitoring Mechanism

It was mentioned how the presence of the lenders can be seen as a monitoring mechanism which solves agency problems and aligns the goal of the SPC with the goal of the government. This monitoring mechanism considers upfront due diligence on whether the SPC is able to execute the works and during. Additionally, and potentially of even more importance, the lender controls the SPC on its actual performance during construction and operation of the DBFMO project. According the theoretical context of the research, the monitoring mechanism is the main argument for the government to implement private finance instead of public finance.

§3.2.2 Financial Instruments

Considering the characteristics from §3.2.1, it can be concluded that equity and debt play an important role in project finance structures. These financial instruments and their relation are further elaborated in this paragraph. Different instruments are apparent to fulfil the financing demand of a (special purpose) company, which can be mainly classified as: Equity or debt capital. There is a common distinction between those sources, which have their own characteristics. Mezzanine can be seen
as a hybrid form between equity and debt. Companies are often financed by a combination of different instruments (Weber & Alfen 2010), which is referred to as the ‘capital structure’. These various forms of capital not only differ from type of provider, but also in terms of their risk profile. The level of risk taken is related to the expected return on the invested capital by the provider of the capital. Equity is considered to be riskier since it has the most subordinated rank regarding recovery of investment in case of non-performance or when financial arrangement can’t be met. Debt is considered less risky (Delmon 2005). The concepts of equity and debt are elaborated, in order to understand the background of financing companies and project finance.

Debt

In order to finance companies in general, debt is often used since it is the most extensive form of financing available. Besides this, companies may not have the requested amount of capital to execute their business plan (Yescombe 2007), such as contractors in DBFMO projects. Different types of debt can be distinguished, of which the most common instruments will be discussed. The figure below shows the relation between equity and debt, which will also become clear.

One can divide loans and bonds as main forms of debt. Where loans, most often provided by banks, cover short term debt (<10 years), bonds are considered to have a long maturity (>10 years). Longer term loans are however also apparent, as mentioned before. (Yescombe 2007; Weber & Alfen 2010). Banks, operative in the money market, may provide loans solely or involve other banks by forming a finance consortium (club deal) or reselling (a part of) the provided loans in the market (syndication). The involvement of other banks is done to lower the total investment by one bank and lowering risk of default (non-repayment). The loans often remain at the initial lender(s) until maturity. For debt transactions with a larger amount or longer maturity, bonds are issued by companies. These bonds are offered to long-term investors in the capital market, which may sell (a part of) these during the term of the bond in order to generate cash to invest in other companies.

Debt can also be subdivided in senior and mezzanine (or junior) debt, of which the latter ranks subordinate to senior debt but superior to equity. This hybrid form of debt and equity is mezzanine or junior debt. Often this is a form of debt over which higher interest has to be paid; used to cover risky phases or investments of the company for example. The required interest lays between equity and debt, due to the intermediate level of risk. In case revenues are disappointing and equity is ‘eaten’, the mezzanine debt may be put forward to substitute the equity. This is named a bail-in. Shareholder often provide so-called ‘shareholder loans’, which is considered a form of mezzanine debt, since it returns interest and is amortised over the contract term. This type of capital is used by investors, since interest on the loans can be tax deductible if approved by the public client. Besides this, it is easier to return funds by just repaying the loan to investors if shares are sold (Yescombe 2007).

Equity

As mentioned, equity is capital in the SPC which is invested by the shareholders. Shareholders are the owner of the SPC and mainly decide on the strategy. They faces higher risk than lenders, since they are responsible for the performance of their company and repayment of debt to lenders for example. In case the company is earning less revenues due to bad performance/management, the debt and interest still have to be repaid to debt providers. In fact, the shareholders face the risk of negative scenarios. Generally, equity is ranked subordinate to debt regarding (re)payment from the revenues. Debt service (interest and repayment) is always paid before sponsors receive so-called
dividend, which make equity investment riskier. For taking more risk, shareholders require higher returns than lenders (Delmon 2005).

Equity is mainly provided by strategic investors, sometimes accompanied by infrastructure funds or institutional investors. Where strategic investors aim to expand business as contractor, the ‘financial investors’ aim to maximise return. Strategic investors invest in equity in order to ensure that works are assigned to them or supply chain activities are included within the company. On the other hand a substantial equity contribution by shareholders shows commitment and might prevent risky behaviour. Besides the fact that debt is ‘cheaper’ than equity, it is also more easy to arrange debt than equity investment because of higher risk investors should take. More equity might also lead to more shareholders, which might make decision-making more complex. Whereas more equity should be required, this might become a difficult situation for a strategic investor like the subcontractors for construction or operation (Yescombe 2007).

High Leverage

Summarised, the following can be said about opportune instruments in project finance structures (Weber & Alfen 2010):

<table>
<thead>
<tr>
<th></th>
<th>Debt</th>
<th>Mezzanine</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>% of capital</td>
<td>70-90%</td>
<td>10-20%</td>
<td>10-30%</td>
</tr>
<tr>
<td>Required return</td>
<td>4-7%</td>
<td>7-10%</td>
<td>&gt;10%</td>
</tr>
</tbody>
</table>

Table 7: Financial Instruments

Project finance structures entail a major stake of debt compared to equity investment. The ratio between debt and equity in the project is called leverage, which in case of project finance is very high. But why are high leverages used in project finance structures? The main reasons are mentioned to argue this:

- Debt is considered cheaper due to the lower risk lenders bear compared to shareholders, which lowers the cost of finance;
- Interest of debt is tax-deductible, which benefits the means that tax to be paid by the SPC is lowered;
- Smaller share of the incoming cash flows is left for the shareholders, which puts more pressure on them to perform as agreed and receive full availability payments

A combination of instruments is used within a project finance structure. As said the recovery of the investment through these instrument by financiers can only be recovered from the project cash flows. This is further elaborated in next paragraph.

§3.2.3 Project Cash Flows

As mentioned in §3.2.1, in project finance lender rely on the cash flows of the project. It is relevant to elaborate what cash flows can be determined in the project. When making a sample cash flow overview of a DBFMO project, the following figure can be drawn. This figure shows the in- and outgoing cash flows of a fictive project during construction (5 years) and operation (25 years):
Expenditure during construction

During the construction phase of the project capital expenditures (CAPEX) are done, from the viewpoint of the consortium and SPC, mainly considers the cost for tendering, designing and construction. Additionally, these costs need to be financed by equity and debt, for which the financiers require a return during construction. Since no incoming cash flows are apparent, the interest on debt and return on equity are added to the CAPEX (capitalised). All of the CAPEX are budgeted in advance and need to be monitored carefully to prevent cost overruns, which reduces returns for the shareholders.

Expenditure during operation

During the operation-phase operational expenditures (OPEX) and maintenance costs are deducted from the availability fees in order to see what cash is left to pay debt service to the lenders and distributions to the shareholders. When looking at the OPEX itself, it mainly consists of management of the SPC, insurance, tax and lastly costs for maintenance and service by subcontractors. Maintenance cost are often the biggest share (Yescombe 2007). Looking at different types of maintenance, a distinction can be determined between economic (highways, rail) and social (governmental housing) infrastructure. Highways for instance require ‘routine’ (repairing potholes and cracks) or major maintenance (resealing surface), of which the latter is done only once in couple of years. Within social infrastructures ‘soft’ (cleaning, security) can be divided from ‘hard’ (heating system, painting) maintenance, which also comprises lifecycle cost like replacement of boilers for example.

Availability Fees

This remuneration-variant is used in most Dutch DBFM(O)-projects and entails a periodical payment during the operation-phase, of which the total should cover all expenditures, financing cost and
return for the shareholders. This agreed fixed fee is paid monthly, quarterly or half-yearly and depends on the availability of the infrastructure in terms of time and quality. If the availability of (sections of) a new road are not meeting agreed minimum criteria, fines are deducted from the upcoming payment. For social infrastructure the criteria also consider soft operational services, such as catering, cleaning and security, which have to meet required standards to receive full payments. ‘Performance-based payment is another name for this service-related payment, which is considered to be part of the availability payment’. In The Netherlands his method is commonly used for most types of infrastructure and reduces the traffic or user risk for the SPC (Yescombe 2007). Remaining traffic risk, in case of roads f.e., is the effect of increased volume of traffic and heavy good vehicles on the maintenance cost of the infrastructure for example. This method is commonly used in The Netherlands. During operation, availability fees are paid by the government to the SPC which should be adequate to cover:

- Operation (OPEX) and maintenance cost;
- Lenders requirements regarding debt service ((re)payment and interest);
- Shareholders required return on equity;

In order to analyse if those objectives can be fulfilled by the project, future cash flows are predicted and analysed during different phases of the project. Finally, if the points above are covered adequately within the constraints of the DBFMO contract, the consortium places a bid which includes a certain periodic availability. In general, the consortium which requires the lowest availability against the best quality, wins the project.

**Bullet Payments**

One can see that substantial CAPEX are partly compensated by ‘bullet payments’ from the government in some projects. The bullet payment is not implemented as a standard in DBFM(O)-projects. The government may implement these to reduce the total financing demand and related cost of debt, which reduces financing (and therefore agency) cost. In some cases the government allows a large payment after delivering (parts of) the construction. In this way the contractor gets compensated for the CAPEX and debt can be repaid directly which reduces financing cost for the government during operation (Yescombe 2007). These bullet payments were introduced at the time that consortia were not able to acquire sufficient finance from the banks to fulfil the complete financing demand between 2008 and 2010. The Rijksgebouwendienst (RGD) aims to compensate 40% of the CAPEX after construction (Rijkswaterstaat 2013). The objective of reducing financing cost affects the total financing demand, which might affect the attractiveness for financiers since their interest revenues or return will decrease.

Besides this, it might be questioned whether the public sector doesn’t counter its aim on outsourcing finance by compensating the CAPEX. In fact the use of bullet payments is countering the purpose of DBFMO, but may be rectified by the fact that it enables some projects to be contracted as DBFMO since sufficient financing is available. It may still be questioned whether bullet payments do not undermine the purpose of DBFMO.
Project Finance structure

When analysing the required amount of finance for a DBFMO project to be arranged, the consortium can summarise the estimated cash flows from Figure 8: Project Cash flows. These cumulative cash flows over the project life gain an overview on the required finance, as shown in the figure below:

During the first five years of the project (construction phase), the financing demand increases to >400 € million at the end of year 5, which should be fulfilled by capital investment from equity and debt financiers. As mentioned, the interest on financing is added on this financing demand during construction since no revenues are apparent (except from bullet payments in some projects, but these are ignored for now). After construction is finished and operation starts, availability payments are provided by the government and the financiers are expected to start receiving (re)payments. As shown by Figure 9: Cumulative capital in a fictive DBFMO project (per year), the capital that remains in the project is expected to lower every year until it is completely paid of. The incoming cash flows of the last two years (called the debt tail), remaining after subtraction of operational and maintenance cost, are considered as distribution to the shareholders.

This type of figure will be used throughout the report to show how project finance structures differ from each other and what type of capital (equity/debt or loans/bonds) is in the capital structure at what moment of the project.

Figure 9: Cumulative capital in a fictive DBFMO project (per year)
Projects and cash flows within the organization

The following figure shows how the different parties related to project finance in DBFMO are related to the cash flows. Since this research mainly considers the finance of this. The figure is based on Daube et al. (2008), Weber & Alfen (2010) and J. Delmon & V. Delmon (2010):

![Flowchart](image)

**Figure 10: Cash flows in the Project Finance Structure**

According the numbers in the figure above, the following cash flows can be determined: one can see how the project is constructed (sub-contractors) and coordinated by the SPC (1), which is financed from equity investment, debt finance and bullet payments (2). After delivery, operation and maintenance services are provided which are paid from the availability payments (3), followed by payments for debt service (4). If cash is left after these other costs are paid, the shareholders receive distribution (5).

§3.2.4 Costs of Project Finance Structures

Since the Dutch government is able to borrow money more cheap than private sector financiers by issuing government bonds, it seems important to see how the (extra) cost of project finance are determined and how this is related to the project finance structure. According theory, risk and return are heavily related (Brealey et al. 2008). The higher the risk, the more uncertainty associated with the investment. To compensate higher risk of equity investors for example, high returns on their investment are required. So it will be further elaborated how these returns for different financiers are determined.

Equity

As mentioned, equity is capital in the company which is invested by the shareholders. Shareholders are the owner of the company and mainly decide on the strategy of the company. Shareholders faces higher risk than debt providers, since they are responsible for the performance of their company and repayment of debt for example. In case the company is earning less revenues due to bad performance/management, the debt and interest still have to be repaid to debt providers. In fact, the shareholders face the risk of negative scenarios. According theory, risk and return are heavily
related. To compensate this risk, high returns on their investment are required. Depending on the requirements of the shareholders, returns on investments are above 10% (Delmon 2005). The return for investors is derived from the cash flows from the total project (Yescombe 2007):

- Initial investment (CAPEX)
- Dividends (payments related to equity investment)
- Residual value at the end of the project

The demanded (equity) IRR is used to discount this future cash flows through time. Like was said before, money is worth more at present than in the future. A discount rate is used to calculate the value of these future cash flows at present (Brealey et al. 2008). This present value (PV) of a cash flow (CF) in a certain year is calculated by the following formula:

\[
PV = \frac{CF_n}{(1+IRR)^n}
\]

*Equation 1: Present Value*

The certain year that is calculated is determined by n. From this formula can be derived that similar cash flows in different years have different present values. This is why investors tend to postpone cash outflows and pull revenues forward. In order assess the value of a whole project the present values are summed and form the net present value (NPV), which is a common way of making investment decisions. The NPV is calculated as follows:

\[
NPV = CF_0 + \frac{CF_1}{(1+IRR)^1} + \ldots + \frac{CF_n}{(1+IRR)^n}
\]

*Equation 2: Net Present Value*

Cash flows at the start of the project are not discounted, since this most often is the starting point of the calculation (the point in time to which the cash flows are discounted to). The NPV should be positive to be worth investing in, referring to the demand of shareholders which demanded a certain minimum return on their investment. The IRR of the project reflects the discount rate(s) at which the NPV is zero. If this is higher than the demanded IRR by the shareholder, the investment is worth investing in.

**Debt**

Banks, operative in the money market, may provide loans solely or involve other banks by forming a finance consortium (club deal) or reselling (a part of) the provided loans in the market (syndicate). The involvement of other banks is done to lower the total investment by one bank and lowering risk of default (non-repayment). The loans often remains at the initial provider(s) until maturity. Interest is paid by the borrowing company over the outstanding debt, which is composed of a general risk-free rate and a company-related risk premium. The main risk-free rate used is the euribor, which projects the interest at which banks within the EU lend money to each other. This rate for maturities up to one year changes every day. The risk-premium is based on the probability that a company will default to (re)pay interest and the initial amount of debt. This interest rate is floating (based on the changing euribor rate) or fixed, depending on the demand of the related parties.
For debt transactions with a larger amount or longer maturity, bonds are issued by companies. These bonds are offered to long-term investors in the capital market, which may sell (a part of) these during the term of the bond in order to generate cash to invest in other companies. The interest rate on bonds (called ‘coupon’) is based on the alternative government bond (risk-free rate) and a risk-premium. This risk-premium is often based on a ‘rating’, which reflects the chance that a company will default. The rating, objectively analysed by a rating agency, makes sure that investments are generally interpreted by different investors which rely on the rating regarding the decision whether to invest or not. In general, bonds require larger transactions and a longer maturity, but are considered to have lower cost (interest rates). Besides this, more stringent arrangements are linked to bonds, which make them less flexible to deal with in unforeseen circumstances.

From this paragraph can be concluded that ‘risk’ and ‘return’ are heavily related and are important to the financiers of DBFMO projects. It also determines the cost of finance for the government, since these are related to the required return. The author of this report states that also the ‘structure’ of the investment is of importance to the required return of the financiers, such as the drawdown of the investment and how it is repaid to the financier. For this reason this element is added and the elements risk, structure and return will be further explored in next paragraph in order to determine financiers perspectives.

§3.3 Categories of Financiers

In order to determine perspectives of financiers, first different categories of financiers will be determined. This is done for both sponsors and lenders to gain a general overview on the apparent financiers for both equity and debt. Besides the strategic investors (§3.3.1), financiers are found in the money and capital markets. Banks are operative in the money market and can be further sub-divided (§3.3.2), while different types of institutional investors from the capital market show increased appetite to invest in DBFMO (§3.3.3).

§3.3.1 Strategic Investors

In order to ensure that main parties in the SPC are ‘financially suffer’ from bad performance (Rijkswaterstaat 2013), the government obliges them to invest equity. Besides this, subcontractors might only have interest to a particular phase of the project, which can be countered through an investment in the project (Yescombe 2007). In their turn, these parties invest in order to ensure that they can execute ancillary contracts as subcontractor to the SPC, such as construction, service provider or management. In this way a contractor divides his overall return, since he makes profit on construction works and has a return on invested equity. The objective of strategic shareholders is to achieve an adequate return and expanding business activities, for which they contribute in form of equity, project development expertise or management expertise (Weber & Alfen 2010).
In contrast to the mentioned threats, one argues that an equity investment increases the level of a party’s commitment to project success. When strategic investors have a substantial share, it is common that a distinction is created between the investment and the contractual relationship in order to prevent conflict of interest from occurring (Weber & Alfen 2010). The following types of strategic investors are divided:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td>Provide service related to construction and maintenance and are willing to ensure this works by investing equity in the SPC.</td>
</tr>
<tr>
<td>Operator</td>
<td>Operators may be willing to ensure their participation during operation. Besides this they can influence decision making in an early stadium of the project in order to arrange efficiency during the operation phase</td>
</tr>
<tr>
<td>Management</td>
<td>Management companies use their expertise to manage the project and financial arrangement for example.</td>
</tr>
</tbody>
</table>

Table 8: Strategic Investors

However these three types differ in origin, they can best be seen together since they have the same aim regarding the DBFMO project: Investing equity as shareholder in the SPC to ensure other business.

§3.3.2 Banks

These lenders have been the most commonly used source of debt for DBFMO project in The Netherlands. Banks rely on the performance of a project, since repayments of loans and interest are paid from revenues. Since revenues are only guaranteed when the project is performing well, the banks will forecast and monitor this process intensively. As compensation for a loan, banks demand interest from the SPC of which the rate is based on the risk for the lender that debt and interest are not repaid. How this interest rate is established for debt, is elaborated later on.

Looking how debt is provided by banks a division can be made between traditional bank loans and syndicated loans or club deals. The first type is provided by one single bank for the whole term, while syndicated loans are provided by one bank but are later on largely sold (syndicated) to a bank syndicate (group of banks). This is often done in larger transactions in order to diversify credit risk, of which regulation is tightened lately due to the ‘credit crisis’. More on the credit crisis can be found in Appendix D. Club deals are a situation where a group of banks agrees up front to provide the debt together. This is done when banks consider the project to risky to carry solely or when the potential to syndicate is to be unlikely. In this concept there is often a leading bank (lead arranger) that coordinates the deal and represents the bank syndicate (Weber & Alfen 2010).

Basel III, regulation for banks in order to reduce risks of bankruptcy and liquidity-issues, changed a lot for the situation of commercial banks. They need to retain buffers for deteriorating times and are less willing to provide large loans for a long time. Loans provided by banks to SPCs in DBFM(O) recently entail a term of 7 to 10 years (Infrastructure Journal 2012), which does not cover the whole lifetime of a project regarding the contract length of 25 years. This insinuates that combinations of different banks or other providers throughout the project might be involved.

Within banks a distinction can be made between commercial and development banks on national and international level. These are outlined in the following table:
**Project Finance in DBFMO**

<table>
<thead>
<tr>
<th>Financier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commercial Bank</strong></td>
<td>Banks that mainly aim to maximise profit by providing loans solely or jointly as syndicate. They also provide services like due diligence and financial modelling.</td>
</tr>
<tr>
<td><strong>National Development Bank</strong></td>
<td>Banks that aim to require adequate returns, while providing loans to stimulate (mainly) national economy. Dutch examples are the Bank Nederlandse Gemeenten (BNG) and Waterschapsbank.</td>
</tr>
<tr>
<td><strong>International Development Bank</strong></td>
<td>These banks also aim at adequate return, but provide loans to stimulate international and national economies. Examples are the European Investment Bank (EIB) or European Bank of Reconstruction and Development (EBRD).</td>
</tr>
</tbody>
</table>

**Table 9: Banks**

Despite the differences on the areas they invest in, the purpose of national and international development banks is common. For this reason they are considered to have a comparable perspective regarding DBFMO projects.

### §3.3.3 Institutional Investors

An upcoming source of financing DBFMO, both equity and debt, can be found in institutional investors. This type of shareholders is mainly interested in the investment itself and benefit only from return on their investment. Institutional investors often focus on maximisation of returns according the riskiness of the project and long-term current income. The finance structure of the project should offer the investor an attractive risk/return profile (Weber & Alfen 2010). This is mainly similar to banks, but the difference is that institutional investors are operative in the capital market.

Some institutional investors are involved from the start of the project and often tend to remain involved for a long period. Other parties may become involved at a later stage, f.e. when the project is structured, after completion or when it is generating current income (Rijkswaterstaat 2013).

<table>
<thead>
<tr>
<th>Financier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure Equity Funds</strong></td>
<td>These funds aim to provide long-term investment in equity of infrastructure. They are mostly financed by other institutional investors and arranged by investment banks, the investment departments of commercial banks.</td>
</tr>
<tr>
<td><strong>Infrastructure Debt Funds</strong></td>
<td>Recently infrastructure debt funds find their way in order to enable smaller institutional investors to cooperatively invest in infrastructure debt. These funds are also arranged by investment banks.</td>
</tr>
<tr>
<td><strong>Pension Funds</strong></td>
<td>Pension funds invest the future pensions of their clients and also invest money of smaller pension funds. Pension funds are stringent by regulation (pension law) to the extent of risk they put the money of their clients at.</td>
</tr>
<tr>
<td><strong>Life Insurance Companies</strong></td>
<td>Life insurance companies can be seen in the same category as pension funds. They also invest savings from their clients to guarantee a certain pay-out in the long term. Other insurance companies are more focused on shorter terms which make them less likely to invest in these long term projects. These parties are also bound to regulation regarding the risks they take.</td>
</tr>
</tbody>
</table>

**Table 10: Institutional Investors**
However the two types of infrastructure funds aim at different investments, they seem comparable since they aim at long-term investments and are funded mainly by pension funds and life insurance companies combined with investment banks. For this reason they are analysed in the same category. Also pension funds and life insurance companies can be seen together in general, due to their comparable focus on long-term investments.

§3.4 Main Elements in Financiers Perspectives

Now it is clear which categories of financiers are apparent to invest in DBFMO projects, it is useful to see what their perspectives may look like in general. Three elements in project finance structures were determined as main elements for perspectives of financiers and will be further elaborated: Risk (§3.4.1), structure (§3.4.2) and return (§3.4.3).

§3.4.1 Risk

Regarding risk, 5 sub-elements were determined that may play an important role to financiers. These will be described shortly to give insight what a financier may question on these aspects.

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seniority</td>
<td>This can be seen as which risk the financier will take regarding repayment. Equity is subordinated, where senior debt can receive first payments.</td>
</tr>
<tr>
<td>Phase</td>
<td>The construction phase of DBFMO is considered to face high risks of budget overruns or delays for example. It may be that the financiers want to take this risk (under certain conditions) or only wants to bear operation risk.</td>
</tr>
<tr>
<td>Stake</td>
<td>Financiers may aim to only invest a limited stake of the total financing or a certain stake of the debt in order to lower risk.</td>
</tr>
<tr>
<td>Rating</td>
<td>Long-term debt investments are often rated by external rating agencies. These ratings give lead to financiers to the riskiness of their investment. In general ratings from A-BBB are considered worth to invest in.</td>
</tr>
<tr>
<td>Liquidity</td>
<td>In case financiers from the capital market are investing, they may be interested in liquidity. Liquidity is the extent to which a certain investment can be traded in case the financiers required cash instantly or wants to invest in other assets.</td>
</tr>
</tbody>
</table>

Table 11: Sub-Elements of Risk

§3.4.2 Structure

Besides risk, the structure is as an important element in the perspective of financiers. Five sub-elements are derived and will be explained.

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maturity</td>
<td>This entails the term of the investment. This may last only one year, only construction or operation phase or the whole contract life for example.</td>
</tr>
<tr>
<td>Drawdown</td>
<td>The financing can be drawn by the SPC at once or flexible for example.</td>
</tr>
<tr>
<td>Repayment</td>
<td>Repayment of the investment and return can be done by bullet payments, by annuity-payments (stable payments covering both interest and repayment) or linear for example.</td>
</tr>
</tbody>
</table>
Different financial instrument within equity and debt are available. Equity is often provided through a sub-ordinated shareholder loan, which can better be seen as mezzanine debt. Besides this, debt can be provided by loans and bonds for example.

In the end, this is what the government want to achieve by implementing a project finance structure. Therefore it should be clear whether the financiers are able to execute this role.

### Table 12: Sub-Elements of Structure

#### §3.4.3 Return

According the risk and structure of the investment the financier may determine its required return for the specific investment.

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interest</strong></td>
<td>This is the return to financiers of debt, which is based on an interest rate over the outstanding debt. In case of bonds, this is called coupon rate.</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td>These are fees related to the investments or services the (debt) financiers provide, such as: financial modelling, due diligence, arrangement of the finance back-end.</td>
</tr>
<tr>
<td><strong>Distributions</strong></td>
<td>This considers all revenues to the shareholders in order to recover their equity investment. This is the sum of dividend (free cash flow after everything else is paid) and interest and repayment on shareholder loans for example. In some projects the residual value of assets at the end of the contracted may also be added.</td>
</tr>
</tbody>
</table>

These elements will be used to determine the perspectives of current and potential financiers in Part B of this report.
Summary Part A

Three main categories of current and potential financiers of DBFMO projects are determined, namely (1) strategic investors, (2) banks, and (3) institutional investors. Where DBFMO projects have been mainly financed by strategic investors and banks, institutional investors show increased interest to step in these types of projects.

The financing costs of a project finance structure rely on the perspective of the involved financiers. These perspectives are determined by (1) the risk financiers take with their investment, (2) the structure of their investment, and (3) the return that financiers require consequently.

Sub Research Question A

Which elements of project finance structures in DBFMO projects determine the perspectives of current and potential financiers?

Conclusions

1. Perspectives of financiers can be determined by (1) risk, (2) structure and (3) return
2. Main financiers are (1) strategic investors, (2) banks, and (3) institutional investors
PART B - ANALYSIS

Sub Research Question B

To what extent are perspectives of current and potential financiers matched in applied project finance structures?
CHAPTER 4  PERSPECTIVES OF FINANCIERS IN DBFMO

Before it can be concluded whether perspectives of financiers are matched adequately, these perspectives first needed to be determined. Data is collected from interviewing various types of financiers and other related parties in Dutch DBFMO projects (§4.1). The results of the interviews and other literature research were structured according the elements risk, structure and return for every type of financier (§4.2). Lastly, main findings regarding the perspectives are shortly elaborated (§4.3).

§4.1 Data Sources

In order to gain insight in the perspectives of current and potential financiers, interviews were held with various types of related parties in Dutch DBFMO projects. This table shows which interviews were held:

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1] World Infrastructure Summit</td>
<td>Various</td>
</tr>
<tr>
<td>[2] Ballast Nedam 1</td>
<td>Strategic Investor (contractor/management)</td>
</tr>
<tr>
<td>[3] Rijkswaterstaat</td>
<td>Public client</td>
</tr>
<tr>
<td>[6] NIBC</td>
<td>Commercial Bank / Infrastructure funds</td>
</tr>
<tr>
<td>[7] RebelGroup</td>
<td>Consultant (contract/project finance)</td>
</tr>
<tr>
<td>[8] Stibbe</td>
<td>Consultant (legal)</td>
</tr>
<tr>
<td>[9] APG</td>
<td>Pension fund</td>
</tr>
<tr>
<td>[10] Aegon</td>
<td>Insurance company</td>
</tr>
<tr>
<td>[12] Brink Groep</td>
<td>Strategic Investor (management)</td>
</tr>
</tbody>
</table>

*Table 14: List of Interviewees*

Not all types of financiers were interviewed equally intensive, but it is assumed that an adequate overview on the perspectives was drawn from interviews with consultants and the actual investors. This mainly applies for the infrastructure funds.

The interviews are shown to the committee but not adopted in this report or the appendices due to privacy reasons and a limited added value for the reader of this report.
§4.2 Perspectives

According the established element in perspectives of financiers, the findings are structured per type of financier: strategic investors (§4.2.1), commercial banks (§4.2.2), development banks (§4.2.3), infrastructure funds (§4.2.4) and pension funds & life insurance companies (§4.2.5).

§4.2.1 Strategic Investors

It was found that strategic investors are obliged to show commitment but aim to keep the investment as low as possible (5-15% of total financing demand). This is due to the fact that their resources are limited as a consequence of the crisis and more projects require finance. They try to gain the required IRR of 11-14% by postponing equity injection (equity bridge loan) in form of mezzanine loan. Contractors with main interest during construction tend to sell their shares (partly) as soon as possible. They are often obliged by the lender to remain some shares throughout the contract life to ensure their commitment.

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Structure</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>H</td>
</tr>
</tbody>
</table>

Table 15: Strategic Investors – Perspective
§4.2.2 Commercial Banks

These financiers are not afraid to take construction risks as senior of mezzanine debt provider, but aim to finance debt (mainly loans) only up to 5-7 years during operation. They aim to provide a large stake in the total project finance up to 90% of the financing demand. They are also willing to provide equity bridge and revolver facilities during construction and aim to retain substantial business in DBFMO projects. Besides this, their loans provide flexible drawdowns and a more forgiving attitude regarding timing of repayment. Further on they are very experienced at controlling the SPC.

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>A Providing senior or sub-ordinated debt to SPC, preferably by club deal [1].</td>
</tr>
<tr>
<td></td>
<td>B Provide up to 90% of the total financing demand [6].</td>
</tr>
<tr>
<td></td>
<td>C Willing to provide equity bridge and revolver loans during construction [1][6][7].</td>
</tr>
<tr>
<td>Structure</td>
<td>D Loans during construction and up to 7 years subsequently [7].</td>
</tr>
<tr>
<td></td>
<td>E Retain a sufficient role within DBFMO project to generate profit [1].</td>
</tr>
<tr>
<td>Return</td>
<td>F Financing during construction would cost 200-230 bps over Euribor (floating), while long-term debt would cost 230-290bps over Euribor [12].</td>
</tr>
<tr>
<td></td>
<td>G Swap margins cost 25-30 bps [12].</td>
</tr>
<tr>
<td></td>
<td>H Sub-ordinated debt would cost 500-700 bps (risk-premium) over the risk-free rate [6].</td>
</tr>
<tr>
<td></td>
<td>I Commitment fee cost around 65bps [12].</td>
</tr>
<tr>
<td></td>
<td>J Arrangement fees cost around 175bps [12].</td>
</tr>
<tr>
<td></td>
<td>K In case of long-term investments, step-ups in the interest rates are implemented every 5-7 years since the banks need to refinance the loan back-end [5].</td>
</tr>
</tbody>
</table>

Table 16: Commercial Banks – Perspective
§4.2.3 Development Banks

Development banks can take construction risk and are able to provide senior and subordinated debt (loans/bonds) DBFMO project over the contract life of 20-30 years. They however aim to finance up to 40% (BNG) or 50% (EIB) of the total finance demand and require another party in the project. In this way they are able to support more economic-relevant project with the same resources.

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>A Providing senior (maximal 50% of required debt) and sub-ordinated debt (maximal 20% of required debt) [1].</td>
</tr>
<tr>
<td></td>
<td>B BNG requires maximum stakes of € 100 million [3], where the EIB provides larger debt stakes of € 300-400 million [1][4].</td>
</tr>
<tr>
<td>Structure</td>
<td>C BNG is willing to provide loans during construction and operation [7].</td>
</tr>
<tr>
<td></td>
<td>D EIB is willing to provide loans and bonds during construction and operation [1].</td>
</tr>
<tr>
<td>Return</td>
<td>E Senior debt from development banks is priced slightly cheaper compared to commercial banks [11].</td>
</tr>
<tr>
<td></td>
<td>F Arrangement and commitment fees are comparable with commercial banks.</td>
</tr>
<tr>
<td></td>
<td>G Sub-ordinated debt is likely to cost around 800bps for 10 years of operation (Davison 2011).</td>
</tr>
</tbody>
</table>

Table 17: Development Banks - Perspective

§4.2.4 Infrastructure Funds

It depends on the type of infrastructure fund whether the fund is willing to take construction risks and whether it will invest in debt or equity. According to the risk their investors are willing to take, funds may provide up to 50% of equity finance from construction and up-to 90% of debt, comparable banks. Since long-term investors are involved back-end, the funds are able to provide long-term debt for the complete contract life.

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>A Long term investments in equity, senior debt or a combination of senior/sub-ordinated debt [1][8].</td>
</tr>
<tr>
<td></td>
<td>B When investing equity, strategic investors are required to take a substantial share in the SPC to ensure commitment [1].</td>
</tr>
<tr>
<td></td>
<td>C Division may be made between primary and secondary market regarding the phase of investment [1].</td>
</tr>
<tr>
<td>Structure</td>
<td>D Loans or bonds with a maturity of 15-30 years in case of debt investment [1][9][10][11].</td>
</tr>
<tr>
<td></td>
<td>E Adequate match of the investment with the liabilities of their back-end financiers (institutional investors) [7].</td>
</tr>
<tr>
<td></td>
<td>F Large drawdowns during construction or at the start of operation [1].</td>
</tr>
</tbody>
</table>
§4.2.5 Pension Funds & Life Insurers

Pension funds and life insurance companies are considered important financiers of DBFMO direct and indirect via infrastructure funds. Due to their long-term liabilities, institutional investors aim to invest in equity (high risk) or senior debt (low risk) in DBFMO. Senior debt often requires to be liquid by achieving an A-rating. Large institutional investors aim to invest debt directly instead of through infrastructure funds to reduce cost, gain transparency and influence the project directly. Some pension funds require inflation-linked investment. Life insurance companies are more reluctant according the size of investment. Some of them however require an experienced partner regarding the controlling role and are not willing to invest solely.

<table>
<thead>
<tr>
<th>Element</th>
<th>Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>A Equity investments from the start of the project in combination with strategic investors, but a maximum of 50% of the equity [9].</td>
</tr>
<tr>
<td></td>
<td>B Senior debt investment during construction only when 'protected' by 10-20% mezzanine debt from another financier [1][7].</td>
</tr>
<tr>
<td></td>
<td>C Liquidity of investment is required by many institutional investors. When demanding a rating of the investment, they require a external ratings with a minimum of A [1][5].</td>
</tr>
<tr>
<td></td>
<td>D Some parties rather invest together with other pension funds and insurance companies to share risks and exchange knowledge [10].</td>
</tr>
<tr>
<td></td>
<td>E Life Insurance Companies are considered to take smaller shares (€ 50-200 million) than pension funds in general (€ 100-200 million) [1][9][10][11].</td>
</tr>
<tr>
<td></td>
<td>F Mezzanine financing is not considered interesting by pension funds [11].</td>
</tr>
<tr>
<td>Structure</td>
<td>G Prefer to invest directly instead of through funds due to gain (1) transparency, (2) direct influence and (3) reduction of transaction cost [1][10].</td>
</tr>
<tr>
<td></td>
<td>H Loans or bonds with a maturity of 15-30 years in case of debt investment [1][9][10][11].</td>
</tr>
<tr>
<td></td>
<td>I Expertise of banks on infrastructure projects is required by some institutional investors during construction phase and the first years of operation [1][8][10].</td>
</tr>
<tr>
<td></td>
<td>J Pension funds may require inflation-linked instruments to ensure solid payments to their clients. Life insurance Companies do not require this [1][9][10][11].</td>
</tr>
</tbody>
</table>
Perspectives of Financiers in DBFMO

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Substantial drawdowns during construction [8][11].</td>
</tr>
<tr>
<td>L</td>
<td>Fixed timing of repayments according Make Whole Clause [8].</td>
</tr>
<tr>
<td>M</td>
<td>Rather no bullet payments by the government since these reduce the financing demand and appetite of financiers [12].</td>
</tr>
</tbody>
</table>

Return

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>IRR comparable to strategic investors for equity investment [10][11].</td>
</tr>
<tr>
<td>O</td>
<td>In case of a BBB-rating, interest is 200-250bps over Euribor (fixed) [11].</td>
</tr>
<tr>
<td>P</td>
<td>Inflation-linked interest rates is sometimes required by pension funds like APG [9].</td>
</tr>
<tr>
<td>Q</td>
<td>In case of inflation-linked rates, pension fund APG implements real interest rates of 150bps (fixed) [9].</td>
</tr>
</tbody>
</table>

Table 19: Pension Funds & Life Insurers - Perspective

§4.3 Findings

Some main differences between the different perspectives were found, namely maturity (§4.3.1), seniority (§4.3.2), construction risk (§4.3.3) and flexibility of drawdown and repayment (§4.3.4).

§4.3.1 Maturity

It can be clearly seen that the commercial banks aim to finance debt for the short term, where institutional investors aim at long term investments in equity or debt. This can be appointed to their own liabilities, such as the money market for banks and clients for institutional investors.

§4.3.2 Seniority

A clear division can be seen between investment in equity and debt. Where strategic investors only invest in equity because they are often required to do so, banks aim at debt financing. Institutional investors invest in both equity and debt, but not together in a single project.

§4.3.3 Construction Risk

Main differences were found regarding type of risk different financiers are willing to take. It is found that banks are willing to take construction risks, where institutional debt financiers require a mezzanine tranche during construction to lower the risk in this phase. Due to their lack of expertise they are reluctant to act as the bank do. After they invested in a couple of projects, they may have gained more expertise in their team and may start to take higher construction risk.

§4.3.4 Flexibility

It becomes clear that institutional investors have a different attitude than banks regarding drawdown and repayment of debt. Where banks provide flexibility during the construction phase regarding drawdowns, institutional investors like to finance a large amount at a set moment. This may become difficult for strategic investors (contractors), since these aim to retain some flexibility. Regarding repayment the institutional investors also show a less flexible attitude, which is due to their own liabilities which often entail strict payment schedule. Bonds may preserve this strict schedule for the institutional investors, but is less forgiving for the SPC in case delays occur during construction for example.
CHAPTER 5  CASE STUDIES

Now the financiers perspectives are determined, it is useful to see whether these are matched at present. Two DBFMO projects in The Netherlands were chosen to analyse, since they represented two different project finance structures used in The Netherlands. The first is a governmental housing project in operation phase, which is financed by solely long-term bank finance (§5.1). The second project is a recently tendered highway project in which two pension funds are involved, both in equity and debt (§5.2). Lastly findings on the two case studies are presented (§5.3).

§5.1 Case Study I (DUO² Tax Office)

First a general description is given (§5.1.1), followed by findings regarding on the apparent financiers in the project (§5.1.2), the applied project finance structure (§5.1.3) and the match with perspectives of financiers (§5.1.4) are analysed.

§5.1.1 Description

The construction of the new office of the Belastingdienst (Tax authorities) and Dienst Uitvoering Onderwijs (Executive Agent of Education) is one of the first DBFMO projects for social infrastructure in The Netherlands. The project consists of the construction of two office towers (47,000 m²), demolition of the old buildings, underground parking facilities (10,000 m²) for 675 cars and 1500 bicycles and a commercial pavilion and a public garden (9,000 m²) on top of the parking facilities (DUO² 2012). As shown by the following picture, area development of surrounding ground was included in the project. The project is awarded with several prices for the architectural design, the ‘innovative’ and sustainable concept and the integrated approach of this DBFMO project (DUO² 2012):
In this project the Rijksgebouwendienst (RGD), public agent for governmental housing, represents the Belastingdienst and Dienst Uitvoering Onderwijs (DUO) as public client. In March 2008 DUO² was awarded ‘preferred bidder’ of the project. Construction started in November of that year (DUO2 2012). The contract has a term of 20 years operation and contains all aspects of DBFMO. Construction is executed in different phases, of which the new office towers were primarily built, followed by demolition of the old offices and construction of the parking facilities. At present those are almost finished and the pavilion and public garden are developed. The planning states that this last phase is finished by September 2013. In the recent progress-report of the Dutch Government regarding DBFMO it was stated that the generated VfM was between 5% and 10%, which is average regarding the overall VfM generated by DBFMO (Dutch Ministry of Finance 2012).

§5.1.2 Financiers

As said, the RGD represents all related public parties as client of the project. The RGD is the responsible agency in order to check whether or not the SPC is performing regarding the contract.

The shareholders of the DUO²-consortium during the construction phase are Ballast Nedam, Strukton and John Laing. All three parties can be seen as strategic investors, since they are mainly represented in the DBMO consortium or provide services to the SPC. Where Ballast Nedam and Strukton provide construction, management and operation-related services, John Laing is involved in the management of the SPC. In 2011 Ballast Nedam sold its shares to the Benelux secondary PPP Fund I, which they participate in for 20% (AFM 2011). DG Infra, an infrastructure equity fund complements the remaining 80% and is funded by different types of institutional investors such as insurance company Ethias and pension fund Pension-B (DG Infra n.d.). In this way the contractor releases money to reinvest in other projects, retains a share in the SPC and ensures quality service to the other investors in the infrastructure fund.

Financiers of the debt are Bank Nederlandse Gemeenten (BNG) and ING. While ING can be seen as a commercial bank which focuses on making profit, BNG is a development bank which is owned by Dutch municipalities and provides (long-term) loans to public parties or projects for housing, healthcare, education and public utilities. Mainly due to their AAA-status BNG can raise funds against relatively low prices, which they use to support public facilities in order to reduce its financing cost (Bank Nederlandse Gemeenten 2012). During construction the BNG has a share of 33%, which increases to 100% after construction is finished.
This figure shows the different financiers in the project finance structure of DUO²:

![Figure 12: DUO² - Financiers](image)

§5.1.3 Project Finance Structure

Analysing the project finance structure, a standard bank loan structure is used in the DUO² project. This structure, in which only (commercial and/or development) banks are involved, represents the common way of financing DBFMO projects in The Netherlands. The following figure represents the project finance structure by showing the cumulative size of the total capital and its division in equity and debt in a certain year of the contract. In year 4 the construction is finished and the project is financed by equity (10%) and debt (90%):

![Figure 13: DUO² – Cumulative capital in the project (per year)](image)
During the construction phase of four years, the initial investment of around € 150 million was invested at a leverage of around 90%. During the construction phase, equity is replaced through an equity bridge loan, which is invested pro rata (according leverage) with the investment of debt. The equity bridge can be considered as a representation of the shareholder equity, since direct repayment of this loan by the shareholders in case of default is guaranteed. Therefore the equity bridge is the same colour as equity in the figure above.

As said, the debt is provided by ING (67%) and BNG (33%). Payments for interest and arrangement fees f.e. are capitalised during construction and added to the total debt amount. At the end of construction, the shareholders invest around (€ 150 million x 10% =) € 15 million through an shareholder loan which is subordinated to senior debt. All senior debt is adopted by BNG by then.

From this moment quarterly availability fees are received which are used for debt service and distributions to shareholders. For the debt payment an annuity is implemented to retain stable cash flows, which aims to repay the debt two years before the end of the contract. This is done to ensure that, if ramp-up risks occur during the operation phase, debt is repaid at the end of the contract. This also means that the shareholders receive the residual of remaining availability fees from the last two years if everything went well. However the shareholders receive interest and repayment of the shareholder loan, their investment remains in the project finance structure until the end.

§5.1.4 Match with Perspectives of Financiers

Four types of financiers can be determined in this project: strategic investors, a commercial bank, a development bank and an infrastructure fund. The project finance structure is analysed to determine whether it matches the perspectives of the financiers, as determined earlier. The following findings were determined regarding the perspectives of involved financiers:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Investors</td>
<td></td>
</tr>
<tr>
<td>Ballast Nedam</td>
<td>Shareholders provide their investment late in construction to preserve fund and lower cost of finance of the project. Ballast Nedam sold its share after construction, which is in line with strategic sponsors perspective to mainly be involved during their own works. Ballast Nedam was involved as contractor during construction and fulfils a management role during operation. Strukton is maintenance contractor and John Laing has a large role regarding SPC management during operation. In general can be said that the strategic investors perspective is matched.</td>
</tr>
<tr>
<td>John Laing</td>
<td></td>
</tr>
<tr>
<td>Strukton</td>
<td></td>
</tr>
<tr>
<td>Commercial Banks</td>
<td></td>
</tr>
<tr>
<td>ING</td>
<td>ING committed a substantial share (67%) in the financing during construction, which was taken over by BNG after construction. In general, also their perspective is matched.</td>
</tr>
<tr>
<td>Development Bank</td>
<td></td>
</tr>
<tr>
<td>BNG</td>
<td>BNG invests 33% of the debt during construction, which is in line with their perspective. Contrary, adopting the 100% debt stake of € 140 million in the project is not in line with their perspective as determined at present, since (element A) they aim to invest a maximum of 50% of the debt in the project, and (element B) their absolute maximum stake in DBFMO project (€ 100 million) is outraged. It can be stated that their perspective is not matched in this project finance structure.</td>
</tr>
<tr>
<td>Infrastructure Fund</td>
<td></td>
</tr>
<tr>
<td>Benelux 2+3 PPP fund I</td>
<td>This fund aims to take over equity stakes of Ballast Nedam in operational projects and stay in for a long term. Where 33% of the total equity shares are bought after construction and main sub-contractors are involved in the SPC, it can be said that their perspective is matched by this structure.</td>
</tr>
</tbody>
</table>

Table 20: DUO² - Match Perspectives of Financiers
It can be mentioned that this project was already started in 2008 and the attitude of development banks was a bit different then. It is likely that the development banks receive more requests to provide long-term loans at present since the commercial banks are less able/willing to provide these.

§5.2 Case Study II (N33 Highway)

First a general description is given (§5.2.1), followed by findings regarding on the apparent financiers in the project (§5.2.2), the applied project finance structure (§5.2.3) and the match with perspectives of financiers is analysed (§5.2.4).

§5.2.1 Description

The N33 project is a highway project in the North of The Netherlands. The DBFM(O) project entails the doubling of the highway over 40 km distance in order to increase traffic safety, enhance traffic streams and connection to crossing regional road and increase of economic wealth in the region (Dutch Ministry of Finance 2012). The following figure shows one of the future artefacts of the N33 project (N33 2013):

![Figure 14: N33 – Future artefact](image)

This project can be considered relevant for this research, since it is a pilot of the Dutch government to attract institutional investors to invest directly in inflation-linked infrastructure debt. The Ministry of Finance is responsible for the financial issues regarding DBFMO projects. This ministry used the N33 project as a pilot to see whether the inflation-linked debt would (1) widen the financing market for infrastructure debt, and (2) whether the inflation-linked debt would offer a better financial deal for the government (Dutch Ministry of Finance 2012). Recently the ministry stated in a preliminary evaluation that the pilot did not prove to attract mainly one pension fund which aims at Dutch inflation-linked debt investments: APG. Foreign institutional investors are not interested in investments linked to Dutch inflation, since this does not help them to provide their client stable pensions in their country of origin. Besides this, the government states that the uncertainty and difficulty to predict future controllability of their expenditures makes them decide to do no further pilots on inflation-linked DBFMO projects (Dutch Ministry of Finance 2013). It is however interesting to see how the project finance is structured.

It should be mentioned that less information is available on this case, since the project is executed at another contractor than Ballast Nedam which supported research. For this reason some assumptions are made regarding the implemented project finance structure.
§5.2.2 Financiers

In this project Rijkswaterstaat is the acting public client, since the DBFMO project considers a highway. This party represents the Ministry of Infrastructure and Environment regarding infrastructure development.

BAM is the only strategic investor in the project. In the last years, BAM aims to execute more projects solely (not in consortium with other parties). As mentioned, contractors have limited resources due to the crisis and many projects to finance. It is difficult to fulfil this financing demand for all projects, which is likely to be the occasion to search for a financial partner to invest equity. BAM found this partner in pension fund PGGM and together (50/50%) they erected a joint venture to invest in DBFMO projects of the BAM. The joint venture is likely to stay in the project during operation, since the BAM is the only contractor during this phase.

Furthermore a ‘consortium’ of three banks finances the required debt during the two-year construction phase. The consortium contains two commercial banks (Rabobank and Japanese BTMU) and a German KfW Ipex (development) bank. After construction, pension fund APG takes over a part of the debt investment.

Lastly should be mentioned that around 50% of the construction is directly financed by local authorities that benefit from the project. These parties will not be included in the overview, since their payments can better be seen by bullet payments from the public client to the SPC in order to reduce the financing demand and financing cost.

Figure 15: N33 – Financiers
§5.2.3 Project Finance Structure

The N33 project can be seen as alternative project finance structure, since this is the first time an institutional investor directly invests senior debt in infrastructure. The cumulative invested capital in the project gives a schematic overview on the project finance structure:

The bank consortium provides between € 105-115 million debt to the project. One year after construction is finished, pension fund APG adopts 70% of the debt from the bank consortium. As mentioned the repayment of their debt will be compensated for inflation by the Dutch government. This means that an assumption will be made on the expected inflation upfront to close the project. In case actual inflation differs from this assumption, which is likely to happen during the 20-year contract, the government pays the actual inflation to the pension fund.

About the equity investment, less information is available. It is considered likely that an equity bridge loan and shareholder loan are implemented, since these instruments reduce the overall costs of finance and ensure a bid that offers more VfM. It is assumed that the equity bridge is not drawn pro-rata, but completely upfront in this scheme.
§5.2.4 Match with Perspectives of Financiers

The following discrepancies were determined between this used project finance structure and the perspectives of involved financiers:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Investors</strong></td>
<td>The single strategic investor reduces its required equity investment by splitting it with PGGM. Since BAM is main contractor in all phases of the project, they are required to retain equity investment over the contract life. Furthermore, the shareholders are often in charge of structuring project finance, which makes them able to do this according to their perspective. For this reason the perspective of the strategic shareholder is likely to be matched by this structure.</td>
</tr>
<tr>
<td>BAM</td>
<td></td>
</tr>
<tr>
<td><strong>Commercial Banks</strong></td>
<td>During the construction, the commercial banks jointly provide 67% of the debt. During operation they retain a 10% debt stake for a term of 20 years. This is in contrast with Perspective D, which states that commercial banks aim to finance until 7 years after construction. Exactly this is where the problems occur in recent project finance structures. The perspectives of the commercial banks are not matched by this structure.</td>
</tr>
<tr>
<td>Rabobank</td>
<td></td>
</tr>
<tr>
<td>BTMU</td>
<td></td>
</tr>
<tr>
<td><strong>Development Bank</strong></td>
<td>This German development bank has a minor debt stake during construction and operation. With this investment they support economic development in Northern Netherlands, which may also be beneficial for near parts of Germany. However, it is not determined which is their investment limit, their stake does not outrage the maximum of the BNG where the KfW is a larger development bank. It can be said that their perspective is matched.</td>
</tr>
<tr>
<td>KfW</td>
<td></td>
</tr>
<tr>
<td><strong>Institutional Investors</strong></td>
<td>According PGGM, their direct equity investment is limited to 50% since BAM is involved for 50% simultaneously during the 20 year contract. Their perspective on equity investment in the N33 project is matched. APG aims to invest in inflation-linked infrastructure, which the N33 project offered. Since they step in one year after construction, no mezzanine debt is required. The expertise of banks is apparent during the first years operation (bank consortium), which satisfies most institutional investors (this is moreover not mainly required by APG). Overall, it can be said that the perspective of APG is matched.</td>
</tr>
<tr>
<td>PGGM</td>
<td></td>
</tr>
<tr>
<td>APG</td>
<td></td>
</tr>
</tbody>
</table>

Table 21: N33 - Match Perspectives of Financiers
§5.3 Findings

From this case three main findings were derived, which are presented in this paragraph: Perspectives of strategic investors (§5.3.1), banks (§5.3.2) and institutional investors (§5.3.3).

§5.3.1 Perspectives of Strategic Investors

In general it can be said that these perspectives are properly matched. The opportunities are found to involve institutional investors to finance the required equity. As shown in the two cases, contractors Ballast Nedam and BAM team up with infrastructure funds and institutional investors to ensure sufficient money can be acquired to finance the equity stake in DBFMO projects. According the equity investments the Dutch government reports that sufficient appetite is noticed from institutional investors, both directly and through infrastructure funds (Dutch Ministry of Finance 2011). Besides this, flexibility regarding drawdowns is provided by bank loans during the construction phase.

§5.3.2 Perspectives of Banks

From the case studies was derived that mainly the perspectives of the banks were not matched properly by the project finance structures. At first, the perspectives of the development bank BNG is not matched, since it retains the whole debt stake after construction is finished at DUO. This is not what they aim to achieve with their resources, since they may be able to support more economic-relevant projects. Secondly the N33-case shows us that commercial banks are still involved during the whole operation phase which outrages the maximum maturity of the investment. This is due to the desire of the government and foreign banks to have a Dutch bank involved to control the project. Longer participation of the commercial banks comes along with periodically refinancing of the debt, leading to step-ups in interest rates per 5-7 years and higher cost of financing. These problems with financiers from the money market were mentioned in §1.2, but are supported by these findings.

§5.3.3 Perspectives of Institutional Investors

Regarding the equity aimed institutional investors, it can be said that their perspectives are properly matched. At first contractor BAM (strategic investor) established a joint venture (50/50%) with pension fund PGGM to finance the equity in the DBFMO projects BAM participates in. The N33-case showed how a (secondary) equity infrastructure fund, funded by contractor Ballast Nedam (20%) and pension fund DG Infra (80%), takes over the shares of Ballast Nedam during operation. In this way both institutional investors are ensured that the contractor stays involved to some extent. It seems that the problem is mainly focused on the financiers of debt. Which is relevant to consider when comparing alternative project finance structures.

Regarding the involvement of institutional investors regarding debt, Dutch pension fund APG is attracted to finance 70% of the debt during operation of the N33-case. In this pilot project, the Dutch government explored the effect of taking inflation risk, since this was a desire from APG. Additionally, recently the Dutch government mentioned that it is not likely to try inflation-linked infrastructure debt again, since it seems not to widen the debt financiers market and financial benefit does not outrage the uncertainty of payments (Dutch Ministry of Finance 2013). This is concluded since APG is the only Dutch party that shows a desire for inflation-linked debt. It seems strange to conclude this without the project being in operation yet and the fact that this made APG provide the debt at a lower rate. This can be clarified by the fact that inflation-linked debt may counter the opportunity for the government to inflate itself out of debt (Dutch: uit de schulden infleren).
Summary Part B

Perspectives of different financiers were determined regarding the identified elements risk, structure and return. Information is derived by examining relevant literature and interviewing financiers and advisors on project finance structures in DBFMO projects. Differences can be found between and within a category of financiers. Main differences can be found between financiers from the money market and capital market, mainly on (1) maturity of finance, (2) seniority of their investment, (3) acceptance of construction risk and (4) flexibility of drawdown and repayment. The perspectives influence the cost of financing by different financiers.

Two case studies were analysed to see whether the identified perspectives of financiers were matched by the applied project finance structures. The findings from the case studies confirm that mainly perspectives of debt financiers are not matched by present project finance structures. For this reason the research is further focused on matching the perspectives of debt financiers.

Sub-Research Question B

TO WHAT EXTENT ARE PERSPECTIVES OF CURRENT AND POTENTIAL FINANCIERS MATCHED IN APPLIED PROJECT FINANCE STRUCTURES?

Conclusions

3. Perspectives of different types of financiers show main differences on the elements maturity, seniority, construction risk and flexibility on drawdown and repayment.

4. Alternative project finance structures should be focused on enhancing the match with financiers of debt.
PART C - DESIGN

Sub Research Question C

HOW CAN THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND PROJECT FINANCE STRUCTURES IN DBFMO PROJECTS BE ENHANCED?
CHAPTER 6 ALTERNATIVE PROJECT FINANCE STRUCTURES

The public and private sector also noticed that the applied project finance structures in DBFMO projects are not matched with the debt financiers perspectives at present. The case on the N33-project showed an alternative solution which unfortunately does not show optimal match yet. There are however other alternative project finance structures designed by public and private parties, which are not implemented in Dutch DBFMO projects yet. The following alternatives were analysed: “Hadrian’s Wall” (§6.1), the “Europe 2020 Project Bonds Initiative” (§6.2) and “Commute” (§6.3). Findings from the analyses are used to determine how which sub-elements of project finance structures were enhanced (§6.4), which are used to provide recommendations (§6.5) and develop other alternative project finance structures in Chapter 7.

§6.1 “Hadrian’s Wall”

This initiative is one of the infrastructure debt products in Europe which focused on the involvement of the capital market. In general it enables institutional investors to invest in senior debt with a high rating in infrastructure projects. Sequentially, the project finance structure (§6.1.1), match with perspectives of financiers (§6.1.2) and financing costs (§6.1.3) will be covered.

§6.1.1 Project Finance Structure

Hadrian’s Wall can be seen as an infrastructure debt fund, which acquires consists of two layers (tranches): senior and sub-ordinated debt. Both tranches consist of bonds which are owned by institutional investors (90% of senior debt) and investment fund (10% of subordinated debt). Hadrian’s Wall, Aviva Investors and other potential investors. It enables institutional investor to invest in A-rated senior bonds, which are ‘covered’ by sub-ordinated bonds. This means that the SPC acquires senior and sub-ordinated debt jointly from a single infrastructure debt fund. The fund requires a 20% equity investment to reduce risk for the fund. The structure can be schematised as follows:

![Figure 17: Hadrian’s Wall – Funding Structure](image)

A key element is that the debt is completely drawn upfront and is ‘stored’ in a savings account against 2% of interest, which can be drawn during construction when required. This means that ‘dead weight’ debt is acquired for the first years of the project by the SPC, which is considered costly since interest (5,85%) needs to be paid over the full borrowed debt over the whole project life. During construction the SPC pays (5,85-2,00=) 3,85% interest over debt they don’t use. These extra cost of debt are named ‘negative cost of carry’.

In order to schematise the project finance structure, a fictive DBFMO project with a financing demand of € 300 million is assumed. This project size make a comparison between loans and bonds possible, where bonds require a larger investment to recover the higher cost of acquiring debt (Stibbe 2013; Delta Lloyd 2013; Macquarie Bank 2013). A construction phase of four years and an operation phase of 25 years are assumed.
In case Hadrian’s Wall is used as project finance structure for the project, this is schematised as follows:

![Figure 18: Hadrian’s Wall – Cumulative capital in the project (per year)](image)

§6.1.2 Match with Perspectives of Financiers

According the perspectives of financiers, the following conclusion can be drawn:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Investors</strong></td>
<td>These financiers don’t see their perspectives matched in this project finance structure, since the required equity investment of 20% is higher than their investment of 5-15% (perspective A). However they may have flexible drawdown (persp. E), bonds require very strict repayment which gives the SPC less flexibility in the first years of operation (persp. F). It can be stated that the strategic investors perspective is not matched.</td>
</tr>
<tr>
<td><strong>Infrastructure Funds</strong></td>
<td>The infrastructure debt fund (Hadrian’s Wall) seems to find its perspective matched, mainly because it established this alternative itself. This long term investment (pers. D) shows one large drawdown at the beginning (pers. F) against appropriate returns for both senior (Persp. I) and subordinated debt investors (persp. J). It can be stated that their perspective is matched.</td>
</tr>
<tr>
<td><strong>Institutional Investors</strong></td>
<td>It should be mentioned that institutional investors tend to invest directly in infrastructure to lower management cost and increase transparency (Perspective G). In this project finance structure they invest through a infrastructure debt fund. This may be a proper option for smaller institutional investors to invest in, but the larger pension funds and life insurance companies may prefer another alternative. However they are not directly involved, the perspective of institutional investors is not matched.</td>
</tr>
</tbody>
</table>

*Table 22: Hadrian’s Wall - Match Perspectives of Financiers*
§6.1.3 Cost of Finance

In order to compare the cost of finance for the alternative project finance structures, a fictive DBFMO project is established of € 300 million CAPEX with a 3-year construction and 25-year operation. During operation, OPEX is € 12.5 million per year. First the cost of financing were estimated according the standard bank finance, as commonly used in The Netherlands. This forms a benchmark to compare the alternative project finance structures with. It was found that, to finance the fictive € 300 million DBFMO project, a yearly availability fee of € 42 million is required during the 25 years of operation. The Net Present Value of these availability fees, as the governments calculates the project, is estimated at approximately € 506 million. These benchmarks are used as reference for the cost of financing of the alternatives. More on the calculations of the benchmark, Hadrian’s Wall and the other alternative project finance structures can be found in Appendix E.

To implement this alternative project finance structure in the fictive DBFMO project, an availability fee of € 43,715,657 is required on yearly basis. The NPV of availability payments is around € 527 million, which is 4.08% higher than the benchmark with standard bank finance. This may clarify why the Hadrian’s Wall never has been implemented and recently terminated its operations.

§6.2 “Europe 2020 Project Bond Initiative”

The European Investment Bank (EIB) noticed that infrastructure investment throughout Europe slowed down and was not proceeding according the planned development (Davison 2011). This is why the EIB and European Commission initiated the Europe 2020 Project Bonds Initiative, which aims to stimulate infrastructure investment from the capital market. Sequentially the project finance structure (§6.2.1), it match with perspectives of financiers (§6.2.2) and related financing cost (§6.2.3) are elaborated.

§6.2.1 Project Finance Structure

Together with the European Committee, the EIB invests up to 20% of sub-ordinated (project) bonds over 10% equity investment by the shareholders. The EIB invests this during construction for the whole contract or gives the guarantee to lenders that it will be available in case the SPC defaults for pay debt service. In this research only the investment option (not the guarantee option), since this is comparable with the other two project finance structures. Financing during construction can be done through a revolver loan, provided by the EIB or a commercial bank for example. When fully drawn the revolver loan is replaced by a combination of subordinated EIB-bonds (<20%) and senior bonds invested by institutional investors. The subordinated bonds increase the rating of the senior bonds from BBB to A, which make them more ‘safe’ to invest and reduces risk to the investor. During construction, a more Commute-like structure is seen, where the operation phase retain sub-ordinated bonds.
The project finance structure is schematised like:

The project finance structure is schematised like:

![Figure 19: Euro 2020 Project Bonds Initiative - Cumulative capital in the project (per year)](image)

### §6.2.2 Match with Perspectives of Financiers

Regarding the different financiers perspectives the following is found:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Investors</strong></td>
<td>However revolver loans provide flexibility during construction (persp. E), the operation phase does not provide flexibility regarding repayment (persp. F). Furthermore the strategic investors perspectives are not completely matched.</td>
</tr>
<tr>
<td><strong>Commercial Banks</strong></td>
<td>Commercial banks retain only a little stake in case only the revolver loan and equity bridge loan are provided by them f.e. (persp. E). Their perspectives are not matched.</td>
</tr>
<tr>
<td><strong>Development Bank</strong></td>
<td>The EIB has a major role in this structure, but invests maximal 20% of the debt (persp. A) through bonds (persp. D) to ‘cover’ the senior debt (persp. C). The perspective is matched.</td>
</tr>
<tr>
<td><strong>Infrastructure Funds</strong></td>
<td>In this way infrastructure funds are able to invest in long-term bonds (persp. D) which are drawn in large drawdowns (persp. F). The subordinated bonds ensure that debt service is fulfilled during operation (persp. G) It can be stated that their perspectives are matched.</td>
</tr>
<tr>
<td><strong>Pension Funds &amp; Life Insurance Companies</strong></td>
<td>These financiers are ‘protected’ during construction and operation phase (persp. B) and their senior bonds have a adequate rating of A (persp. C) which ensures a fixed timing of repayment (persp. L). The expertise of the EIB is used throughout the project (persp. I). Since they can invest directly (persp. G) for a long term (persp. H). It can be said that the perspectives of pension funds and insurance companies are matched.</td>
</tr>
</tbody>
</table>

*Table 23: Europe 2020 PBI - Match Perspectives of Financiers*
§6.2.3 Cost of Finance

For this alternative project finance structure, the required availability would be € 42,373,253, which is slightly higher than the benchmark. The estimated Net Present Value of the availability fees is approximately € 511 million, which is 0.89% higher than standard bank finance. However it is more expensive than the benchmark, this alternative provides a better match with financiers perspectives.

§6.3 “Commute”

The Dutch commercial bank NIBC also generated a new product called the ‘Commute’-structure. More will be elaborated on the project finance structure (§6.3.1), the match (§6.3.2) and financing cost (§6.3.3).

§6.3.1 Project Finance Structure

This alternative is based to prevent negative cost of carry by postponing the investment of institutional investors to a later point in time. During the construction phase, the bank provides a subordinated loan of 10% of the financing demand on top of the required 10% of equity investment by shareholders. Besides the subordinated loan, a so-called revolver facility is implemented which can be drawn by the SPC during construction. When the maximum amount (40% of financing demand f.e.) of this loan is drawn, institutional investors adopt this debt by providing long-term loans or bonds. The revolver loan is fully drawn again at the end of the construction phase and the revolver loan is once again adopted by the institutional investor. At this point in time, construction risk is (mainly) out of the project and the ramp-up phase is entered. The subordinated loan is commuted into an alignment facility, which is equal to senior debt at lower cost. The bank stays committed during the early years of operation to control the SPC and give the SPC some flexibility. Contrary the risk of the senior debt increased since no subordinated tranche is apparent anymore, but the construction risk is out of the project. Schematised, it can be seen as follows:

![Figure 20: Commute - Cumulative capital in the project (per year)](image)
§6.3.2 Match with Perspectives of Financiers

When comparing the financiers perspectives with this alternative, the following conclusion can be drawn:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Investors</strong></td>
<td>Flexibility during drawdown (persp. E) and early operation (persp. F) is guaranteed by this structure, which satisfies strategic investors. Since the structure also accepts a 10% equity investment (persp. A) and an equity bridge (persp.C) and a shareholder loan (persp. D) may be implemented it can be stated that their perspective is matched.</td>
</tr>
<tr>
<td><strong>Commercial Banks</strong></td>
<td>The commercial banks retain business during construction (persp. E), but their involvement fades out in the first seven years of operation (persp. D). It may however be questioned whether the banks are satisfied with this amount of works. In general their perspective is matched, but it might be questioned whether their involvement is substantial enough.</td>
</tr>
<tr>
<td><strong>Pension Funds &amp; Life Insurance Companies</strong></td>
<td>This structure covers the senior debt investment for institutional investors during construction (persp. B). The bonds may therefore be rated A which can provide liquidity (persp. C). It enables institutional investors to invest directly in infrastructure projects (persp. G) for a long term (persp. H). Also the presence of a bank during early operation works positive on the institutional investors perspective (persp. I). In general the perspective is matched by the Commute-structure.</td>
</tr>
</tbody>
</table>

Table 24: Commute - Match Perspectives of Financiers

§6.3.3 Cost of Finance

When implementing the 'Commute' project finance structure, a yearly availability fee of € 39,242,619 is required. The Net Present Value of the availability fees is € 473 million, which is 6.57% lower than the benchmark. This can be mainly attributed to the lower interest rate on long term senior debt, which is established by the increased rating since construction risk is covered by the mezzanine debt. It seems that the Commute structure provides both (1) an enhancement in match with perspectives of financiers and (2) lowers the cost of finance for DBFMO projects.
§6.4 Findings

In the three alternative project finance structure some findings were found. These findings will be further elaborated according the main project finance elements, as determined in Chapter 3: Risk (§6.4.1), structure (§6.4.2) and return (§6.4.3).

§6.4.1 Risk

Regarding risk, 5 sub-elements were determined that may play an important role to financiers. The enhancement per different sub-element is determined in this table:

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seniority</td>
<td>As shown in the case studies, all used forms of debt were equally senior to equity. The alternatives show the implementation of subordinated debt (credit enhancement facilities), which has a lower seniority than senior debt. This extra tranche ensures a lower risk and higher rating of senior debt leading to lower cost of finance.</td>
</tr>
<tr>
<td>Phase</td>
<td>The reluctant perspectives of some institutional investors regarding construction risk is partly solved by subordinated debt during this phase. These can be provided by banks or more risk-seeking institutional investors. Besides this, the involvement of banks during construction helps to attract inexperienced pension funds and life insurance companies in to the construction phase.</td>
</tr>
<tr>
<td>Stake</td>
<td>By giving the development banks a role as subordinated debt provider, they can limit their stakes per project and support more projects with similar resources. However development banks may find this beneficial, the commercial banks may find their total share in the project finance structure low and non-beneficial.</td>
</tr>
<tr>
<td>Rating</td>
<td>Normally debt in DBFMO projects is estimated at a BBB-rating. Where subordinated debt lowers the risk for senior debt in the alternatives, senior debt can be rated at A. This rating of senior debt is likely to (1) lower cost of financing, and (2) improve liquidity of the investment for the financier. Contrary the subordinated debt will be rated at B, which entails higher interest rates.</td>
</tr>
<tr>
<td>Liquidity</td>
<td>The implemented project bonds in the alternatives can provide more liquidity than the bank loans in present project finance structures. This may attract (inexperienced) institutional investors as they want to be able to sell the assets in the future. This liquidity provides the shareholders less transparency on the actual owners of the bonds apparently.</td>
</tr>
</tbody>
</table>

Table 25: Enhanced Sub-Elements of Risk

§6.4.2 Structure

Besides risk, the structure is considered as an important element in the perspective of financiers. The enhancement per different sub-elements is determined in this table:

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maturity</td>
<td>It is found that the maturity of the investments is better matched for banks, since their investment is refinanced or fully repaid within the first 10 years of the project. Besides this, the institutional investors find their long-term (20-30 years) investments in these alternative project finance structures.</td>
</tr>
</tbody>
</table>
Drawdown

Flexibility regarding drawdowns preserved by the alternatives in different forms, but enables the contractors and SPC to optimise the construction phase. In some of the alternatives this goes along with higher cost of financing (Hadrian’s Wall).

Repayment

Institutional investors require a more certain stable repayment than the banks, since (payments to) their liabilities are also accurately planned in the future. Therefore the institutional investors state fines for the SPC in case of early or late payment. The involvement of banks during the first years after construction or complete operation phase provide some flexibility to the SPC to deal with ramp-up and operation risks.

Instrument

The alternatives show an increased use of project bonds, which can provide more liquidity and certainty of timely repayment to financiers. The bonds in some alternatives consider private placements, which provide less transparency to the market regarding project specifics but less liquidity to the financier.

Controlling role

The alternatives show the commitment of a banks during construction and ramp-up phase to execute the controlling role. The institutional investors have up to 5-7 years after construction to gain expertise by learning from banks. Only the EIB accepts commitment throughout the contract, which doesn’t force the institutional investor to gain expertise.

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>Where the SPC always should swap the floating interest rates of bank loans against higher cost, the institutional investors provide fixed rate debt. This may form a reduction in the long-term financing cost. Referring to the N33-case, no inflation-linked debt alternatives are apparent for Dutch DBFMO projects.</td>
</tr>
<tr>
<td>Fees</td>
<td>However it seems less applicable that institutional investors calculate arrangement fees, these are still apparent since banks will still need to structure the project finance. In the Hadrian’s Wall alternative a Guaranteed Investment Certificate (GIC) is introduced, in which the surplus debt can be stalled to reduce the financing costs. These costs however stay higher than the commitment fees which are normally related to bank loans.</td>
</tr>
<tr>
<td>Distributions</td>
<td>The alternatives show no particular differences within the distributions to equity financiers.</td>
</tr>
</tbody>
</table>

Table 26: Enhanced Sub-Elements of Structure

§6.4.3 Return

According the risk and structure of the investment, sub-elements of required returns by financiers are triggered by the alternatives. This is elaborated in this table:

<table>
<thead>
<tr>
<th>Sub-Element</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>Where the SPC always should swap the floating interest rates of bank loans against higher cost, the institutional investors provide fixed rate debt. This may form a reduction in the long-term financing cost. Referring to the N33-case, no inflation-linked debt alternatives are apparent for Dutch DBFMO projects.</td>
</tr>
<tr>
<td>Fees</td>
<td>However it seems less applicable that institutional investors calculate arrangement fees, these are still apparent since banks will still need to structure the project finance. In the Hadrian’s Wall alternative a Guaranteed Investment Certificate (GIC) is introduced, in which the surplus debt can be stalled to reduce the financing costs. These costs however stay higher than the commitment fees which are normally related to bank loans.</td>
</tr>
<tr>
<td>Distributions</td>
<td>The alternatives show no particular differences within the distributions to equity financiers.</td>
</tr>
</tbody>
</table>

Table 27: Enhanced Sub-Elements of Return

However all three show enhancement of financiers perspectives, the Commute structure is the only one that reduces costs of finance compared to standard bank finance.
§6.5 Recommendations

Four main fields of optimisation are determined in order to provide main recommendations. These fields of optimisation are: the implementation of subordinated debt (§6.5.1), a changing role of commercial banks (§6.5.2), division of short and long term debt (§6.5.3) and the implementation of project bonds (§6.5.4). Lastly, main recommendations are summarised (§6.5.5).

§6.5.1 Subordinated Debt

The alternatives all include tranches of subordinated debt, which lowers the risk for senior debt providers regarding (1) construction cost overruns and/or (2) repayment of the outstanding loans. Where Hadrian’s Wall and the European Project Bond Initiative have a subordinated layer throughout the project life, the Commute structure only covers the construction phase with subordinated debt which is beneficial for the financing cost. The subordinated debt facilities are also named ‘credit enhancement facilities’, since they lower the risk of senior debt which will lead to a higher rating. This higher rating is likely to (1) lower cost of financing, and (2) improve liquidity of the investment for the financier. Since the return on government bonds is very low, pension funds and life may find a comparable substitute with a higher return in debt of DBFMO projects.

§6.5.2 Role of Commercial Banks

It is found that commercial banks start focusing at specific aspects, namely arranging the project finance structure, controlling the SPC and financing of the construction and ramp-up phase. Both NIBC and ING developed an alternative in which they arrange a fully committed project finance structure by acquiring financing from the institutional investors. Since these relatively new financiers have little experience on controlling the SPC, the banks can stay involved during ramp-up in order to provide their expertise on the controlling role. During ramp-up some risks (childhood diseases) may occur, which can better be absorbed by banks in case also senior debt bonds are implemented. Bonds are less flexible regarding repayment as determined by a make whole clause, which states high fines for late payments. Lastly the involvement during ramp-up is also beneficial to preserve a substantial return for banks within the project, since regulation forces them to finance a shorter period. They can however retain an important role during construction by providing construction loans in form of ‘pre-financing’ institutional debt by revolver loans. This generates flexibility for the contractor to optimise activities during construction without extra financing cost.

§6.5.3 Short and Long Term Debt

It can be seen that, in order to offer full committed finance for the project, some long term debt is likely to be acquired from institutional investors. This is due to the perspectives of (1) commercial banks to only finance up to terms of five to seven years after construction, and (2) development banks to finance only a part of the required long term debt. Another fact is that the institutional investors, which aim at long term investments, in general require a fixed rate return which is considered to be lower than bank debt. Therefore the institutional investors may adopt a major role regarding the long term finance, where banks may become more important in the provision of short term debt. It is worth mentioning that the banks debt up to 10 years is less costly than the 25 to 30 year debt from institutional investors.
§6.5.4 Implementation of Project Bonds

It can be seen that many of the alternatives introduce project bonds instead of loans. As mentioned in chapter 3, bonds are applicable for large projects and entail less flexible conditions regarding repayment and drawdown than loans. Since the financier has more certainty about the timing of repayment and is compensated for changes by the make whole clause, lower return is required (lower risk). Since these bonds require a rating which represents the riskiness of the project, bonds may be easier to sell (more liquid) in case the financier needs immediate cash for example. Senior debt in DBFMO projects is normally rated as BBB (just above investment grade), which is mainly determined by the construction risk of the project. By implementation of subordinated debt (credit enhancement facility) from banks during construction, the rating are thought to be upgraded from BBB to A. For these reasons bonds are interesting to implement in the project finance structure and may involve institutional investors into Dutch DBFMO projects. Since the Dutch government is not willing to issue inflation-linked bonds since there is only one institutional investors interested (APG), it is beneficial to see whether an international market is apparent for these instruments.

§6.5.5 Main Recommendations

These recommendations are provided to contractors in Dutch DBFMO projects regarding enhancement of the match between perspectives of financiers and applied project finance structures:

Recommendations

Let institutional investors finance long-term debt of DBFMO projects, since this will lower cost of financing and preserves full committed finance.

Verify whether the institutional investors accept construction risk and implement sub-ordinated bank loan during construction as short as required.

Involve institutional investors early and let them invest during construction at the moment their maximum amount of debt is drawn from a revolver bank loan.

Preserve flexibility regarding drawdown during construction by the use of revolver loan facilities from banks, which are drawn pro-rata with subordinated debt and equity in order to reduce financing cost.

Make use of the flexibility of bank loans through senior debt (alignment) facilities during the ramp-up phase to overcome potential childhood diseases and ensure that institutional investors are repaid according schedule.

Implement project bonds in order provide a more liquid and potential inflation-linked debt investment to the financier during and/or after the construction phase, since this is likely to reduce financing cost.

Preserve a substantial share for banks within a maturity up to 10 year, since this short term debt is cheaper than long term debt from institutional investors.
CHAPTER 7  FURTHER OPTIMISATION

Alternatives for project finance structure developed by the public and private sector were analysed, enhanced sub-elements were found and recommendations were presented in Chapter 6. A self-developed alternative project finance structure is elaborated, namely "Top-up" (§7.1). Lastly, the author of this report proposes design guidelines for other alternative project finance structures (§7.2).

§7.1 “Top-up”

This alternative project finance structure is firstly described (§7.1.1), its actual match with perspectives of financiers (§7.1.2) and the related cost of finance (§7.1.3) follow.

§7.1.1 Project Finance Structure

This alternative shows similarities with the “Commute” structure. The main difference is that two different tranches of debt are issued for institutional investors. One during construction with a maturity over the whole maturity of the contract and one after construction with a shorter maturity. In this structure a certain diversification of assets is created, which may attract different investors since large projects may require too much debt for one institutional investor. Medium term bonds (type B) with a maturity of 10 years and A-rating can be attractive for smaller investors and are cheaper than the long-term bonds. The B-bonds may also be replaced by an institutional loan. The banks stay involved for 9 years with a substantial share and fulfil the monitoring role during the first ten years. The project finance structure can be schematised as follows:

![Figure 21: Top-up – Cumulative capital in the project (per year)](image-url)
§7.1.2 Match with Perspectives of Financiers

The following can be found regarding the perspectives:

<table>
<thead>
<tr>
<th>Financier</th>
<th>Match?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Investors</strong></td>
<td>To satisfy them, flexibility during drawdown (persp. E) and early operation (persp. F) is</td>
</tr>
<tr>
<td></td>
<td>guaranteed by a revolving bank loan. Since the structure also accepts a 10% equity</td>
</tr>
<tr>
<td></td>
<td>investment (persp. A) by an equity bridge (persp. C) and shareholder loan (persp. D), it</td>
</tr>
<tr>
<td></td>
<td>can be stated that their perspective is matched.</td>
</tr>
<tr>
<td><strong>Commercial and Development</strong></td>
<td>Due to the combination of senior and subordinated loans, commercial or development banks</td>
</tr>
<tr>
<td><strong>Banks</strong></td>
<td>may earn a bit more during construction than in present traditional financing (persp. E).</td>
</tr>
<tr>
<td></td>
<td>This is repaid within the required maximum maturity (persp. D), which partly compensates</td>
</tr>
<tr>
<td></td>
<td>for their absence during operation. Their perspective is matched.</td>
</tr>
<tr>
<td><strong>Pension Funds &amp; Life</strong></td>
<td>Institutional investors which aim at different maturities or heights of investments in</td>
</tr>
<tr>
<td><strong>Insurance Companies</strong></td>
<td>infrastructure projects, can directly (persp. G) invest jointly (persp. I) in one structure</td>
</tr>
<tr>
<td></td>
<td>for a long term (persp. H). During construction and first years of operation, banks are</td>
</tr>
<tr>
<td></td>
<td>involved (persp. I). A subordinated bank loan covers the senior debt investment for</td>
</tr>
<tr>
<td></td>
<td>institutional investors during construction (persp. B), which improves the rating of bonds</td>
</tr>
<tr>
<td></td>
<td>to A (persp. C). The perspective is matched.</td>
</tr>
</tbody>
</table>

Table 28: Top-up – Match Perspectives of Financiers

§7.1.3 Cost of Finance

Also this alternative project finance structure shows a decrease in costs of financing compared to standard bank finance. An availability fee of € 40,079,570 per year is required for the project. With Net Present Value of € 483 million a reduction of 4,57% is established. However this is not as much as the Commute structure, this alternative provide a substantial share for banks. Besides this, two types of bonds with different maturities can be issued to institutional investors, which may be beneficial to attract different financiers in the project.

§7.2 Design Guidelines

This paragraph describes some other thoughts on alternative project finance structures, namely implementing short and long term project bonds (§7.2.1), refinancing after construction phase (§7.2.2) en private hedging of inflation (§7.2.3).

§7.2.1 Short and Long-term Project Bonds

However project bonds are often considered as long-term debt instruments in project finance, bonds with a shorter maturity are also issued by governments (and corporates). Bonds with a maturity of five to ten years tend to be cheaper, since credit risk (on default of repayment) is lower due the shorter time horizon. This option may contain that short-term bonds are issued during construction for a term of five to ten years for example. These bonds are covered by sub-ordinated debt to decrease construction risk and are repaid in the first years of operation. Directly after construction is completed, long-term bonds are issued to finance the operation phase. A drawback here is that it is difficult to determine a pricing for the long-term bonds upfront, due to the time gap between the start of the project and issuance of the bonds.
§7.2.2 Refinancing after Construction Phase

This concept elaborates on the N33 case, but the inflation-linked debt is substituted for fixed rate debt. However pension fund APG aims at the inflation-linked debt to provide fixed value pensions, life insurance companies require fixed income assets (Delta Lloyd 2013; Aegon 2013). For this reason it is useful to see whether these institutional investors are willing to guarantee the adoption of long-term debt against fixed interest upfront. In this way, the banks are ensured that they are refinanced after some years, which matches their perspective. Refinancing can be done directly after or split (50% after construction, 50% after 5 more years for example), which ensures the controlling role from the banks during ramp-up phase of the project. It is considered more likely that this is done by loans, since pricing of bonds relies on a comparison of the actual market that time.

§7.2.3 Private Hedging of Inflation

As mentioned in the conclusion of the N33 case, the government stated that inflation-linked debt will not be applied anymore. It may be worth to see whether the SPC is able to swap the fixed availability fees (ignoring the inflation over DBMO-related expenditure) against inflation to attract pension funds to provide debt to DBFMO projects. However this inflation swap is considered costly, an important risk for (some) pension funds is mitigated and enables them to provide a lower real interest rate than commercial banks.
Summary Part C

Alternative project finance structures proposed by the market were analysed on the match with the identified perspectives of financiers. It was found that the alternatives, however they are still not implemented in Dutch DBFMO projects, enhance the match between project finance structures and perspectives of financiers. To determine the potential effect on the Value for Money, the associated financing cost were estimated. Cost of finance can be lowered, but this depends on many elements and the perspective of the financiers involved. Four fields of optimisation are identified within the project finance structures, namely (1) implementation of subordinated debt, (2) the changing role of banks, (3) division of short and long term debt and (4) implementation of project bonds.

According these fields of optimisation, the author of this report determines recommendations which are used to provide some design guidelines. This is done with the assumptions from the theoretical context (chapter 2) in mind: (1) project finance structures should match the perspectives of financiers, and (2) financing cost should be minimised in order to preserve or increase Value for Money. One of the design guidelines is further developed in the alternative project finance structure “Top-up”. It is found that it is possible to establish enhanced project finance structures when considering the recommendations provided by the research.

After analysing the different alternative project finance structures, it was found that some will lower the cost of financing. One of the market alternatives shows a good match with perspectives of financiers against lower cost than the commonly used standard bank finance.

Sub-Research Question C

**How can the match between perspectives of financiers and project finance structures in DBFMO projects be enhanced?**

Conclusions

5. Debt finance should be provided by both banks and institutional investors to offer full committed finance and fulfil perspectives of different financiers against low cost of financing.

6. A proper match between the financial instruments and the perspectives of the involved financiers lowers the cost of financing.

7. Perspectives of institutional investors should be individually identified in order to optimise the financing cost of the project finance structure.

8. In general the alternative project finance structures are better matched with financiers perspectives, but some of them are more expensive than the standard bank finance.
EVALUATION

Main Research Question

HOW CAN CONSORTIA IN DUTCH DBFMO PROJECTS ENHANCE THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND APPLIED PROJECT FINANCE STRUCTURES?
CHAPTER 8  CONCLUSION

To complete the research a conclusion was derived from the previous chapters regarding the main research question. This chapter will show whether the research objective was achieved by presenting findings (§8.1). It is considered relevant to evaluate the established research from the viewpoint of the author by reflecting the research (§8.2) and proposing subjects of further research to cover thoughts of the authors which did not meet the scope of the research (§8.3).

§8.1 Findings

First the general findings are presented (§8.1.1), followed by the recommendations to contractors as stated by the research objective (§8.1.2).

§8.1.1 General

It was assumed that consortia of DBFMO projects may preserve or increase Value for Money to the Dutch government by enhancing the match between the applied project finance structure and perspectives of financiers. Simultaneously, consortia improve their competitiveness when they are able to enhance this match better than competitors. This research therefore focused on the following main research question, followed by some main conclusions:

HOW CAN CONSORTIA IN DUTCH DBFMO PROJECTS ENHANCE THE MATCH BETWEEN PERSPECTIVES OF FINANCIERS AND APPLIED PROJECT FINANCE STRUCTURES?

Mainly perspectives of debt financiers are not matched properly

The project finance structure of DBFMO projects requires funding for a term of 20-30 year. Regarding equity investment strategic seem to find financial partners in different types of institutional investors, both direct as indirectly through funds. In this way they are able invest their diminished financial resources efficiently. Main problems of project finance in the DBFMO projects occur in debt financing, since commercial and development banks don’t find their perspectives met. Therefore alternative project finance structures should be focused on perspectives of debt providers.

Combination of banks and institutional investors

Both commercial and development banks are not likely to fully finance the debt for the required term, since they aim at shorter financing (commercial banks) or limit their stake of the required finance in order to provide multiple projects with certain financial resources (development banks). When looking at institutional investors regarding debt finance, it can be seen that they aim to invest for a long term due to their own liabilities. It is shown that some institutional investors are reluctant to invest debt during construction, due to the high risk in that face of the project. In the case of direct investment by pension funds or life insurance companies, it is questioned whether they are experienced enough to fulfil the monitoring role which enables the monitoring mechanism of the project finance. It is concluded that neither banks or institutional investors are likely to finance the required debt completely. Therefore an adequate combination of debt from both banks and institutional investors should be acquired by the consortia. Banks and institutional investors differ in their perspectives regarding finance of the DBFMO project. Also institutional investors mainly differ from each other and have their own policy on investments or may face different regulation. Identifying financiers perspectives and matching these in applied project finance structures helps to (1) acquire project finance debt, and (2) lower financing costs.
Combination of different financial instruments

When establishing the project finance structure, different financial instruments are apparent. In most DBFMO projects, mainly loans were used to fulfil the finance demand for long term debt. Some institutional investors however, are in search of investments that are comparable with government bonds since the associated interest rates do not deliver sufficient return to them. Due to the AAA-status of the Dutch government and artificial low interest rates of European Central Bank (ECB), return on government bonds is insufficient for many institutional investors. Pension funds and life insurance companies retain a substantial share of government debt, but face difficulties to achieve their required rate of return on their overall portfolio due to the less-profitable Dutch government bonds. Debt in DBFMO projects may seem a comparable long-term investment, but normally senior debt is rated BBB in these projects. Acquiring a tranche (layer) of sub-ordinated debt from a commercial or development bank seems a solution to increase the rating of senior debt to AA. This may attract some institutional investors to invest in de DBFMO projects. Debt investments with an A-rating enhance the liquidity of the investment in case the institutional investor decides to sell it to another investor. There are also some institutional investors that do not require liquid debt investments in case the timing of periodic debt service is guaranteed. It is considered interesting to combine different financial instruments (of different maturities). Adequate structuring of short term bank loans with long term bonds may (1) attract different financiers and (2) lower cost of financing.

Financing costs of alternative project finance structures

The applied project finance structures in DBFMO projects are privately financed and are associated with higher cost of finance compared to public finance in case of traditional contracting. However these extra costs can be seen as agency costs for enabling a monitoring mechanism to ensure performance by the SPC, they should be minimised. Especially at present this is relevant, since the Dutch government is able to borrow at low interest rates. Due to the good rating of The Netherlands within Europe, many investors tend to invest since their investment is 'relatively' safe. In order to minimise the cost of the project finance structure, cost of carry caused by large drawdown before construction should be avoided. Additionally, the use of subordinated loans to enhance ratings of senior debt should be minimised, invested as late as possible and repaid early to minimise costs. Alternative project finance structures can lower the costs of financing of DBFMO projects, as the 'Commute' and 'Top-up' show according the estimates. Therefore the implementation of alternative project finance structures may be beneficial for consortia, since it lowers the required availability fees which increases Value for Money to the government.

General Conclusion

This research showed how the match between applied project finance structures and perspectives of current and potential financiers can be enhanced. One may question whether the positive effect of the monitoring mechanism on Value for Money compensates for the higher cost of the project finance structures in general. Especially in times when the Dutch government is able to borrow at tremendous low interest rates, discussion. Contrary, it is likely that the involvement of investors from the capital market will increase competition which will lower the cost of debt for DBFMO projects in general. Besides this, it gives the government and bidding consortia a more robust solution regarding the fulfilment of the long term finance for the total demand in future DBFMO projects. By safeguarding the fulfilment of the project finance structure, the monitoring mechanism is enabled to prevent the agency problem. For those reasons it is considered plausible that alternative project finance structures, in which the perspectives of financiers are better matched, will be
implemented in more DBFMO projects during the upcoming years. Also the lower financing cost of some of the alternatives is likely to encourage consortia to use alternative project finance structures in order to improve their bids compared to competitors.

§8.1.2 Recommendations

The research objective was determined as follows:

**Providing recommendations to consortia in Dutch DBFMO projects in order to enhance the match between the perspectives of financiers and applied project finance structures.**

The following recommendations have been determined by this research:

- Let institutional investors finance long-term debt of DBFMO projects, since this will lower cost of financing and preserves full committed finance.

- Verify whether the institutional investors accept construction risk and implement sub-ordinated bank loan during construction as short as required.

- Involve institutional investors early and let them invest during construction at the moment their maximum amount of debt is drawn from a revolver bank loan.

- Preserve flexibility regarding drawdown during construction by the use of revolver loan facilities from banks, which are drawn pro-rata with subordinated debt and equity in order to reduce financing cost.

- Make use of the flexibility of bank loans through senior debt (alignment) facilities during the ramp-up phase to overcome potential childhood diseases and ensure that institutional investors are repaid according schedule.

- Implement project bonds in order provide a more liquid and potential inflation-linked debt investment to the financier during and/or after the construction phase, since this is likely to reduce financing cost.

- Preserve a substantial share for banks within a maturity up to 10 year, since this short term debt is cheaper than long term debt from institutional investors.

These recommendations are further elaborated in Chapter 6.
§8.2 Reflection

In order to verify the outcomes of the research, the author uses this paragraph to reflect the established research. Reflection is done on the content (§8.2.1) and the process that has been experienced (§8.2.2).

§8.2.1 Content

Regarding the content, some main points of reflection are further determined.

Private Financing of Infrastructure

The government can validate the extra costs of project finance structures as agency costs according principal-agent theory, as stated in chapter 2. However alternative finance structures show a better match with the perspectives of financiers, to what extent the extra (agency) cost of private financing are acceptable. Maybe it is enough to let the consortium only arrange half of the financing demand to enable the monitoring mechanism. Maybe it is sufficient to let the main contractors finance only 10% equity, which may form a significant incentive for them to perform well. The issue on extra cost of finance may rise discussions whether the positive effect of project finance structures on VfM compensates for the higher cost of debt now the Dutch government is able to borrow at tremendous low interest rates. There is a strong feeling that, however the principal-agent theory provides a proper base, the Dutch government increasingly relies more and more on DBFMO in order to fulfil the demand for infrastructure. May it be to ensure that critical infrastructure is still developed during a crisis overloaded with governmental budget deficits or to prevent a large bubble of infrastructure demand next decade. This may become and issue when a substantial part of the Dutch highway network needs to be upgraded or replaced due to the end of the lifecycle, which requires big budget in a relatively short period of time.

Perspectives of Financiers

During this research several interviews have been done with various parties. However the interviews provided a clear view on the global differences between different financiers, mainly institutional investors don’t show uniform perspectives. This can be appointed to the fact that DBFMO is relatively new for them and a limited amount of Dutch DBFMO projects is financed by institutional investors at present. It is advisable to determine the perspectives of these financiers again after some projects are closed. Then the different financiers may have developed a more distinct viewpoint, which can be used to develop tailored solutions.

It is certain that the increased involvement of investors from the capital market through alternative project finance structures will increase competition and lower the cost of project finance structures in DBFMO projects. Besides this, Europe starts to turn their strong rely on the money market into the Angel Saxon system which more relies on the capital market (such as America). This will make Europe better resistant against a particular crisis in a specific market. In case of another credit crisis, debt may remain better available for corporates for example.

The author of this report believes that, however the alternative project finance structures have not been implemented widely, they may become a new status quo in the DBFMO market. Therefore it is useful for contractors and financial partners to retain a progressive attitude and develop adequate alternatives in order to offer the best Value for Money. During the first years this may definitely help to win bids, but it should be considered that this is only a part of the overall plan.
Financing Cost of Alternative Project Finance Structures

During the research the research became more focused on the perspectives of the financiers, which decreased the priority of modelling the financing cost of the alternatives. However some figures are presented in chapter 7, these consider estimates. Firstly, risk premiums differ per project, per financier and are in the end partly determined by competition between consortia and financiers mutually. Secondly, mainly old or public sources are available regarding the applicable interest rates, which made it difficult to estimate the prices at present. Lastly, project finance structure are in fact very detailed and complex models which are modelled by professional analysts. It should be said that the financing cost of the alternatives are difficult to estimate precisely, especially if the estimator is not a professional. Therefore it is worth for consortia to further explore which alternatives are the cheapest, after some alternative project finance structures have been implemented in DBFMO projects.

§8.2.2 Process

This research was the first of this size as performed by the author of the report. By choosing this subject, his goal to perform a challenging, recent and societal relevant subject is definitely succeeded. However the researcher explored performing research at the edge of his educational background, the process was accompanied with some difficulties.

Challenging Subject

Obviously, studies at the Delft University of Technology focus on technology and financial aspects are often a subordinated subject. Financial knowledge was mainly derived from courses related to financial engineering, during extracurricular activities and from general interest in economy. During the first months of the research it was found that the gap of knowledge on this subject was significant and should be closed to finish the research successfully. This leads to a strong learning curve, but also an early delay in the progress of the research. It may also have postponed the moment that the research problem was analysed, since it is difficult to exclude irrelevant aspects without knowing their relevance, content and context. In the end it has been instructive and worth it to gain more knowledge on this subject.

Recent Trends

At present this subject has shown to be an hot topic in the Dutch DBFMO market. The different trends as determined in Chapter 1 provided a lot of possibilities to gain information from relevant parties. During the process the consequences and opportunities generated by these trends changed the Dutch DBFMO market and showed the increasing enthusiasm of banks and contractors to develop alternative project finance structures. It was hard to assess which recent trends would be useful to include in the research, especially since new aspects are still entering the market.

Societal Relevance

Since this research helps consortia to deliver more Value for Money to the Dutch government in the end, it contributes to society from the viewpoint of the researcher. The relevance of this research regarding the field of knowledge on financing DBFMO projects has been a driving factor during the research. The consortia, and contractors within, moreover aim to lower cost of financing in order win the bid and maximise profit for the company. Sometimes it was difficult to preserve the societal relevance, but in the end the result is satisfactory.
§8.3 Further Research

While establishing this research, some subjects for further research crossed the author's mind which did not fit within the scope of the research. These subjects are summed and briefly elaborated in this paragraph: the development of a public infrastructure debt fund (§8.3.1), the establishment of the Dutch Bank of Infrastructure development (§8.3.2), the issuance of inflation-linked government debt (§8.3.3) and the selling of infrastructure in operation (§8.3.4).

§8.3.1 Public Infrastructure Debt Fund

In an early stage, the government suggested to set up an infrastructure fund, but the big institutional investors were not interested since it is more transparent an cheaper to invest directly in projects. This is why they establish special teams to focus on infrastructure investment. Smaller institutional investors may become interested in a funds, since the high cost of establishing teams is not profitable for them. Besides this, one might think that it is beneficial for the government to arrange a source for subordinated debt if this lowers the cost of senior debt. The EIB already started this with the EURO 2020 Project Bonds Initiative, but not all Dutch projects are eligible for this programme. Maybe the BNG can be used to establish this fund, combined with subordinated finance or guarantees from the Dutch government.

§8.3.2 Dutch Bank of Infrastructure Development

It is interesting to see whether there is an opportunity to establish a Dutch Bank of Infrastructure Development, which focuses on acquiring and providing senior and subordinated debt for the development of infrastructure and renewable energy for example. In this way a more focused commercial/development bank will arise is possibly supported by funding from the Bank Nederlandse Gemeenten (BNG), Waterschapsbank and the Dutch Government for example. Due to a good rating, long term and/or subordinated debt may be acquired against attractive pricing, which can be used to stimulate economy or environment relevant project and help them to acquire funding from capital market investors.

§8.3.3 Inflation-linked Government Debt

The Dutch government decided that inflation linked government bonds are not profitable, However, an inflation-linked loan was implemented in the N33-project. This was supreme effort to involve pension funds APG, since this was their requirement to invest in infrastructure. APG provided a cheaper real rate and will provide long-term debt, but the project finance structure was adjusted by their requirements. The lower price may insinuate that inflation-linked debt is beneficial to the government. Especially in a time that high-rated countries like the Netherlands are in high demand, it is interesting to see whether inflation-linked government bonds can be issued.

§8.3.4 Selling Brownfield Infrastructure

Since it seems that the construction risk in DBFMO projects may discourage some investors, it is interesting to look whether brownfield projects (existing roads for example) may be offered to the market. This may create a new type of asset and the government may gain extra finance for new infrastructure development in case budget deficits rise. This debt is considered cheaper, since the construction risk does not affect the project anymore. When it is used as a substitute for debt in new DBFMO, government debt may not rise in total. This may have remarks off course since the Design and Build component are distracted, but it is interest to look whether this is possible and what it might bring for society.
VI – BIBLIOGRAPHY


Bank Nederlandse Gemeenten, 2012. Over BNG.


Delmon, J., 2009. Private Sector Investment in Infrastructure: Project Finance, PPP Projects and Risks,

Delmon, J., 2005. Project Finance, BOT Projects and Risk,


HM Treasury, 2012. A new approach to public private partnerships,


Mongkol, P., the critical review of new public management and its criticisms.

Moody’s, 2010. Generic Project Finance Methodology,

Murphy, D., 2010. Project Finance and Capital Markets,


Van der Post, F., 2011. Private Financing For Infrastructural Projects in The Netherlands: Added Value Or Illusion?


VII - LIST OF FIGURES & TABLES

Figure 1: Public cost of an infrastructure project ............................................................................. 12
Figure 2: Research Structure ............................................................................................................. 21
Figure 3: Principal-Agent relation in DBFMO ............................................................................... 24
Figure 4: Theoretical Framework ..................................................................................................... 26
Figure 5: Phases of a DBFMO project ............................................................................................. 31
Figure 6: Organisational Structure of a DBFMO project ................................................................. 32
Figure 7: Project Cash flows ............................................................................................................ 39
Figure 8: Cumulative capital in a fictive DBFMO project (per year) .................................................. 41
Figure 9: Cash flows in the Project Finance Structure .................................................................... 42
Figure 10: DUO² – Overview of Project .......................................................................................... 57
Figure 11: DUO² - Financiers .......................................................................................................... 59
Figure 12: DUO² – Cumulative capital in the project (per year) ......................................................... 59
Figure 13: N33 – Future artefact ...................................................................................................... 61
Figure 14: N33 – Financiers ............................................................................................................. 62
Figure 15: N33 – Cumulative capital in the project (per year) .......................................................... 63
Figure 16: Hadrian's Wall – Funding Structure .............................................................................. 68
Figure 17: Hadrian's Wall – Cumulative capital in the project (per year) ......................................... 69
Figure 18: Euro 2020 Project Bonds Initiative - Cumulative capital in the project (per year) ........ 71
Figure 19: Commute - Cumulative capital in the project (per year) ................................................. 72
Figure 20: Top-up – Cumulative capital in the project (per year) ................................................... 78

Table 1: Public cost in traditional and DBFMO contracts .................................................................. 13
Table 2: Main sources of long term finance for consortia ................................................................. 16
Table 3: Report Content .................................................................................................................. 21
Table 4: Main Parties in DBFMO projects ...................................................................................... 33
Table 5: Contracts in DBFMO projects ........................................................................................... 34
Table 6: Risk Categories in DBFMO projects .................................................................................. 34
Table 7: Financial Instruments ........................................................................................................ 38
Table 8: Strategic Investors ........................................................................................................... 45
Table 9: Banks ................................................................................................................................. 46
Table 10: Institutional Investors ..................................................................................................... 46
Table 11: Sub-Elements of Risk ..................................................................................................... 47
Table 12: Sub-Elements of Structure ............................................................................................. 48
Table 13: Sub-Elements of Return .................................................................................................. 48
Table 14: List of Interviewees ......................................................................................................... 51
Table 15: Strategic Investors – Perspective .................................................................................. 52
Table 16: Commercial Banks – Perspective .................................................................................. 53
Table 17: Development Banks - Perspective ................................................................................... 54
Table 18: Infrastructure Funds - Perspective .................................................................................. 55
Table 19: Pension Funds & Life Insurers - Perspective ................................................................. 56
Table 20: DUO² - Match Perspectives of Financiers ................................................................. 60
Table 21: N33 - Match Perspectives of Financiers ........................................................................ 64
Table 22: Hadrian's Wall - Match Perspectives of Financiers ...................................................... 69
Table 23: Europe 2020 PBI - Match Perspectives of Financiers .................................................. 71
Table 24: Commute - Match Perspectives of Financiers ............................................................... 73
Table 25: Enhanced Sub-Elements of Risk ..................................................................................... 74
Table 26: Enhanced Sub-Elements of Structure .......................................................................... 75
Table 27: Enhanced Sub-Elements of Return .............................................................................. 75
Table 28: Top-up – Match Perspectives of Financiers ................................................................. 79
VIII - APPENDICES

The following appendices are documented in this part of the report:

Appendix A  Net Present Value
Appendix B  Value for Money
Appendix C  Debates on DBFMO
Appendix D  Credit Crisis
Appendix E  Financing Costs of Project Finance Structures
APPENDIX A: NET PRESENT VALUE

This appendix will elaborate some theory on the Net Present Value.

Money is worth more at present than in the future. From a public point of view, the total cost of the DBFMO project can be determined by calculating the Net Present Value (NPV) of the payments to the SPC over the whole lifecycle. A discount rate is used to calculate the present value of these future cash flows, and is based on (1) the general time value of money (i.e. related to financial market interest rates), and (2) a risk premium for risks of the project (Yescoombe 2007). The Dutch government bases their discount factor for DBFMO projects on the (risk-free) market rate for government bonds (around 2.50%), complemented with a project-specific risk-premium (around 3.00%).

To show how the future cash flows for the government (availability fee) are discounted, the following formula is used:

\[
NPV = \sum_{t=0}^{n} \frac{C(t)}{(1 + d)^t}
\]

NPV = Net present value
C = Cash flow
t = timing (years)
d = Discount rate
n = Contract length

**Equation 1: Present Value** (Brealey, Myers, and Allen 2008; Van der Post 2011)

For every year the cash flows are accumulated and discounted against the discount factor in that particular time. Cash flows at the start of the project (year 0) are not discounted, since this most often is the starting point of the calculation (the point in time to which the cash flows are discounted to). The NPV should be positive to be worth investing in, referring to the demand of shareholders which demanded a certain minimum return on their investment.

When assuming a DBFMO project for which the total cost for the government consider a € 100 million (bullet) payment at the end of construction (year 2) and availability payments of € 40 million per year during the 25-year operation phase. The present value of the € 100 million payment when using a discount factor of 5.50% is \((100 / (1,055)^{2}) = € 89.8\) million. In case of the example above, the NPV may be calculated by accumulating all present values of the futures cash flows:

<table>
<thead>
<tr>
<th>Initial (x 1 mio)</th>
<th>Construction</th>
<th>Construction</th>
<th>Operation 1</th>
<th>Operation 25</th>
<th>Operation 26</th>
<th>Operation 27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discounted (5%)</td>
<td>5,50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0,0</td>
<td>100,0</td>
<td>40,0</td>
<td>40,0</td>
<td>40,0</td>
<td>40,0</td>
<td>40,0</td>
</tr>
<tr>
<td>0,0</td>
<td>89,8</td>
<td>34,1</td>
<td>10,5</td>
<td>9,9</td>
<td>9,4</td>
<td></td>
</tr>
</tbody>
</table>

\[ NPV (x 1 mio) = 571.9 \]

**Figure 1: Discounted Cash flow Calculation**

The Internal Rate of Return (IRR) of the project reflects the discount rate(s) at which the NPV is zero. The IRR is often used by investors to see whether the investment is worth investing in by checking if it outrages the own cost of funding of the company.
APPENDIX B: VALUE FOR MONEY

By implementing a DBFMO contract the government aims to generate Value for Money, as was mentioned in the introduction of this report. Value for Money is determined by calculation of cost and benefits of the DBFMO project (§B.1). Four main drivers related to the calculation of VfM are cost for DBMO activities (§B.2), risk transfer (§B.3), transaction cost (§B.4) and cost of finance (§B.5).

§B.1 Calculation of VfM

As shown in Chapter 1, the efficiency of a DBFMO contract compared to a traditional contract is determined by Value for Money. This was visualised by the following figure:

![Figure 2: Components in Value for Money](image)

In general the author states that the calculation of VfM can determined by the following formula:

\[
VfM = \Delta NPV(DBMO) + \Delta NPV(risk) - \Delta NPV(transaction) - \Delta NPV(finance)
\]

Value for Money is generated if the positive effect of DBFMO on the (1) cost for DBMO activities and (2) risk transfer outrage the negative effect on (3) transaction cost and (4) financing cost. It can be seen that private financing (in DBFMO projects) is more expensive than public financing (in traditional contracts). In case financing cost may be extremely high VfM may be outraged which makes the Dutch government choose for a traditional contract. In chapter 2 is elaborated why the government accepts this higher costs of financing of DBFMO contracts.

The next paragraphs will further determine the four separate components of the calculation of VfM.
§B.2 Integration of project activities and phases

The different phases and related activities of a project are contracted jointly through one DBFM0 contract to the SPC. It is a contract between public and private parties for a long term (20-30 years) in which payments from public to private parties are spread over the lifetime of the project. This creates an incentive for the private parties to be committed during the whole lifecycle of the contract (Yescombe 2007). This contract considers the design (D), building (B), finance (F), maintenance (M) and operation (O) of the infrastructure by the private sector. In traditional contracts is the operation-phase is not taken into account and may lead to higher cost (Delmon 2005). When integrating all activities in one contract in combination with financing, it also considers many private sector parties to co-operate and anticipate on the operation phase of the project. This is expected to gain efficiency during construction and a reduction of cost during the operation phase. The maintenance cost are difficult to estimate by the government, which bears a lot of risk by retaining this.

§B.3 Risk Transfer

In DBFM0 the risks of the project are distributed between the public client and SPC. The government aims to see whether as many risks as possible can be transferred to the private sector, as long as this is cost-efficient (and generates VfM). In case the government expects a monetised risk to be less expensive than the price the SPC offers, the risk may be taken back to the private sector (Yescombe 2007).

The concept of allocating risk at the party who is best able to bear it is further extended by the SPC by passing on construction and operation risks directly (‘back-to-back’) to the related sub-contractors through a DBMO-contract (Delmon 2005). This is often driven by the fact that the financiers are not willing to bear risks they are not able to manage and the SPC who does not want to pay associated increases in financing cost by extra risk premiums. Transfer of risk to the private sector is considered to reduce the monetised value of risks for the government, which delivers VfM.

§B.4 Transaction Cost

The transaction costs (for the government) can be seen as cost for bidding procedures, making up contracts and monitoring the actual performance for example. DBFM0 contracts are larger and associated with more complexity than traditional contracts like Design & Construct for example. Due to complex contracting the transaction cost are likely to increase (Farajian and Cui 2013). More specifically, the higher transaction costs are due to (Van der Post 2011):

1. Development of performance criteria to measure whether the SPC performs according the agreed standards
2. The more detailed and specified designs, taking a longer time.
3. The formation of a large tailored contract by hiring experts on risk or legal issues (Grimsey and Lewis 2005).
4. The long-term and complex tender process including selection and negotiation processes.
5. Compensation of the tender cost of winning and losing consortia.

A distinction can be made between (1) cost incurred by the government for hiring experts to draw the specification or contract f.e., and (2) cost incurred by the SPC for cost of participating in the tender f.e. (Van der Post 2011).
From the points mentioned above can be derived that the transaction costs are likely to be higher than in traditional contracting. The transaction costs can also partly be seen as agency costs, since some of these are used to gather information on the status or performance of the project. Despite whether the costs can be seen as agency costs, they should be minimised in order to benefit VfM.

§B.5 Project Finance

The cost of private financing are considered higher than if the government would have funded it directly (Yescombe 2007), which is further discussed in Appendix C. It was stated that these extra cost could best be seen as agency cost since the project finance structure functions as a monitoring mechanism for the government. By implementing project finance a lender is introduced to the project, which controls the SPC on its performance. Another important element of the project finance is that the main contractors (or sponsors) are obliged to have some money at stake as shareholders in the SPC. In case of bad performance these parties ‘feel’ this directly, since their return will decrease.

More on the project finance structures is elaborated in chapter 3.
APPENDIX C: DISCUSSIONS ON DBFMO

However DBFMO may have a background, some debates are apparent on the purpose and implementation of this way of contracting in practise. Main discussions are regarding the use of DBFMO to enable off-balance sheet borrowing (§C.1), the reliability and accuracy of VfM (§C.2) and the higher cost of private financing of infrastructure (§C.3).

§C.1 Practical occasion for DBFMO

As mentioned, the role of the public sector is to provide infrastructure for free or at low cost. The private sector is not able to achieve this, since it private sector parties mainly focus on making profit and creating shareholder value and can’t take into account externalities, such as societal benefits or economic growth, which the public sector is actually able to. Due to the substantial investments associated with infrastructure, governments should compare and plan the potential projects properly in order to meet their current and future budgets (Yescombe 2007). However the public sector will retain an important role regarding the provision of infrastructure, but in the past decennia the involvement of the private sector increased.

Demand for private sector involvement originated from the United Kingdom, where infrastructure demand was outraging public budgets for infrastructure. Limitations on public budget deficits on national level were restrained by Maastricht Treaty limitations, which caused problems in UK to fulfil infrastructure demand. From 1992, the Private Finance Initiative (PFI) was introduced in the United Kingdom; a contractual form which aims to attract private financing of projects in order to be able to meet the infrastructure demand. PFI can be seen as an early form of collaboration between the public and private sector and is still a commonly used way of contracting by public authorities on national and local level since 1992 (Shaoul 2005; Shaoul 2011). A main advantage of PFI was that this type of borrowing was off-balance, which means that it does not affect the yearly government budget and does not appear on the balance of the government. This enabled the government to enable infrastructure development without outraging limitations from the Maastricht Treaty.

§C.2 Reliability and accuracy of measuring VfM

It was mentioned that VfM is ‘benchmarked’ against a hypothetical project in case the public sector would have used traditional contracting, the PSC. Some concerns are associated with these hypothetical models, since it’s mainly based on many assumptions. When monetising risks, which is considered a crucial component of the calculation of VfM (Chou et al. 2012), opportunistic assumption may draw a optimistic or pessimistic view on a project. This also means that the policy makers are able to influence the results of a PSC compared to DBFMO. This is also thought of the NPV-method used to discount future cash flows, since the used discount rate differs per project according the specific risk also this may be influenced and not completely reliable (Algemene Rekenkamer 2013).

Chou et al. (2012) mentions the real issue in the projects is uncertainty, of which the government retains most of them. Obsolescence, changing public demand and outcomes of service performance by the SPC are held by the public sector. These types of risk are difficult to monetise and include in the project, but it is important to consider this.

Long lasting contracts make it difficult to estimate the feasibility of a DBFMO project, since cost estimates, discount rates and risk allocation are “incomplete bases to draw conclusions” (Grimsey...
and Lewis 2005). Concluding can be said that there are people questioning the way in which VfM is measured since it is based on many assumptions and uncertainties over the contract term.

§C.3 Public versus Private Finance

Since the cost of private finance are considered higher than public finance, critics doubt whether it is worth to pay these extra cost in DBFMO projects. To understand the differences between types of public and private financing the following options will be elaborated: Government finance (§C.3.1), corporate finance (§C.3.2) and project finance (§C.3.3). Lastly, the discussion on off-balance sheet finance for the government will be elaborated (§C.3.4).

§C.3.1 Government Finance

Public financing is the traditional way of financing infrastructure projects and entails direct borrowing by the government by issuing government bonds for example. The acquired finance is directly invested in the project, which often appears in Design & Construct projects.

In case a country is relatively save, the government is able to borrow at low interest rates. The Dutch government recently issued bonds at 1.48% which is the lowest in all time. This mainly due to their safe status and the weak and risky status of Southern European countries (Volkskrant 2012). It is considered be the cheapest way of financing public infrastructure in case budgets are not sufficient. The borrowed debt appears on the governments balance and counts for their public debt according the Maastricht Treaty. Besides this, principal-agent theory describes the problems that occur when infrastructure is outsourced by the government and goals of the agent is not aligned. In case of government finance these relations occur and may not follow the vision of New Public Management.

Government finance can be schematised as follows (Delmon and Delmon 2010):

![Figure 3: Government Finance](image)

§C.3.2 Corporate Finance

In case the government chooses to outsource the finance of the projects, private sector parties can finance the project by borrowing as company itself and use this money for the project (Brealey, Myers, and Allen 2008). Whether the company is able to borrow the money depends on its profile and financial status. Especially in the construction sector, main contractor face worsened financial situations due to a deteriorating market and pipeline of works. This increases the risk for financiers, resulting in higher interest rates.

The financiers of companies will rely on the company to recover their provided investment rather than on the project itself. This means that if the project is not doing well, the parent company still
has the liability to repay the acquired loan (Delmon 2005). In case of relatively large projects with substantial investment, which infrastructure projects often entail, bad performance of the project may lead to bankruptcy of the company. Vice versa, if the company faces bankruptcy, the infrastructure project may find difficulties to perform and high quality service can't be guaranteed to the government and users (Yescombe 2007).

Another argument may be that infrastructure project, mainly integrated contracts, are too big or complex for a single contractor to execute solely. This means that other contractors need to be involved in the works, which may be difficult to do properly in a project that is incorporated at only one of the parties. Corporate finance can be schematised as (Delmon and Delmon 2010):

### §C.3.3 Project Finance

A second way of private financing is through a project finance structure, which is the common way of financing DBFMO projects. This type of financing entails direct financing of the financiers in the project. The main difference is that the financiers do not rely on the company for repayment of the loan, but on the cash flows generated by the project. The financiers base their requirements for interest rates on the feasibility of the project and only partly on the financial status of the companies related to the project. Besides this, in Chapter 2 was stated that agency problems are (partly) solved by the presence of a debt financier through a project finance structure. Project finance can be schematised as follows (Delmon and Delmon 2010):
§C.3.4 Off-balance Sheet Government Debt

A predecessor of DBFMO was the Private Finance Initiative, which arose when the UK faced budget deficits and were limited to borrow money by the Maastricht Treaty (Yescombe 2007) in the ‘80s and ‘90s. Critics state that the use of DBFMO is still a ‘disguised’ way of borrowing money to fill gaps that are left by budget deficits.

In general, money which is borrowed by the government (by issuing government bonds for example) is accounted on their balance as debt. At present it is seen that this public debt in many countries outrage the limits set by Maastricht Treaty (60% of GDP), as shown in the following figure (Karner 2012):

![Figure 6: Public Debt in % of GDP (2011)](image)

Since infrastructure projects through traditional contracts are directly drawn from the budgets and governmental budget deficits are apparent during crises (Devapiya and Alfen 2005), governments may be forced to borrow extra money in order to fulfil infrastructure demand. As shown in the figure, many countries outrage the 60% limit set by the Maastricht Treaty. Therefore DBFMO offers the possibility to borrow money indirectly from the private sector and fulfil infrastructure demand.

The availability fees to be paid over the total term of the DBFMO contract are not deducted from the present budget, but from future budgets. This creates more space in the present governmental budgets to spend on infrastructure or other fields. However, the government still has the obligation to pay the future availability fees. These obligations are not shown in the overviews on public debt (HM Treasury 2012), but are taken into account in the multiannual planning of infrastructure development (MIRT in The Netherlands). Since a component of these fees can be addressed to project finance, it is criticised whether this indirect way of public lending should not be added to the public debt (HM Treasury 2012). Recently, the UK government introduced the ‘Whole of Government Account’, a accounting publication which also takes into account all commitments arising from off
balance sheet PFI contract in order to gain more transparency (HM Treasury 2012). In The Netherlands this is not introduced yet.

It is criticised that governments are able to borrow money unlimited from the private sector through the use of DBFMO. Since future budgets in fact are influenced by the obligations (availability fees) from DBFMO, future governments may be limited in their actions since a part of their budgets is already destined by their predecessors. The Dutch government however limits the obligations from the use of DBFMO contracts to a maximum of 25% of the yearly budgets for infrastructure development (Dutch Ministry of Infrastructure and Environment 2011). In this way they ensure that enough flexibility will remain in the future and the obligations will not increase too far.

In addition, it can be expected that a strong pipeline of infrastructure projects will occur, since the expected lifecycle of developed infrastructure in the ’70s and ’80s may end in the upcoming decennium. The government should ensure that enough budget is available to fund this flow of infrastructure project to be renewed. By spreading the investments, budgets can be levelled over year not causing problems for infrastructure development nor other field that require attention. As mentioned, contracting through DBFMO may be a way to ‘pull’ some projects forward to prevent giant budget deficits or unfulfilled demand for infrastructure.

It can be concluded critics see DBFMO as a disguised way of government borrowing. However this may be true, the Dutch government implements a cap of future expenditure on DBFMO projects. They are however more likely to fulfil infrastructure demand, which seems to be substantial in the upcoming decennium. This does not counter the fact that VfM should be generated by a potential DBFMO project.
APPENDIX D: CREDIT CRISIS

This appendix will focus on key elements, causes and consequences of the credit crisis on financial markets. It will become clear why the availability of long-term bank loans of DBFMO projects is deteriorating by explanation of stringent regulation and changing interest rates, which emerged from the crisis. Subsequently, the consequences for the potential financiers of DBFMO are determined. After reading this chapter will be clear what (in)direct effects the crisis has on potential financiers of long-term debt for DBFMO.

§D.1.1 The Beginning of the Credit Crisis

In general the credit crisis is considered a consequence of the provision of sub-prime mortgages by American banks to risky consumers. From 2000 till 2007 the central bank of the USA (FED) lowered the interest rates for credit (loans) in order to revive the economy by increasing consumer trust in the market after 9/11. As a consequence companies and consumers were able to borrow money relatively easy and cheap, against a floating rate. In line with this movement, banks provided mortgages and long-term loans to debtors who were not financially able to meet the related obligations (in case the interest would increase again). Banks borrowed billions of dollars in order provide these loans and mortgages. After repacking many of these and less risky mortgages into not transparent packages, named collateral debt obligations (CDOs), these risky financial products were traded to investors all over the world. In 2007 the interest rate of the FED increased again, what can be seen in this figure (Global Rates 2013):

Due to this increase of interest rates in general, the floating interest rates of the mortgages and long-term loans also increased. The mortgages and loans became more expensive and soon the house owners were not able to meet their obligations anymore since to their financial situation remained the same none or less. Banks faced losses since mortgages were not repaid sufficiently. When these financial liabilities outraged their abilities, they were forced to sell their houses, to mortgage-owners for example. If only a few houses were sold back to the banks, it wouldn’t have been a big problem.
But many houses were sold simultaneously, which later appeared to become worth less than expected. This was caused by the large amount of buyable houses, which increased competition and lowered prices in the housing market.

These houses, together with comparable risky loans of companies, appeared on the asset side of the banks. Since the value/price of houses and loans lowered, the asset-side of the balance of banks declined rapidly. As mentioned in § 2.5, this may cause problems regarding the liabilities-side of the banks balance. Indirectly the same situation appears to happen in the balance sheets of the owners of CDOs all over the world (Jarvis 2012).

Bad loans and mortgages are widely apparent in balances of many different financial institutions, which makes trust within the financial markets decline. When financial institutions are less willing to providing debt to companies or consumers, less investment are undertaken in the economy. For the financial markets this means that economy slows down and makes it even hard to repay debt by decreased levels of consumption, investment, trading and, with that, revenues and asset value.

Banks are not able to meet their own liabilities (cost of debt) because their assets are worth less, do not generate revenues and are not liquid (no one wants to buy them). It appears that the high leverage-ratio of banks at this point starts to backfire them, since the ‘cold shower’ is faced if all equity is ‘eaten out’ (Vrijling and Verlaan 2011) and bankruptcy seems the banks destiny if nothing happens.

Safety measures were taken by the public authorities by adopting ‘bad assets’ from banks or execute ‘bail-outs’ by buying new equity in the banks. American authorities provided $ 750 billion for this purpose, where Europe invested € 1600 billion between 2008 and 2011 (Rijksoverheid 2012). Many banks required governmental support by bail-outs, but recently European and local authorities announced that they will reduce the amount of this rescue actions to save banks. They tend to forms of bail-in, were (subordinated) bond investors will decrease in seniority if the bank tend to go bankrupt and pay. However this seems to feel natural from theory, the markets appetite for this is low since this means their bonds may be riskier and returning less then expected (Financieel Dagblad 2013). At present the ECB has the Long-Term Refinancing Operations (LTRO), a safety debt fund with 3-year loans which banks can use to stabilise their balance and secure financing of operations.

§D.2 Consequences

It is shown that the crisis affected the whole financial system, both money and capital markets. The credit crisis revealed many pitfalls and lack of transparency in this sector, which made public authorities eager to tackle these. Since they are in a controlling position, they improved regulation for banks and other financial institutions, mainly institutional investors which invest pension and life insurance reserves from individuals. The ECB plays an important role in reviving the European economy by lowering its interest rates, which affects the financial markets. At the same time the interest on government debt of high-rated countries lowers, which also applies for Dutch government bonds.

§D.2.1 Basel III

In order to gain more control on and insight in the financial situations of financial institutions, regulation has been sharpened. By the implementation of Basel III for banks and Solvency II for insurance companies the public authorities aim to realise this ambition. In order to cover the regulation for pension funds also, the pension law will be explored. Banks generate revenues by
earning interests on outstanding loans, but also in form of transaction fees and financial advice to third parties for example. By regulation banks are obliged to reserve a part of the acquired funds, for a situation in which depositors suddenly require withdrawal of their money or other problems occur (Raise Capital 2011). Regulation of Basel II provided such guidelines for banks in order to reduce the financial risks when economy deteriorates. From the past decennium, which was plagued by the financial crisis, emerged that the Basel II regulations were not sufficient to prevent the banking sector from deteriorating. Banks were, intentionally and unintentionally, facing a lot of risks which the Basel II regulations were not capable to cover. The existing Basel II regulation was strengthened in order to monitor the recovering and competitiveness of banks (Moody’s 2010). The biggest and most challenging differences for banks in Basel III are established in the following phrases (Een Vriend B.V. 2012; Basel Committee on Banking Supervision 2010):

• **Basel III: Capital requirements**

The crisis showed that banks overall had, accounting-wise, enough capital related to the regulations of Basel II. The problem was that the capital was not directly available to the bank (liquidity), since this was allocated at sub-companies and illiquid assets. Credit defaults and write-downs could not be properly be absorbed by retained earnings, since no reserve was available. In the new regulations is stated that the banks should increase the quality, consistency and transparency of their capital base. Higher quality means more certainty and insight on the ability of banks to cover losses that affect the capital. A distinction between Tier 1 (equity and retained earnings) and Tier 2 (subordinated, revaluation reserves, mezzanine, subordinated long-term debt) capital is made in order to ensure that enough capital in the banks consists of equity (Basel Committee on Banking Supervision 2010). One can see that banks are obliged to retain certain percentages of provided debt as equity on their balance. This is relatively expensive for them, which make banks adding an extra liquidity premium to borrowers.

• **Basel III: Liquidity ratio**

In an early phase of the financial crisis banks experienced difficulties, because they did not manage their liquidity (tradability of assets) in a proper manner. A quick and big reversal in market conditions showed how fast liquidity can evaporate and that this can last for an extended period of time. A regulation on liquidity has been set for standards, measurement and reserves for outstanding loans. This should help banks to prevent their situation for resilience of the market on short and long term. This factor can also be seen an important issue regarding the provision of long-term loans by banks, while short-term funds were acquired. This phenomenon is called ‘maturity transformation’ or ‘asset liability mismatch’, since maturity of the borrowings (liabilities) and provided loans (assets) are not matched properly. So if banks acquire too many illiquid assets, they are demanded to hold more equity (which is more expensive). Due to position in the money market and their purpose is considered to provide short-term debt, banks will have to hold even more equity capital when providing long-term loans, which also increases the price of debt for the borrower. Extra cost related to the ‘capital’ are namely calculated in a liquidity premium in the interest rate to the borrower. One can state that the risk premiums on both short-term and long-term debt are risen as a projection of the liquidity premium which was not apparent before.

• **Basel III: Leverage ratio**

Another cause of the crisis were excessive debt positions of banks, which was relatively a lot higher than the banks equity. This financial leverage ratio was too high and created a risky situation in case deleveraging processes would occur. This happened and created situations in which banks were not
able to recover and repay loans. The regulations were changed in a way that only equity capital is taken into account when calculating the ratio, since this was the relevant part of the capital when assessing the risk of bankruptcy. Besides this, the required height of the financial leverage ratio was lowered towards an acceptable and less risk-full level.

- **Basel III: Pro-cyclicality**

When Basel II was implemented, the fear for pro-cyclical effects appeared. Within a economic recession, it might be that a shortage on lending occurs. If the regulation on capital requirements is sharpened (liquidity and leverage ratio), banks can react by (1) increasing their capital reserve and (2) by providing less or smaller loans. Since the banks fear to make less profit and even losses in a deteriorating economy. The Rabobank, however, tries to increase their capital reserve by selling their subsidiaries, like Robeco. Many banks started to provide less loans, since this is more easy than acquiring more capital reserve from the capital market for example (Bikker and Metzemakers 2003). In general the negative effect of a bad economy is intensified by the decreased provision of loans by the banking sector. In order to prevent this from happening, Basel III proposes that banks will create anti-cyclical capital reserves during a good economic climate, to which can be prescribed in worse times. Off course this might be affecting the debt providing in good weather also. It is a more stabilizing measure through economic cycles.

**§D.2.2 Solvency II**

The new regulation on Solvency II is of main importance to insurance companies. Often Solvency II is referred to as "Basel for insurers," since it has similar characteristics like the banking regulations of Basel. In order to indicate, the proposed Solvency II framework has three main areas:

- Pillar 1: Quantitative requirements (for example, the amount of capital an insurer should hold).
- Pillar 2: Requirements for the governance and risk management of insurers, as well as for the effective supervision of insurers.
- Pillar 3: Disclosure and transparency requirements.

The pillars contain standard calculations for certain ratios or capital requirements are determined. Within pillar 1, the Solvency Capital Requirement (SCR) represents the amount that an insurance company demands to be able to fulfil its liabilities for a period of 12 months with a probability of 99.5%. In order to support this requirements, calculations of technical provisions (interest rates, return) should represent the current amount to be paid in case of immediate transfer (EIOPA 2013). This also includes that illiquidity premiums may be added to the risk-free premiums in times of stressful markets, in order to meet the requirements of Solvency II. It enables the insurer to absorb decreased liquidity and value of assets at the asset side of the balance. Also regulation on maximum leverage, capital requirements and asset liability management are apparent for insurance companies. However, a lot of uncertainty on the content of the regulations appears to dominate the market (Delta Lloyd 2013; Aegon 2013). Insurance companies try to anticipate on new regulation and hope to see clarification of the actual content of Solvency II in the short term.

**§D.2.3 Pension Law**

This regulation is established in order to withhold pension funds of opportunistic behaviour regarding investments. Since they, just like insurance companies, manage the savings of individuals, risks taken should not be too big. If pension funds fail in this objective it means that less pension is received by future pensioners. Regulation on this is mainly based on the ratio of future pension
payments are covered/secured, called the pension coverage ratio. This ratio show for example that 105% of the liabilities is covered by the discounted future value of their assets for example.

The crisis also harmed the pension funds, since their assets became worth less and their coverage ratios dropped since liabilities remained generally stable. However, the pensioners do not benefit by short term actions, since the liabilities are often required in decennia. In the mean time another crisis may pas the financial or capital market. The Pension Law prescribes how pension funds should absorb risks regarding volatility and returns and how they should approach problems regarding their long-term horizon regarding liabilities and assets. Also the pension law prescribes certain capital requirements when providing loans.

Pension funds tend to invest a large amount in lower-risk assets, such as government bonds, in order to reduce the risks of their overall portfolio. However, when the yield on government debt decreases, the pension funds should find other assets which enough return to fulfil their future and present liabilities.

§D.3 Interest rates

Besides this regulations for financial and capital market parties, the interest rates play an important role within the economy and can be influenced by public authorities, like the FED or ECB. Important interest rates for Europe and The Netherlands are the ECB refi-rate, Euribor (and Libor) and the interest on 10 year government bonds. Those interest rates will be discussed briefly regarding their importance for the provision of loans.

European Central Bank

Comparable to the FED, the ECB has a major role in the European financial markets. Public and private parties can borrow or deposit surplus cash at the ECB against a competitive rate. Since the ECB is owned by all European Union member states, it is considered a very stable bank. Its main objective is to maintain price stability in the EU by adjusting interest rates in a (de)stimulating way. In the following figure can be seen how the interest rates are kept low artificially by the ECB (Global Rates 2013):
In May 2013 the refi rate (main refinancing rate) even dropped from 0.75% to 0.50%, which means that companies can borrow money for 12 months against 0.5% interest. In theory this would stimulate public and private parties to borrow this money which stimulates activity. Besides this the deposit rate is 0%, which means that banks can only deposit surplus cash at a safe place against no interest.

This implies that financial markets should react by lending money to consumers, since this may gain a better return/interest then deposit at the ECB. At the other side, they should remain provide competitive interest rates compared to the ECB.

**Euribor**

Partly due to this regulation measurements by the ECB, the interbank interest ratings decreased. In this figure can be seen how the interest on interbank loans of different maturities relate to each other. It is shown that borrowing 12-month Euribor (green) from bank to bank is more costly than 6-month (yellow), 3-month (red) or 1-month (blue) loans. This is mainly due to the increased risk of default of outstanding loans with longer maturity (Global Rates 2013):

![Euribor rates](image)

**Figure 9: Euribor rates**

At present the 3-month Euribor is at 0.203%, where the 12-month is 0.489% (just below 0.50% of the ECB). The Euribor rates followed the trend of the ECB rates from the other figure, which shows how the regulation by ECB forced banks to lend money at cheaper rates. It should be mentioned that these are the risk-free rates (where the risk premiums increased due to liquidity premiums). The benefits of lowering of risk-free rates is only partially passed through to consumers, companies and SPCs, since risk premiums increased at the same time. This is an interesting remark on the actual effects of the regulated interest rates (Financieel Dagblad 2013).

Since banks are able to borrow money from other banks at cheap rates, they also decrease the interest on savings accounts of consumers. In this way also consumers are forced to use their money for other purposes. In the US, which started earlier with lowering interests, the desired revive of the economy by lowering interest rates is already visible. Also the interest rates on mortgages lowered, which revives the housing market: The point were it al started.

**Government debt**

Governments can acquire new debt by lending (from the ECB) or issuing government bonds for example. Where the ECB has a societal objective to facilitate financing for public and private
authorities, government bonds are being (mainly) issued in the open market against competitive interest. Competitive in a way that the risk of providing debt plays a more important role for investors. Lower-rated countries, like Greece or Spain need to pay more interest when issuing bonds to the market. This is why they are more likely to acquire a loan from the ECB against a lower rate, which also increases securities/guarantees from the country concerned.

Especially countries with a high rating, such as The Netherlands and Germany, are able to issue bonds at lower interest rates. Their alternative is borrowing from the ECB, so why will they issue bonds against higher interest? Highly rated countries are also more attractive to investors regarding low-risk investment. Since many investors may be attracted by the low risk bonds, the interest rates may even be reduced due to increased competition. The decrease of interest on 10-year Dutch government bonds can be seen in the following figure (Global Rates 2013):

![Figure 10: Interest rate of 10-year Dutch government bond](image)

The interest rate for this maturity decreased to 1.48%, which is only 0.18% higher than German government debt. The interest on 10-year government bonds of Spain and Italy was respectively 5.25% and 4.50% in December 2012, due to their lower ratings (Elsevier 2013).

## §D.4 Present Situation

When analysing these consequences, we may be able to draw conclusions regarding the deteriorating availability and interest rates of long-term loans for DBFMO projects in The Netherlands.

It is shown that Basel III forces the financial institutions in the money market to focus on its purpose: the acquisition of short-term financing to provide loans for 5 to 7 years. When providing loans (assets) with a longer maturity more risk is involved since an increased horizon of repayment may increase the chance on default. Due to this horizon it may also become less certain that those loans can always be (re-)financed back-end in the money and capital markets. In its turn, capital markets became more risk averse towards the provision of debt to the money market, which may be backed by underprized risk of bond debt in banks (Financieel Dagblad 2013). Extra equity should be held at the liability side of the balance in order to compensate this extra risk according long-term loans, of which the extra cost are calculated to the final borrowers. Recently the bail-ins were used to save distressed banks in Cyprus for instance, which showed that also bondholders in banks face more risk than thought upfront.

Basel III also demands the money market to lower their leverage in order to decrease risk in the capital. Since banks often issue bonds in the capital market in order to provide a long-term loans
front-end, this may be less attractive due to leverage restrictions. The money market shows a lower appetite of banks to provide debt, which automatically lowered the demand for their own financing. In the Eurozone only € 71 billion of bank loans was provided, which is the lowest amount since the erection of the Eurozone (Financieel Dagblad 2013). So banks are issuing less bonds in the capital market, existing bonds are maturing and less debt is provided to consumers. This is a way for banks to lower their leverage, but does not help the European economy to revive by investments of companies.

Besides this, Institutional investors in the capital market are also bound to stringent regulation and are obliged to (1) compose a well-diversified portfolio which limits risk for policy and pension holders, (2) match the maturity of assets to their liabilities and (3) preserve liquidity. Due to the lower interest rates on governmental debt, the overall return for institutional investors will decrease when investing in newly issued Dutch or German government bonds for example. As mentioned before, the interest is composed of a real and nominal rate. ING states that a low return on highly-rated and relatively safe government bonds results in negative real returns since inflation outrages the real return (ING Investment Office 2013). This may also be an important point for many investors to find comparable assets with better returns.

There is a need for investors to find new assets which gain adequate return (Financieel Dagblad 2012). A shift within the capital is noticed from low-risk bonds towards corporate bonds or shares, of which the latter is named ‘The great rotation’ by bank Merrill Lynch (About Bonds 2013). Since those assets entail more risk, a higher return is expected. Institutional investors are not allowed to take too many risky assets in their portfolio, due to their societal duty as pension or life insurance investor. This is why they may tend to invest in corporate bonds or loans as substitute for low-yielding government debt. Public infrastructure is also considered interesting for institutional investors, since “conservatively structured infrastructure investments can serve to improve the risk-return profile of an investors overall portfolio on account of their long-term and their low level of correlation with traditional asset classes” (Weber and Alfen 2010).

Another interesting fact is that interest rates are kept low artificially by the ECB in order to stimulate provision of debt to banks and from banks and to companies/consumers from banks, which supports revive of the economy. The 0,5% interest that banks will pay by borrowing from the ECB for 1 year forces the money market to lend each other against a cheaper rate for short-term. The 12-month Euribor is now 0,49%, slightly lower than the ECB-rate. However this lower risk-free rate can be acquired to banks, the borrowing consumers and companies don’t notice this decrease due to increased premiums for credit (default) risk, liquidity risk and capital held by the banks. In the end this means that, if the Euribor will increase again in some years, long-term floating-interest loans may face high cost of debt in the future. Maybe this is a second reason for banks to be reserved to issue of bonds, since the banks may profit from these increased risk premiums on the long-term despite extra cost for illiquidity of assets or holding extra capital. Banks pass extra cost for this to the borrower.

This paragraph described the main reasons why DBFMO projects face difficulties regarding the long-term bank loans at present. The deteriorating availability of long-term loans is mainly caused because banks have trouble with acquiring adequate finance from the ‘frozen’ financial markets. Banks are also required to hold extra equity when providing loans longer than the standard terms of the money market. In case a bank is willing to provide the long-term debt increased risk-premiums for extra cost for illiquidity of assets or holding extra capital are charged on the borrowing party. Risk-free rate (Euribor) for short term debt is low at present, but borrowers may face the risk that debt becomes very expensive when Euribor increases later on.
Dutch DBFMO projects are still financed at present, but often the European Investment Bank or Bank Nederlandse Gemeenten is involved which are backed by public authorities on national or international level. Also some German and a Japanese banks are still interested (Infrastructure Journal 2012). Briefly analysed the German banks consider KfW and Bundesbank, which are partly erected from public funds and are still partly owned by the state. Appetite of the Japanese bank Sumitomo Mitsui can be clarified by the low interbank libor-rates for the Japanese yen, which is 0,43% for 12 months (0,06% lower than the Euribor) and the low yield on Japanese government bonds (0,44%). The Bank of Japan (central bank) also decreases the interest on their loans, which creates more space for investors to lend this from the Bank of Japan. Japanese investors aim for higher returns in 'semi-core' countries (medium-rated like France or Belgium) or more risky assets in highly rated countries, like the Netherlands (van Trigt, 2013). This may clarify why some German and Japanese banks are still interested to finance debt in Dutch DBFMO-projects.
APPENDIX E: FINANCING COSTS OF PROJECT FINANCE STRUCTURES

In this appendix the financial impact of the alternative project finance structures is analysed. This document will clarify why this is done (1.1), which method is used to estimate the cost of financing (1.2) and what findings are derived (1.3).

§E.1 Purpose

As stated by the author in Chapter 2 of the concept report, project finance structures in DBFMO projects can best be seen as a ‘monitoring mechanism’ according principal-agent theory. Compared to government finance in traditional contracting, project finance (the monitoring mechanism) comes along with extra cost. According principal-agent theory, these extra cost can be seen as agency cost. These extra cost negatively affect the VfM to be delivered to the Dutch government, so consortia should minimise these financing cost to improve their competition. For this reason it will be estimated what the different alternative project finance structures will cost compared to project finance structures which are fully financed by banks.

§E.2 Estimation Method

To estimate the cost of financing, a fictive DBFMO project is established of which the project finance structure is changed according the described alternatives. This research approaches DBFMO from the viewpoint of the consortia, which are obliged to implement a project finance structure in their and aim to provide the best bid to the Dutch government. To keep the model focused on the financing from the consortium’s viewpoint, the VfM-components ‘risk’ and ‘transaction cost’ are not considered in the model. This is done since calculation methods of these components are not transparent and disturb to view the findings regarding the financing costs.

It should be mentioned that this only a single projection of the project finance structure and no scenario planning or probabilistic analysis have been established. It is done this way to compare the different alternatives in a simplified way. This method although has its shortcomings, since normal project finance models possess scenario planning or probabilistic estimation. These estimations are only made to give an global estimation of the financing cost of the different alternative project finance structures.

Assumptions were made on the different elements of the DBFMO project, like the size of CAPEX, OPEX and the term of the contract for example. These figures determine the project in general in which the alternative project finance structures are implemented to estimate the costs of finance. The following assumptions were made for the fictive DBFMO project:

<table>
<thead>
<tr>
<th>Element</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>3 years</td>
</tr>
<tr>
<td>CAPEX</td>
<td>€ 300 million</td>
</tr>
<tr>
<td>Drawdown (per half year)</td>
<td>Year 1 (5%/12%), year 2 (20%/25%) &amp; year 3 (22%/16%)</td>
</tr>
<tr>
<td>Interest during construction</td>
<td>Capitalised</td>
</tr>
<tr>
<td>Bullet payments</td>
<td>none</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>25 years</td>
</tr>
<tr>
<td>OPEX (yearly)</td>
<td>€ 22.5 million (no compensation for inflation)</td>
</tr>
</tbody>
</table>

Financing Costs of Project Finance Structures

<table>
<thead>
<tr>
<th>Structure</th>
<th>Required IRR on equity</th>
<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leverage (unless required different)</td>
<td>90% debt</td>
</tr>
<tr>
<td></td>
<td>Debt tail</td>
<td>Debt repaid 2 years before end of contract</td>
</tr>
</tbody>
</table>

Table 1: Assumptions fictive DBFMO project

From here it is important to determine the figures behind the project finance structures, which in the end determine the financing cost. This is done for all alternative project finance structures, but first a 'benchmark' with standard bank loans is established. From this benchmark is derived which availability fee is required to fulfil the finance demand of the fictive project.

§E.2.1 Standard Bank Loan

As derived from one of the interviewees, which recently arranged this project finance structure, the bank loans during the construction and operation phase are often divided. Shareholders require are considered to require an IRR of 12% over their investment, which lays between the 11% and 13% as determined in interviews and literature. An equity bridge is used to ensure that the strategic investors can postpone their equity investment until the end of construction. This is the same for every alternative, so the equity bridge will not be mentioned again.

Furthermore interest rates and structure of apparent loans in the project finance structures need to be determined and are of main importance to determine the required availability fee. The following figures are related to the three loans in this project finance structure:

<table>
<thead>
<tr>
<th>Element</th>
<th>Construction Loan</th>
<th>Equity Bridge (all alternatives)</th>
<th>Operation Loan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start</td>
<td>Year 1</td>
<td>Year 1</td>
<td>Year 4</td>
</tr>
<tr>
<td>Term</td>
<td>3 years</td>
<td>3 years</td>
<td>23 years</td>
</tr>
<tr>
<td>Repayment</td>
<td>Bullet (by operation loan)</td>
<td>Bullet (by equity)</td>
<td>Annuity</td>
</tr>
<tr>
<td>Interest Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-free</td>
<td>1,10%</td>
<td>1,10%</td>
<td>3,60%</td>
</tr>
<tr>
<td>Risk Premium</td>
<td>2,10%</td>
<td>1,65%</td>
<td>2,90%</td>
</tr>
<tr>
<td>Swap Margin</td>
<td>0,25%</td>
<td>0,25%</td>
<td>0,25%</td>
</tr>
<tr>
<td>Total</td>
<td>3,45%</td>
<td>3,00%</td>
<td>5,75%</td>
</tr>
<tr>
<td>Fees</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrangement</td>
<td>1,75%</td>
<td>1,50%</td>
<td>-</td>
</tr>
<tr>
<td>Commitment</td>
<td>0,63%</td>
<td>0,50%</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2: Standard Bank Loan - Figures

It should be mentioned that the risk free rates for bank loans are based on recent euribor swap rates. Risk premiums differ per type and the maturity of the loan and are derived from interviews and
brochures from the alternative project finance structures. Swap margin are an additional margin, which need to be paid by the SPC to swap the floating rate (euribor rate) of a bank loan in to a fixed interest rate. Arrangement fees are applied by banks as compensation for the effort and manhours. Commitment fees are applied over the amount of a loan which is not drawn yet by the SPC in order to compensate the bank for their own costs and keeping these financial resources available for the SPC.

**Structure**

When visualising the capital structure in every year directly from Excel, a similar figure can be seen as in the descriptions of the alternative project finance structure in Chapter 7:

![Figure 11: Standard Bank Loan – Capital in project (per year) [Excel]](image)

The figure shows a curve regarding the debt capital in the project finance structure in a certain year. This is due to the implemented annuity payment, which aims to keep the payments for debt service stable over the contract. As a consequence, the relative share of repayment within the total payment for debt service increases over time, where the relative share of interest decreases. Due to the increase in repayment towards the end of the contract, the amount of debt in the project decreases harder in later years. The decrease in debt capital is more linearly displayed in the report to keep the overview simple.

In the figure on the next page, a part of the cashflow model is shown in order to gain insight in the construction phase and calculation. One can see that during the first three years € 300 million of CAPEX (named construction cost) and interest during construction are financed by equity bridge (€ 30 million) and senior debt. After construction real equity takes over the equity bridge and receives distributions (including repayment and dividend), while senior debt starts amortising. The annuity payment in debt service can be clearly seen in the difference between year 4 and year 26: Debt service stays around € 25.6 milion, but the amortisation increases from € 6 million to € 24 million.

**Availability Fees**

As shown in Figure 12: Standard Bank Loan - Overview Cash Flow, the required yearly availability fee to compensate the consortium for the invested capital and operation during 25 years is € 42.000.963. Accumulated, the availability payments outrage € 1 billion. However, as mentioned in Appendix A, future payments should be discounted. This is done at a Public Sector Discount Rate (PSDR) of 5.50%
Financing Costs of Project Finance Structures

(Algemene Rekenkamer 2002). Discounting the availability fees results in a Net Present Value of € 506 million. This number will be the benchmark against which the alternative project finance structures.

<table>
<thead>
<tr>
<th>CASH FLOW</th>
<th>Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVENUES</td>
<td>Construction</td>
</tr>
<tr>
<td>Availability Payment</td>
<td>1,050,024,038</td>
</tr>
<tr>
<td>Bullet Payment</td>
<td>0</td>
</tr>
<tr>
<td>OPEX</td>
<td>Operations</td>
</tr>
<tr>
<td></td>
<td>Maintenance (minor)</td>
</tr>
<tr>
<td></td>
<td>Maintenance (major)</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Construction cost</td>
</tr>
<tr>
<td></td>
<td>Capitalised interest &amp; fees</td>
</tr>
<tr>
<td>TAXES</td>
<td>0</td>
</tr>
<tr>
<td>PROJECT CASH FLOW</td>
<td>IRR</td>
</tr>
<tr>
<td>SENIOR DEBT</td>
<td>Drawdown</td>
</tr>
<tr>
<td></td>
<td>Interest + fees</td>
</tr>
<tr>
<td></td>
<td>Amortisation</td>
</tr>
<tr>
<td>EQUITY BRIDGE</td>
<td>Drawdown</td>
</tr>
<tr>
<td></td>
<td>Interest + fees</td>
</tr>
<tr>
<td>SHAREHOLDER DISTRIBUTION</td>
<td>12%</td>
</tr>
<tr>
<td>PSDR</td>
<td>5.5%</td>
</tr>
<tr>
<td>Availability Fees (cumulative)</td>
<td>-1,050,024,038</td>
</tr>
<tr>
<td>NPV</td>
<td>-506,186,357</td>
</tr>
<tr>
<td>Availability Fee</td>
<td>€ 42,000,962</td>
</tr>
</tbody>
</table>

Figure 12: Standard Bank Loan - Overview Cash Flow

§E.2.2 Hadrian’s Wall

As described in the report, the Hadrian’s Wall alternative requires a 20% equity stake. Besides this, however the debt fund consists of a senior and mezzanine tranche, the SPC only acquires the (combined) debt from the fund. Therefore only one interest rate applies for the viewpoint of the SPC in which the interest rate of mezzanine and senior debt are weighted. Lastly, the debt should be drawn upfront which is accompanied with 'negative cost of carry' (dead weight). The figures of this alternative are determined as follows (equity bridge is similar to standard bank loan):

<table>
<thead>
<tr>
<th>Element</th>
<th>Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td>Year 1</td>
</tr>
<tr>
<td>Start</td>
<td></td>
</tr>
<tr>
<td>Term</td>
<td>26 years</td>
</tr>
<tr>
<td>Drawdown</td>
<td>Bullet (at start construction)</td>
</tr>
<tr>
<td>Repayment</td>
<td>Annuity</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Interest Rate</strong></td>
<td></td>
</tr>
<tr>
<td>Risk-free</td>
<td>2.90%</td>
</tr>
<tr>
<td>Risk Premium</td>
<td>3.40%</td>
</tr>
<tr>
<td>Swap Margin</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6.30%</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td></td>
</tr>
<tr>
<td>Arrangement</td>
<td>0.75%</td>
</tr>
<tr>
<td>GIC</td>
<td>2.00%</td>
</tr>
</tbody>
</table>

Table 3: Hadrian's Wall - Figures

It should be mentioned that not commitment fee is apparent, since the whole funding is received upfront. To compensate a part of the negative cost of carry, the unused finance is parked in a Guaranteed Investment Certificate (GIC) against 2.00% interest. This means that the cost of unused funds (like commitment fee) are only (6.30%-2.00%=) 4.30%. This is way higher than the commitment fee of 0.63% in the construction loan of the benchmark.

**Structure**

Also this alternative shows a comparable figure as in chapter 7, but with a similar curve as the benchmark:

![Project Finance Structure](image)

Figure 13: Hadrian's Wall – Capital in project (per year) [Excel]

**Availability Fee**

To implement this alternative project finance structure in the fictive DBFMO project, an availability fee of € 43,715,657 is required on yearly basis (Figure 14: Hadrian’s Wall – ). The NPV of availability payments is around € 527 million, which is 4.08% higher than the benchmark with standard bank
finance. This may clarify why the Hadrian's Wall never has been implemented and recently terminated its operations.

### CASH FLOW

<table>
<thead>
<tr>
<th>Year</th>
<th>Construction</th>
<th>Construction</th>
<th>Construction</th>
<th>Operation</th>
<th>Operation</th>
<th>Operation</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>REVENUES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability Payment</td>
<td>1,062,691,434</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>43,715,657</td>
<td>43,715,657</td>
</tr>
<tr>
<td></td>
<td>Revolu Payment</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>OPEx</td>
<td>-250,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-10,000,000</td>
<td>-10,000,000</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>-42,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-2,500,000</td>
<td>-2,500,000</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>-29,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>CAPEX</td>
<td>-300,000,000</td>
<td>-91,000,000</td>
<td>-155,000,000</td>
<td>-114,000,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Capitalized interest &amp; fees</td>
<td>-40,791,460</td>
<td>-132,339,600</td>
<td>-137,244,726</td>
<td>-16,207,124</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>TAXES</td>
<td>29%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-3,841,429</td>
</tr>
<tr>
<td></td>
<td>PROJECT CASH FLOW</td>
<td>IRR 5.83%</td>
<td>-63,339,600</td>
<td>-147,244,726</td>
<td>-130,207,124</td>
<td>31,215,657</td>
<td>27,274,229</td>
</tr>
<tr>
<td></td>
<td>SENOR DEBT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drawdown</td>
<td>63,339,600</td>
<td>147,244,726</td>
<td>70,207,124</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Interest + fees</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-17,699,561</td>
<td>-1,369,215</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Amortization</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EQUITY BRIDGE</td>
<td>Bridge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drawdown</td>
<td>0</td>
<td>0</td>
<td>90,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Interest + fees</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-17,699,561</td>
<td>-1,369,215</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Amortization</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Debt Service</td>
<td>0</td>
<td>0</td>
<td>-88,900,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>SHAREHOLDER DISTRIBUTION</td>
<td>12%</td>
<td>-60,000,000</td>
<td>7,775,408</td>
<td>3,933,980</td>
<td>26,989,616</td>
<td>26,584,820</td>
</tr>
<tr>
<td></td>
<td>SHAREHOLDER LOAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drawdown</td>
<td>90,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Interest Shareholder Loan</td>
<td>-5,467,716</td>
<td>-923,077</td>
<td>-692,308</td>
<td>-461,530</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EQUITY CASHFLOW</td>
<td>5.50%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>703,210</td>
<td>23,939,810</td>
</tr>
<tr>
<td></td>
<td>PSER</td>
<td>1,000,000,000</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Hadrian's Wall</td>
<td>-1,062,691,434</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-43,715,657</td>
<td>-43,715,657</td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>-526,651,484</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Difference NPV</td>
<td>21.00% Higher</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Figure 14: Hadrian’s Wall – Overview Cash Flow**

### §E.2.3 European 2020 Project Bonds Initiative

This alternative requires only 10% equity. Financing during construction is done by a revolver bank loan, which is refinanced two times (during and after construction) by project bonds. The project bonds are divided in subordinated (mezzanine) bonds from the European Investment Bank (20%) and senior bonds from institutional investors (80%). The following figures are used:

<table>
<thead>
<tr>
<th>Element</th>
<th>Revolver Bank Loan</th>
<th>Senior Bonds</th>
<th>Mezzanine bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start</td>
<td>Year 1</td>
<td>Year 2 (and year 4)</td>
<td>Year 2 (and year 4)</td>
</tr>
<tr>
<td>Term</td>
<td>3 years</td>
<td>24.5 years</td>
<td>24.5 years</td>
</tr>
</tbody>
</table>
Repayment

<table>
<thead>
<tr>
<th></th>
<th>1(^{st}) (bullet year 2, € 112M)</th>
<th>2(^{nd}) (bullet year 3, € 155M)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interest Rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-free</td>
<td>1.10%</td>
<td>2.90%</td>
</tr>
<tr>
<td>Risk Premium</td>
<td>2.10%</td>
<td>3.60%</td>
</tr>
<tr>
<td>Swap Margin</td>
<td>0.25%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3.45%</td>
<td>6.50%</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrangement</td>
<td>1.50%</td>
<td>1.75%</td>
</tr>
<tr>
<td>Commitment</td>
<td>0.63%</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 4: European 2020 PBI - Figures**

**Structure**

This figure shows how the project is financed during construction and how the project bonds are amortised over the term of the contract:

![Project Finance Structure](chart.png)

**Availability Fees**

For this alternative project finance structure, the required availability would be € 42,373,253, which is slightly higher than the benchmark. The estimated Net Present Value of the availability fees is approximately € 511 million, which is 0.89% higher. However, this is more expensive than the benchmark; this alternative provides a better match with perspectives of financiers.

**§E.2.4 Commute**

This alternative project finance structure shows a bit more complexity, but also a better match with perspectives of financiers in general. During the construction phase the 10% of direct equity
investment is strengthened by a credit enhancement facility (mezzanine) of 10%, which lowers the risk for senior project bonds.

<table>
<thead>
<tr>
<th>Element</th>
<th>Revolver Bank Loan</th>
<th>Credit Enhancement (loan)</th>
<th>Alignment Facility</th>
<th>Senior bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start</td>
<td>Year 1</td>
<td>Year 1</td>
<td>Year 4</td>
<td>Year 2 (and year 4)</td>
</tr>
<tr>
<td>Term</td>
<td>3 years</td>
<td>3 years</td>
<td>7 years</td>
<td>24.5 years</td>
</tr>
<tr>
<td>Repayment</td>
<td>1st (bullet year 2, €120M)</td>
<td>bullet (year 3)</td>
<td>Annuity</td>
<td>Annuity</td>
</tr>
<tr>
<td><strong>Interest Rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-free</td>
<td>1.10%</td>
<td>1.10%</td>
<td>2.40%</td>
<td>2.90%</td>
</tr>
<tr>
<td>Risk Premium</td>
<td>2.10%</td>
<td>6.50%</td>
<td>2.00%</td>
<td>2.25%</td>
</tr>
<tr>
<td>Swap Margin</td>
<td>0.25%</td>
<td>0.25%</td>
<td>0.25%</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3.45%</td>
<td>7.85%</td>
<td>4.65%</td>
<td>5.15%</td>
</tr>
<tr>
<td><strong>Fees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrangement</td>
<td>1.50%</td>
<td>1.75%</td>
<td>1.75%</td>
<td>1.75%</td>
</tr>
<tr>
<td>Commitment</td>
<td>0.63%</td>
<td>2.40%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 5: Commute - Figures

**Structure**

This figure follows from the Excel model:

![Project Finance Structure](image-url)
Availability Fees

When implementing the ‘Commute’ project finance structure, a yearly availability fee of € 39,242,619 is required. The Net Present Value of the availability fees is € 473 million, which is 6.57% lower than the benchmark. This can be mainly attributed to the lower interest rate on long term senior debt, which is established by the increased rating since construction risk is covered by the mezzanine debt. It seems that the Commute structure provides both (1) an enhancement in match with perspectives of financiers and (2) lowers the cost of finance for DBFMO projects.

§E.2.5 Top-up

This alternative is self-established and may best be compared with .

<table>
<thead>
<tr>
<th>Element</th>
<th>Revolver Bank Loan</th>
<th>Credit Enhancement (Loan)</th>
<th>Senior Bonds A</th>
<th>Senior Bonds B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start</td>
<td>Year 1</td>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 4</td>
</tr>
<tr>
<td>Term</td>
<td>7 years</td>
<td>3 years</td>
<td>24.5 years</td>
<td>10 years</td>
</tr>
<tr>
<td>Repayment</td>
<td>1st (bullet year 2, € 120M)</td>
<td>bullet (year 3)</td>
<td>Annuity (from year 14)</td>
<td>Annuity</td>
</tr>
<tr>
<td></td>
<td>2nd (bullet year 3, € 110M)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk-free</td>
<td>1.50%</td>
<td>1.10%</td>
<td>2.90%</td>
<td>2.30%</td>
</tr>
<tr>
<td>Risk Premium</td>
<td>2.10%</td>
<td>6.50%</td>
<td>2.25%</td>
<td>2.00%</td>
</tr>
<tr>
<td>Swap Margin</td>
<td>0.25%</td>
<td>0.25%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>3.85%</td>
<td>7.85%</td>
<td>5.15%</td>
<td>4.30%</td>
</tr>
<tr>
<td>Fees</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrangement</td>
<td>1.50%</td>
<td>1.75%</td>
<td>1.75%</td>
<td>1.75%</td>
</tr>
<tr>
<td>Commitment</td>
<td>0.63%</td>
<td>2.40%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 6: Top-up - Figures

Structure

The following structure is shown after structuring this alternative in Excel:
Availability Fees

Also this alternative project finance structure shows a decrease in costs of financing compared to standard bank finance. An availability fee of €40,079,570 per year is required for the project. With Net Present Value of €483 million a reduction of 4.57% is established. However this is not as much as the Commute structure, this alternative provide a substantial share for banks. Besides this, two types of bonds with different maturities can be issued to institutional investors.

Figure 17: Top-up – Capital in project (per year) [Excel]